

Russia VS Ukraine: Research into the Relevance of Tanks in
Contemporary Warfare.

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Chapter I Introduction

Introduction

Tanks have been around for more than a century now. They have dominated battlefields around the globe, broken the seemingly inevitable stalemate of trench warfare, and proven their value on more than one occasion, from its first appearance on the battlefields of Flanders to their most recent one on the battlefields of Ukraine. Tanks have proven to be the backbone of modern offensives. Combining such penetrating force and firepower proves a formidable foe for any defensive line (Aylward, 2022).

However, the effective use of antitank-guided missiles and drones has proven to be effective in countering tanks on the battlefield. These modern weapons have been able to destroy, damage, and defeat tanks on several occasions since the Second World War (Aylward, 2022). The development of tank armour and offensive weapons to penetrate this has been ongoing for a century. Therefore, it is similar to the competition between plate armour and firearms during the military revolution of the sixteenth century. The ongoing competition between armour and weapons has yet to favour one side. The recent experiences with the deployment of tanks in Ukraine have made a compelling case in favour of anti-tank weapons. Therefore, this paper will analyse the relevance of tanks in the Russian-Ukrainian War. In this paper,

I research three decisive tank battles during the last century with the question of if, and if so, why the deployment of tanks contributed to the final outcomes of these battles in order to assess the relevance of the use of tanks in strategic offensive warfare in the ongoing Russian-Ukrainian War.

Relevance

The paper analyses the relevance of using tanks in the ongoing Russian-Ukrainian War. The topic is relevant because of the Russian-Ukrainian War's global impact. As a result, Europe has been hit by increased gas prices, refugees from Ukraine, and diplomatic relations with Russia have deteriorated. Moreover, much like the Cold War, two blocks are forming around the conflict. Russia and its allies Belarus, China, India, and many Middle Eastern nations, as well as African nations, stand against the West and its allies. The consequences of this conflict could alter the balance of power established after the Second World War, the fall of the communist regimes in 1989-1991, and the end of the so-called *Pax Americana*. From a humanitarian perspective, the War in Ukraine is claiming many lives on both sides of the conflict, making it one of the bloodiest conflicts of the early twenty-first century on European soil.

Furthermore, how warfare is conducted could drastically alter depending on the outcome of the conflict. The conflict in Ukraine has seen a debate start on the supposed obsolescence of tanks in contemporary warfare. Anti-tank weapons have thus far proven superior to tanks. If anti-tank weapons would claim supremacy over tanks, warfare, as we knew it over the last hundred years, would alter significantly (Kaplan, 2022). Consequently, the nature of contemporary warfare could change in favour of mosaic warfare, cyberwarfare, information warfare, and even biological or nuclear warfare. The obsolescence of the tank could mean a shift in focus from heavily armoured, slow-moving warfare to lightly armoured and fast-moving warfare.

Additionally, terrestrial defensive warfare could become less significant because the lack of tanks would cause a shift towards aerial warfare. Consequently, air defence systems could become more prevalent. Moreover, the increasing reliance on unmanned aircraft, such as drones, could further aid this development. In conclusion, the consequences of the conflict in a larger geopolitical, humanitarian, and economic context will be severe. In conclusion, the consequences of the War in Ukraine could have far-reaching ramifications for warfare and, subsequently, society as we know it.

Theoretical Framework & Historiography

The paper uses military jargon to explain the strategic development of tanks. This paper includes the intrinsic workings of tank warfare and other military and historical concepts. Furthermore, the literature provides information about the course of the analysed tank battle, building on concepts such as strategy, tactics, and combined arms warfare, establishing a theoretical framework to analyse the strategic development of tank warfare and determine the relevance of tanks in contemporary warfare.

Therefore, literature by C. von Clausewitz, H. Guderian, and J.F.C. Fuller is used in the chapter on Cambrai 1917 to explain these concepts. These authors profoundly influenced the development of modern warfare, especially Carl von Clausewitz's work *On War*, which emphasised the necessity of combined arms warfare (Von Clausewitz, 2008, p. 200). Combined arms warfare underlies the effective deployment of tank warfare, as was already noticed by J.F.C. Fuller and Heinz Guderian during the First and Second World Wars (Fuller, 1920, p. 78). The First World War, in particular, proved true many of the theories Fuller developed on tank warfare; namely, it has to be supported by infantry whilst using its armour to penetrate fortified positions and trenches. The stratagems of *Achtung-Panzer* by H. Guderian came to fruition during the Second World War (Guderian, 1999, p. 206). These were founded on Fuller's theory and Guderian's experience with armoured warfare in WWI.

The interbellum proved fertile soil for H. Guderian to develop tank tactics, and the German *Blitzkrieg* tactic proved especially effective in WWII. The Battle of Kursk 1943 is analysed using D.E. Showalter's *Armor and Blood: The Battle of Kursk*, one of the most influential analyses (Showalter, 2013, p. 41). Showalter analyses this battle on a comprehensive level, providing insights into strategies, operations, tactics and the implications of the battle concerning the development of tank warfare. *Kursk 1943: the greatest battle of the second world war*, by R. Toepfel, is another comprehensive analysis of the Battle of Kursk, used beside Showalter, considering Toepfel's work is more recent and might provide new insights (Toepfel, 2018, p. 18). The text by C.K. Pickar provides insight into the German *Blitzkrieg* tactics (Pickar, 1992, p. 1). In addition, the writings of C. D. M. Glantz emphasise the inner workings of WWII warfare and the specific implementation of strategic, operational and tactical theory (Glantz, 2012, p. 8). It was subsequently focussing on the theoretical aspect of the Battle of Kursk. R. W. Harrison's: *The Battle of Kursk: the red army's defensive operations and Counter-offensive, July-august 1943*, is used to provide information regarding the Red Army strategy and counter-offensive, creating a Soviet perspective on the battle, enabling a more comprehensive understanding of the battle (Harrison, 2016, p. 29). *Storm of Steel: the development of armour doctrine in Germany and the Soviet Union, 1919-1939*, by M. R. Habeck is a source focussing on the Soviet Deep Battle Doctrine, elaborating on its most profound ideas and concepts (Habeck, 2003, p. 296). It consequently aided in understanding Soviet strategy.

The chapter on the Yom Kippur War refers to analyses by D. Rodman, L. Whetten & M. Johnson, and A. Siniver since their works contain a comprehensive overview of the tanks'

contribution to this conflict. D. Rodman provides an overview of the conflict, focusing on the progress of the War. Rodman's text explains the understanding of combined arms warfare and its significance in the Yom Kippur War. *Military Lessons of the Yom Kippur War* by L. Whetten & M. Johnson is an analysis concerning the aerial and terrestrial warfare during the 1973 Yom Kippur War. The text focuses on the military lesson learned in hindsight. Rodman's text explains primarily from an Israeli perspective. Therefore, Siniver's is used to provide the strategic perspective from an Egyptian point of view. Consequently, Siniver created a more balanced overview of the most prominent battles, strategies and occurrences of the Yom Kippur War's tanks.

Lastly, the Russian-Ukrainian conflict is analysed with the help of several sources. These articles focus on the role of mainly Russian tanks in the War between Russia and Ukraine. Therefore, these articles analyse the contribution of tanks. Articles by L. Kaplan and M. K. Aylward provide information concerning the use of ATGMs in the conflict and why tanks are either obsolete or not. Academic research on the contribution of tanks to the outcome of this conflict is scarce because this conflict is still ongoing, and the conflict analysed here is merely a year old. L. C. A. Haider, E. Holdeman, and S. G. Jones et al. are a few academic sources concerning the Russian invasion of Ukraine in 2022. These elaborate on the Russian strategy and deployment of tanks. Hence, the sources are limited. Consequently, many sources were necessary for creating the theoretical framework for this chapter. In conclusion, the sources used for the theoretical framework and historiography consist of military historians, military personnel and historians to provide a comprehensive framework for the analyses and conclusions.

In conclusion, effectively deploying tanks on the battlefield depends on properly implementing combined arms warfare. If other military branches do not support tanks, this prevents their practical use. Therefore, tanks must be deployed supported by infantry, artillery, and aircraft. This lesson can be seen in all the literature, from von Clausewitz to Aylward; effective tank warfare hinges on effective combined arms warfare.

Approach

This paper aims to answer the research question by providing insight into the relevance of tanks on the contemporary battlefield. The approach to the paper is to analyse literature on three of the largest and most significant armoured conflicts of the past century. This literature establishes the theoretical framework which is used as a means to determine the role of tanks.

Moreover, the literature explains that strategy, operation, tactics, combined arms warfare, and armoured warfare are used as significant criteria. These criteria are the foundation for the analysis and aid in establishing a framework. This framework is used to analyse the role of tanks in their conflicts and decide if they are still relevant. Subsequently, these tank battles are compared to the role of tanks in the Russian-Ukrainian War, particularly the Russian offensive in 2022. By analysing the strategic implementation and operational and tactical deployment of tanks in these conflicts, the paper displays the contribution of tanks to the outcome of these conflicts to assess the relevance of tanks in contemporary warfare. Consequently, the findings will be positioned in the more extensive academic and military debate surrounding the obsolescence of tanks on the contemporary battlefield. This combination of information provides the answer to the research question.

Structure

This paper answers the research by analysing three major tank battles, researching to what extent the deployment of tanks was vital for the outcome of the conflict. The battles are the first-largest and second-largest tank battles in the history of armoured warfare. Furthermore, the current Russian-Ukrainian conflict is also analysed to provide a picture of contemporary tank warfare.

The analysis consists of four chapters divided into three paragraphs:

The pre-battle paragraph explains the strategic, operational, and tactical levels concerning implementing and deploying tanks in the conflict. The course of the actual battle is described to provide insight into the practical aspect of battle and provide contrast to the theoretical aspect. These two paragraphs are scrutinised to determine the differences between theoretical and practical aspects of tank warfare.

These differences provide insight into how tanks contributed to the outcome of the conflict. Additionally, it will showcase what strategic implementation and tactical deployment of tanks are effective and ineffective and why this is the case—subsequently displaying the relevance of tanks in an armed conflict.

In conclusion, the findings of the analysis are discussed to show how the academic and military debate regarding the relevance of tanks on the battlefield is evolving. Finally, the conclusion will sum up the findings of the research and provide an answer to the research question.

Chapter II

The Development of Strategic Offensive Tank Warfare between 1916 and 2023

Introduction

This chapter elaborates on the development of strategic, offensive tank warfare from the first appearance of the tank on the battlefields in Northern France in 1917 until its most recent appearance in the war theatre in Ukraine. The chapter focuses on military strategy highlighting the theoretical approach to tank warfare, not so much its practical application.

Additionally, the offensive usage of tanks in warfare will be emphasised, not the defensive deployment of tanks in warfare. The primary purpose of this chapter is to describe and elaborate on the evolution of tank warfare, especially the offensive implementation of tanks in warfare on the battlefield. The first paragraph describes the Battle of the Cambrai in the First World War, during which Mark I was the first tank ever to grace the battlefield. The evolution of armoured warfare will be scrutinised to provide a thorough understanding of the significant developments and what these meant for tank warfare. The second paragraph continues with the Second World War and the part tanks played in what became known as Blitzkrieg and the Soviet Deep Battle Doctrine. The third paragraph describes the implementation of tanks during the Yom Kippur War of 1973, the first time the tank was deemed obsolete by the Israeli general staff. The last paragraph describes the latest conflict featuring tanks: the Russian-Ukrainian War.

The First World War 1914-1918



Figure 1: Mark I, First Tank WWI (Brooks, 1916)

How did the emergence of the tank impact trench warfare in WWI and pave the way for modern warfare? The following paragraph elaborates on the genesis of the tank and its usage during World War I and provides insight into the early life of this battlefield behemoth. The idea of an armoured vehicle precedes WWI and, according to H. Guderian, finds its origins in the British military in the late nineteenth century (Guderian, 1999, p. 48). The British military used machine guns with devastating effects on

their adversaries, making them wonder what would happen if they faced the same situation. So, when faced with this situation early in the First World War, the astonishing defensive capacities of machine guns combined with barbed wire proved invaluable to the British army

(Guderian, 1999, p. 48). Hence, the British army researched solutions to break through these seemingly impregnable iron and steel lines. Thus, in 1914 the development of armoured machine gun carriers started with a track system. These early track systems could provide protected armoured transport, carrying crews and weapons (Guderian, 1999, p. 49). The French army swiftly pursued the British, starting its research in August 1915 (Guderian, 1999, p. 49). After years of development, the first tanks were considered battle ready and deployed during the Somme battle on September 15, 1916 (Guderian, 1999, p. 59). The first 32 tanks rolled up the main street of Flers-Courcelette in Northern France, but these proved incapable of breaking through the German line (Guderian, 1999, p. 59). The number of tanks during their debut in the theatre of war proved insufficient to achieve a victory that day. 1917 would be the year the tank would prove its value on Cambrai's battlefield, as discussed in Chapter II.

The tank tactics that would prove successful, as described by J.F.C. Fuller, were shaped around several fundamental principles, which boil down to; "penetration with security" (Fuller, 1920, p. 73). Before this, frontal infantry assaults did little to no damage to frontlines. The tanks could use their momentum to break through opposing trenches and steamroll over barbed wire. Also, their weight and armour protected them from opposing fire, contrasting the unprotected infantry assaults (Fuller, 1920, p. 73). In the words of Fuller:

"From a military point of view, this penetration of a line of defence does not simply mean passing straight through it, but cutting it in half, and then moving outwards as well as forwards to push back and envelop the flanks, thus creating and so widen the base of operation to admit the movement forwards of reserves and supplies, and the movement backwards of casualties and tired troops. A man getting through a hedge first selects a weak spot (point of attack), he then forces his arms through these branches (penetration), and pushing them outwards (envelopment), forms a sufficiently large gap (base of operations) to permit his body (army) to pass easily through the hedge (enemy's defences)" (Fuller, 1920, p. 74).

