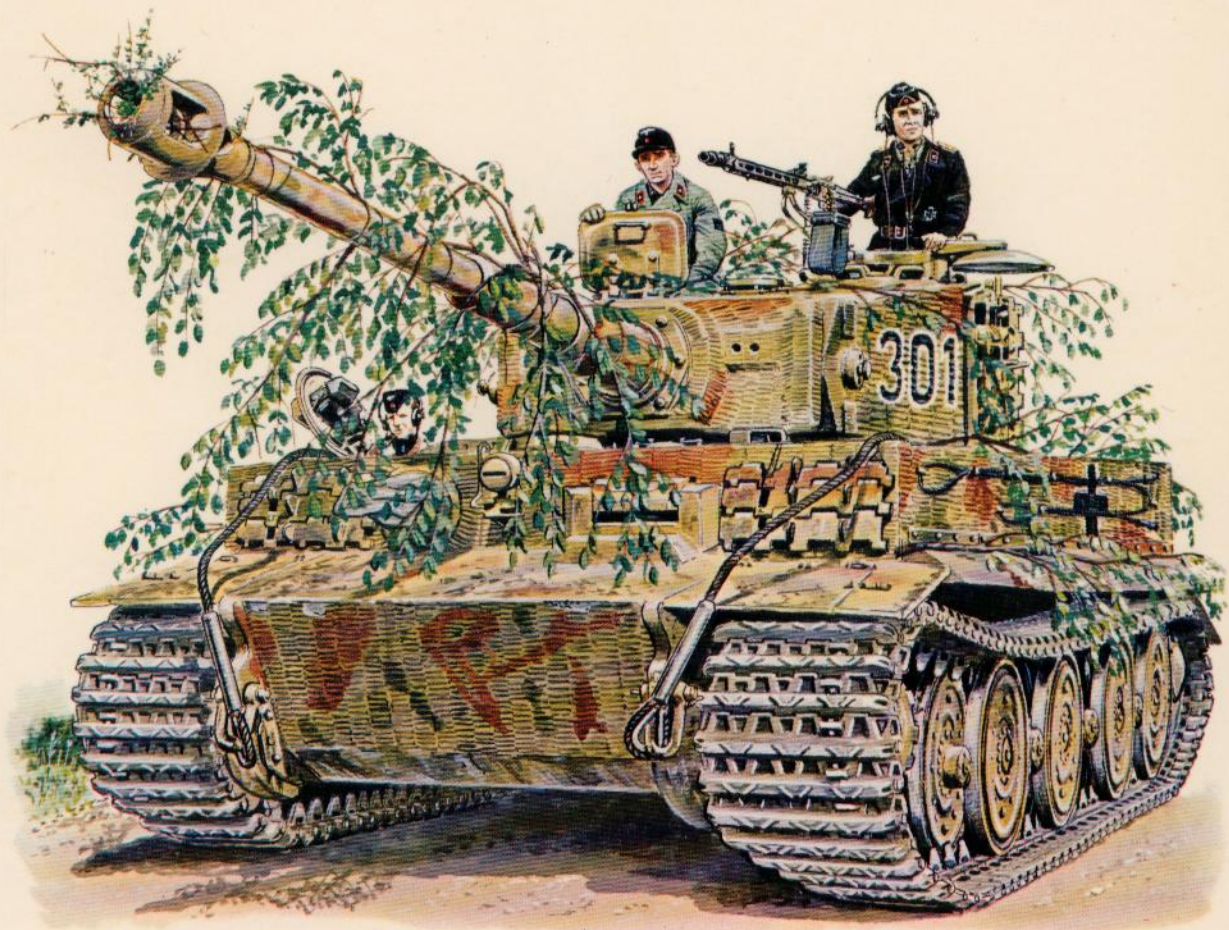


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THE TIGER TANKS



Bryan Perrett

Colour plates by **David E. Smith**

VANGUARD SERIES

EDITOR: MARTIN WINDROW

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Colour plates by DAVID E. SMITH

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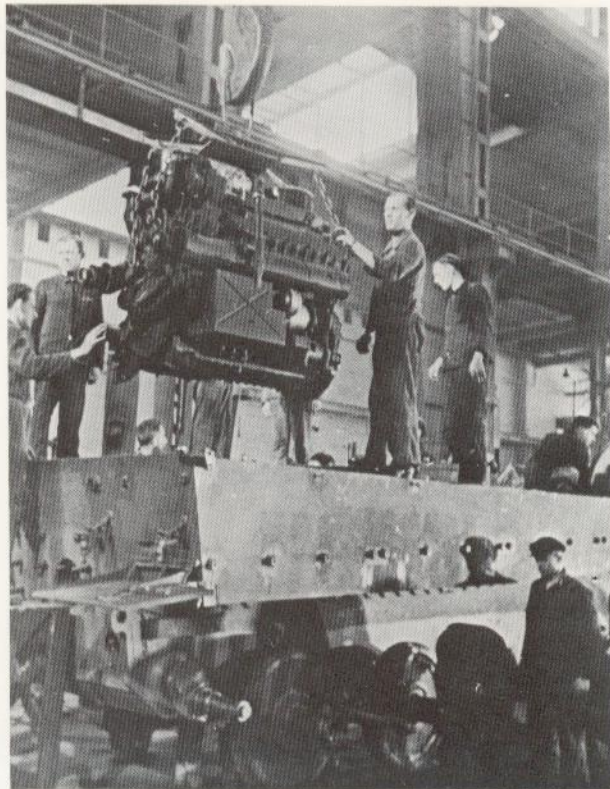
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The Maybach engine being lowered into the completed hull of a Tiger E. (Martin Windrow)



Development History

In the two decades between the World Wars most of the world's major armies dabbled in the concept of a heavy 'breakthrough' tank; the British produced the Independent, the French the Char de Rupture C, the Russians various multi-turreted designs, and the Japanese the Type 91 and 95 Heavies. Germany, officially denied tanks until Hitler's repudiation of the restrictive clauses of the Treaty of Versailles, also produced two versions in 1934 under the transparent title of Neubaufahrzeug (NbFz) or New Production Vehicles, and actually used the few prototypes built during the short Norwegian campaign of 1940, manned by crews drawn from the 4. Panzer-Division. Their major contribution was, however, a propaganda coup achieved by Dr Goebbels' department, which slyly contrived a leak to the effect that the vehicles were a new PzKpfw V, thereby causing some alarm among the Allies who were fully conversant with PzKpfws I-IV but only dimly aware of the existence of the NbFz. (The NbFz were actually classified as PzKpfw VI and PzKpfw VII [Sturmwagen], but Goebbels wisely chose to under-state his case.)

The 'breakthrough' tank belonged properly to the realm of infantry support and thus had no part to play in the basic philosophy of the Panzerwaffe, which relied on concentration, speed and firepower to achieve its aims. Notwithstanding, the concept did have its influential protagonists. By 1937 the NbFz was patently old-fashioned and the Henschel organization was asked to produce a design for a well-armoured vehicle with a weight restriction of 33 tons which could be substituted for the PzKpfw IV in close support role. (This is fully discussed in Vanguard No 18, *The Panzerkampfwagen IV*.) This tank, like the PzKpfw IV, was to be armed with the 75mm L/24 howitzer and reached its final form in the **DW²** (Durchbruchswagen or Breakthrough Vehicle Mark II) of 1940, which had a five-man crew and was carried on a five-wheel torsion bar suspension. At this point the Heereswaffenamt, responsible for the Army's procurement, increased its requirements by specifying a 75mm L/48 gun, tenders for the new design, known as **VK 3001**, being invited not only from Henschel but also from Porsche, Maschinenfabrik Augsburg-Nurnburg (MAN), and Daimler-Benz. The

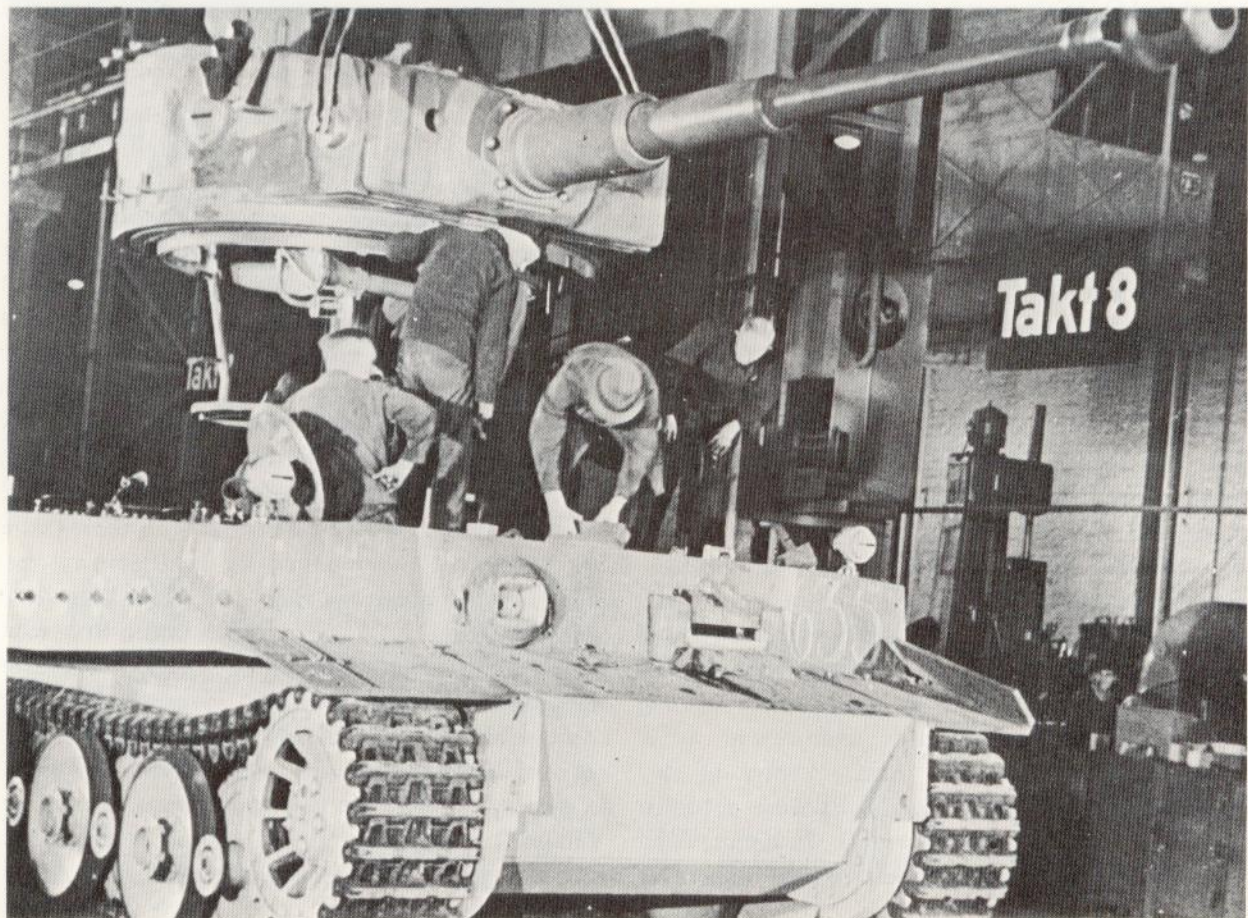
Henschel contender, the VK 3001(H), carried on a seven-bogie interleaved suspension, was overtaken by events; the two chassis built were later converted to Panzerjäger by fitting a 128mm gun, and served on the Eastern Front in 1942.

