**- PRE-PRINT ENGLISH-LANGUAGE VERSION -**

Panzerkampfwagen VI ‘Tiger II’

ALARIC SEARLE

**THE ULTIMATE HEAVY TANK?**

The Tiger II tank was, in many ways, the ultimate heavy tank of the Second World War. It weighed 54,500kg without its turret; and, with the ‘Serien Turm’ its total weight reached a staggering 69,800kg. With frontal sloped armour of 150mm, and even tougher 150mm armour on the mantlet, the tank was virtually indestructible if facing head-on fire from tanks of the Western Allies. There are, in fact, no known cases of a single Tiger II being knocked out from a shot to its frontal armour in northwest Europe, 1944-45. Its battlefield performance on the Eastern Front looks impressive enough: The *Schwere Panzerabteilung* (Heavy Tank Battalion) 503 claimed approximately 500 kills between January and April 1945 for the loss of 45 Tiger II machines (these losses were often due to factors other than direct enemy action). The question which is still debated, however, is whether such a machine which was so expensive in terms of development and production costs was a better investment than simply producing more of other models, such as the Tiger I, Panther or Panzer IV.

**DESIGN AND DEVELOPMENT**

The history of the Tiger II has been traced back to a meeting between Hitler and civilian and military officials from the Armaments Office (*Waffenamt*) on 26 May 1941 at which the need for a heavy tank was debated. As well as the requirement of a speed of at least 40 kmph, and very thick armour, much of the discussion focused on improving the effectiveness of the existing 8.8cm K.w.K. gun. Hitler was to make clear that he wished the 8.8cm Flak 41 gun mounted in the turret of the planned heavy tank, which created considerable design problems due to the length of the gun. In late July 1941, the two companies of Krupp and Rheinmetall received a contract to present design proposals for a turret which could mount the 8.8cm Flak 41 gun on the heavy tank design which was being worked on.

A further impetus, however, came at a meeting of the *Panzerkommission* on 29 November 1941 at which the results of an examination by civilian tank experts of captured Russian T-34 tanks were discussed. With Hitler present, it was concluded that the T-34 and KV-1 machines were too far ahead of the German medium tanks, so that simple upgrades of the Panzer III and Panzer IV would not adequately address Soviet superiority in tank design. With an acceleration of the German tank development programme now considered urgent, new companies were required to expand production. The company of Henschel, based in the city of Kassel, originally a manufacturer of buses and locomotives, now had the opportunity to move into tank production. It had already become involved in the Panzer IV upgrade, but soon received the lucrative contract to share in the manufacture of the Panzer V but also the Tiger I, Tiger II and *Jagdtiger* assault gun.

The decision to produce the Tiger II was finally made in August 1942, the month when the contract was offered to armaments firms. Henschel and Porsche were the two competing companies, with the former securing the contract. The decision in favour of Henschel was reached in January 1943, while Krupp was contracted for the development of the 8.8cm K.w.K. 43 (L/71) gun as well as the first design for the turret. Henschel sought to bring together certain design features of the Panther (which used elements of the T-34, wide tracks and sloping frontal and side armour) with those of the Tiger I, a decision which led to further delays, so that the first prototype was not completed until October 1943.

 The technical complexities surrounding the design and development of a heavy tank, mounting a long-barrelled 8.8cm gun in a turret, meant that the name Tiger II only appeared in official documents for the first time on 16 March 1943. This new designation replaced the Tiger H3 references, in what was up until this point still an early prototype. Nonetheless, the official designation was in rather more typical German military language – *Panzerkampfwagen Tiger* (8.8cm), Sd.Kfz. 182, or Ausführung B to distinguish it from the Tiger I; in addition, in an order of 2 June 1943, a command vehicle also appeared in the documents, which ran under the designation *Panzerbefehlswagen Tiger* Sd.Kfz. 267 and 268 (Ausführung B). The term *Königstiger* (King Tiger) was first employed in January 1945, but only as a colloquial short form; it was never used as an official designation. Following existing German tank practice, the command vehicle was planned in two versions. While both were to be equipped with the FuG 5 10-watt transmitter, the Sd.Kfz. 267 was to carry in addition the FuG 30-watt transmitter, which required the Star Antenna 2, whereas the Sd.Kfz. 268 was to receive the FuG 7 20-watt transmitter, served by a 1.4m rod antenna mounted on the rear deck.