The tanks were supposed to break through enemy lines and allow infantry to occupy these lines without running into machine gun fire and barbed wire, virtually nullifying their chances of success. Fuller describes it as follows: Tanks should be used as bastions moving in the firing line, providing the advancing infantry with protection. This protection reduced the number of casualties. Also, not interfering with the effectiveness of infantry machine gun fire (Fuller, 1920, p. 78). These machine gun units protected the space between the advancing tanks (Fuller, 1920, p. 79). After these, machine gun units followed the rifle units, tasked with destroying direct adversaries. This destruction allows the machine gun units and tanks space to advance. The advance of the tanks and machine gun units would protect the rifle units from enemy snipers. It is essential that the advancing soldiers would continue this formation to achieve a maximum effect—only breaking formation when the rifle units can no longer adequately provide space for the tanks and machine gun units to advance. If this happened, the machine gun units, followed by tanks, would break through the line of rifle units and revive the push, with the rifle units supporting from behind. Fuller elegantly clarifies this tactic using some of history's most effective militaries:

"Curiously enough, this formation resembles very closely that generally adopted by the Roman *Velites* and *Hastati* (riflemen), *Principes* (Lewis gunners), *Triarii* (tanks), and Napoleon's Light Infantry (riflemen). Infantry of the Line (Lewis gunners). Old Guard and Heavy Cavalry (tanks)." (Fuller, 1920, p. 79).

In conclusion, the tank was implemented to protect the infantry and provide the shock necessary to break through the heavily fortified enemy lines. The tank's dual objective was to protect the infantry to reduce the loss of life and break through enemy lines.

The Second World War 1939-1945

Blitzkrieg

“Tactics is the art of using troops in battle; strategy is the art of using battles to win the war.”
– Carl Von Clausewitz (Von Clausewitz, 2008, p. 200).

This paragraph elaborates on tank warfare during the Second World War and the interbellum years leading up to the war, also providing insight into the change offensive tank warfare underwent in the 21 years between WWI and WWII, which resulted in the so-called:

German *Blitzkrieg* and Soviet Deep Battle Doctrine (Habeck, 2003, p. 295). *Blitzkrieg* is a tactic practised by the *Wehrmacht* in World War II (Pickar, 1992, p. 1). It was a part of the overarching tactical deep battle. However, it was not a strategy, as often claimed (Pickar, 1992, p. 1). Pickar describes *Blitzkrieg* as follows:

“Blitzkrieg is a tactical form of manoeuvre consisting of a breakthrough, or envelopment, or both. It can be used in both offensive and defensive engagements. In a positional-type battle, the breakthrough opens a hole in enemy defences allowing the envelopment procedure to develop. It was designed to encircle and destroy enemy forces and to avoid the stalemates of World War I. The initiative is the key characteristic of this form of manoeuvre as it allows the attacker to set the conditions, the time and the place of the attack. The name conveys the speed and force, and effect of the attack.” (Pickar, 1992, p. 2).

After the tank's debut in the First World War, the victors of this conflict started to develop this weapon further since they realised its potential in countering stationary defensive warfare (Guderian, 1999, p. 207). However, they also realised that tanks on their own proved to be vulnerable. Hence they combined the

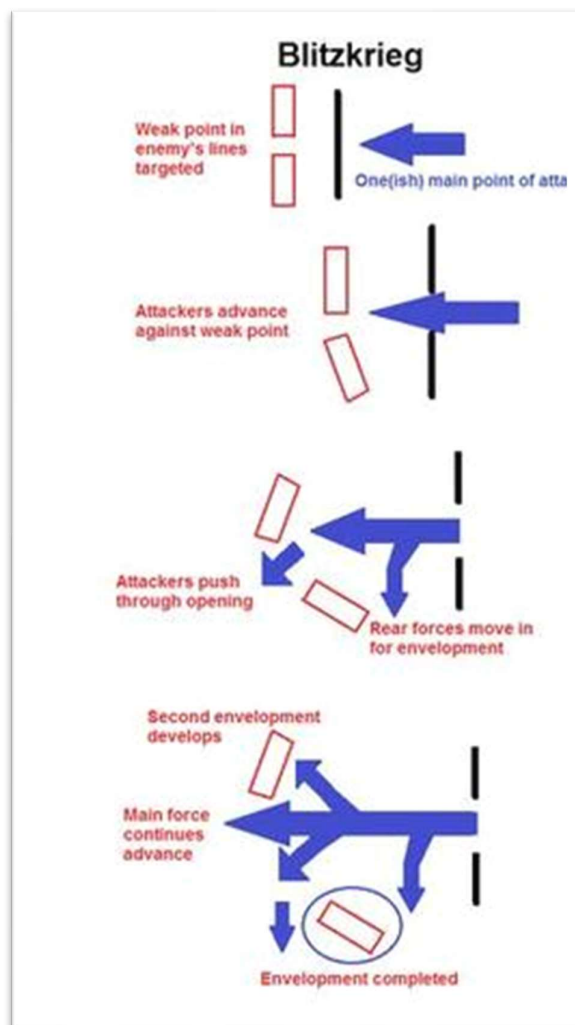


Figure 2: Depiction German *Blitzkrieg* tactics WWII (The Four Fronts of World War 2 Military Tactics, 2019)

terrestrial and aerial branches of the military. Combined Armed Warfare combines the various military branches to achieve mutually complementary effects (Guderian, 1999, p. 206). The idea of combining different military branches originates with C. von Clausewitz, who stated that the different military branches were to cooperate in a mutually supportive manner (Von Clausewitz, 2008, p. 180). The combination would combine their strengths and compensate for each other's weaknesses. Therefore, the combination of aircraft, infantry, and artillery provided the tank with the required protection to perform its crucial role on the battlefield (Guderian, 1999, p. 207). Combining the different military branches, in addition to an emphasis on armoured warfare, led to the birth of *Blitzkrieg* (Pickar, 1992, p. 1).

Deep Battle Doctrine

The Soviet Union devised a military doctrine called the 'deep battle' theory. Soviet military strategists devised the theory during the 1930s in response to the outdated and ineffective strategies of the First World War and were more able to counter contemporary warfare (Habeck, 2003, p. 296). The deep battle theory added one level to the two existing levels of military planning. It connected the strategic and tactical levels via the new operational level. Connecting the highest and lowest level of military planning would increase military coherence on the battlefield. This newfound coherence provided the Soviet Union with an increased effective deployment of its forces. The deep battle theory would create several strata of defensive units, going hundreds of kilometres behind the front lines (Habeck, 2003, p. 297). The objective was to inhibit envelopment tactics using the vast Soviet manpower stationed in these many defensive strata, reducing the enemy's momentum. If the enemy's offensive failed and the Red Army could counter-attack, it would break through the front line. They then exploited the gap in the front line with coordinated combined arms warfare tactical pushes. Additionally, the Red Army would send several other units along the front lines to create the idea of other pushes being prepared. This tactic would confuse the opponent.

In many respects, it is similar to *Blitzkrieg*, but Deep Battle is more comprehensive, considering it is more refined (Habeck, 2003, p. 295). Deep Battle Doctrine consists of three levels: the strategic level, being the highest; the operational level, being the middle; and the tactical level, being the lowest (Glantz, 2012, p. 8). The first and highest strategic level entails learning from past military experience and analysing current social-political, economic and military conditions (Glantz, 2012, p. 8). The second and middle operational level covers the preparation and execution of operations (Glantz, 2012, p. 10). These operations can be combined arms and independent operations concerning large armed forces units. The third and lowest, the tactical level, concerns the preparation and execution of smaller units (Glantz, 2012, p. 14). It emphasises the role of these units on a micro-formational level, such as companies, platoons, and squads. *In contrast to Deep Battle, Blitzkrieg emphasises the tactical and operational levels, whereas it lacks the overarching strategic level.*

The Yom Kippur War 1973

The following paragraph sheds light on the doctrine of tank warfare during the Yom Kippur War of 1973. This war, in particular, is chosen from many Wars because of the significant influence of anti-tank guided missiles (ATGMs) on tank warfare and the initial dismissal of the proper implementation of Combined Arms Warfare. The paragraph's primary focus is the Egyptian front and the Egyptian invasion of the Israeli-annexed Sinai (Siniver, 2013, p. 29). During the Six-Day War of 1967, the Israeli Defence Force overwhelmed its Arab

adversaries with surprise attacks on Egyptian airfields (Siniver, 2013, p. 2). The attack gave the IDF air superiority, effectively running the inferior Egyptian army over with their armoured divisions without worrying about aerial attacks (Rodman, 2016, p. 41). When the Yom Kippur War commenced six years later, the Egyptians were adequately prepared and armed with aerial support and new ATGMs, most notably the Sagger. The IDF caught off guard implied the same tactics as in Six-Day War, resulting in heavy casualties and the belief that the tank was outdated and did not belong on the battlefield (Rodman, 2016, p. 41). General DePuy phrases this as follows:

“[The IDF’s] attempts to use tanks and air power [sic] without strong support from the infantry or artillery branches . . . led to many of its problems during the 1973 war and showed [it] the need for a more balanced combined arms approach. 1 Both the [Sinai Campaign] and the Six-Day War had left the [IDF] with the impression that wars on the ground were won by armour [i.e., tanks] and armour alone. As a result, [it] failed to develop an integrated infantry–armour doctrine and effectively eschewed the use of infantry. . . . Part of the IDF’s problem was its overreliance on armour; another equally important component was its underreliance on artillery. The latter was related to the fact that . . . the [Israel Air Force] had gained air superiority within the first few days of [previous] conflict[s]. The IDF of 1973 was not built organizationally or mentally for an absolute commitment to joint operations. The realisation of the paramount value of combined-arms [sic] combat was one of the IDF’s bitterest lessons of the Yom Kippur War.” (Rodman, 2016, p. 41-42)

Next, we commence with an elaboration on the IDF’s approach to warfare during the October War, shedding light on the aforementioned quote. After the Six-Day War, the IDF focused on



Figure 3: Destroyed Israeli M60 Patton Tank, 1973 (Sherif9282, 2010).

tanks and aircraft based on their experienced success during this War (Rodman, 2016, p. 42). This focus came at the cost of infantry, artillery, and other significant military branches. Consequently, the military doctrine implemented by the IDF was altered based on the experience of the Six-Day War (Rodman, 2016, p. 42). This change meant the operational and tactical levels now preferred independent tank and aircraft offensives over combined arms operations. This approach entailed that the Israeli Air Force (IAF) and the IDF seized most of the military budget, hence, putting the infantry and artillery at a

disadvantage (Rodman, 2016, p. 42). Along with its spending, the IDF’s doctrine emphasised the significance of tanks and aircraft, neglecting the other branches. Therefore, when the Egyptian forces-initiated attacks on the Bar Lev Line, the defence consisted mainly of high-quality tanks supported by low-quality infantry and artillery (Rodman, 2016, p. 50).

Consequently, the Egyptian forces broke through the line and occupied the Eastern side of the Suez Canal, rooting out the last defended positions (Rodman, 2016, p. 49). They mounted a counter-offensive in line with the IDF’s military doctrine (Rodman, 2016, p. 50). This counter-offensive consisted of small-scale tank charges. Additionally, artillery fire did

not support these tank charges because Israeli artillery was preoccupied with Egyptian infantry assaults and artillery shellings (Rodman, 2016, p. 50). Eventually, the IDF and IAF would gain the upper hand and retake the east side of the Canal and even pieces of land on the west side this victory. However, this came at a high cost. Moreover, it proved the significance of adequately implementing Combined Arms Warfare rather than solely relying on tanks and aircraft. The chapter on the tank strategy during the Yom Kippur War takes a deeper dive into the specifics of these strategies.

Russia's Invasion of the Ukraine 2022-Present

The following paragraph elaborates on the usage of tank warfare during the Russian invasion of Ukraine in 2022, emphasising the strategic approach of the Russian army. Hence, the paragraph lays out the latest application of tanks in a large-scale conflict, analysing the doctrines and strategies involved. The objective of the Russian invasion of Ukraine was to maintain Russia's sphere of influence



Figure 4: Abandoned Russian T-72, Ukraine 2022 (Mvs.gov.ua., 2022).

and the prevention of Ukraine's admission into NATO (Aylward, 2022). The initial Russian invasion prioritised a rapid pace and confidentiality, disregarding other significant aspects of offensive warfare. The Russian forces expected minimal opposition. Hence the combined arms operation was performed poorly. This poor performance stemmed from inadequate coordination and cooperation between aerial, naval, and terrestrial forces. Consequently, Russian terrestrial forces moved in on urban centres, needing more preparation. This lack of preparation showed their inability to perform a complex operation such as this. Combining this with the encountered opposition had detrimental consequences for the invasion's success. Considering this, one can assume the order was given at the highest governmental level. Especially considering the Gherasimov doctrine does advocate the implementation of combined arms warfare (Laurențiu, 2022, p. 47). Therefore, the initial stage of Russia's invasion might provide an inaccurate representation of contemporary tank warfare. The ineffective deployment of tanks may be a major indicator of this misrepresentation of the part tanks can still play (Aylward, 2022). The multitude of faults seen in the invasion stems from inadequate preparations. Therefore, they fail to accurately reflect the capabilities and pertinence of tanks in contemporary warfare.