The position was complicated by a concurrent project, the 36-ton **VK 3601**, the specification for which came from Hitler himself, his remarkable insight into weapons technology not as yet having reached the heights of fantasy to which his manias later gave rise. The VK 3601 called for heavy armour, a high-velocity gun and a top speed of 24.5mph, the need arising directly from the Panzerwaffe's experience against the thick-skinned French Char Bs and British Matildas during the campaign in France. The decision to raise these requirements still further by the revised specification **VK 4501**, calling for the installation of a tank version of the redoubtable 88mm dual-purpose anti-aircraft/anti-tank gun

while permitting an increase in weight to 45 tons, was one of the most remarkable in fighting vehicle history since it was made in May 1941, one month *before* the invasion of Russia and *without* foreknowledge of the qualities possessed by the Russian T-34.

There was, therefore, an element of sycophancy rather than expediency in the directive to manufacturers that they should have their prototypes ready to demonstrate to the Führer on his birthday, 20 April 1942. By now Henschel and Porsche were the only contenders left in the race and in order to meet their deadline both decided to incorporate the better features of their respective VK 3001 and VK 3601 designs. The trials took place at Rastenburg on the date specified, the Henschel machine being adjudged the superior. Quantity production commenced in August 1942, the tank's official designation being **PzKpfw VI Tiger Ausf.H (SdKfz 181)**, re-

Nearing completion. Building a Tiger involved 300,000 man hours and a cost of 800,000 Reichsmarks. (Martin Windrow)





named **PzKpfw Tiger E** in 1944, by which title it is more generally known and referred to hereafter. The Porsche version formed the basis of the Elefant tank destroyer, details of which can be found in Vanguard No 12, *Sturmartillerie and Panzerjäger*.

The Tiger E exceeded the VK 4501 weight specification by over ten tons and was carried on an eight-bogie interleaved torsion bar suspension with a front drive sprocket. It was powered by the Maybach HL230 V-12 700hp engine which produced a top speed of 23mph. Its most striking features were its 88mm L/56 KwK 36 gun and its armour, the latter being 110mm thick on the mantlet, 100mm on the vertical front plate, and 60–80mm on the sides. Two machine-guns were mounted, one co-axially with the main armament and the second in the front plate.

Layout followed the conventional German pattern, the line of drive passing from the engine compartment at the rear through the fighting compartment to the gearbox and thence across the front of the vehicle through an extremely complex final-drive mechanism to the drive sprockets. The commander was located at the

Narrow transit tracks were fitted during construction and were used until the vehicle reached its assigned unit. (Martin Windrow)

left/rear of the turret with the gunner immediately in front of him, the loader being on the right of the gun, his seat facing towards the turret rear. In the driving compartment the driver was separated from the hull-gunner/radio operator by the gearbox. In honour of their special station in life Tiger crews enjoyed the benefit of slightly more comfortable seats than those provided in other German tanks.

Production continued for two years, being terminated in August 1944, by which time 1,350 had been built, only 26 less than had been contracted for, an average of 56 per month with a peak of 104 in April 1944. Great interest was shown in the vehicle by the Imperial Japanese Army, which purchased one through its Berlin agents, Showa Tsucho Kaisha Ltd, at a cost of 645,000 Reichsmarks: there is no record of its delivery.

No sooner had the first Tiger E entered service than plans were put into effect to produce an

even better protected model with a yet more powerful main armament. Most of the main components of the Tiger E's armour were arranged in a vertical plane, but the T-34 had demonstrated beyond doubt that better ballistic protection was provided by any given thickness of armour if it was angled back. Again, it was considered to be of vital importance that Germany should break the cycle in which the Red Army's designers were progressively introducing larger calibre weapons than were available to the Panzerwaffe, and a means of putting her ahead once and for all was available in the high-velocity 88mm KwK 43 gun, which had a calibre length of 71.

Once more, Henschel and Porsche were asked to submit competitive designs. Dr Ferdinand Porsche was a particular favourite of Hitler's and was sufficiently confident that his **VK 4502 (P)** design—a modified version of his earlier entry—would succeed that his organization began manufacturing turrets, which were to have been mounted at the rear of the vehicle. Unfortunately, a major element in the concept was its electric transmission, requiring large quantities of copper, which was in critically short supply in Germany as a result of the Allied blockade, and on this ground it was rejected in favour of the Henschel **VK 4503 (H)**.

The Henschel candidate followed the conventional layout and was standardized as the **PzKpfw VI Tiger Ausf.B (SdKfz 182)**, sometimes referred to as the Tiger II, but known popularly in Germany as the **Königtiger** (King Tiger) and among the Allies as the Royal Tiger. Production commenced in January 1943.

'The first Tiger B was delivered in November 1943. Production models started coming off the lines in February 1944, parallel with the Tiger E; in this month eight Model Bs were produced as compared with approximately 95 of the Model E in the same period. By September 1944 production of the Model B was scheduled to reach a rate of approximately 100 tanks per month, increasing to 145 per month by December and continuing at this rate until August 1945. By this date, if production had been allowed to proceed according to plan, 2,179 Tiger Model Bs were scheduled to have been produced since January 1944 alone

Tiger E commander's position, with shield from roof removed. The auxiliary traverse handwheel can be seen at the centre of the picture, with the rod connecting the cupola 'clock scale' to the turret rack slightly to the left of it. (RAC Tank Museum)

BELOW

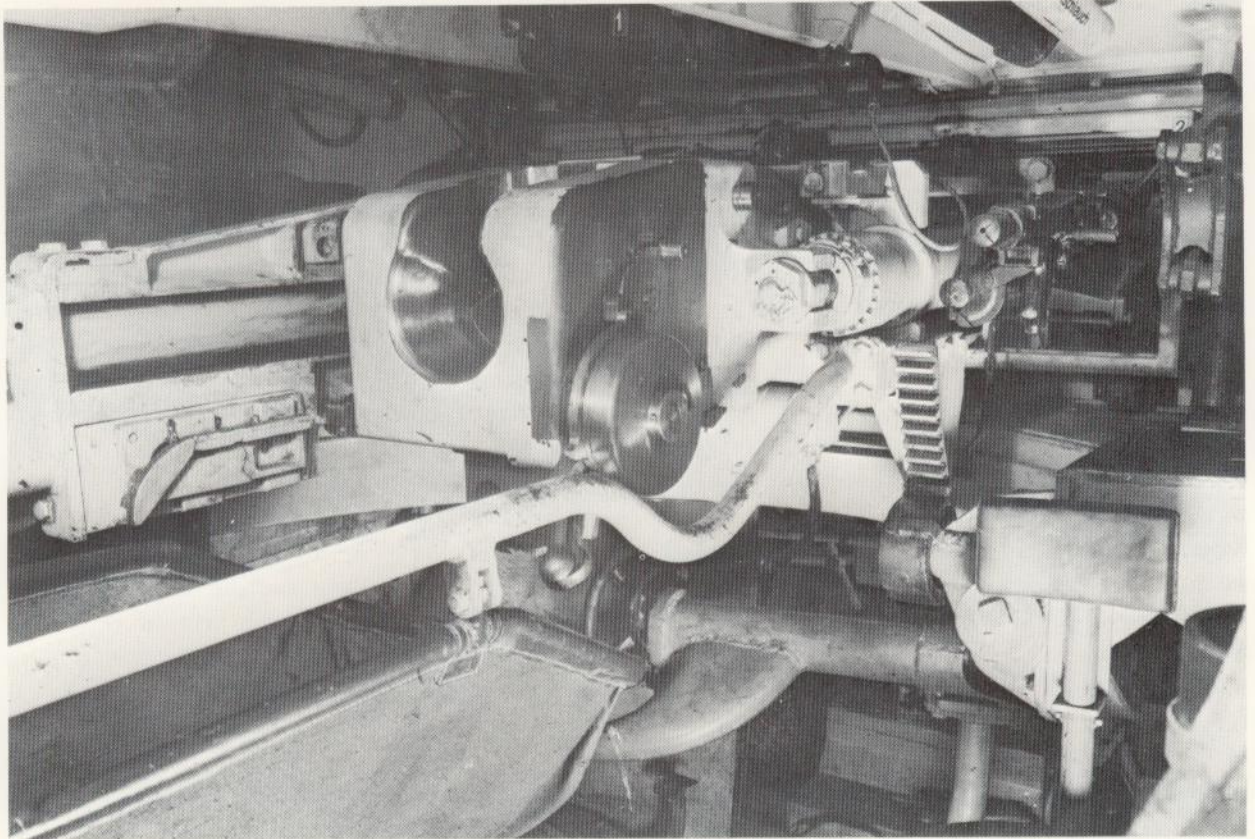
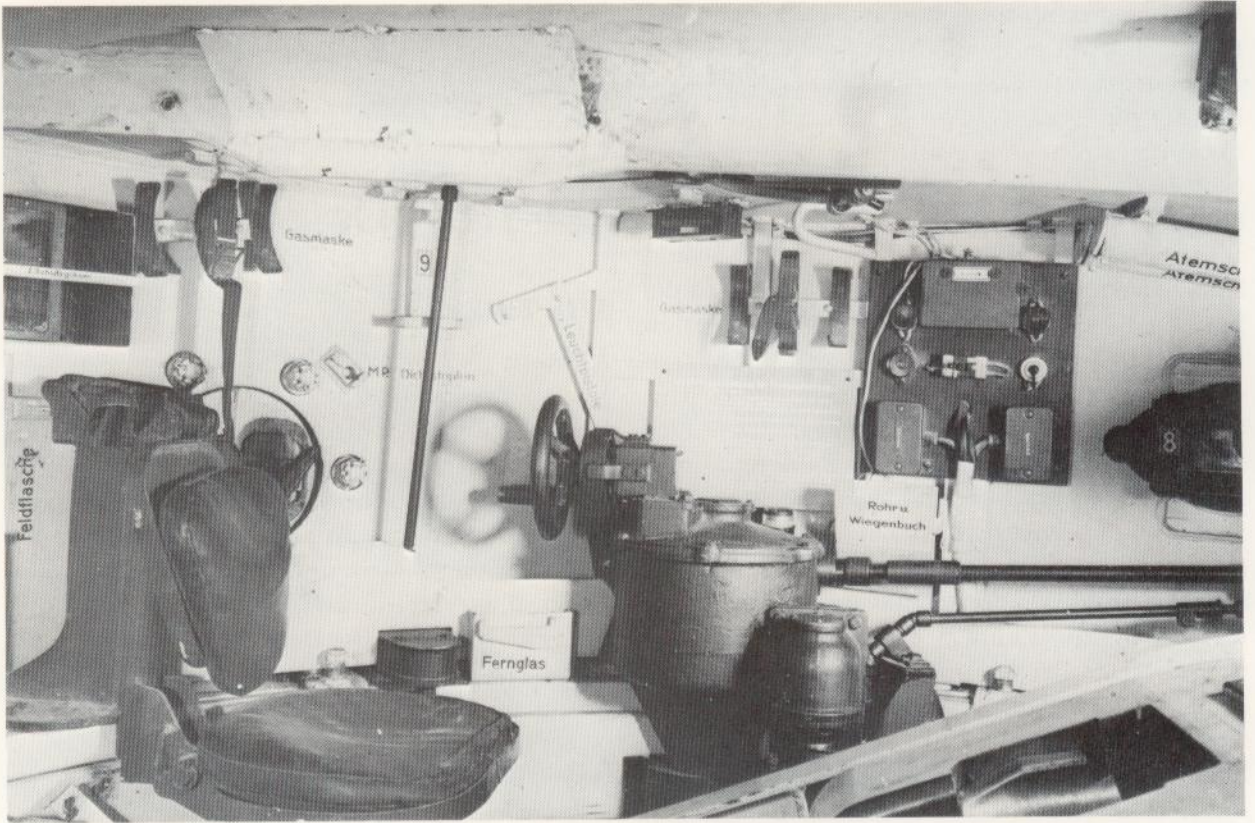
Loader's view of the main and co-axial armament; the canvas tray for catching ejected shell cases can be seen at bottom left, and the back of the loader's rear-facing seat at the right. (RAC Tank Museum)

and this vehicle was meant to form approximately five per cent of the total German AFV production for the first eight months of 1945. In fact, the maximum monthly output was 84 tanks in August 1944, and this had tailed off by March 1945 to only 25 tanks, due chiefly to non-receipt of components (mainly hulls and turrets) from the Ruhr. The total number of Tiger Model Bs produced was 484.¹

The delay between the production order and the first delivery arose because of the need for Henschel to liaise closely with MAN concerning the interchangeability of components with the proposed Panther II project, in which the latter were closely involved. The results of this liaison were apparent in the Model B's external appearance, which suggested lineal descent from the Panther rather than the Model E. The already completed Porsche turrets were used on the first 50 production models, following which the domestic Henschel turret was fitted as standard: the Porsche turret had a rounded front which could deflect a shot down through the thin roof armour of the driving compartment, whereas the Henschel version's flat, slightly back-sloped front avoided this danger. Both turrets took the shape of a blunted oval in plan, the rear third consisting of a bustle used primarily as convenient stowage for the heavy ammunition.