 Operated by a five-man crew (commander, driver, loader, gunner and radio operator), by any measure the Tiger II was a formidable tank. It had a top speed of 41.5 km/h and an average cross-country speed of 15-20 km/h. For a vehicle its size and weight, this was a very respectable performance. Moreover, its ability to cross obstacles and traverse undulating terrain was as good, if not better, than the majority of German tanks. Fuel consumption was heavy, while its maximum range was 170km at cruising speed. The most significant problem facing the Tiger II was its unreliability in the early production version, mainly caused by leaking seals and gaskets, and the drive train, originally designed for a lighter vehicle. What was impressive, however, was its battlefield survivability due to the thickness of its armour, combined with the power of its main gun.

**PRODUCTION HISTORY**

One of the key considerations in passing judgement on the value of the Tiger II to German operations in northern and eastern Europe is the number of machines envisaged compared to the number eventually produced. In October 1942, 176 Tiger II tanks were ordered from Henschel, raised later to 350 machines. Further orders brought the total number projected to over 1,500. The first tank was accepted by the Inspector of Armaments in November 1943; the first five combat machines were produced in January 1944. Until production ceased entirely in March 1945 as the German war industries disintegrated under the strategic bombing campaign of the Western Allies, or the factories were overrun, 489 production series Tiger II tanks rolled off the assembly lines, as well as three prototypes. In other words, less than a third of the original number of tanks ordered were actually produced.

 The main reason for the disparity between the tanks produced and the number ordered, quite apart from the growing shortage of raw materials in Germany in 1944/45, was a series of devastating Allied air attacks on German factories. Henschel suffered from five separate bombing raids on its production facilities on 22, 27 and 28 September and 2 and 7 October 1944. A further raid on 15 December 1944 disrupted the attempts to repair the extensive damage caused. Other raids on 22 and 23 October 1944, and between 30 December 1944 and 1 January 1945, saw production sink to 40 tanks in January, 42 in February and 30 in March 1945. Given the technical complexity of the Tiger II, it can be speculated that the threat of Allied bombing raids did not seem to have featured in the original decision to pursue the building of a heavy tank.

**COMBAT CAPABILITY**

The capabilities of the Tiger II do, though, give some indication as to why the Germans pursued the production of the tank, despite all the difficulties which they encountered. The 8.8cm 43 (L/71) gun differed from the 8.8cm gun mounted on the Tiger I. The cartridge size was double that of the cartridge for the Tiger I. The round was of a similar size, but the velocity of the L/71 gun when fired was far greater, allowing it to knock out most Allied and Russian tanks at ranges of up to 3km. It possessed a high level of accuracy. Four types of round were carried: two were armour-piercing tungsten core (the Panzer Granate 39/40 and 40/43), the third was high-explosive, the fourth hollow charge. In addition, it was armed with two M34 machine-guns. A third machine-gun could be added to a bracket fitted to the commander’s turret to provide some form of anti-aircraft defence. A close defence weapon system was fitted to the turret which could fire explosive, smoke or flare rounds. The thickness of the armour was a further notable feature: with a glacis plate 150mm and nose 100mm thick, the angled sides were 80mm; the Serien-Turm was 110mm at the front, 80mm at the sides and rear, with 40mm on the roof. The driver’s periscope could be rotated.

 During the course of its production, numerous modifications were undertaken. The most important of these were directed towards improving the engine and the tank’s automotive reliability; some modifications were dictated by growing shortages. In February 1944, the exhaust pipes were bent away from the engine to prevent the exhaust gases from being sucked into the engine cooling system. In June 1944, the deep-fording equipment was discontinued after it was discovered that a 16-ton engineer bridge could carry the weight of the Tiger II. Perhaps the simplest modification, but the most effective, was introduced in July 1944 with the inclusion of hangers and fasteners to the turret. This enabled spare track to be hung around the turret. This was not only a useful way of carrying spare track, it also provided additional turret protection. In September 1944, an order was given that the Zimmerit anti-magnetic mine coating was to be discontinued due to fears that it could catch fire when hit by shells. These were but some of the numerous modifications.

 The size of the vehicle presented its own problems when it came to rail transportation. In order to send Tiger II tanks to the front, the 80cm tracks used for cross-country movement needed to be exchanged for 66cm wide tracks which would allow it to fit on a rail wagon. It was also necessary to remove the side-skirts to enable each tank to be loaded for rail transport. In other words, the Tiger II had reached the absolute limits of what was possible for a heavy tank. A further issue was the lack of any recovery vehicle based on the Tiger II chassis. As the heaviest tank in the German inventory, it posed serious recovery and hence repair problems for its crews. Many Tiger II machines had to be abandoned if they broke down.