Furthermore, Russia has implemented a new military doctrine since 2013, named the Gherasimov Doctrine (Laurențiu, 2022, p. 46). Gherasimov was a General in the Russian

army who later became the Chief of the General Staff of the Russian Armed Forces. Additionally, Gerasimov currently holds office as the first deputy minister of the Defense Minister of Russia. The Gerasimov doctrine is fundamentally similar to the Clausewitzian theory. Both theories perceive war as serving political objectives; however, the Gerasimov doctrine has a different approach to applying the strategic level. Hence, political objectives drive warfare (Laurențiu, 2022, p. 47). According to the Gerasimov doctrine, war is founded on rules that prescribe combined arms operations within its military. Furthermore, non-military actions are also relevant in obtaining strategic objectives, all in service of the overarching political objectives. On the strategic and operational level, the doctrine emphasises the following:

“Controlling the information space and the real-time coordination of all aspects of a campaign, in addition to the use of targeted strikes deep in enemy territory and the destruction of critical civilian as well as military infrastructure” (Laurențiu, 2022, p. 48).

The armoured divisions of the Russian Armed Forces perform these strikes in Ukraine. The emphasis of these strikes differs not in essence from the Soviet Deep Battle Doctrine and can be seen as a modern implementation thereof. Similarly to WWII, the Russian high command anticipated easily breaking through the Ukrainian front (O’Brien, 2022). This assumption was founded on their superiority in weaponry. Russian forces thought they would steamroll into Ukraine, rapidly advancing with their armoured divisions and supported by their air force. However, as mentioned before, the poor implementation of combined armed warfare with stiff Ukrainian resistance and Western support had changed the offensive into a much more complicated endeavour.

Conclusion

This chapter has provided a brief overview of offensive strategic tank warfare development. Tank warfare has developed significantly over the last century.

The tank’s debut in WWI proved significant; this new battlefield behemoth penetrated the enemy’s defence line. It was subsequently breaking the deadlock of trench warfare. The Interbellum proved a pivotal period for the development of tank warfare, proving its worth in WWII. The increased implementation of combined arms warfare resulted in the comprehensive strategic and tactical deployment of tanks in WWII. The German tactics and Russian doctrine proved a new, more mobile, faster and more versatile adaption of tank warfare. The most significant development was the addition of aircraft and the switch from tanks as infantry protection to infantry as tank protection. This phenomenon would lay the foundation for modern and contemporary combined arms warfare. Although the Arab-Jewish conflicts in the Middle East led many to believe the tank could only be effectively used with aircraft, infantry and artillery support. The Yom Kippur War ended this belief, reassuring military experts of the tank’s reliance on combined arms warfare. Lately, the Russian invasion of Ukraine has once more emphasised the vitality of combined arms warfare if the tank is to perform effectively. Therefore, the development of tank warfare can be summed up as the tank evolving into an integral aspect of warfare but reliant on the support of other military branches to perform effectively.

Chapter III

The Battle of Cambrai 1917: The World's First Large Scale Tank Battle

Introduction

This chapter analyses tanks' strategic and offensive implementation in the Battle of Cambrai. It explains the role tanks played in the offensive and their implementation on a strategic level. Therefore, it looks at their function on the battlefield. This chapter builds on the brief explanation of tank warfare in WWI, as explained in the first chapter. In this way, the theory introduced in the first chapter is used as the foundation upon which the analysis in this chapter is founded. Authors such as J.F.C Fuller and H. Guderian are again used as significant sources. Three main sections divide the chapter. Firstly, the situation leading up to the battle is analysed, providing insight into the tanks' strategy, tactics, and implementation in theory. Secondly, the battle is analysed, looking into how the offensive transpired in practice. Thirdly, the first and second sections are compared to display the discrepancies between the theoretical and practical sequence of the battle. Lastly, the conclusion provides a nuanced answer to the significance of tanks in this battle and what this battle meant for future tank warfare.

Pre-Battle

The following paragraph elaborates on the first significant tank battle in history, the Battle of Cambrai. The battle took place on the fields of Flanders during WWI and was the first occurrence of large-scale tank deployment. This paragraph will explain the Allied command's theoretical approach to deploying these new battlefield behemoths. Hence, we research this battle's leading doctrine, objective, strategy and operation. The objective of this paragraph is to provide an understanding of the ideas on tank warfare before the battle of Cambrai and what these entailed for later tank battles.

The first chapter outlined the leading tank doctrine during WWI, entailing tanks primarily used as protection for infantry attempting to penetrate enemy positions. As Fuller explains, the objective of the tanks was to create a gap in the enemy's position by destroying the barbed wire and disabling the opposing artillery (Fuller, 1920, p. 73). The tanks commenced their offensive after an initial artillery barrage by their artillery, on the opposing lines. After this, the tanks, followed closely by infantry, would approach enemy lines under a barrage that would fire just before their offensive line. This barrage is called a 'creeping barrage'. Eventually, the tanks would engage the opponent's defensive line and attempt to penetrate it with their heavy firepower. After the initial penetration, the tanks were to continue straight on, penetrating further into the secondary or even tertiary line. However, they could also turn to the sides and widen the gap created in the primary defensive line, providing the infantry more cover and more time to establish a bridgehead.

However, a significant downside to this doctrine was that the tanks could not use their superior speed to overtake the enemy's position by speed and surprise because they were required to support the infantry (Fuller, 1920, p. 78). Another significant downside was the creeping barrage, which gave away the start of an offensive. Hence, the enemy had time to

retreat into their fortified positions, such as bunkers and underground tunnel systems. Once the barrage was stopped, the opponents would retake their positions and commence the defence of their lines.

The objective of the offensive later called the Battle of Cambrai, was to capture the town of Cambrai, which in 1917 was located behind the German *Siegfriedstellung* in Northern France (Guderian, 1999, p. 77). Preparations for the battle began with locating suitable territory for the tanks to attack their objective. Once this was found, a tactic was devised. The British IIIrd Corps, with the three divisions, attacked the enemy lines from its

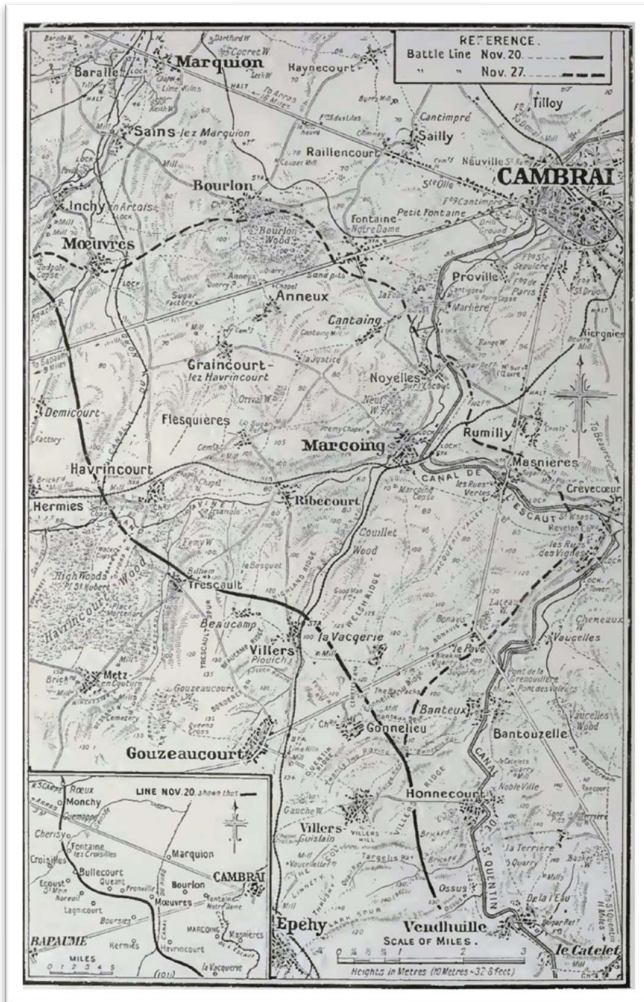


Figure 5: Sketch map allied strategy at Cambrai 1917. (Anonymous, 2013).

perform this pincer movement.. Another pincer was executed on the western part of Cambrai by one Cavalry Division. This Cavalry Division aided the capture of Cantaing and Fontaine-Nôtre-Dame by the infantry. The manoeuvre would enable other Cavalry Divisions to cut off Cambrai.

eastern side. Two divisions of the IV Corps attacked the enemy lines from its western side. The capture of the demarcation line between Havrincourt and La Vacquerie was the primary objective of the offensive (Fuller, 1920, p. 144). The second objective was to capture the demarcation line between Flesquières and Le Pape. The third objective was capturing the demarcation line between Graincourt and La Justice. The IVth Corps continued its push towards Fontaine-Nôtre-Dame, while the IIIrd Corps covered the advance from the north (Fuller, 1920, p. 144). Simultaneously, a deceiving attack was undertaken by the 56th division on the German line between Quéant and Inchy (Fuller, 1920, p. 144). This subsidiary attack aimed to divert German attention from the real point of attack.

Additionally, the IIIrd Corps' attack was reinforced by one division, functioning as a reserve and seizing the line Masnières-Rumilly-Marcoing (Fuller, 1920, p. 144). In the last stages of the offensive, the cavalry would exploit the success by performing a pincer movement. Two Cavalry Divisions in Cambrai's southern and eastern parts would

Battle

This paragraph describes the battle's progression as it transpired and the particular role tanks played in the offensive to provide a clear understanding of the intricate workings of early tank warfare. Furthermore, the paragraph touches upon the role of infantry and artillery, as the collaboration between these two branches gained more significance in future tank warfare.

The offensive started with a British barrage on the German line surrounding Cambrai (Guderian, 1999, p. 81). The Germans launched a counter barrage ahead of their outposts. The Allied tanks moved forward, followed closely by the infantry, catching the German soldiers off balance (Fuller, 1920, p. 148). The German soldiers fled and even surrendered. Westwards, a ridge had been captured and used as a launching point for an armoured attack on Masnières. One of the tanks approached a bridge, which was crucial to capture. However, the Allied force noticed the bridge was destroyed upon arrival, nevertheless trying to traverse it with their tanks. However, traversing through the remnants of the bridge, the tanks prove unable to ascent on the other side. The advancing infantry was aided by the tanks, which remained stuck on the opposite side of the river, providing suppressive fire. Westwards, Allied forces attacked La Vacquerie and occupied Marcoing. The attack on Marcoing was prepared extensively in advance of the attack. A comprehensive plan was created to ensure the most effective deployment of tanks after occupying the village. The complicated operation went according to plan and proved successful. Even though they were under constant fire from German soldiers preparing a bridge for demolition. In the Grand Ravin, an area between Havrincourt and Marcoing, the offensive became chaotic, with many German soldiers reverting to flight and panic.

Further north from Ribecourt, a similar situation unfolded, with many German soldiers leaving their weapons behind in their flight. At the same time, the town of Bois des Neuf was attacked, and the town of Premy Chapel was occupied. However, not everything went according to plan; the 51st Division ran into tactical difficulties at the village of Flesquières. This division had created its own attack plan, and consequently, its tanks outdistanced its infantry. Insufficient infantry support caused serious losses when an enemy artillery barrage hit the tanks crossing over the ridge. Considering these losses as insignificant would be possible if infantry support was near. However, due to the distance between the two, German machine gunners were able to incapacitate many tanks. These German units hindered the advance from their well-defended positions between the debris of Flesquières. As a result, the town remained in German hands until November 21.

Moreover, Havrincourt provided severe resistance, requiring a serious struggle to capture. Eventually, they occupied all designated objectives. The 62nd Division successfully occupied the town of Graincourt prior to sunset. After the occupation of this town, multiple tanks advanced in the direction of Bourlon Wood and Rue de Cambrai. The infantry, however, could not capitalise on the gains because of their weariness. In the meantime, the Premy Chapel-Rumilly line pushed through in the direction of Masnières. The first section of the 29th Division was undertaking this push collaborating with the second section of the division to capture Marcoing and its surroundings. Bois des Neuf was assaulted by the third section of this division, overcoming German resistance and capturing the village of Noyelles with infantry units. Besides this push, the armoured logistics vehicles met at the designated staging ground. Furthermore, Allied engineering units removed the barbed wire, clearing the way for the advancing cavalry, subsequently doing so prior to convening in the Grand Ravin and Masnières.

The first significant tank battle in history had been fought, and the Allies were victorious. The Tank Corp had proven its value to the Allied high command. The weary

forces were recalled in the aftermath of the battle of Cambrai. The next morning reassigning the healthiest soldiers, they were to continue the attack, but in the later days of the battle, tanks and infantry seized collaborating. Therefore, the major part the tank played in this battle had ended.

Post-Battle

What can we learn by comparing the pre-battle strategy with the actual outcome of the battle? The focus will be on the first push, the attempted capture of Rumilly-Seranviller and the push at Flesquières. These pushes best characterise the battle, surprise, retaliation, penetrating, and power, technology. The analysis focuses on these aspects concerning its effect on the tank's performance in the battle. Therefore, the analysis established the contribution of tanks to the outcome of the battle and the future development of tank warfare.

Firstly, the initial advance went more favourable than planned because the German soldiers were caught off guard. The defenders were inhibited from mounting a proper defence and subsequently overwhelmed by the number of tanks. The supporting infantry quickly captured strategic objectives and broke through the first few German positions (Fuller, 1920, p. 148). Although this proved beneficial to the Allied push, it does not accurately represent the tanks' contribution to the battle's outcome because they surprised the German soldiers. The tanks initially penetrated much deeper into the German defence; later, they were met with stiffer resistance which reduced the speed of their advance (Guderian, 1999, p. 81). Moreover, the Allied troops needed help to consolidate their newly acquired territories. Hence, the Germans reconquered much of the gains made by the tank corps; the value of implementing tanks next to infantry had proven its worth.

Secondly, the push towards Flesquières ran into unforeseen difficulties rooted in the novelty of tank warfare. The major problem was the infantry's inability to keep up with the tanks. The speed discrepancy caused the tanks to lose the protection provided by the infantry, resulting in their destruction by German artillery. From the infantry perspective, they lost their protection from machine gun nests and German soldiers in the trenches. As a result, the separation of armour and infantry resulted in severe loss of life and delayed the capture of Flesquières.