At 68.7 tons the Tiger B was the heaviest tank to enter general service during the Second World War and this, together with its sheer size, severely inhibited its operational use. It was driven by the same V-12 Maybach HL230 P30 engine fitted to later models of the Panther, producing 600/700hp, and was thus underpowered, although it could reach a top speed of

¹Extracted from *Intelligence Notes on Enemy AFVs* prepared from captured documents and received by the British School of Tank Technology on 21 June 1945; now held by RAC Tank Museum, Bovington.



23.5mph on good, hard, level going. Being longer than the Model E, it was carried on a torsion bar suspension supporting nine bogies per side, overlapping but not interleaved. Maximum armour thickness was 185mm on the turret front, with 150mm on the glacis and 80mm on the angled hull and turret sides.

For all its size and weight the Tiger B would have paled into insignificance beside some of the heavy tank projects which had their roots in Hitler's increasingly disturbed brain, none of which were ever completed, although work on a prototype **E100** was started; had it been produced the vehicle would have weighed 140 tons and carried a 150mm main armament with a 75mm gun mounted co-axially. Lest this idea be considered the ultimate in phantasmagoria, it should also be mentioned that serious discussion took place concerning a 1,500-ton tank which was to have been powered by four U-boat engines! Only slightly less bizarre was the Ram-Tiger idea, originating in the street fighting at Stalingrad, which would have produced a sort of mechanized battering-ram intended to bring buildings down on top of their defenders.

A few Tigers were supplied to the Italian Army but were quickly taken back into German service when Italy requested an armistice with the Allies; Spain also acquired several, General Franco being careful to give a calculated impression of sympathy with the Axis cause. Those vehicles which survived the war in running order saw limited service with the French Army and were then used as targets on French gunnery ranges.

Special purpose vehicles

The Tigers were not suitable for conversion to other roles, nor was it really intended that they should be. The two most notable variants, the **Sturm-tiger** (Assault Tiger) based on the Model E and the **Jagdtiger** (Hunting Tiger) based on the Model B, are discussed in Vanguard No 12, *Sturmartillerie and Panzerjäger*. However, a number of Model Es were converted to the **Bergepanzer** (armoured recovery vehicle) role, and examples of both models were equipped as **Panzer-befehlswagen** (armoured command vehicles) by the installation of additional radios.

Details of the Tiger E's elevating rack and handwheel; the traversing handwheel can be seen at top left, with the clinometer and binoscopic sight. (RAC Tank Museum)

BELOW

Driver's position showing instrument panel and gear selector lever. Spare vision blocks are stowed above the instruments. (RAC Tank Museum)

The Tigers Described

THE TIGER E

Armour

Following examination of samples taken from a captured model in September 1943, the British consultants reached these conclusions:

'In all the samples so far examined the armour steel is of a type not hitherto encountered in the investigation of German tank armour. The main points of interest are as follows:

'(i) The use of homogenous instead of face-hardened plate for the frontal armour, which is a logical development in thick armour designed to provide protection against large-calibre capped projectiles.

'(ii) The high chromium and molybdenum content.

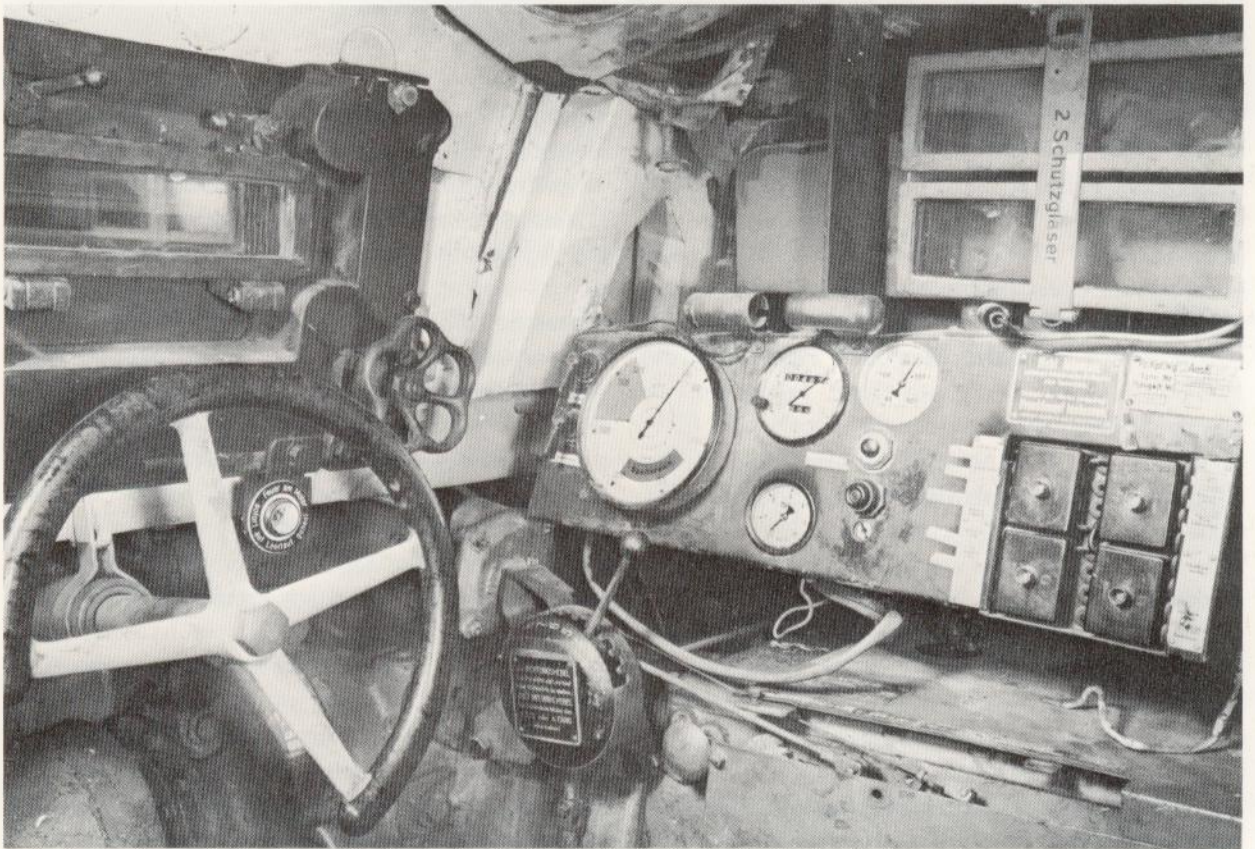
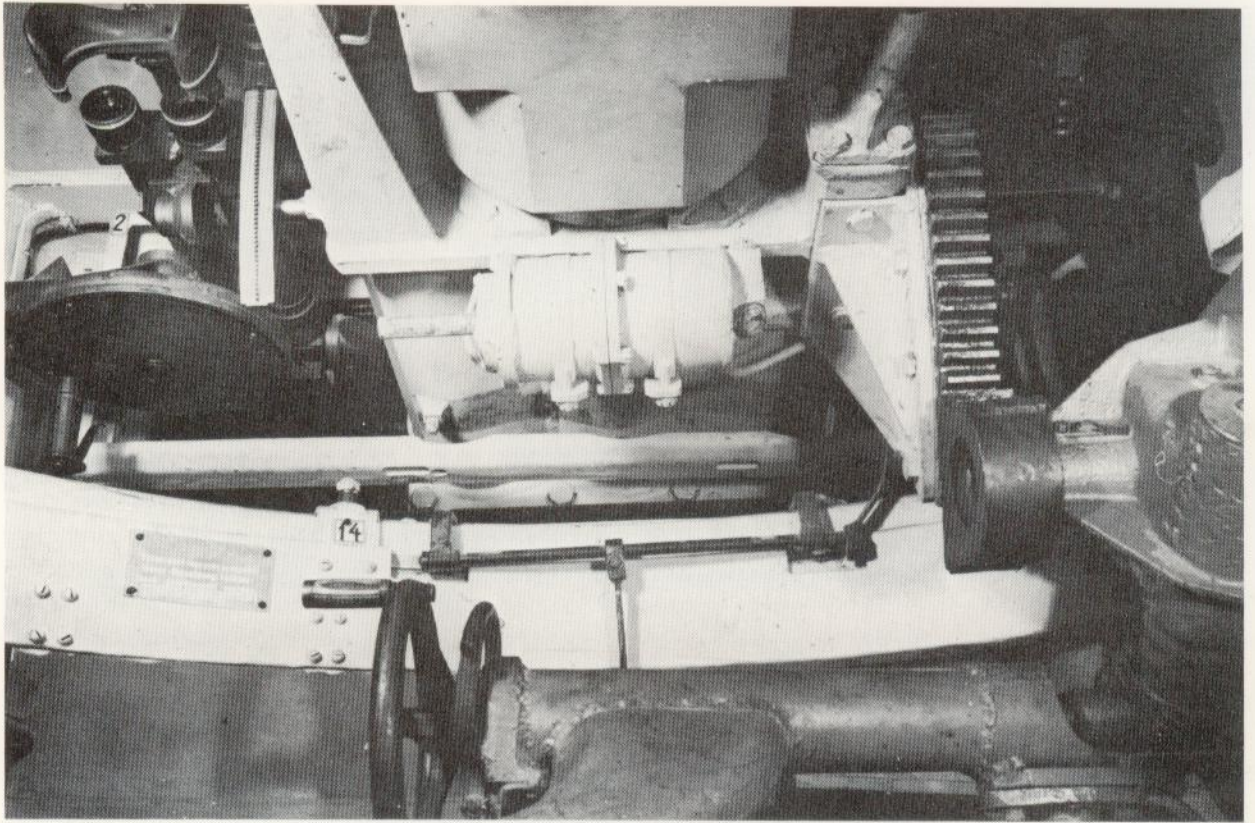
'(iii) The high carbon content, which is likely to give rise to welding difficulties.