 The armour thickness of the front hull was supplemented by the angled front glacis plate which added to the protection against anti-armour shells. If the front of the vehicle was essentially invulnerable to tank shells, the sides of the hull and turret were weaker, but still provided a reasonable level of protection. Captured vehicles subjected to tests by the Red Army in 1944 revealed just how robust the tank was: attempts by a T-34/85 to penetrate its frontal armour at 300m were unsuccessful; Russian 76mm guns also failed to penetrate either the hull armour or turret sides. The Red Army tank with the best chance of knocking out the Tiger II was, not surprisingly, the Josef Stalin II tank with its 122mm gun.

**THE TIGER II IN COMBAT**

With some obvious strengths and weaknesses, how did the Tiger II acquit itself on the battlefield? But the early history of the tanks sent to the front was essentially one of automotive failure. The first five tanks were sent to the Panzer Lehr Division in northwest Europe, arriving in March 1944, but had to be destroyed before they could even engage in combat due to their poor automotive condition. The first dedicated Tiger II unit, the *Schwere Panzerabteilung* (Heavy Tank Battalion) 501, which was sent to the Eastern Front, arrived with only eight out of 45 machines operational, largely due to the failure of certain components. The second dedicated Tiger II unit, the *Schwere Panzerabteilung* 505, which received its tanks in July and August 1944, experienced three new Tiger IIs burning due to leaks in the engine compartment, with other machines suffering less catastrophic fires. The 505th had to work with Henschel representatives to help correct the technical difficulties which had emerged. Vehicle reliability gradually improved, however, as the early problems were ironed out and modifications introduced on a rolling basis. Better trained drivers, as well as improved maintenance techniques, led to units reporting operational reliability close to that of the Panzer IV and superior to the Panther V.

 Tiger II machines were only issued to heavy tank battalions of the German Army or the Waffen-SS, presumably to provide commanders with a form of powerful reserve and to streamline logistics. In the West, a total of 194 Tiger II tanks were issued to units which fought against the Western Allies. In addition to the Panzer Lehr, the Army Heavy Tank Battalion 503 received 12 Tiger II machines, supplemented by a further 33 Tiger I tanks, following its return from the Eastern Front in late May 1944. It was unloaded at its railhead on 7 July and first engaged in combat on 11 July. Between 12 and 16 July, there were 45 Tiger I and II machines available, with 40 operational on 16 July, with 5 in repair. At the end of the month a further 14 Tiger IIs were sent to the 503rd. By the end of the September 1944, only two King Tigers appear to have survived, although all the evidence seems to suggest that the majority of these tanks broke down, had to be abandoned, or were hit during air or artillery strikes, rather than being knocked out by enemy tank fire. A similar fate was suffered by the 14 Tiger IIs which had been received by 1st Company, SS Heavy Tank Battalion 101, by 1 August 1944; they were all lost during the retreat through France in August and September 1944.

 The Army Heavy Tank Battalion 506 was ordered to return to Paderborn from the Eastern Front to reorganise in August 1944. It received 45 Tiger IIs and was sent westwards in late September 1944. It played a significant part in the repulse of the British airborne operation at Arnhem. It continued to receive replacement tanks until the end of the war: on 20 October, it had 10 operational tanks, with 27 in repair; on 25 December 1944, it had 36 operational tanks, with 11 undergoing repairs; on 15 March 1945, it had 2 tanks operational, with 16 in repair. Two other units equipped with Tiger II tanks were employed in the West. Heavy SS Tank Battalion 501 received 34 Tiger IIs before its despatch to the front on 5 December 1944. Subsequently, a further 11 were transferred to it from another unit. Prior to its transfer to the Eastern Front in late January 1945, the 501st participated in the Ardennes Offensive, losing 13 Tiger IIs during December 1944. The Army Heavy Tank Battalion 507 was engaged in fighting in Germany in March 1945 after receiving a total of 21 Tiger IIs. As a final footnote on the fighting inside Germany, 3rd Company, Army Heavy Tank Battalion 510 and 3rd Company, Army Heavy Tank Battalion 511, received the final 13 Tiger IIs to leave the Henschel factory.