In conclusion, the significance of the Battle of Cambrai is not to be overstated. The first battle was when tanks were used *en masse* in a combined arms tactic with infantry (Guderian, 1999, p. 79). Although many infantry soldiers died, and tanks were destroyed because they ended up unsupported by the infantry, the performance of the tank corps. Nonetheless, the



Figure 6: preparation *en masse* tank charge Cambrai 1917 (Baker, 2017).

value of implementing tanks next to infantry had proven tremendous potential.

Thirdly, the penetrating power of the *en masse* tank deployment at Cambrai is not to be understated. The tank penetrated the German lines even when the German soldiers were not surprised and resisted the Allied advance. The offensive proved to the Allied command that the tanks penetrating power were a valuable asset in breaking the deadlock of trench warfare, albeit its necessity for further tactical development (Fuller, 1920, p. 73). The tanks could advance through barbed wire, trenches and machine gun nests whilst remaining largely unaffected. The tank allowed the infantry to swarm the breached enemy trenches and establish a safe gap through which more infantry and armour could advance. Therefore, the penetrating power of the tanks proved invaluable to the Allied push and the future of tank warfare.

Fourthly, the initial advance went better than anticipated, as there were no mentions of tanks breaking down or getting stuck in the terrain—which would prove to be one of the most significant contributing factors inhibiting tanks from performing effectively. As mentioned in the former chapter, several tanks could not cross the remnants of a destroyed bridge and got stuck in the water (Guderian, 1999, p. 81). The novelty of the technology of the tank proved unable to manoeuvre on unfavourable terrain; they would get stuck and become sitting ducks for infantry and artillery. The mechanical insufficiency could not be helped at the time because of its novelty; however, it did indicate the technological progress necessary to optimise battlefield performance in the future.

In conclusion, the first *en masse* tank charge in military history was a success because it displayed the penetrating power of the tank and its practical use in combined arms operations with infantry. However, the infancy of the tanks' technology and the tank's unprecedented speed compared to the infantry concluded in the Allied inability to consolidate its territorial gains. Despite these setbacks, the tank proved its value to the future of warfare.

Conclusion

In conclusion, the battle at Cambrai is regarded as the first tank battle in which tanks were used *en masse* on the battlefield. Moreover, the momentum created by the tank proved to be such an advantage to the Allied forces that they continued to increase its usage on the battlefield until the end of the war. Cambrai showcases how these heavy machines could break through barbed wire, traverse trenches, and lay waste to enemy lines while moving and covering the accompanying infantry. The Allied tanks' momentum and mobility countered the German lines' stiffness and immovability. Although the Allied gains of November 20, 1917, would be lost the following day, the tanks had proved their value and solidified their place in contemporary warfare. In the following two decades, armies across Europe would invest in or further develop their armoured divisions, so much so that they were to play an instrumental role in future wars. Therefore, tanks solved the impasse trench warfare had created, eventually breaking the seemingly immovable *status quo*. The break meant that tanks ushered in a new era of mechanised warfare. The Battle of Cambrai would lay the foundation for this.

Chapter IV

The Battle of Kursk 1943: The World's Largest Scale Tank Battle

Introduction

The Battle of Kursk between the German *Wehrmacht* (Army) and the Soviet Red Army was fought from July 5 until August 3, 1943, resulting in a decisive Soviet victory. The battle is often seen as history's largest and most significant tank battle. On a front spanning between 150 and 300 kilometres, well over 7000 tanks met on the fields surrounding the town of Kursk to settle the future of the German occupation of Soviet territories. The three distinct paragraphs divide this chapter, each elaborating on vital aspects of this battle. The first paragraph explains the battle plans of the *Wehrmacht* and the Red Army, providing an understanding of the strategy, operations, and tactics implemented. The second paragraph describes the progression of the actual battle is explained to provide insight into the actual course of the battle. The battle is analysed by scrutinising the differences between the battle plans and the course of the actual battle in the last paragraph. The difference provides insight into tank warfare and how it developed on the battlefield, explaining its significance for the future development of tank warfare.

Pre-Battle

German Wehrmacht

This section elaborates on the strategic, operational, and tactical approach of the *Wehrmacht* high command in the East. We focus on the role tanks were to play in the Battle of Kursk.

The strategic objective of the offensive at Kursk was to turn the tide of Operation Barbarossa, the German campaign to defeat the Soviet Union that started in June 1941 (Toeppel, 2018, p. 18). Since the German attack, the chances of the German army to win this war had been heavily compromised, among others, due to the lost Battle of Stalingrad in February 1943 (Showalter, 2013, p. 41). Consequently, the *Wehrmacht* designed a strategy founded on an early attack on Soviet positions in the spring of 1943. The objective was to forestall Soviet offensives and maintain the initiative (Toeppel, 2018, p. 20). Hence carrying out these offensives would consist of evasive actions and pre-emptive strikes on the Red Army. It was subsequently pre-empting the Red Army with minor offensive attacks to keep the Wehrmacht's initiative (Toeppel, 2018, p. 21). The staff of the Eastern forces recommended a joint attack of Army Groups Centre and South to forestall a Soviet offensive against Army Group South (Showalter, 2013, p. 43). Elements of Army Group South were to deploy from the area west of Khar'kov to the north, while units of the Second Army of Army Group Centre were to move north of Sumy towards the southwest.

On the operational level, the offensive was to commence after the spring because of the wet and muddy Russian spring (Showalter, 2013, p. 49). Operation Citadel would be the name of the German operation against the Kursk salient (Toeppel, 2018, p. 28). The operation consisted of two pincer movements performed by two army groups (Toeppel, 2018, p. 31). Army Group Centre was to perform this movement capturing the town of Orel.

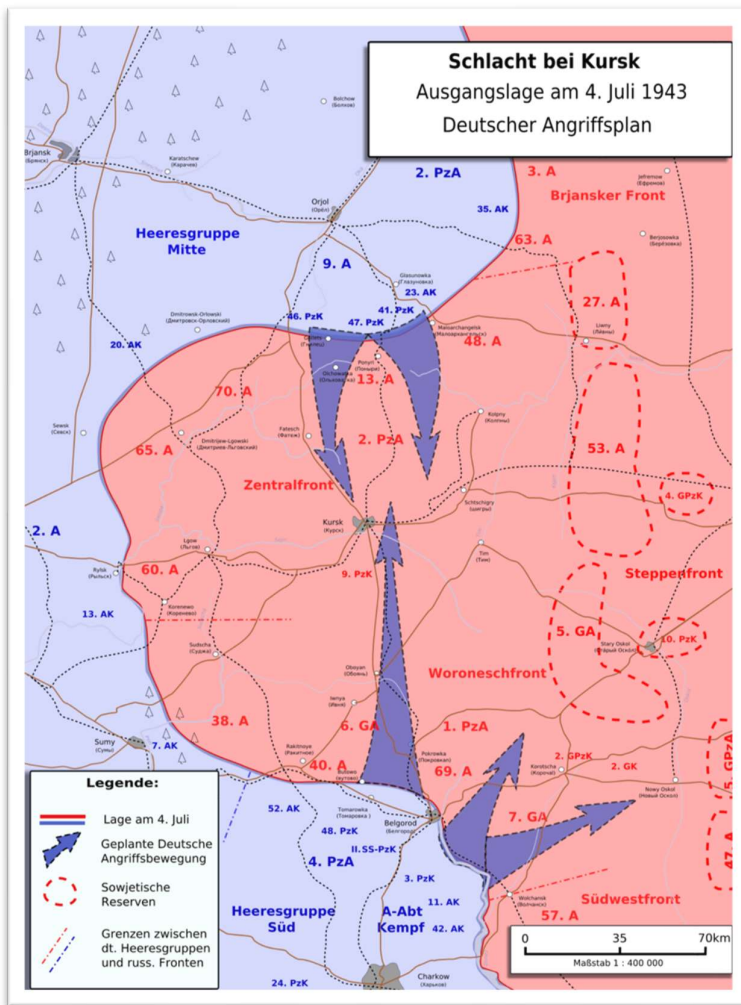


Figure 7: German strategy Operation Citadel, July 4 1943 (Alexpl, 2010).

Simultaneously, Army Group South was to perform this movement capturing the town of Belgorod. These pincers would be performed by armoured divisions supported by artillery, infantry, and aircraft. Due to weather conditions, the operation only started in June, months later than planned.

The tactics of Operation Citadel entailed the movement of several segments of the *Wehrmacht's* Eastern armies. These segments were to perform the northern and the southern pincer movement, involving several infantry and armoured divisions. The objective of this pincer was also to push towards Kursk. These armoured divisions were supposed to break through the Soviet positions and meet up with the northern segments enclosing the Soviet forces in the Kursk Salient. The Soviet force would then be forced to surrender once encircled by

the *Wehrmacht*. The victory would reinvigorate the German offensive in the East and provide the *Wehrmacht* with the necessary momentum.

Soviet Red Army

What was the strategic, operational and tactical approach of the Red Army high command? The strategic objective of the Soviet Union was to continue its offensive operations, to prevent the offensive from being prepared by the enemy (Harrison, 2016, p. 29). Therefore, deciding for the Central and Voronezh fronts go over to a static and stubborn defence to exhaust and bleed the enemy white should the *Wehrmacht* undertake an offensive (Showalter, 2013, p. 60). Furthermore, the German *Blitzkrieg* tactics had to be obstructed to prevent a German breakthrough (Harrison, 2016, p. 30). Hence, in line with the Deep Battle Doctrine, the Soviet Union fortified up to 300 km behind the front lines. This defence line aimed to withstand the concentrated attacks of large tank groups supported by aviation. The operational level entailed that the Western and Bryansk fronts would attack in the general direction of Orel (Harrison, 2016, p. 29). The objective of this offensive was as follows: firstly, attacking the rear of the Germans' Orel group of forces in case it should attack the Central Front. Secondly, the defeat of this group of forces and, thirdly, the

elimination of the enemy's Orel bridgehead. They foresaw close cooperation with the forces of the Central and Voronezh fronts. Their counteroffensive was to begin immediately, as soon as it became clear that the Germans had attacked Orel and Belgorod.

The main tactical objective of the Central Front was to defend the Kursk salient in the sector between the boundary lines of Yefremov and Bruski (Harrison, 2016, p. 32). It was ordered to create defensive lines. The strength of the Centre Front consisted of five armies (Harrison, 2016, p. 33). These consisted of two tank brigades and fifteen independent tank regiments. Additionally, rifle divisions and rifle brigades supported these regiments. These troops were to stomp the initial German attack, being reinforced from other echelons if necessary.

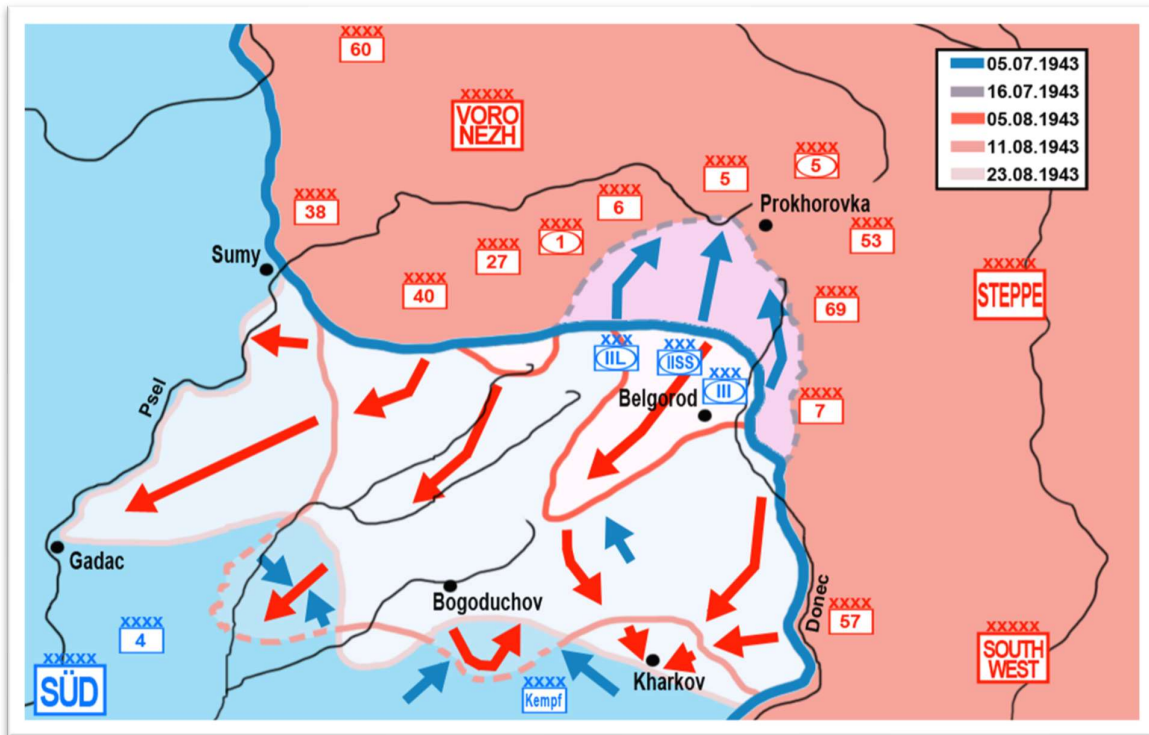


Figure 8: Tactical Map Operation Citadel 1943 (Blablaaa, 2010).

Battle

How did the battle progress, and what role did tanks play in the offensive? Furthermore, the role of infantry, artillery, and aircraft will be touched upon, as the collaboration between these branches will gain more significance in future tank warfare.