'Pending further evidence, however, the ballistic properties of this type of German armour would seem to be at least comparable with good machinable quality armour of the same thickness.

'There is no protection for the turret ring other than that provided by the front plate of the superstructure, the upper edge of which extends about 2in. above the level of the superstructure roof.'

A further report, prepared about the same time, comments that 'The introduction of plate interlocking in addition to the normal stepped jointing is a distinct development in AFV construction.'

Of particular interest are the results of firing trials carried out against the armour of a captured Tiger E with every high-velocity anti-tank weapon then in service with the Western Allies. The American 37mm gun barely succeeded in penetrating the thinner rear armour at 400 yards. The British 6pdr. penetrated the rear at 1,500 yards, but only got through the side armour at a



range of 500 yards with shots angled at 30° and more. The British and American 75mm guns were effective against the side armour at 700 yards, but the American 3in. gun fitted to the M10 tank destroyer was capable of penetrating the flank at 1,400 yards at angles of 60° and more, as well as the rear at 2,500 yards with 90° angle of impact. The best performance was provided by the British 17pdr., which found no difficulty in penetrating hull and turret side and rear armour at 1,900 yards. In no instance was the frontal armour penetrated. No figures are available for the 90mm gun fitted to the M36 tank destroyer specifically to combat the Tiger, but the results would have been comparable with the 17pdr. gun. On the Eastern Front the Red Army's 122mm gun, fitted to the JS series and the SU 122, provided some improvement on this as although its muzzle velocity was lower than that of the 17pdr. (2,562 ft/sec as opposed to 2,950 ft/sec) it relied to a greater extent on the mass of its round to achieve its effect.

Automotive




The early Model Es were powered by the Maybach HL 210 21-litre engine, but it was soon realized that this lacked the necessary power and it was replaced by the HL 230, which had a capacity of 24 litres. The HL 230 had an aluminium cylinder block, crank case and piston heads, although the connecting rods were made of steel. Like all German tank engines it was designed for operation in temperate climates and experience gained in the hot, dusty conditions of North Africa with the Maybach engines of the PzKpfw III and IV led to those Tigers sent to Tunisia being fitted with the Feifel air filter system, which was attached to the rear of the vehicle and connected with the engine by prominent trunking which crossed the engine deck. The end of hostilities in Tunisia removed the necessity of fitting the Feifel system.

The engine was water cooled, the total capacity of the system being 16 gallons. Two linked radiators were located one each side of the engine compartment and through these air was drawn by four fans driven by the timing gears, and expelled through grilles in the engine deck. Two petrol tanks were fitted at each side of the engine

compartment, the upper wedge-shaped, the lower rectangular. All four tanks were coupled and held a total of 125 gallons. Petrol consumption averaged 2.75 gallons per mile across country.

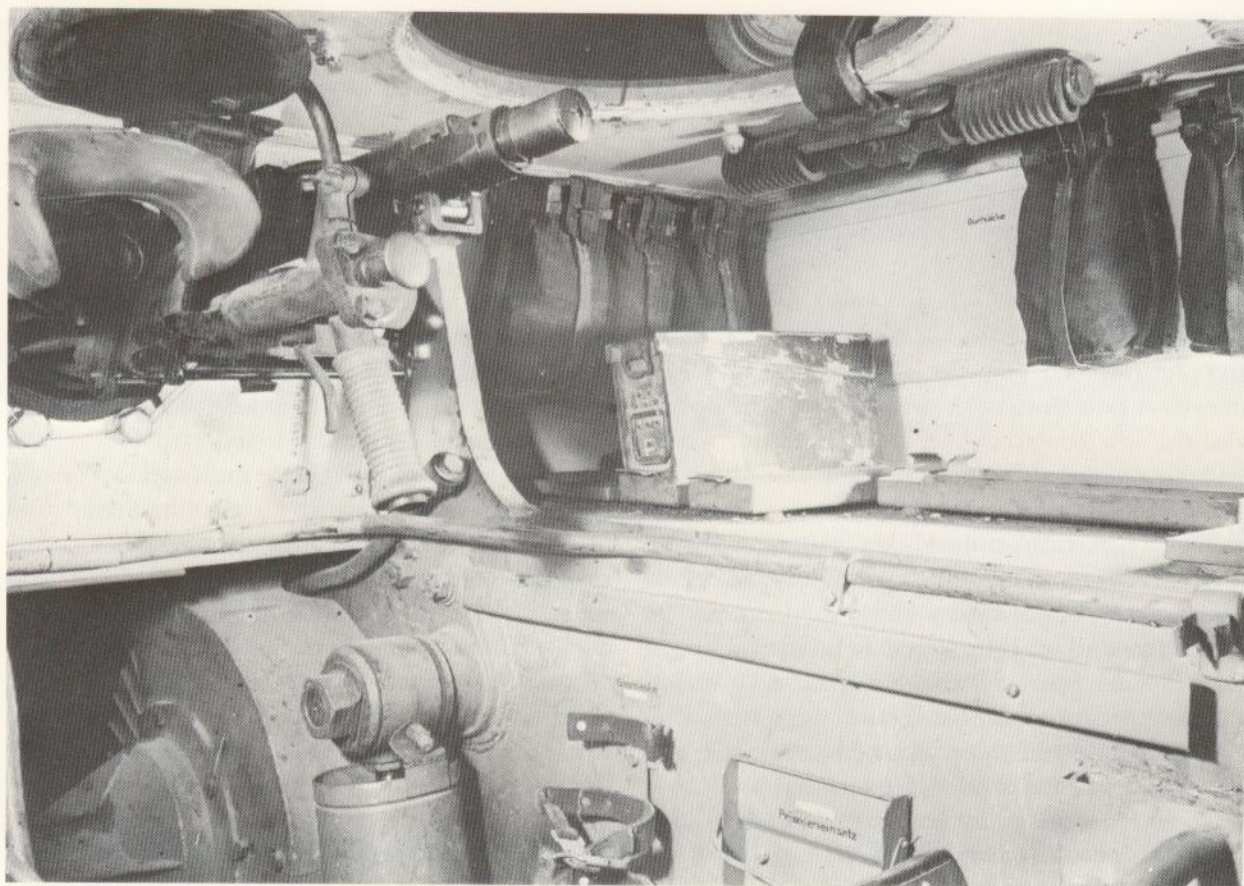
Two alternative starting systems could be employed: an electric 24-volt axial motor, operated from the driving compartment and located on the right of the engine at its forward end, and a Bosch inertia starter similar to that fitted to the PzKpfw II, III and IV. The latter was turned by a crank handle inserted through the tail plate and swung by one or two men, the geared reduction between the starter flywheel and the main crankshaft being much greater than that on earlier tanks because of the obviously greater effort involved.

A hydraulically operated pre-selector Maybach Olvar gearbox was employed, giving eight forward and four reverse gears, used in conjunction with three hydraulic cylinder selectors, thus providing the widest possible flexibility. For the driver's guidance a metal strip was mounted on the gearbox, inscribed:

1 2 3 4  5 6 7 8 1 3 5 7  2 4 6 8
  3 4 7 8

To this the User Handbook provided the key: 'The figures within the diamonds correspond to the hydraulic cylinder of each selector. The figures on the left of the diamonds in each case represent the number of the gear engaged with the respective selectors in the forward position. The figures on the right of the diamonds represent the gear engaged with the selectors in the rear position'. The reverse ratios were obtained by shifting the drive change lever through neutral into the rear position.

Because of the Tiger's great weight a simple clutch-and-brake steering mechanism was considered unsuitable. Instead, a hydraulic regenerative controlled-differential steering unit was employed, similar to the Merritt-Brown system installed in the British Churchill, the driver using his steering wheel to impose different speeds on the sun-wheels of the epicyclic gearing. This system provided two turning radii in each



Hull gunner/radio operator's position in a Tiger E. The machine gun has a head-pad device for elevation, since both hands were needed for firing the gun and controlling the ammunition feed. Spare belt bags are slung in the sponson space on the right. (RAC Tank Museum)

gear but, as already mentioned, resulted in a complex final drive which absorbed valuable construction time and was difficult to maintain. If the power steering failed, the driver could resort to two steering levers which acted upon the vehicle brakes, but these were intended for emergency use only.

The service track consisted of 96 twin-horn manganese steel links 725mm wide and extended beyond the hull, producing an overall vehicle width of 12ft 3in. This was too wide for rail transit, for which a narrower 520mm track had to be fitted, the service tracks travelling on the same rail flats as their vehicles. With the service track the eight bogies consisted of 24 wheels, interleaved front to rear in the following manner:

Outer front	1	1	1	1	
	2	2	2	2	
	2	2	2	2	
	1	1	1	1	Inner rear

However, with the transit track the outer wheels

from each bogie were removed, reducing the number to 16, arranged as follows:

Outer front	1	1	1	1	
	2	2	2	2	
	1	1	1	1	Inner rear

The time quoted for changing a single track was 25 minutes, no doubt quite possible on hard standing in ideal conditions, but probably the subject of wry comment in the field. Track adjustment was obtainable through the cranked mounting of the rear idler wheel, the draw bolts, by means of which the adjustment was made, being internally mounted but accessible from outside by the removal of a domed cover on each side of the tail plate. Originally all wheels were rubber-tyred, but in 1944 all-steel resilient wheels

Tiger '131', much photographed after its capture by British troops in Tunisia. The original German markings include the Heavy Tank Company symbol, seen here just to the right of the Allied 1st Army shield and the black diabolo insignia of 25th Tank Brigade. (RAC Tank Museum)

temperature gauge from 40–120 degrees Centigrade; ignition switch and warning light; lighting switches and fuseboxes; and, on the left of the compartment, a gyroscopic direction indicator. Driving was described as a pleasure, the steering being so light that it could be controlled with two fingers.

Gunnery and Optical

The KwK 36 88mm L/56 gun was 17ft long, contained 32 grooves with a right-hand twist, and was fitted with a double-baffle muzzle-brake. A semi-automatic falling-block breech was employed, the weapon being fired electrically from a control incorporated in the elevating hand-wheel. The trunnions were of spherical type and recessed into the turret sides. Maximum elevation was $+17^\circ$ and maximum depression -6.5° , further movement in either direction being curtailed by stops on the rear face of the mantlet, which projected across the turret side plates and could be removed by the extraction of four bolts. The gun was muzzle-heavy in its mounting and to compensate for this was linked to a balance-spring in a cylinder which was bolted horizontally to the right-hand upper segment of the turret ring. In normal circumstances the recoil cylinders were filled with *Bremsflüssigkeit Braun* (brown buffer fluid), but in conditions of severe cold this was replaced by *Bremsflüssigkeit Arktisch* (Arctic buffer fluid). Later it became the custom to employ an equal mixture of both fluids, the fact being recorded by stencilling *Braun Ark* on the recoil cylinders; one SS unit is known to have stencilled this on the gun sleeve, externally. The gun was fitted with a recoil indicator which showed the maximum working recoil as 580mm. In common with the PzKpfw III and IV a number of safety devices were employed, operating if (a) the breech was not fully closed, (b) the gun was not fully run out and (c) the recoil cylinders were less than full. A protective shield

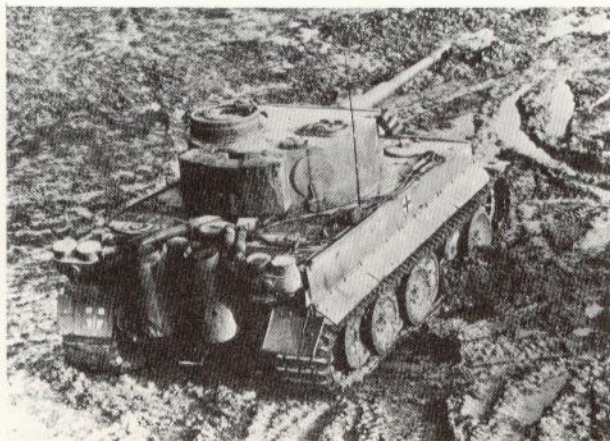
The same vehicle on evaluation trials in the UK, showing details of the Feifel air filter system. (RAC Tank Museum)



were introduced and the outer set were abandoned. A poor feature of the running gear design was the low centre of the drive sprocket, which severely curtailed the vehicle's obstacle-climbing capability.