 The employment of Tiger II tanks in the Ardennes Offensive provides some good examples of the problems surrounding their survivability in combat. The first point is that the Tiger II was best used in either defensive fighting, or in offensive situations where it could make use of its gun in long-range engagements. The SS Heavy Tank Battalion 501 suffered its fair share of losses from Allied air attacks. Such attacks were usually not catastrophic, but often led to the need to abandon a damaged machine. Fire from a US Army unit caused a Tiger II to become stuck in a building so that it had to be abandoned. Two tanks of the Third Company were hit multiple times but could still be recovered. On 22 December 1945, two Tiger IIs had to be abandoned due to multiple shell hits. By 28 December 1944, the 501st had lost half its Tiger IIs. The narrow and winding roads in the Ardennes were quite simply not the place to exploit the strengths of a heavy tank of its type.

 In the East, a total of 274 machines were sent to combat units. Heavy Tank Battalion 501 fought as part of Army Group Northern Ukraine from late August 1944 until it was renamed the Heavy Tank Battalion 424 on 19 December 1944. Heavy Tank Battalion 505 arrived in the East on 11 September 1944, registering 38 operational tanks the following day; it received 12 Tiger IIs from another unit in February; on 4 April 1945, it still had 12 tanks operational. Heavy Tank Battalion 503, which was renamed Heavy Tank Battalion Feldherrnhalle on 21 December 1944, detrained in Budapest on 14 October 1944, with an operational strength of 18 (19 in repair) on 1 November 1944. On 5 April 1945, it still had an operational strength of 13 tanks (with 18 in repair). The Army Heavy Tank Battalion 509 had returned to Germany for refitting, finally receiving 45 Tiger IIs, so that it returned to combat in Hungary on 18 January 1945. The SS Heavy Tank Battalions 501, 502 and 503 also operated Tiger IIs in the East in 1945.

 Some Tiger II tanks were involved in the fighting for Berlin in April/May 1945. Two machines, 110 and 314, were engaged in some intense actions around the Potsdamer Platz in the city centre. King Tiger 314 apparently knocked out 39 Russian tanks during the course of the fighting. At the end of April, a group of German civilians and soldiers attempted to break out of the government area and head towards Spandau in the north of the city. Consisting several tracked vehicles, the group was led by Tiger II No. 314. This machine managed to get as far as the Humboldthain Flak Tower where it ran over a German mine, which disabled it. It was abandoned by the crew who, nonetheless, managed to survive the war. Tiger II No. 314 demonstrated the tactical strengths of the machine, but a final verdict requires a broader view of the decision made to produce the tank.

**TECHNICAL TRIUMPH OR DISASTROUS ERROR?**

In reaching a conclusion as to the actual significance of the *Panzerkampfwagen* VI Tiger II, an awareness of the strengths and weaknesses of the tank design provides a starting point. The strength of the Tiger II was clearly its frontal armour and extremely powerful gun which made it, at first glance, almost invincible on the battlefield. The problems facing such a heavy tank, however, became apparent very quickly. In the first instance, its excessive weight reduced its operational mobility as not every bridge could take almost 70,000kg. Whenever a Tiger II broke down, only another Tiger tank or a recovery vehicle could hope to tow it from the battlefield. Furthermore, the production costs of one Tiger II tank were eight times that of a single Sherman tank, which raises the question whether the investment in both the development and production of the machine seen in a wider context was really worth the final battlefield outcome.

 The decision to produce the Tiger II is only fully explained by Adolf Hitler’s tendency to pursue ‘wonder weapon’ projects. This tank was in many ways the product of his belief that a such a machine might help turn the tide of the war in favour of the Third Reich. It could, of course, be argued that the tank was necessary as counter to the likely appearance of a Soviet heavy tank (the first IS-2 tanks were delivered in December 1943). But what Hitler failed to understand was the huge investment in experimentation and development would cause costs to spiral, creating a catastrophic diversion of resources in favour of a machine which would be too late to enter mass production. One might be able to excuse his reasoning in 1941, but in 1944 sending Tiger IIs into the Ardennes battle was an obvious sacrifice of their tactical advantages: on the one hand, there were not the long-range fields of fire found on the Eastern Front, while on the other the tanks would inevitably face the crippling effects of British and American air power. An additional problem was the lack of training for some of the crews in the final months of the war, which further degraded the tactical value of the tanks. While the Tiger II was beyond doubt a technical triumph, and highly effective on the Eastern Front, its history revealed at the same time the irrationality of Nazi Germany’s management of its war effort and tank production programmes.

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