German Wehrmacht

The *Wehrmacht* started Operation Citadel on July 4 with an initial infantry thrust supported by aircraft and assault guns. The objective was to neutralise the Soviet outpost on the hills overlooking the Soviet positions surrounding Kursk because these strategic points were needed before the actual attack could start (Toepfel, 2018, p. 81). After neutralising these outposts, the Fourth Panzer Army Armoured Corps began its advance, supported by an infantry division on its far-left flank. The objective was to push towards Kursk, meeting up with the Ninth Army. These initial attacks proved fruitful, but there were significant losses due to aerial bombardments, minefields, and stiff Soviet resistance (Toepfel, 2018, p. 83).

The Ninth Army's push started on July 5, with the advance of several Panzer Corps and one Army Corps. The objective was to capture Maloarkhangel and protect the eastern flank of the Ninth Army in its attack on Kursk (Showalter, 2013, p. 79). Although the *Wehrmacht* initially succeeded, it suffered significant losses in its southern push because of significant resistance and heavy fortification (Toeppel, 2018, p. 97). The Panzer Corps, performing the main thrust of the northern advance, suffered heavy casualties due to Soviet artillery, infantry and aerial bombardments (Toeppel, 2018, p. 100). After weeks of fighting, the *Wehrmacht's* territorial gains in the north were minimal; in the south, however, it achieved more, albeit with heavy casualties (Showalter, 2013, p. 89). The *Wehrmacht's* inability to achieve aerial superiority caused its Panzer divisions to be vulnerable to aerial strikes. Furthermore, the mounting losses took a great toll on the *Wehrmacht*, while its opponents had significant reserves to rely upon. This situation forced the *Wehrmacht* to lose the operational initiative and go defensive.

Eventually, after weeks of fighting, the *Wehrmacht* was driven back to their defensive lines. The ineffective offensive resulted in heavy casualties in men and machines, crippling the German offensive power in the East. In a strategic manoeuvre, the German high command implemented a defensive approach in the East, losing the Battle of Kursk at a high toll.

Soviet Red Army

The Red Army's defensive operation in the north started on July 5 with significant artillery shelling on German positions (Showalter, 2013, p. 78). A day later, in the south, the Soviet army pre-emptive bombarded the German positions (Toeppel, 2018, p. 84). Initially, the northern push was met with fierce resistance, only achieving minor territorial gains. Although the *Wehrmacht's* southern push had initial success, the Red Army's approach to the battle proved more effective and could counter this. Implementing the Deep Battle Doctrine in multiple defensive lines and drawing German units deep into these lines prevented a breakthrough and circumvallation (Toeppel, 2018, p. 88). The deep defensive lines and fortified positions allowed the Red Army to destroy much of the *Wehrmacht's* panzer divisions. Furthermore, the Red Army had a significant numerical superiority in men and material, allowing them to fight a defensive battle of attrition, wearing down the German forces over almost two months (Toeppel, 2018, p. 80). The numerical superiority enabled the Soviet Airforce to establish aerial superiority, contributing significantly to the destruction of German Panzer divisions and the disruption of German supply lines.

Eventually, the effects of the Soviet Deep Battle Doctrine and numerical superiority over the *Wehrmacht* enabled the Red Army to launch a counteroffensive against the German lines. This offensive is marked by the mass deployment of Soviet armoured vehicles, the T-34 medium battle tank (Toeppel, 2018, p. 80). In August, the *Wehrmacht* has driven back further away from the Soviet defensive lines. The Red Army's reliance on the numerous reserves of the *Steppenfront* provided the manpower to counter and pursue the German troops. Near the end of August, the Red Army had taken the operational initiative from the *Wehrmacht*, crippling any future German offensive in the East. With the operational initiative firm in hand, the Red Army would start its march on Berlin.

Post-Battle

What can we learn by comparing the pre-battle strategy with the actual outcome of the battle? The focus will be on the north and south German pushes. These pushes best characterise the German *Blitzkrieg* tactics. Additionally, they showcase the difficulties this strategy encountered fighting the Soviet Deep Battle Doctrine. We will see how the battle plans and the battle itself differed significantly. The analysis is made from these differences to see the impact these had on the further development of tank warfare. The paragraph emphasises the offensive differences between the battle and the battle plans.

The *Wehrmacht Blitzkrieg* tactics consisted of tactical manoeuvring consisting of a breakthrough, an envelopment, or both. The Wehrmacht strategy was to break through the Soviet lines using tanks while the infantry mopped up pockets of resistance. However, the Soviet Deep Battle Doctrine and experience with these tactics in earlier battles ensured a deep defence (Glantz, 2012, p. 14). The Soviet defence consisted of several layers of defensive lines, fortified positions, anti-tank obstacles, and minefields (Showalter, 2013, p. 63). Hence, the German tanks could only reach their objectives if they encountered enemy lines and fortified positions. The number of fortified positions effectively nullified the tactic.



Figure 9: German Tiger I tank 1944 (Bundesarchiv, 1944).

the *Tiger*, *Panther*, and *Ferdinand* was considered superior to the main Soviet battle tank, the T-34 on the battlefield did not compensate for overwhelming numerical inferiority (Showalter, 2013, p. 46). Thus, the numerical superiority of the Soviet armoured forces proved instrumental in the *Wehrmacht's* defeat.

The third aspect is the involvement of the *Luftwaffe* and the Soviet air force in the battle for aerial superiority over Kursk. As with the tank, the *Luftwaffe* was also outnumbered by the Red Air Force, facing a 1:2 ratio (Toepfel, 2018, p. 80). Therefore, the *Luftwaffe* faced the same fate as the Wehrmacht's armoured divisions. Consequently, this disabled German combined arms warfare, for without the aerial protection of the *Luftwaffe*, the German tanks were easy prey for the Soviet bomber and fighter planes. This lack of aerial superiority proved fatal for the German tanks, making clear the significance of planes in successfully implementing tanks on the battlefield.

Moreover, the battlefield's terrain was rugged, and in itself difficult to manoeuvre the heavy armour. Moreover, minefields the Red Army had laid proved another significant hurdle for the *Wehrmacht* tanks, bogging many down and rendering them unusable.

The second analysis focuses on the numerical superiority of the Red Army's armoured forces. The *Wehrmacht* fielded 3,400 tanks and self-propelled guns, facing 5,600 opposing tanks and self-propelled guns (Toepfel, 2018, p. 80). These numbers meant the Wehrmacht to Red Army ratio was 1:1.6, which meant the Red Army significantly outnumbered the *Wehrmacht*. Although the quality of German tanks such as

Fourthly, and lastly, there was the numerical inferiority of infantry, its detrimental effects on the effectiveness of combined arms warfare, and the role of tanks in this. The *Wehrmacht* faced a 1:2.4 ratio concerning men's power, so its infantry was significantly inferior to the Red Army (Toeppel, 2018, p. 80). The role of infantry in supporting tanks in battle is vital for effective tank warfare. However, because of the *Wehrmacht's* numerical inferiority, it could not properly support the tanks. Subsequently, they got stuck in minefields, where they were attacked by Soviet infantry units or by artillery from the flanks. The inability to provide the necessary support resulted in significant losses of German tanks, contributing to the German defeat.

All in all, the weakened German position on the Eastern front, in combination with the numerical and strategic superiority of the Red Army, proved fatal for the German offensive in the East. Unable to apply their *Blitzkrieg* strategy, unable to enforce air superiority and achieve their tactical objective, the *Wehrmacht* was forced to admit defeat and retreat further westward.

Conclusion

In conclusion, the Battle of Kursk marked the end of the German offensive in the East, ending all German hopes for a victory over the Soviet Union. The battle was the largest armoured battle, featuring 8,000 armoured vehicles. Despite their technical superiority, the German forces were numerically inferior to their opponent, which led to their defeat. However, this battle also showcases the strategic superiority of the Deep Battle Doctrine in countering the *Blitzkrieg* tactics. Moreover, it emphasises the significance of aircraft and infantry necessary for effectively using tanks on the battlefield. The Battle of Kursk proved that the tanks were extremely vulnerable without the support of these military branches. The tanks can overcome minefields, anti-tank obstacles, and fortified positions with this support.

Additionally, the lack of aerial protection renders tanks sitting ducks extremely vulnerable to aerial attacks. These are the main lessons for tank warfare that can be drawn from the Battle of Kursk: firstly, *Blitzkrieg's* inability to effectively break through and circumvallate Deep Battle Doctrine's deep defensive lines. Secondly, tanks are vulnerable to artillery, aircraft, and infantry without combined arms warfare. Consequently, tanks are unable to perform effectively. Thirdly, superior material is not enough to win against significant numerical inferiority.

Chapter V

The Yom Kippur War 1973: Tanks Declared Obsolete

Introduction

In 1973, a war erupted between Israel and an Arab alliance led by Egypt and Syria. This war would become known as the Yom Kippur War. The alliance launched an offensive on multiple fronts in October 1973. This chapter focuses on the Southern Front, the battlefield of the Egyptian and Israeli forces. The focus is on the Southern Front because of the tactical deployment of the Israeli Defence Force's (IDF) tanks in the initial phase of the war. What lessons can be learned from the lack of cooperation between the IDF, infantry, and Israeli Air Force (IAF)? Rooted in ideas stemming from its success during the Six-Day War of 1967, the IDF had clear assumptions about the tactical deployment of tanks during the October War. How did these assumptions contribute to the outcome of the war? These led to the ill-fated tactical deployment of tanks during the October War. Eventually, the IDF reverted to effectively implementing combined arms warfare, rectifying its mistakes and proving the tank's prominence on the battlefield. Therefore, this chapter analyses Yom Kippur War on its Southern Front. The chapter starts by outlining the Egyptian and Israeli battle strategies before the battle. Next is the actual battle's course, explaining its course and the result for both sides. Lastly, the post-battle paragraph analyses the differences between the battle plans and the actual battle, providing an analysis concerning the role of tanks in the offensive, focussing on the IDF's deployment and the Egyptian countermeasures.

Pre-Battle

Israeli Defence Force

What was the IDF's strategy before the conflict with Egypt in 1973? Here we explain the shift in strategy after the initial losses to the Egyptian Armed Forces, reassuring the vitality of combined armed warfare.

The IDF's military doctrine preceding 1967 consisted of conclusive functions for tanks and aircraft (Rodman, 2016, p. 42). The operational and tactical levels of the IDF's doctrine displayed these functions in combat. The IDF did deploy other military branches in support of armour and aircraft. However, their doctrine drastically shifted after the success of the Sinai Campaign and the Six-Day War 1967. These conflicts convinced the IDF and IAF that terrestrial combat was winnable solely by tanks and other armoured vehicles. Consequently, infantry and artillery were unnecessary in supporting tanks and aircraft. Armoured divisions were to thrust forward, utilising their speeds and penetrating power. The tactical deployment entailed breaking through enemy lines, and enveloping fortified positions, at staggering speeds so that the enemy could not stop the momentum (Rodman, 2016, p. 44). The tactical deployment of aircraft entailed the swift destruction of opposing air forces to ensure air superiority, as happened in 1967. However, this war-fighting doctrine proved futile against an enemy which effectively implemented combined arms warfare. Therefore, the IDF and IAF were forced to revert their doctrine to combined arms warfare. The reversion of their doctrine meant implementing an adequate combined arms doctrine (Rodman, 2016, p. 43). This implementation translated to the battlefield cooperative deployment of infantry, armour, aircraft, and artillery. The combination nullifies individual

weaknesses and increases individual strengths creating a more capable fighting force. On an operational level, that meant that infantry, artillery and aircraft would protect tanks. Artillery would protect armour, aircraft, and infantry. Accordingly, infantry, armour and aircraft protected artillery. The tactical level meant the thrust of armoured divisions utilising their speeds and penetrating power simultaneously with infantry and under the protection of artillery and aircraft. The delicate balance achieved by these tactics would eventually prove victorious over the Egyptian forces in 1973.

Egyptian Armed Forces

The Egypt of Anwar Sadat suffered under the losses of the Six-Day War. Egypt had to cede territory in the Sinai oilfield, and its control over the Suez Canal resulted in economic difficulties for Egypt (Siniver, 2013, p. 50). Moreover, the *status quo* established between Egypt and Israel was unfavourable for the Egyptians. Therefore, Egypt urged the Arab League to attack Israel from multiple directions simultaneously. This conflict started in 1973 and became the Yom Kippur War. Furthermore, the Soviet Union supported Egypt by providing weapons and armour. Egypt's goal was, as Siniver describes it:

“To challenge the Israeli Security Theory by carrying out a military action according to the capabilities of the armed forces aimed at inflicting the heaviest losses on the enemy and convincing him that continued occupation of our land exacts a price that is too high for him to pay.” (Siniver, 2013, p. 56).

The Egyptian Armed Forces conceived an operational initiative called Operation *Badr*. On the operational level, Operation *Badr* aimed at the reoccupation of the Sinai Peninsula after its loss in the Six-Day War. Operation *Badr* consisted of a coordinated effort between the Egyptian Second and Third Armies (Rodman, 2016, p. 60). Several infantry divisions had to traverse the Suez Canal into the Sinai Peninsula, establishing bridgeheads. Once these bridgeheads were established, armoured divisions would reinforce the infantry divisions. Together, these divisions would advance under the protection of an Integrated Air Defence System (IADS) (Rodman, 2016, p. 46). This system would prevent the IAF's aircraft from forming a threat to the Egyptian advance. In the Sinai, the IDF had constructed the Bar Lev Line, a string of strong points parallel to the Suez Canal (Rodman, 2016, p. 61). This line consisted of fifteen garrisoned strongpoints, surrounded by minefields and fortified with firing ramps for tanks. After neutralising the Bar Lev Line, the Egyptian armies would advance further into the Sinai, re-establishing Egyptian control. The tactical level entailed a surprise crossing of the five infantry divisions on October 6, 1973, on Yom Kippur, the holiest Jewish holiday (Rodman, 2016, p. 59). The tactics would use surprise to overwhelm Israeli garrisons (Whetten et al., 1974, p.102).