The Tiger's dimensions denied it the use of many bridges available to smaller tanks; to circumvent this difficulty the vehicle could be sealed for wading submerged to a depth of 15ft. with the aid of a long breathing tube, provided the river bed was suitable.

Apart from the steering and gear selection systems already mentioned, the driver's controls included a handbrake lever on his left and a footbrake pedal operated with his right foot; an accelerator pedal; a mechanical clutch pedal which was power assisted when the engine was running and which could be adjusted by means of a handwheel to his right rear; and a starter carburettor behind his seat. Instruments included a tachometer marked to 3,500rpm, 3,000–3,500rpm in red, 1,300–2,500rpm in green; a speedometer calibrated to 100kph; an oil pressure gauge scribed up to 12kg per cubic cm; water



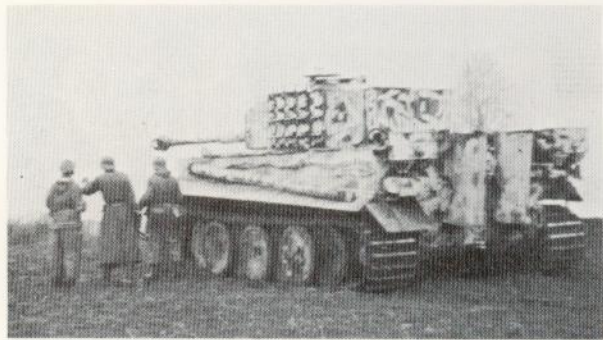
was installed for the gunner and commander, mounted vertically from the roof. A canvas bag was slung beneath the breech, capable of holding ten spent cases.

The 20-ton turret turned on a crowded ball-race incorporating 79 load-carrying balls of 40mm diameter, alternating with 79 spacer balls of 39mm diameter. Because of the weight involved the gunner's hand traverse was heavily geared, requiring 720 turns to complete one revolution. Some assistance was available from the commander's linked auxiliary traverse hand-wheel, which required 595 turns per revolution. Turret locks were available at 11.30, 12 and 6 o'clock in the form of a spring-loaded plunger which engaged coincident holes.

A two-speed power traverse system was also available, the direction being controlled by an uncomfortable rocker plate activated by the gunner's foot. Power was drawn from the main drive shaft by means of a hydraulic coupling which could be switched in by a hand lever.

The gunner's binocular telescopic sight was articulated and had a magnification of 2.5 and a field of 23°. It was calibrated from 0-4,000 metres for the main armament and 0-1,200 metres for the co-axial machine gun. The sight incorporated two transparent discs, on one of which the range scales were inscribed around the circumference. This disc was turned until the appropriate range was set against a pointer, the action simultaneously raising or lowering the second plate which contained, centrally, the aiming and lay-off marks. Then, using his traverse and elevation controls, the gunner placed the aiming mark against the target.

A further aid to good gunnery was a clinometer with an illuminated bubble, located on the gunner's right. This was graduated to 400 mils (22.5°) in elevation and to 100 mils (5.625°) in depression, the latter being shown in red, as well as incorporating a metric scale from 0-8,000 metres. In contrast to this comparatively sophisticated piece of equipment, a rudimentary traverse indicator graded from 1 o'clock to 12 o'clock was located on the gunner's left, being driven by a pinion from the turret rack. More fittingly described as a turret or target position indicator, this instrument was intended for use in con-



Tiger E in roughly applied snow camouflage, Russia, spring 1943; note log stowed on hull side as unditching beam. This is probably a tank of 2/sPzAbt.502. (Bundesarchiv)

junction with the 1 o'clock to 12 o'clock scale recorded around the inside of the commander's cupola on a toothed annular ring.

This scale worked on the counter-rotation principle. When the turret was traversed a pinion which also engaged the teeth of the turret rack drove the scale in the *opposite* direction but at the same speed, so that the figure 12 remained in constant alignment with the hull's centreline, looking directly forward. This enabled the commander to determine the bearing of his next target and inform the gunner accordingly. The gunner would then traverse onto the bearing ordered, using his traverse indicator, and would find the gun approximately 'on' for line.

The cupola itself provided the commander with all-round vision through five horizontal vision slits measuring 7¼in. by ½in., a sighting strip being incorporated in the foremost visor. All visors were of green-tinted bullet-proof glass and were easily replaced but, oddly, no latched armoured shutters were provided for their protection, as on earlier German tanks.

The Tiger E stowed 92 rounds of main armament ammunition, as follows:

Horizontally in two bins, forward at <i>each</i> side,	
each holding 16 rounds	64
Horizontally on floor in two bins at <i>each</i> side,	
each holding 4 rounds	16
In bin under floor	6
In pannier alongside driver	6

As with most German AFVs the hull machine-gun was breech-heavy in its mounting, this being partially corrected by a spring and a shaped



Two views of the crew of Tiger E '332' of the heavy company, SS-Div. 'Das Reich', carrying out routine cleaning and maintenance of armament and optics in Russia, February/March 1943; see also Plate B1. Apart from the commander, an *SS-Hauptscharführer* (warrant officer) the crew are noticeably youthful. (ECPA)

head-piece. In all 5,250 rounds of machine-gun ammunition were carried, disposed around the vehicle in 34 bags each containing one 150-round belt.

Three smoke grenade dischargers were fitted on each side of the turret. These were fired electrically by three buttons in boxes fitted to the turret roof on either side of the commander's seat.

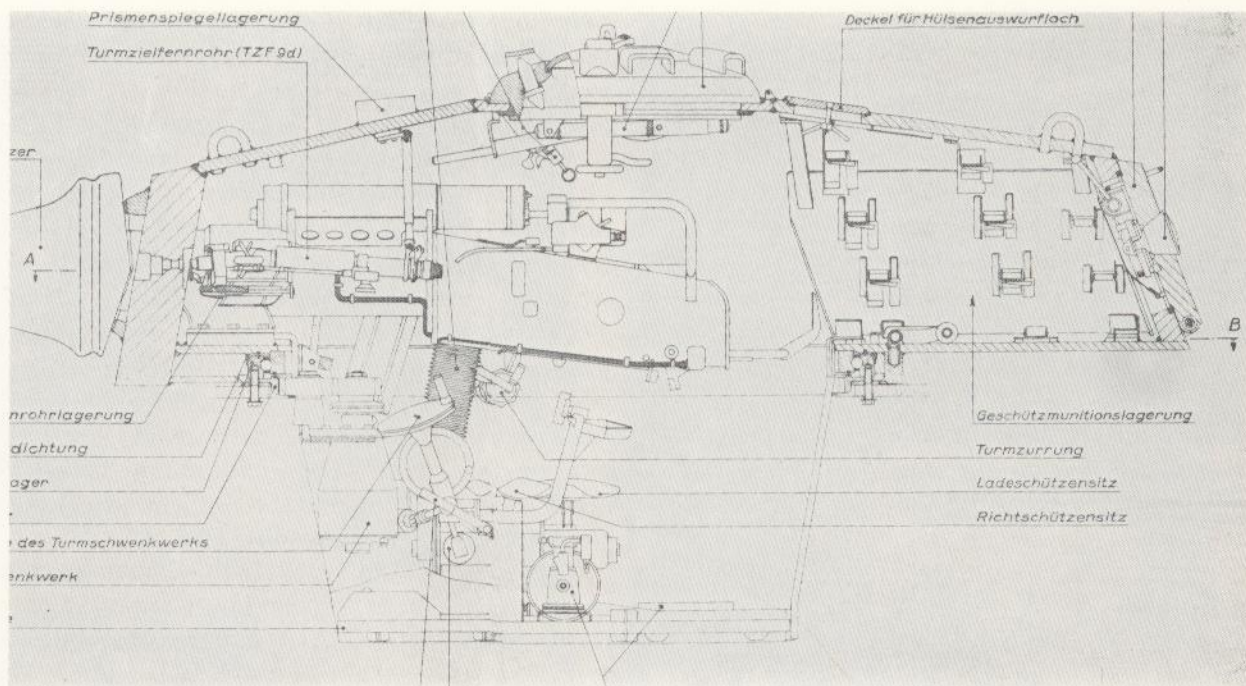
THE TIGER B

Armour

The turret and hull construction has been accomplished from a minimum number of plates and a limited number of plate thicknesses. Actually only six plate thicknesses have been employed (180mm, 150mm, 100mm, 80mm, 40mm and 25mm). Considerable effort seems to

have been directed towards the use of sloped plates, and it would appear that the Germans considered a slope of 20–25° to be worthwhile. In the case of the thick plates, i.e. 150mm and 180mm, the hardness figures are lower than anything previously met in German armour practice, whereas the pannier side plate is approximately in line with recently examined Panther armour. The mantlet design is unusual and is one of the most interesting features of the tank. It represents a distinct departure from previous German practice and is worthy of special consideration. The immunity should be of a very high standard and particular attention seems to have been given to the design in order to avoid the deflection of hits from the mantlet into the hull roof. It would be difficult to jam the mantlet under attack, other than by penetration or at least near-penetration, and because of the bell-shaped protector casting such a hit would be difficult to obtain'.¹

¹Extracted from Appendix F to *War Office Technical Intelligence Summary No 163*, dated 7 February 1945.



Henschel Königstiger turret—elevation. (RAC Tank Museum)

between the inside of the turret front plate and the inside of the turret ring, so allowing the trunnions to be mounted well forward and thus giving the loader room in which to work. To compensate for this further frontal weight a turret bustle was added to the rear, holding 22 rounds of main armament ammunition and so providing an effective counter-weight. Muzzle heaviness was corrected by a vertical hydro-pneumatic cylinder installed to the right rear of the gun mounting.

The spent-case deflector shield was hinged at the breech and spring-loaded catches held it steady in either the dropped or the firing position. Ingenious use of it could be made by the loader who, having withdrawn a round from the turret bustle, would rest the base on the shield which, given a sharp upward jerk, would then deliver it into the breech.

The recoil indicator showed the normal recoil distance as being 530mm (20 $\frac{7}{8}$ in.) and the maximum permitted 580mm (22 $\frac{3}{4}$ in.). If the crew were feeling particularly frivolous the deflector shield would be lowered and the recoil forces used to shoot a spent case straight out of the breech and through the open escape hatch at the rear of the turret bustle, the official attitude

to such merry-making being vaguely disapproving.

The gun could be elevated to +15° and depressed to -8°, 6.5 turns of the elevating handwheel giving 5° in either direction. The same two-speed power traverse system was used as on the Model E. A complete 360° traverse in high ratio with an engine speed of 2,000rpm took 19 seconds, the fastest time available; a range of lower speeds resulted from various other combinations, the slowest being 77 seconds in low ratio with an engine speed of 1,000rpm. It required 700 turns of the gunner's traverse handwheel to complete one revolution of the turret, this being linked to an auxiliary handwheel which was worked by the loader and which required a mere 680 turns—there was a saying that more Model B turret crews died of overwork than as a result of enemy action.

The gunner's sight was a monocular telescope Type TFZ 9d which provided either a $\times 3$ or a $\times 6$ magnification, operating on the principle already described. On some versions the number of aim-off marks on the aiming plate varied. The range plate was marked around its circumference in the following manner, the AP scales being diametrically opposed to the HE:

APCBC: 0-3,000 in red, 200m intervals
 APCR: 0-3,000 in green, 200m intervals
 HE (percussion): 0-5,000 in black, 100m intervals
 HEAT: 0-3,000 in yellow, 100m intervals
 Officially, those Model Bs fitted with Porsche turrets stowed 78 rounds of main armament ammunition, those with the Henschel turret 84 rounds. However, there seem to have been departures from this scale as two Henschel versions captured by the US Army in October 1944 had provision for only 70 rounds each, disposed as follows:

In left front sponson beside driver, nose forward (6); in left sponson, centre of fighting compartment, nose to rear (7); in rear sponson, centre of fighting compartment, nose forward (11); in right forward sponson beside operator, nose forward (6); in right sponson, centre of fighting compartment, nose to rear (7); in rear sponson, centre of fighting compartment, nose forward (11); in turret bustle, left, nose forward (11); in turret bustle, right, nose forward (11).

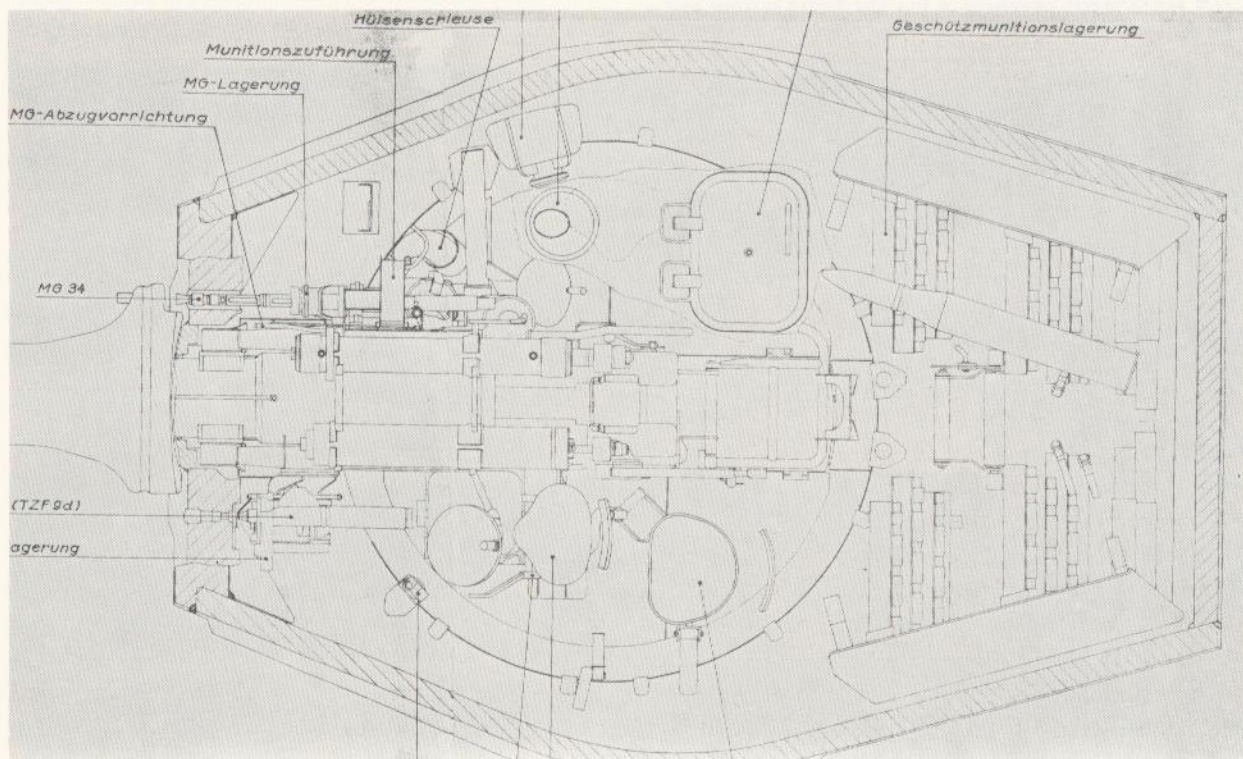
Much of this was extremely inconvenient and the turret bustle was obviously the prime source of ready-use rounds, being replenished from the

sponsons when time allowed.

The APCBC projectile was fired at a muzzle velocity of 3,340ft/sec and could penetrate 130mm armour set back at 30° at a range of 2,400 yards. The figure 92 was stencilled in white or yellow on the projectile and '8.8cm KwK 43 Pak 43 43/1/2/3' in black on the case. The HE (percussion) projectile was stencilled in black '13 IV R8'. A total of 4,800 rounds (32 belts) of machine-gun ammunition were also stowed. Some vehicles, including Model Es, carried three 'S' mines which were thrown by dischargers, but their use was by no means universal.

The commander's cupola contained seven episcopes, as opposed to vision blocks, the forward episcopes incorporating two vertical vanes giving a line of sight parallel with the gun barrel; occasionally this was used in conjunction with a blade foresight welded to the front of the turret roof, but the arrangement was a personal one. The installation of episcopes meant that since the commander's head was now below the cupola he had a direct view of the gunner's traverse indicator and it was therefore possible to dispense with the counter-rotating clock scale.

Henschel Königstiger turret—plan. (RAC Tank Museum)



The Tigers Assessed

The common opinion among Western tank experts during the last years of the Second World War was that 'The PzKpfw VI with its heavy armour, dual-purpose armament and fighting ability is basically an excellent tank and constitutes a considerable advance on any tank that we have tried. Its greatest weakness is probably the limit imposed on mobility owing to its weight, width and limited range of action. Taking it all round, it presents a very formidable fighting machine which should not be under-rated.'

Over 30 years on, and in the light of user experience one can only add a postscript to the effect that a degree of difficulty in servicing certain aspects of the vehicle was accompanied by a high level of engineering excellence.

Organization and Manning

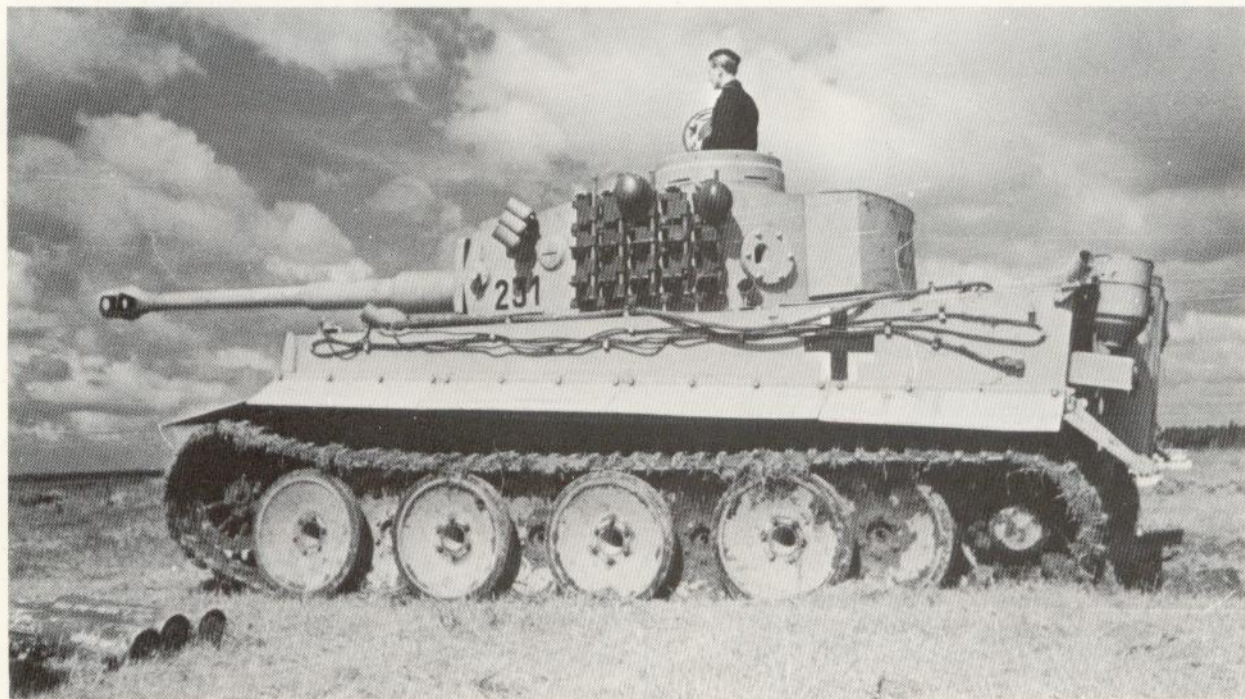
Guderian's intention was that each Panzer division should have its own organic Heavy Battalion; but in fact only the most favoured Army and SS Divisions ever received an allo-

cation, since the supply of vehicles never approached the demand for them. The theoretical establishment of the Heavy Battalions included battalion headquarters with three tanks, and four companies each with two company headquarters tanks and three four-tank platoons, giving a total of 59 Tigers. In the event battalions considered themselves to be lucky if they possessed sufficient vehicles to form their third company.

When formed, some Heavy Battalions were actually equipped with PzKpfw III Ausf.Ns until their Tigers arrived. The PzKpfw IIIN mounted an L/24 75mm howitzer inherited from the early models of the PzKpfw IV which had once equipped the Heavy Companies of the standard Panzer battalions, and the issue therefore had some historical justification. These vehicles lingered on in battalion and company headquarters long after Tigers began reaching their units regularly. (See also Vanguard Nos 16 and 18, *The Panzerkampfwagen III* and *The Panzerkampfwagen IV*.)

The Army formed one Replacement and Training Heavy Battalion (*Schwere Panzer Ersatz- und-Ausbildungs Abteilung 500*—sPzErs-u-Ausb. Abt. 500) based at Paderborn, and 11 independent Heavy Battalions (sPzAbt.) numbered

Newly-arrived Tiger of 2/sPzAbt.502 on the Leningrad front, summer 1943. Painted all over in factory-finish ochre, with small black turret numbers, it has the Feifel system and a full complement of S-mine discharger cups. (Bundesarchiv)





501 to 511. The initial allocation of Tigers to favoured divisions enabled them to form one Heavy Company. Thus, the three-battalion Panzer Regiment 'Grossdeutschland' added an additional company to its establishment (13/PR 'GD'), the whole of the regiment's third battalion being converted to the heavy role in December 1944 and re-designated sPzAbt. 'GD'. During Operation *Zitadelle* the 1. SS-Panzer-Division 'Leibstandarte Adolf Hitler' also added a 13th Company to its Panzer regiment (13/SS-PR 1 'LSSAH') and the two-battalion Panzer regiment of the then 2. SS-Panzer-Grenadier-Division 'Das Reich' converted its 8th Company, which was referred to as 8/sPzKp (Tiger) 2. SS-PGD 'Das Reich'. Later the SS formed three independent Heavy Battalions of their own (sSS-PzAbt.) numbered 101 to 103 (but sometimes referred to as 501 to 503) and these generally fought in support of the SS Panzer Corps.¹

The Heavy Battalions were employed at the discretion of senior commanders for specific tasks or to stiffen particularly important sectors of front. Frequently single companies were detailed for operations, their identity being recorded as a prefix to their battalion number. Thus 1/sPzAbt. 504 refers to the 1st Company, 504th Heavy Tank Battalion, and 2/sSS-PzAbt. 101 to the 2nd

Rounded white turret numbers (right) probably indicate sPzAbt.509, which arrived on the Eastern Front in the autumn of 1943. These Tigers are also fitted with S-mine dischargers, intended for use when the tank was in the assault rôle and was deep inside the enemy position. However, since the Heavy Battalions fought defensively for the most part after Kursk, there was little need for these dangerously impartial weapons, and they were discontinued. (Bundesarchiv)

Company, 101st SS Heavy Tank Battalion.