The attack meant establishing bridgeheads on the Sinai and capturing Israeli forts. From there, combined arms warfare had to neutralise the fifteen strong points on the Bar Lev Line. Once achieved, these divisions were to capture and occupy the Mitla pass, ensuring a route further into Israeli territory (Whetten et al., 1974, p.106).

Battle

This paragraph describes the progression of the conflict on the Southern Front as it transpired and the particular role tanks played in the offensive to provide a clear understanding of the intricate workings of this large-scale tank battle. Furthermore, the role of infantry, artillery,

and aircraft will also be touched upon; the collaboration between these branches proved necessary for effectively implementing tanks on the battlefield.

Israeli Defence Force

The Egyptian forces crossed into the Sinai in multiple areas along the Suez Canal (Rodman, 2016, p. 60). The effective Egyptian offensive, poor Israeli preparation, and overconfidence forced the IDF on the defensive, attempting to stop the overwhelming Egyptian thrust into the Sinai (Whetten et al., 1974, p.107). The IDF's defence relied on the garrisons of the Bar Lev Line, who were supposed to harass the advancing Egyptian forces. However, the overwhelming Egyptian firepower and infantry proved too much for these garrisons. Consequently, these were swiftly neutralised and occupied by Egyptian forces. The IDF responded with small tank charges to relieve the pressure on the Bar Lev Line (Rodman, 2016, p. 50). However, conducting these charges, the tanks went unsupported by infantry, artillery, or even aircraft. Subsequently, they were largely ineffective. Meanwhile, the containment of Egyptian bridgeheads occupied the IDF's main tank divisions.

After two days, the IDF launched a counter-offensive, attempting to recapture the Bar Lev Line and Egyptian bridgeheads. However, the two tank divisions responsible for the offensive were once more poorly supported (Rodman, 2016, p. 51). Additionally, the Egyptian use of antitank guided missiles (ATGMs) resulted in the loss of almost two Israeli battalions. After this failed counter-offensive, the IDF returned to a defensive approach, revising its initial implementation of combined arms warfare and reverting to the more conventional implementation.

October 14 marked the turning point in the Israeli approach to the war. The defence had proven effective, and the IDF and IAF were ready to take the initiative and launched a counter-offensive. The objective was to cross the Suez Canal and thrust into Egypt proper, forcing Egypt to negotiate a ceasefire. The IDF launched an attack against the Egyptian forces in Sinai, achieving victory and dealing a significant blow to the opponent (Rodman, 2016, p. 52). This battle was the second-largest tank battle in history. From this day on, IDF and IAF would go on the offensive, achieving their objective of capturing the Egyptian bridgeheads. The so-called battle of the Chinese Farm is considered one of the bloodiest battles of the entire war. Here the IDF broke through the waterline, enabling its divisions to cross the Suez Canal, capturing land in Egypt proper. Eventually, the IDF and IAF surrounded the Egyptian Third Army 100 km from Cairo, forcing Egypt to negotiate a ceasefire.

Egyptian Armed Forces

The Egyptian Armed Forces started with an artillery barrage on the Bar Lev Line (Rodman, 2016, p. 46). Under cover of this barrage, infantry divisions crossed the Suez Canal in line with the Operation *Badr* plan (Rodman, 2016, p. 60). The army established multiple bridgeheads on the Eastern bank of the Suez Canal, providing its armoured divisions with a safe landing ground and bases of operations. From these, the Egyptian forces launched smaller offensives against the garrisons guarding the Bar Lev Line (Rodman, 2016, p. 61). The Egyptian forces significantly outnumbered the IDF and IAF, but its inferior material

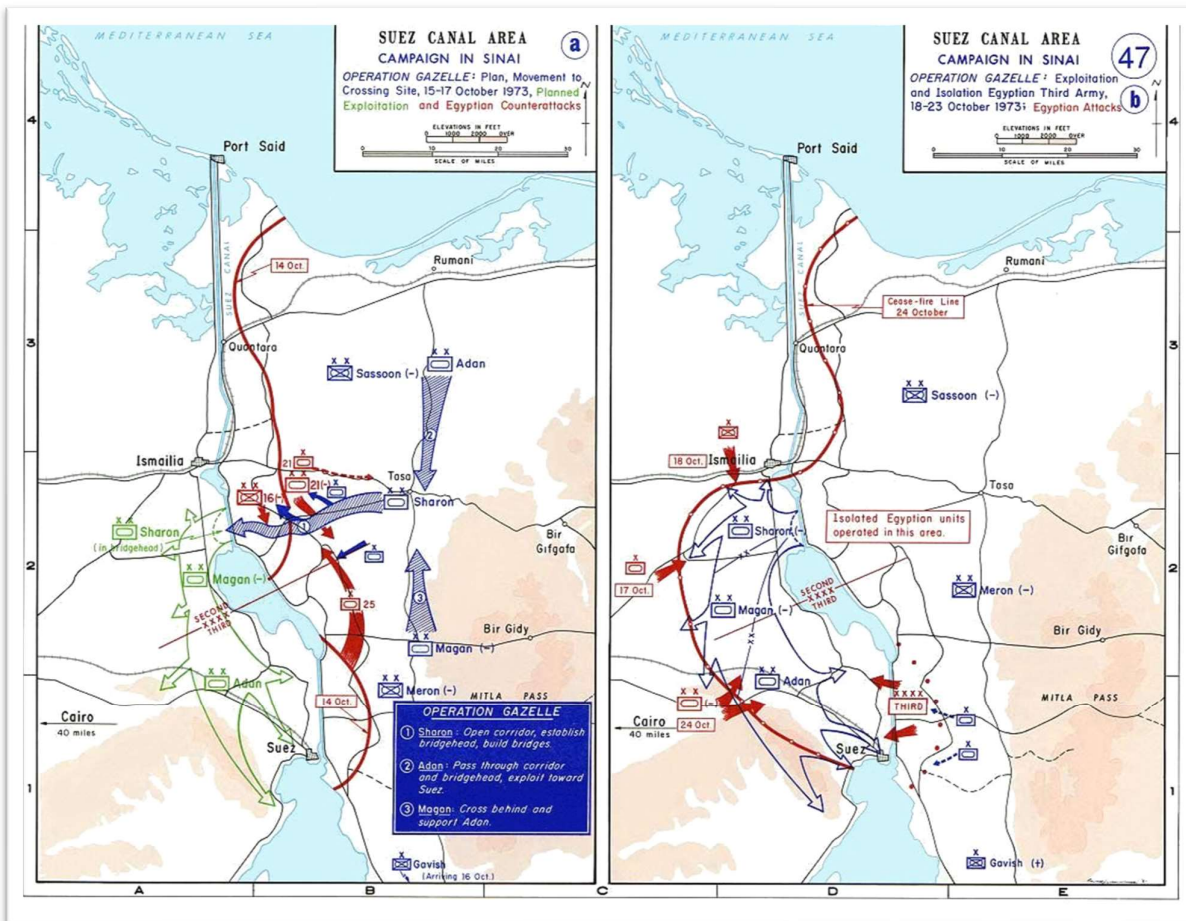


Figure 10: Sinai Campaign October 15-23 1973 (Department of History, U.S. Military Academy, 2019).

virtually nullified this numerical superiority (Whetten et al., 1974, p.108). Their numerical superiority enabled the Egyptian forces to successfully capture the garrisons of the Bar Lev Line because they were poorly garrisoned. Furthermore, the tank-only charges of the IDF's initial counter-offensive proved no match for the Egyptian soldiers armed with ATGMs, especially the Russian Sagger. The Egyptian Integrated Air Defence System (IADS) inflicted critical losses on IAF aircraft, rendering them unable to support the IDF optimally (Whetten et al., 1974, p.103). With the Israeli forces on the defensive, the Egyptian forces started their advance into Sinai. Subsequently, the emboldened Egyptian forces ventured out of its IADS. The IADS provided the opportunity with the Israeli forces needed for its counter-offensive. The proper implementation of combined arms warfare, in combination with material superiority, proved futile for the Egyptian offensive.

Consequently, halting the Egyptian advance, and from October 15, the Egyptian forces were on the defensive. Although the Egyptian forces provided stiff resistance, its defence started to crumble, and after they had fought the battle of the Chinese Farm, its defence was all but broken. This breach in their bridgeheads enabled the IDF to get behind Egyptian lines and destroy its IADS, providing the IAF with safe corridors to attack Egypt properly. The conflict ended when forcing the Egyptians to negotiate a ceasefire.

Post-Battle

What are the differences between the pre-and post-battle scenarios? What can we learn from the pre-battle strategy compared with the actual battle unfolding? The focus is on the initial Israeli deployment of tanks and its revised approach to combined arms warfare. It touches

upon the significance of antitank-guided missiles, as this conflict proved their value on the battlefield.

As discussed in the first paragraph of this chapter, the Israeli forces altered its military doctrine significantly after the Six-Day War of 1967. In the aftermath of this conflict, Israel became convinced of the strategic advantage of swift tank charges into enemy territory. These charges would be performed almost exclusively by tanks, needing more armoured infantry, artillery, and proper air support (Rodman, 2016, p. 42). This doctrine existed because Israeli forces achieved air superiority early in the Six-Day War. During this war, the IAF provided IDF's tanks with air cover without a serious enemy threat in the skies. Consequently, infantry support was perceived as being redundant. However, the start of the Yom Kippur War proved this doctrine wrong for several reasons.



Figure 11: Sagger ATGM (Kos93, 2009).

These losses proved the value of infantry support, especially if the supporting air force achieves no air superiority.

Secondly, the lack of aerial support could have protected advancing tanks from ATGMs and artillery batteries. The initial phase of the conflict proved that under the protection of an integrated air defence system, the IAF could not achieve air superiority. Therefore, they could not protect their advancing tank when entering the IADSs range. Consequently, the IDF's tanks were easy prey for Egyptian artillery and infantry. Only after the IDF reverted its military doctrine to conventional combined arms warfare the combination of tank, infantry and artillery proved victorious over the IADS (Whetten et al., 1974, p.104). Subsequently, after creating air corridors providing safe zones for the IAF's aircraft, IDF supported advancing tanks and bomb-designated targets on the Egyptian line of defence.

Thirdly, artillery support also proved invaluable to proper combined arms warfare. The Egyptian IADS, for example, proved to be a formidable defensive obstacle to overcome, denying the IAF air superiority for a significant duration of the conflict. Moreover, Egyptian tanks could manoeuvre unchallenged within the IADS range. The aerial protection made their advance difficult to halt and mount an effective counter-offensive even more difficult. Only in the revision of their doctrine could the IDF advance into the IADS range without being

Firstly, and perhaps most significantly, the antitank-guided missile threatened tanks. The Sagger was a Russian ATGM, which infantry could control from 500 to 3000m, launching it at an unsuspecting tank division (Whetten et al., 1974, p.107). In conventional combined arms warfare, infantry counters these types of threats when on an offensive thrust, protecting tanks.

Nevertheless, because IDF had invested heavily in tanks lacking the proper infantry support, the advancing tanks could not scout the infantry units besieging them with Sagger missiles.

completely demolished. Furthermore, tanks need to be protected by infantry and aircraft and mobile artillery pieces. These vehicles, supported by infantry, later proved extremely effective in countering the devastating ATGMs.

The conclusion that is to be drawn from the Yom Kippur War is not the obsolescence of tanks but their poor deployment. The idea of combined arms warfare is combining the different military branches. These branches nullify each other's weaknesses while emulating each other's strengths. A lonely tank on the battlefield is vulnerable due to poor vision, lack of speed, and significant size, which make it an easy target. However, when one combines its penetrating power, size, and firepower with the protection of infantry, artillery and aircraft, the battlefield behemoth is almost unstoppable. This fact was proven after Israel returned to the conventional implementation of combined arms warfare.



Figure 12: Soviet/Egyptian IADS (Soviet/Egyptian S-125 anti-aircraft type missiles in the Suez Canal vicinity, 2009).

Conclusion

The Yom Kippur War, especially the battle on Southern Front, caused much commotion in its day. Regarding the place of the tank on a modern battlefield, the tank was deemed obsolete after the Egyptians' successful repulsion of Israeli tanks, particularly because of the Sagger ATGM.

However, the problem in the initial phase of the conflict was less the tank itself than the implementation thereof. The opposite proved true in the later phase of the conflict. The Yom Kippur War teaches us the significance of combined arms warfare when implementing tanks on an operational and tactical level. The tank constitutes an easy target for infantry, artillery, and aircraft. Hence, deploying it on its own is a precarious endeavour. It is the combination of multiple branches which creates a strong military force. Therefore, in 1973 it was proven that the tank was not obsolete but poorly deployed. The Yom Kippur War proved the significance of combined arms warfare when deploying tanks on the battlefield. The relevance of the supporting branches is, thus, vital in effectively using the tank.

Chapter VI

The Russian War on Ukraine: Are Tanks Still Relevant?

Introduction

The Russian-Ukrainian War is between the Russian Federation and the Ukrainian Republic. This conflict started with Russia's annexation of the Crimean Peninsula in 2014. For almost a decennium, the tension between these two nations increased. This tension climaxed in February 2022, resulting in a full-scale Russian invasion of Ukraine on the 24th of February 2022. Armoured columns spearheaded by Russian T-72s rolled across the Ukrainian border. The objectives were toppling the government in Kyiv, the conquest of Ukraine, and its annexation into the Russian Federation, creating a buffer zone between itself and the West.

However, the campaign needed better implementation of combined arms warfare and better deployment of tanks on the operational and tactical levels. Consequently, many Russian tanks were destroyed, abandoned, or captured by Ukrainian armed forces and even civilians. Once more, the debate reignited on whether or not the tank still belonged on the battlefield. This chapter analyses the conflict and the role of tanks in this. The chapter analyses the situation pre-battle and during the battle paragraph and the differences between the two in the post-battle paragraph. The pre-battle paragraph elaborates on Russia's strategic, operational, and tactical plans. The battle paragraph describes the course of the actual battle. Lastly, the post-battle paragraph analyses the differences and ends with a conclusion on the development of tanks in this conflict.