Service in the Heavy Battalions was regarded as being a signal honour and recruitment was by means of selection from volunteers, of which there was never a shortage. The battalions themselves possessed a tremendous *esprit de corps* and the majority chose to identify themselves by some individual symbol, which was painted on their vehicles when time allowed. The coveted Knights' Cross was won by no less than 50 Tiger crewmen, seven of whom were later awarded the supplementary Oakleaves and one, the legendary Michael Wittmann, the Swords.

It was, perhaps, a little resented by vehicle commanders in less dramatic branches of the Panzerwaffe that service in a Heavy Battalion could quickly elevate a man to the status of 'tank ace'. The ace system was regarded as being unrealistic by the Western Allies, who looked on each kill as being the result of teamwork by an entire crew which would, in the nature of things, change, while the commander alone received the cumulative benefit of their combined efforts. The

¹While not strictly relevant to our story, it is worth mentioning that one independent Jagdtiger battalion (512) was also formed, and two Sturm-tiger companies (1000 and 1001).

Motto: Oft kommt man nicht so recht zum Schuß
weil sie nicht, wie Du willst, auch muß.

Die Braut und das Munitionsfabrikat



Nicht zu früh auspacken!
Nicht stellen, sondern liebevoll auf eine Decke legen.
Nicht das Packmaterial verheizen, sondern abliefern.
Nicht Nässe, Schmutz, Sonne, Frost drankommen lassen!
Nicht wie die Maurer werfen und verbeulen.

Granaten mit Rissen und Beulen raus!
Granaten mit bestoßenem Führungsring raus!
Granaten mit nässem Sprengstoff raus!
Geschosse ohne Bördelring und Abschlußplatte raus!

Vorsicht!

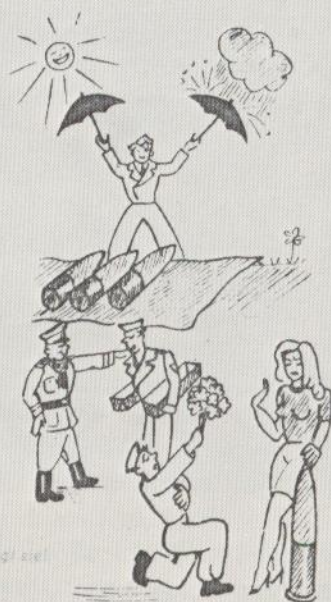
Prüfen, säubern, nicht ölen!
Lose Zündschrauben von Hand anziehen!
Zündschrauben dürfen nicht hervorstehen!
Kopfzunder von Hand anziehen!
Kopfzunder nicht auseinandernehmen!
Lose und drehbare Geschosse geraderichten!
Munition mit Schlagzündschraube gibt Kurzschluß!

Achtung

Granaten fest in die Halterungen klemmen!
Beizeiten umlagern!
Beim Laden Führungsring nicht bestoßen!
Panzergranate 39 ist schwarz nicht bestoßen!
Panzergranate 40 ist schwarz!
HL-Granate ist grau!
Sprenggranate ist gelb!
Verzögerung nur mit dem Schlüssel einstellen!
Nach dem Entladen wieder zurück auf O. V. ...sonst versagt sie!

Versager und Hülsen abgeben!

Moral: Ob blond, ob schwarz, weiß und ergraut, umhege sie wie Deine Braut.
Die Wirkung ist dann ungeheuer: „Ein Fingerdruck, schon fängt sie Feuer!“



Page 54 of the *Tigerfibel* handbook, offering advice on the recognition, care and maintenance of ammunition. The 'moral' at the bottom may be loosely translated as: 'Whether blonde, black, white or grey, make a fuss of her as you would your bride. The result will be sensational; one touch of the finger, and she catches fire!' (RAC Tank Museum)

provision of hero-figures was, however, considered to be an essential element in maintaining German civilian morale and the system remained in use to the end. Whatever one's views on its wisdom, the fact remains that the aces were extremely capable vehicle commanders.

At the more work-a-day level, the crews of Tiger tanks were presented with a humorous aide-memoire to their respective duties, the *Tigerfibel* or Tiger Primer. Written in 'Landserdeutsch' (i.e. service slang, the German soldier's name for himself being Landser), the booklet contained numerous 'do's and don'ts' for every crew member, easily-remembered rhyming mottoes, and cartoons amongst which a nubile blonde lady, frequently naked, urged the reader to greater efforts.

The Tiger in Action

Fighting a Tiger successfully was a team effort to a greater extent than with any other vehicle, all crew members being actively involved with the possible exception of the radio operator who, beyond attending to his sets and the hull machine-gun, could make only a limited contribution. This is illustrated by the following incident, based on an action carried out by Leutnant Meyer of 1/sPzAbt. 502 near Leningrad on 17 February 1943.

A KV-1 has moved into position behind a wood and the Tiger has been detailed to deal with it. The commander decides to leave the wood on his right and sets the vehicle in motion, choosing his ground carefully: 'Driver—advance! Keep to the left of that bank—now, speed up!' The engagement will take place at close range and he chooses the appropriate ammunition: 'Load AP 40!' Obediently the loader selects a black-nosed round from the nearest bin, bracing himself against the tank's motion. He lays the

round in the breech-trough and rams it into the chamber with his fist; the breech closes noiselessly.

The commander peers through his vision slits. They are almost past the wood—and there it is! The KV is at the far corner, exchanging shots with the German anti-tank gunners; a round strikes as he watches, flying off the thick castings high into the air. ‘Driver, halt!’ The Tiger comes to an abrupt standstill, its gun barrel dipping as it rocks on its suspension. The scale around the cupola indicates the angle of the target. ‘Traverse hard right—three o’clock!’ The gunner switches in the high-speed power traverse and jams his right foot on the rocker plate. ‘Rev up!’ His warning to the driver is not necessary. The latter knows what is coming and already the engine note is rising to 2,000rpm. The power take-off from the drive shaft begins to hum as the heavy turret turns. ‘Tank—400 metres!’ The commander completes his fire order.

The gunner watches his traverse indicator until it shows three o’clock, then releases the rocker plate and grips the hand traverse and elevation control wheels as he peers into his binocular sight. The KV fills the lens, and he chooses his point of aim with care. The commander watches the muzzle of the gun move very slightly to the right and then drop a little as the final lay is made. ‘All safe—loaded!’ The loader has completed the safety drill. ‘Fire!’ ‘Firing—*now!*’ With the last word the gunner depresses the firing button.

Inside the vehicle the concussive explosion is muted to a dull roar. The gun’s recoil is sensed rather than seen. The empty case clangs off the deflector shield and tumbles brassily onto others in the bag. The breech is open again, trickling blue-grey smoke into the turret.

For the gunner the target has been obscured by a cloud of snow kicked up by the blast of the weapon, and now his vision is momentarily impaired by a drift of super-heated air from the muzzle-brake causing distortion. The commander, however, has seen the Tiger connected to the KV by a slim lance of green tracer, lasting the merest fraction of a second; seen, too, the orange flash, tinged with red, that signalled a hit on the hull side, just below the turret ring.



Action sequence showing Tigers performing standard fire-and-movement drill as they advance towards a burning village. The leading vehicle has moved onto an intermediate crest, covered by the second tank. (Bundesarchiv)

In this next picture the second tank has also moved up to the crest and is in a good hull-down position, using the low bank at the side of the dirt road. The left hand tank is too far forward and could be reversed several yards without impairing its performance. (Bundesarchiv)



A hatch flies open on the KV’s turret and a man tries to scramble out. Dense smoke pours through the aperture. He is almost clear when the burning ammunition explodes, throwing the turret high into the air. The shock wave washes over the Tiger.

Unit Deployment and Operations

When Major Richard Marker’s 1/sPzAbt. 502 was ordered to the Leningrad sector of the Eastern Front it was a company in name only, consisting of four Model Es, one PzKpfw III and

a small echelon and workshops. De-training at Mga, southeast of the city, on 29 August 1942, it was committed to action only hours later. The next day horrified officers at OKH and OKW learned that every single Tiger in the company had been knocked out.

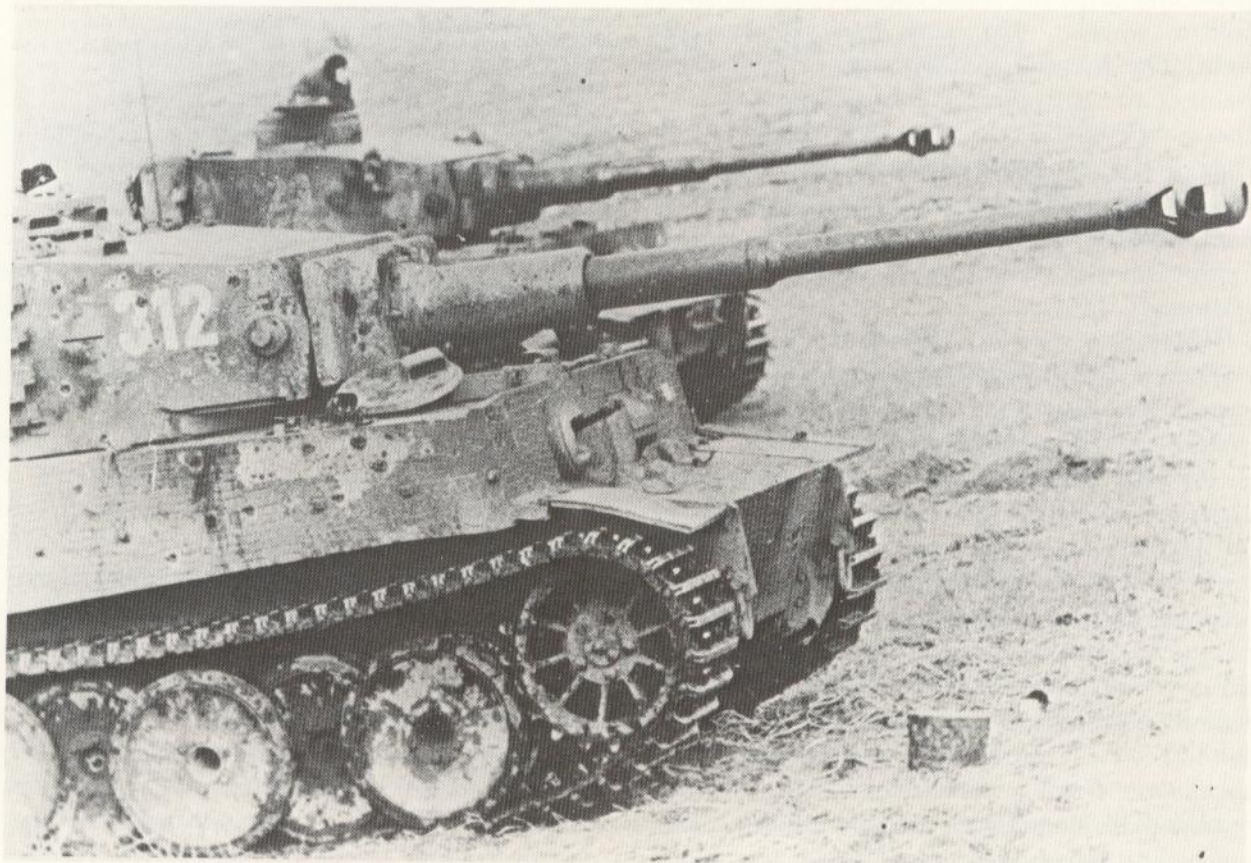
Although in involuntary retirement at the time, Guderian obviously heard of the affair shortly afterwards and subsequently gave vent to his disgust in his memoirs. 'There is an old military maxim to the effect that if one develops a new weapon system one must exercise considerable patience so that mass production can take place and mass attacks be made when the appropriate moment comes. Hitler knew this perfectly well; nonetheless, burning with enthusiasm to try out his huge new killers, he decided to employ them on a front of secondary importance, more specifically in a series of limited