Pre-Battle

Russian Forces

What was the Russian strategy before starting a war against Ukraine in February 2022? How did the Russian operation and tactics unroll?

The Russian military doctrine, which currently is the Gherasimov doctrine, consists of several key concepts (Laurențiu, 2022, p. 47). One of the most significant is that modern warfare is not limited to traditional means but encompasses a wide range of activities to achieve strategic objectives. These activities entail the use of propaganda, cyber-attacks, and the spread of disinformation, among other types of unconventional warfare. The Gherasimov doctrine prefers non-military means of achieving political objectives but does not exclude using military force when these seem impossible. The Russian approach to the invasion of Ukraine was founded on conventional combined arms warfare, emphasising speed and secrecy (Aylward, 2022). The Russian forces anticipated little resistance from Ukrainian forces, making these two aspects significant. Therefore, the Russian strategic objective consisted of a swift assault on Ukraine, quelling the few points of resistance before conquering the nation.

This plan translated to the operational level in the shape of aerial bombardments by the Russian air force during the first days of the war. These bombardments aimed to incapacitate the opponent before starting the terrestrial offensive (Militaire Spectator, 2023, p.107). After the opponent was incapacitated or severely damaged, the armoured units accompanied by infantry, artillery, and aircraft were supposed to move into enemy territory. These units would approach Ukraine in a coordinated manoeuvre from several positions in

the north-east, east and south-east. The overarching objective of these units was to break through the enemy defences, swiftly advancing towards Kyiv, occupying it and forcing a Ukrainian capitulation (Aylward, 2022).

At the tactical level, the Russian invasion meant deploying armoured units using penetrating and firepower while speedily moving into Ukraine (The Economist, 2022). Each specific unit was tasked with particular objectives, such as capturing, neutralising, or destroying fortified positions and pockets of enemy resistance (Aylward, 2022). Furthermore, Russian tactics relied on heavy artillery shellings on enemy positions, particularly “indirect fire”. Indirect fire is from rockets, ATGMs and mortars (Holdeman, 2023). Lastly, the Russian forces held a numerical superiority over the Ukrainian forces, which they intended to use to their advantage by deploying many underqualified soldiers on the frontlines. The objective here was to overwhelm the Ukrainian forces with numerical superiority.

Ukrainian Forces

How did the Ukrainian forces respond to Russia’s invasion? What strategy, operation, and tactics did they implement to prevent a Russian victory? This paragraph explains the Ukrainian forces’ initial reaction to the Russian invasion. We will see what a changing perspective on the strategic objective of Ukraine meant for warfare on the operational and tactical levels.

The Ukrainian strategy against the Russian invasion initially consisted of a classic Soviet military doctrine. However, thanks to Western support, this strategy has shifted towards the NATO military strategy (U.S. Department of Defense, 2022). On the strategic level, this means quelling the Russian threat to NATO’s security objectives, namely peace and stability in the Euro-Atlantic area (NATO, 2022, p. 4). This strategic objective has



Figure 13: Ukrainian T-72AV Tanks Kharkiv Offensive 2022 (Mil.gov.ua., 2022).

become the most prominent because Russia has contravened Ukrainian sovereignty twice in the last decade. The military consequences of this strategy consist of strengthening the defences against Russia. Although Ukraine is not a NATO member state, it does receive Western support because it is in NATO’s strategic interests to counter Russian aggression, be it indirectly. These objectives align with Ukraine’s own objective, namely ending Russian aggression in its sovereign territories.

On the operational level, these strategic objectives translate into implementing combined arms warfare and setting up a defensive operation. This operation consists of countering and delaying the Russian advance, making this as difficult as possible (Militaire Spectator, 2023, p.107). Furthermore, key positions are fortified and garrisoned as an integral component of a defence line. Lastly, to diminish the numerical superiority of the Russian army, conscription became mandatory for every male between the age of 18 and 65, consequently bolstering their ranks.

These operational objectives translate into the performance of combined arms warfare. Tactics entail the combination of armour, infantry, artillery, and aircraft to counter Russian battalions and brigades advancing into Ukrainian territory. However, due to the novelty of this conflict and the fact that it is still ongoing, the amount of factual and credible information regarding the Ukrainian strategic, operational, and tactical objectives still needs to be determined. Consequently, only in hindsight will we be able to determine the exact nature of these objectives.

Battle

Russian Forces

The next paragraph elaborates on the actual course of Russia's invasion of Ukraine. The paragraph provides insight into the implementation of Russian military doctrine and the tactical deployment of tanks in this offensive. The focus will be on the deployment of armoured units and their role in the offensive.

The Russian Offensive started on the 24th of February, 2022, with a missile shelling of designated targets such as airports, among other significant military infrastructure (Haider, 2023, p. 47). After this shelling, a combined aerial and terrestrial thrust into Ukraine started. This attack was spearheaded by low-flying helicopters and aircraft-dropping paratroopers to capture significant targets. The terrestrial thrust consisted of entering armoured convoys and advancing along designated lines towards their assigned targets, Kyiv and Bakhmut, among others. These armoured convoys, expecting little resistance, advanced towards cities with minimal preparation (Aylward, 2022).

Consequently, when these convoys were met with stiff pockets of resistance, their poor preparation resulted in them being walloped and sustaining serious losses. The supply lines were also in danger because of the swift advance, which left them insufficiently protected. Consequently, the Russian army lost artillery, electronic warfare, and air defence coverage, further exacerbating logistics issues. Moreover, this left the Russian soldiers vulnerable to being cut off, stranding the convoys without fuel, food, and ammunition. Furthermore, the convoys often consisted of armoured vehicles protecting military transport vehicles and carrying supplies. However, the infantry, artillery, and aircraft protected the armoured vehicles insufficiently.

Consequently, NLAWS, Javelins, and other ATGMs attacked many armoured vehicles destroying, damaging, or forcing crews to desert the vehicles (Kaplan, 2022). Many of these tanks had already been abandoned by their crew, because of supply issues, for example, a lack of fuel or ammunition, thus rendering the tank useless (Aylward, 2022).

Although the Russian advance went difficult, it initially proved effective enough to conquer territories in Kharkiv, Luhansk, Donetsk, and Kherson Oblasts (Jones et al., 2022). The advance changed when volunteers and conscripted citizens bolstered Ukrainian ranks. Moreover, the West started importing ATGMs, tanks, aircraft, and ammunition supporting Ukraine. Especially these state-of-the-art ATGMs proved a formidable opponent to the Russian convoys and their poor protection (Kaplan, 2022). After months of conflict, by the autumn of 2022, the initiative shifted to the Ukrainian forces, who regained significant territories, formerly lost to Russia. After the summer of 2022, the Russian offensive largely halted and, in some areas, repulsed. Therefore, the conflict quieted down for the time being. This period of relative quiet established a new status quo in Ukraine until a new Russian offensive or Ukrainian counter-offensive was launched sometime in the spring of 2023.

In conclusion, this Russian lack of proper preparation, effective deployment, and the improper implementation of combined arms warfare became a serious problem when stiff Ukrainian resistance appeared. Subsequently, the Russian offensive halted. The Ukrainian counter-offensive is pushing Russian forces slightly back, using their Western aid. However, until a conclusive end to the offensive is reached, the status quo remains today.

Ukrainian Forces

This paragraph deals with the actual course of Russia's invasion of Ukraine. This approach provides insight into the Ukrainian response to the Russian invasion. The focus will be on the deployment of armoured units and their role in the offensive. Additionally, the role of antitank-guided missiles, mobile field artillery, and drones will be focused on, considering they were used to great effect on Russian tanks.

The shock of the Russian offensive caught the Ukrainian forces somewhat off guard, resulting in initial losses (Militaire Spectator, 2023, p.107). However, the Ukrainian army has been arming and preparing itself since the annexation of Crimea. Consequently, the army responded effectively after a couple of days. The response consisted of the effective and efficient moving and distributing of effective means to buy time. This time bought by the professional army's Elite units, who protected Kyiv. Meanwhile, the rest of the army could regroup, reorganise, and take positions. After this swift but necessary respite, Ukrainian forces mounted a proper defence. This defence consisted of harassing the Russian convoys with the help of Western ATGMs, such as the Western Javelin, NLAW, and the Ukrainian Stugna-P (Kaplan, 2022). Drones, such as the Predator, Reaper, and Switchblade, effectively delayed the Russian advance. These ranged weapons proved effective against the Russian convoys because they lacked infantry support.

Moreover, Ukrainian forces could halt the Russian advance by implementing precise artillery shellings on Russian convoys and positions (Militaire Spectator, 2023, p.107). The lack of sufficient Russian infantry and artillery support aided the Ukrainian artillery units in these attacks. Swift, well-coordinated, hit-and-run attacks enabled the Ukrainian forces to damage Russian positions and convoys severely. Additionally, the lack of sufficient Russian aerial cover proved advantageous for Ukrainian artillery attacks, considering the Ukrainian artillery was at a relatively safe distance.

Furthermore, the Russian air force has thus far been unable to establish aerial superiority, even though it seemed successful in the first days of the invasion (Haider, 2023, p. 47). It did not partake in a combined arms operation except for the initial days of the invasion. Also, the Ukrainian surface-to-air defence systems, especially the TB2 UCAVs, have proven effective against the few Russian fighter jets that participated in the offensive



Figure 12: U.S. Javelin ATGM (U.S. Army Missile Command, 1990).

(Haider, 2023, p. 49). In combination with this defence system, the Ukrainian air force has been able to keep Russian attempts at aerial superiority at bay. After a six-month preparation and significant aid from the West, Ukraine has started its counter-offensive (Balmforth, 2023). This offensive has seen the Ukrainian forces recapture parts of Kherson and Kharkiv (Balmforth, 2023). The Western tanks are used in the counter-offensive and prove their worth as they push the Russian forces back (Balmforth, 2023).

In conclusion, Ukraine's aid from the West was supplemented by its armament over the past decade, but, most significantly, the poor Russian implementation of combined arms warfare has proven advantageous for Ukraine. Western support is increasing, the momentum rests with Ukraine, and its counter-offensive is rumoured. Only time will tell how this conflict is going to unfold itself.

Post-Battle

What are the differences between the pre-and post-battle scenarios? What can we learn from the pre-battle strategy compared with the actual battle unfolding? The focus is on the initial Russian deployment of tanks, its mistake concerning combined arms warfare, and the significance of safe supply lines. Furthermore deals with the significance of antitank-guided missiles, drones, artillery, and air cover, as this conflict proved their value on the battlefield once more.

First and foremost, we observe the poor implementation of combined arms warfare, particularly regarding the deployment of tanks (Aylward, 2022). The Russian armoured convoys were meant to penetrate Ukrainian territories to capture Kyiv, but the other three branches insufficiently supported them. The failure was because of insufficient operational planning. They were executing the offensive hastily, resulting in a poor outcome—the coordination between aerial and terrestrial forces needed improvement. Subsequently, the long convoys were unprotected from aerial and terrestrial attacks.

Moreover, due to the decision to start an offensive in many parts of Ukraine simultaneously, many units needed to prepare for such a complex operation (Aylward, 2022). Consequently, many armoured units, in particular, needed more supplies for the offensive. This approach translated in many armoured vehicles stranded and abandoned by their crew, eventually often destroyed after Ukrainian forces could not claim these vehicles.

Secondly, the Russian offensive was assumed to need more resistance. Therefore, it started suddenly with insufficient preparation. The convoys advancing into Ukraine were poorly protected and stretched out too thin. Aerial pictures show single-line convoys stretching over 60 km, as shown in new features last year. This length meant that the already insufficient protection was stretched even thinner.

Consequently, the Russian supply lines came under enormous pressure from Ukrainian artillery and infantry. This pressure resulted in vehicles and the military not receiving the fuel, ammunition, and food necessary to continue the advance. Many undamaged vehicles had to be abandoned by their crew because they were inoperable. Some units even destroyed their vehicle so they could not be used against them.

Thirdly, the convoys did not have proper infantry support, which translated to them being easy prey for ATGMs, drone strikes, and artillery shellings (Militaire Spectator, 2023, p.107). These ranged weapons are designed to hit vehicles. Sufficient infantry accompanying these convoys would mean the ability to scout ahead and spot potential ambushes before they could unfold (Aylward, 2022). The infantrymen can take these units out to inform the tanks of their location so they can shell the enemy units. Consequently, these Ukrainian units' effectiveness and ATGMs could be significantly reduced.

Furthermore, artillery would prove instrumental if the infantry units were to miss artillery positions or units with ATGMs and the convoys came under fire. Mobile artillery units could suppress light artillery, especially ATGM units, with mortar fire. These units would allow the tanks and infantry to mount a counter-attack while temporarily protected by the artillery units. The consequences of neglecting these two vital aspects of combined arms warfare proved to be one of the reasons Russian forces lost many of their armoured vehicles (Aylward, 2022).

Fourthly, the lack of proper air support meant convoys were vulnerable to long-range artillery fire, ATGMs, drones, and aerial attacks by manned vehicles. Drones can execute top-down attacks, to which armoured vehicles are extra vulnerable (Kaplan, 2022). When properly deployed, air support covers these drone strikes, allowing armoured vehicles to penetrate enemy territory. Similarly to the infantry and light-mobile artillery, aircraft can suppress enemy fire if the latter fails. This suppression means that aircover protects armoured vehicles from aerial bombardments, drone strikes, and ground-based ranged weapons such as ATGMs. However, the Russian air force's insufficient coordination and deployment left the terrestrial offensive without air support.

Consequently, the Ukrainian forces could use their ATGMs, drones, and precise artillery fire to harass the armoured convoys and halt the Russian advance. Moreover, the Russian air force has thus far been unable to force aerial superiority. They were subsequently forcing its terrestrial forces to retreat and lose momentum. The Ukrainian counter-offensive of late 2022 and 2023 slightly pushed back the Russian forces, recapturing lost territories (Balmforth, 2023). However, due to Ukraine's information black-out policy, military strategists and academics cannot determine the offensives objective.

Moreover, although the offensive looks promising, it is too soon to tell whether it is successful. Lastly, regarding Western tanks and their role in the offensive, sources have confirmed that they have been incorporated into nine Ukrainian armoured brigades. However, their deployment and role remain unknown (Balmforth, 2023).

In conclusion, the Russian invasion of Ukraine has proven detrimental to Russian armoured vehicles, tanks especially. However, this has more to do with Russia's poor implementation of combined arms warfare, insufficient preparation for an offensive of this size, and an overcomplicated and poorly executed operational plan. These factors, more than anything else, made tanks look obsolete. Nevertheless, this does not mean tanks are outdated; they need to be implemented according to proper combined arms warfare to be effective.

Conclusion

The Russian-Ukraine war continues to draw attention around the world. The difference between the expected performance of the Russian military and the actual performance shocked many. Especially the shockingly poor performance of the armoured vehicles, tanks in particular, went viral on social media and news outlets. Many deemed the tank obsolete, similar to the Yom Kippur War of 1973.

Although Russian armoured convoys have suffered great losses, above all significant tank losses, the real problem lies once more with the improper implementation of combined arms warfare on the operational and tactical levels. On the operational level, the Russian forces needed to prepare for an offensive of this scale. This preparation translated into armoured units consisting of inexperienced, ill-prepared crews who were unable to accumulate the necessary materials needed to maintain the vehicle during the campaign. On the tactical level, the tanks needed more infantry, artillery, and aircraft support. This lack of

support meant they were increasingly vulnerable to attacks by Ukrainian ATGMs, drones, and artillery.

Additionally, the supply lines of these convoys were stretched thin, and they came under enemy pressure, resulting in the inability to supply the already insufficiently prepared units sufficiently. Consequently, these armoured units were forced to abandon their vehicles due to the inability to move or repair them, even going as far as to destroy them so they would not fall into enemy hands. If this was not the case, Ukrainian units picked off the poorly protected tanks using anti-tank ranged weapons. In conclusion, much like the Yom Kippur War, the tank itself is not so much the problem as the poor implementation of combined arms warfare.

Chapter VII Discussion

Introduction

This chapter discusses the findings of the paper. Firstly, it summarises the results of the analysis. Secondly, the interpretations are assessed, clarifying the results to answer the research question. Thirdly, it discusses the implications of the results, providing insight into the contributions to the field of tank warfare. Fourthly, the limitations of the analysis are discussed. Lastly, based on the limitations, some recommendations are given for improving future research into this area.

Findings

In this paper,

I researched three decisive tank battles during the last century with the question of if, and if so, why the deployment of tanks contributed to the final outcomes of these battles in order to assess the relevance of the use of tanks in strategic offensive warfare in the ongoing Russian-Ukrainian war.

The descriptive parts of this paper show a major trend in deploying tanks on the battlefield: the crucial significance of combined arms warfare. Tanks are most effectively deployed with the support of other military branches. The Battle of Cambrai in 1917 initially showed tanks as supporting infantry. However, the tanks were meant to be supported by the infantry, so they could use their penetrating power and firepower to create breakthroughs in the enemy trenches. Although the Allies made significant gains due to the *en masse* tank charges at Cambrai, they could not hold on to these gains. However, tanks' contribution in WWI is to be recognised because the deployment of tanks eventually broke the deadlock of trench warfare and ended the conflict. The contribution of aircraft to offensive warfare during WWI needed to be more significant to influence tank warfare. Nonetheless, Fuller and Guderian anticipated the future significance of aircraft and tank cooperation in line with combined arms warfare. Thus, tanks proved their value as a powerful weapon in offensive warfare.

The Battle of Kursk in 1943 proved many theories by Fuller and Guderian right, especially the implementation of a combined arms strategy. The *Wehrmacht's Blitzkrieg* tactic had proven successful in the initial campaigns during the first half of WWII. The combination of aircraft, tanks, artillery, and infantry working together to penetrate and surround enemy positions proved highly effective against regular defence lines. However, the already battered and the *Wehrmacht's* depleted Eastern Army Groups proved no match for the Soviet Deep Battle Doctrine and the overwhelming numerical superiority of the Red Army. Although the *Wehrmacht's* armoured divisions tried their best to implement *Blitzkrieg* tactics, they could not penetrate deep enough into Soviet lines to perform pincer movements and surround them.

Moreover, the *Luftwaffe* was unable to achieve air superiority. Hence, it could not assist the *Wehrmacht's* tank effectively. Consequently, the *Wehrmacht* lost the Battle of Kursk. In conclusion, the *Wehrmacht's* offensive was lost due to the inability to perform a comprehensive combined arms offensive and severe numerical inferiority. Therefore, the loss

of the battle was not so much due to poor tank performance but to the inability of the Army Group to perform a sufficient combined arms offensive.

The Yom Kippur War in 1973 started under the assumption that the IDF's rapid, unsupported tank charges were enough to suppress the enemy whilst IAF aircraft secured the skies. However, this strategy proved futile because it did not achieve air superiority due to an integrated air defence system. Subsequently, the tank charges, unsupported by infantry and aircraft, encountered antitank-guided missiles and artillery fire. These charges resulted in the destruction of Israeli tanks and halting the Israeli advance. After this initial failure, the IDF and IAF reverted to conventional combined arms warfare.

Consequently, the Israeli forces penetrated the Egyptian defence and destroyed their IADS, enabling the IAF to perform coordinated combined arms operations with the IDF. The contribution of tanks to the war's outcome was vital because, without the penetrating power and firepower of the tanks, the IDF would not have been able to break through Egyptian lines and create room for the IAF. However, one must stress the significance of properly implementing a combined arms strategy. With this, tanks will perform effectively on the battlefield.

The Russian-Ukrainian war, especially the recent Russian invasion of Ukraine in 2022, has once more proven the significance of proper combined arms warfare. The Russian forces have thus far yet to make significant progress in their conquest of Ukraine. Russian tanks encountered well-defended positions, effective ATGM attacks, and stiff resistance. Because the Russian forces did not anticipate stiff resistance, this halted their advance, marked by poorly supported and overextended armoured convoys. These factors culminated in severe Russian casualties and the massive destruction of tanks, eventually culminating in the shifting momentum from Russia to Ukraine. Only time will tell if the Russian forces can recover as the Israeli forces did in 1973. The novelty of the Ukrainian counter-offensive and the information black-out policy prevent definitive information on how Ukraine uses its tanks in the conflict. Although the Russian forces have faced some defeat, it is too soon to determine the role of Ukrainian tanks. Therefore, the Russian and Ukrainian tanks' contribution to the war's outcome cannot be definitively stated because the conflict is ongoing and thus has yet to have a clear outcome.

Discussion

The most significant trend noticed throughout the analysis of the historic three battles and the ongoing Russian-Ukrainian War is the importance of combined arms warfare for the contribution of tanks to the outcome of any battle. The tank is a large, heavy, and mobile artillery piece, but without the support of other military branches easily incapacitated by artillery, infantry, and aircraft. The tank alone cannot perceive, outmanoeuvre, and repulse these other branches on its own. However, if supported by infantry, these supporting units can sweep minefields, suppress ATGM units, and aid the tank in perceiving enemy tanks, aircraft, and artillery. Furthermore, add artillery to the support, and these armoured divisions are covered from behind by artillery and will be able to call in an artillery strike or a creeping barrage.

Moreover, they can then perform counter-artillery barrages on enemy batteries to suppress enemy artillery fire and cover advancing tanks. The air force could attack enemy artillery positions while out of reach of its artillery. Consequently, it suppresses enemy artillery fire and protects its tanks from enemy aircraft and ATGM units out of infantry and artillery range. Similar to the first phase of the Yom Kippur War, the other military branches poorly protected the advancing Russian tanks. Combined with supply, preparation, and

internal problems, this culminated in a failed initial advance into Ukraine. Suppose Russia wants to win the war with Ukraine. In that case, it has to start implementing a comprehensive combined arms warfare doctrine, reflecting on the operational and tactical level in deploying supported armoured divisions. This implementation would reflect the tactics in the first phase of the *Wehrmacht* in WWII and of those of the Red Army at Kursk.

Additionally, with the arrival of new Western-style Leopard-2 tanks from Germany, Challenger 2 from the U.K., and M1 Abrams from the U.S., replenishing the Ukrainian tank battalions, Ukraine should be able to mount a more proficient defence against Russia (Jazeera, 2023). If the Ukrainian forces can deploy these new vehicles in combined arms operations, this could translate to combining aircraft and tanks to attack Russian artillery positions or supply convoys. However, meeting Russia's still significant tanks force head-on might not be the most strategic approach for Ukraine. The current tactics seem to accomplish smaller victories for the Ukrainian forces; hence, optimising their current strategy with these new tanks could be the most effective path forward. However, this is still speculation. Only time will tell how Ukraine will deploy these tanks and how proficiently its new crew can operate these vehicles in battle.

In conclusion, tanks still contribute significantly to the outcome of contemporary armed conflicts but must be deployed in combination with other military branches to perform optimally. Therefore, the relevance of tanks in contemporary warfare still needs to be understated. In the words of Australian Maj. Gen. Kathryn Toohey in 2019:

“Tanks are like dinner jackets. You don't need them very often, but when you do, nothing else will do.” (Kaplan, 2022).

The relevance of tanks on the contemporary battlefield can be seen as the continuation of warfare, as we have known it since WWII. Of course, the competition between armour and firepower will continue, much like it did during the military revolution of the sixteenth century. As for now, it is too early to dismiss tanks (Aylward, 2022). Furthermore, alternative outcomes concerning the future of warfare ought to be made based on something other than an ongoing war. The Russian deployment of tanks is not necessarily a guaranteed prospect for future conflicts. Moreover, the ongoing Russian-Ukrainian conflict means there is still much about this war that has yet to be discovered from open sources. Therefore, the factors that distinguished the early stage of the conflict might be insignificant in the future.

Consequently, specific weapon systems may appear incapable in certain situations due to poor usage. This poor deployment does not mean the weapon cannot perform its task effectively. Hence, for the foreseeable future, the nature of armoured warfare will likely not alter drastically. This conclusion means that the conflict in Ukraine will likely be fought similarly to the recent Nagorno-Karabakh War, when Russia failed to implement a proper combined arms strategy. As stated in the article by Aylward:

“The available data from Ukraine, as well as the recent war in Nagorno-Karabakh, indicate that tanks are still critical in modern warfare and their vulnerabilities have been exaggerated.” (Aylward, 2022).

Therefore, only the outcome of the war in Ukraine, as well as the future implementation of combined arms wars, the deployment of tanks, and the development of anti-tank weapons, will indicate in what direction the use of tanks on the future battlefield will evolve. This paper concludes that the role of tanks is still significant, although heavily reliant on sufficient support from other military branches if used optimally.

Limitations

The paper concludes that tanks are still relevant in contemporary warfare based on their contributions to three historical battles and the ongoing Ukraine conflict analysis. Furthermore, the paper displays the significance of combined arms warfare for the optimal deployment of tanks. The tank's effectiveness in warfare is highly dependent on this strategy, as showcased in the Yom Kippur War of 1973. However, the academic, military, and historical sources necessary for an in-depth study of this subject are insufficient because of the ongoing Russian-Ukrainian War. This situation culminates in a Gordian knot. Only time can cut.

Moreover, the conflict is still ongoing, so an outcome has yet to be. Therefore, definitive conclusions regarding the performance and contribution of tanks still need to be drawn. Lastly, the emphasis was on analysing the relevance of tanks in the Russian-Ukrainian War. Consequently, the paper does not consider other current armoured conflicts and the role of tanks in those. Hence, to provide a more comprehensive picture of the relevance of tanks in contemporary warfare, besides the Russian-Ukrainian War, such as more recent and ongoing armoured conflicts should be analysed. Nonetheless, given the limited information available, the paper does provide a tentative answer to the research question. It presents a comprehensive analysis of tank warfare over the last century and highlights its continued significance on the contemporary battlefield in Ukraine.

Recommendations

The practical issues in answering the research question come with several difficulties. Firstly, warfare is not something a complex endeavour. Therefore, one cannot just implement theories concerning armoured warfare. These theories can only be tested when an actual armoured conflict erupts or is ongoing. Therefore, the situation in Ukraine is ideal for the practical implementation of this research. This ongoing conflict provides researchers, military personnel, and academics with data to further investigate and implement combined arms warfare and see if tanks are still relevant in practice.

Furthermore, future research could include the outcome of the conflict when it has ended. The information available in hindsight will be much larger than in this study. Hence, the research will be more comprehensive than this one. Therefore, the recommendation for improving future research into this academic area is to collect as much data as possible during the duration of the conflict. After the conflict, the amount of information should have increased sufficiently, enabling researchers to analyse more complete data. This more complete data set will lead to a more comprehensive answer to the research questions. Additionally, this will establish a more complete perspective on this academic area and provide a clearer perspective on the future of tanks in warfare.

Conclusion

The chapter answered the research question by concluding that tanks are still relevant on the contemporary battlefields of Ukraine. This chapter may mean that the nature of contemporary warfare will remain the same in the foreseeable future. Moreover, tanks remain a significant aspect of contemporary warfare, and their deployment is problematic rather than their inherent flaws. Furthermore, the shortcomings of the research, such as the shortage of academic data and the fact that the conflict is still ongoing, inhibit the drawing of a definitive

conclusion. Therefore, the recommendations are to continue gathering data to enable comprehensive research to be undertaken when the conflict has ended.

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