The dents, gouges and gashes in the Zimmerit and armour of these tanks confirm the ferocity of the *Kesselschlachten* in which they have been involved. The further tank has the original cupola, the nearer one the improved version. (Martin Windrow)

local attacks in an area of quite unsuitable going. Heavy avoidable losses were incurred and the benefit of surprise in future actions was forfeited; disappointment was great but due to the nature of the ground the attack can hardly have been expected to succeed.¹

Much of what Guderian said was true, but while there was no cause for celebration, neither was there cause for deep despair. His account has given rise to the suggestion that the attack was made in an area of soft, boggy going, but photographic evidence shows dry, reasonably firm ground and, of course, the autumn rains were still some way off. On the other hand, the tanks had been committed along narrow forest tracks bordered by dense pine and fir and were unable to give each other mutual fire support. Again, the Russian anti-tank gunners facing them were battle-hardened, had not given way to panic, knew the range to the metre and were good at their job. They had gone first for the tracks and when the Tigers had ground to a standstill had

¹Guderian: *Erinnerungen eines Soldaten*.





Tiger Es of sPzAbt.506 fording a river near Tarnopol, summer 1944. (Martin Windrow)

sent round after round at the front armour. They had *not* succeeded in effecting a penetration, although photographs reveal the use of heavy calibre ammunition, very possibly 122mm. The German crews had escaped but returned at night, blowing up one immovable vehicle to prevent its secrets falling into Russian hands, but recovering three.

It has been pointed out that Hitler did *not* regard Leningrad as a front of secondary importance—he certainly nurtured a deep loathing for the city which had spawned Bolshevism—and that the Tiger offered a real opportunity of breaking the Red Army's iron ring of bunkers and anti-tank guns. It was unfortunate that his enthusiasm lacked the temper provided by practical experience.

Meanwhile 1/502 was back in business, and was not again committed along an unsuitable axis. Throughout the rest of the year the company's strength was slowly built up until on 12 January 1943 it stood at four Tigers and eight PzKpfw III Ausf.M and N. On that date the Red Army launched a massive and carefully prepared offensive designed to break the siege of Leningrad, and the following day a distress call was received from the 96th Infantry Division to the effect that it had been overrun by 24 T-34s; the formidable 'Snow Kings' found no difficulty in operating in the prevailing temperature of 28° below zero.

The situation was critical, and the four Tigers under Oberleutnant Bodo von Gerdstell were sent to the infantry's relief. During a sharp exchange of fire 12 T-34s were blown apart and the remainder turned tail and drove for their own lines as they had never been driven before. Tiger Company 1/502 had had their revenge and the Snow King no longer reigned alone.

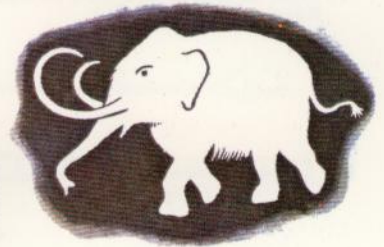
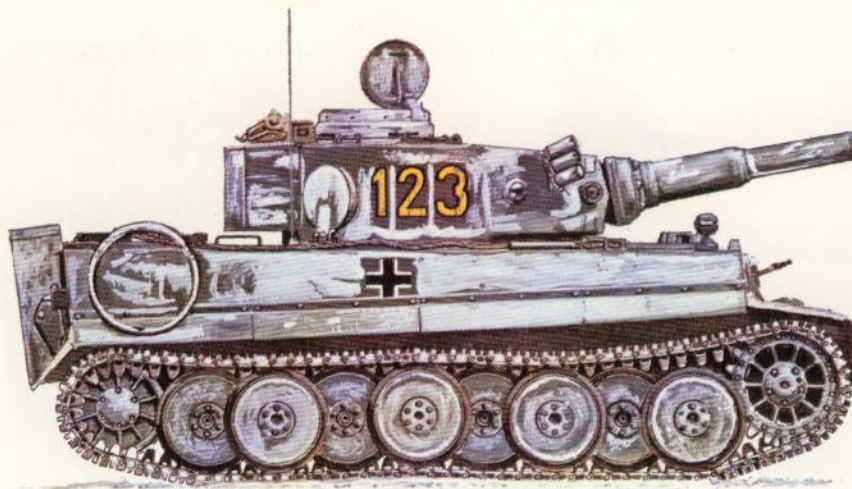
The Soviet offensive lasted until 6 April and the company was in action almost daily, receiving a welcome reinforcement of three new Tigers on 5 February. When the Russians finally abandoned their efforts they had lost a total of 675 tanks, including T-26s, T-34s, KV-Is and IIs, and SU-122s. Of these 163, approximately one-quarter, were credited to 1/502, an incontestable proof of the Tiger's effectiveness. On 11 February the company accounted for 32 of the 46 tanks

destroyed on the Leningrad front, while during the three days 19–21 March it knocked out no fewer than 40 T-34s. It was a truly remarkable achievement for so small a unit, aided to some extent by the Russians' unimaginative tendency to attack repeatedly over ground on which they had already been decisively repulsed.

Elsewhere, the deteriorating situation in North Africa had led to the despatch of Major Hans-Georg Lueder's sPzAbt. 501 to Tunisia, the 1st Company arriving at the end of November 1942 and the 2nd following some weeks later. The first three Tigers ashore joined the *ad hoc* battlegroup which successfully foiled the Allied attempt to seize Tunis by *coup de main*, claiming their first victories over British Crusaders and American Lees during scrappy fighting around Tebourba between 1 and 3 December. These vehicles almost certainly belonged respectively to the 17th/21st Lancers and the US 2/13th Armored Regiment, but the presence of Tigers went largely unrecorded by the Allied armour (though not by the infantry) probably because those few who had seen them were either dead or prisoners. During the course of these engagements Hauptmann Nikolai Baron von Nolde, the commander of 1/501, was killed by shell splinters while controlling his vehicles from an open Kubelwagen.

On 19 January 1/501 spearheaded an attack on the French XIX Corps at Hamra. (Entered as Robaa in some Allied records.) At this stage the French garrison troops were still limited to pre-war equipment and were forced to rely for their defence on their famous but now elderly 'seventy-fives'. These weapons were actually used to arm the first American tank destroyer and could produce results against the German PzKpfw IIIs and IVs, but were useless against the Tiger, their rounds flying off the frontal armour in rapid succession (see Vanguard No 10, *Allied Tank Destroyers*). 1/501 broke through, forcing the French to withdraw and leaving the field littered with 25 wrecked guns and 100 burning vehicles.

The Allies could hardly fail to be impressed by the Tiger; after all, in size it bore the same relationship to the diminutive Valentine as the cabin cruiser to the dinghy. On the other hand,



sPzAbt.502

1. Tiger E, 1/sPzAbt.502; Leningrad, winter 1942/43



2. Tiger E, 1/sPzAbt.501; Tunisia, early 1943

3. Tiger E, 1/sPzAbt.504; Tunisia, spring 1943

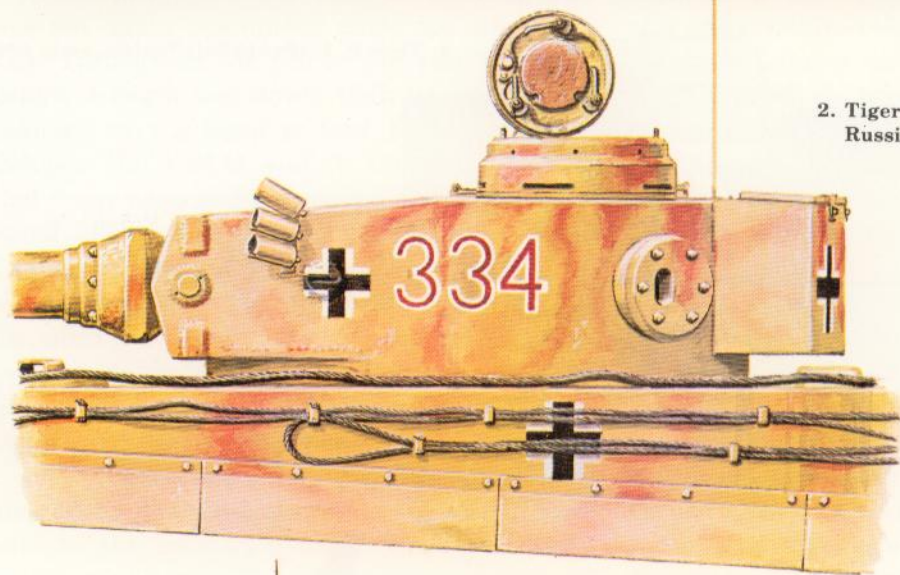


sPzAbt. 501

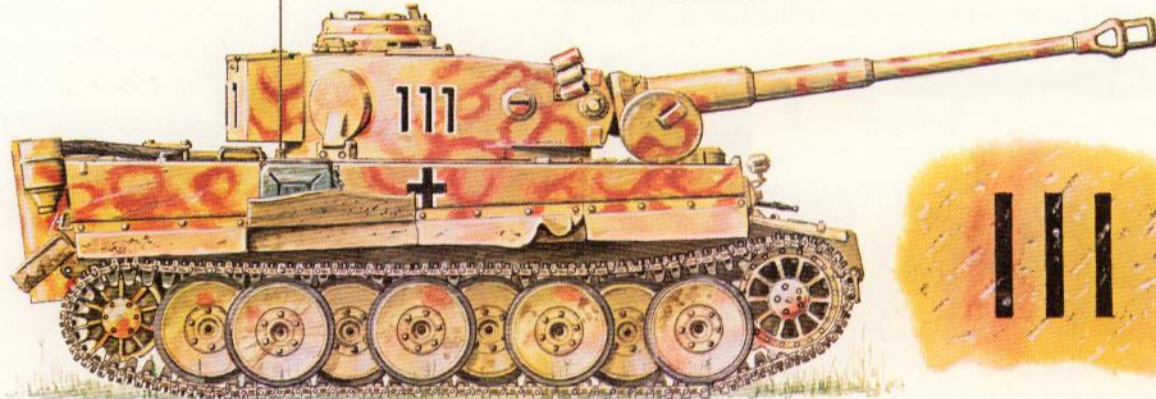
1. Tiger E, 8/sPzKp, 2.SS-Pz-Gren-Div. 'Das Reich';
Russia, February 1943

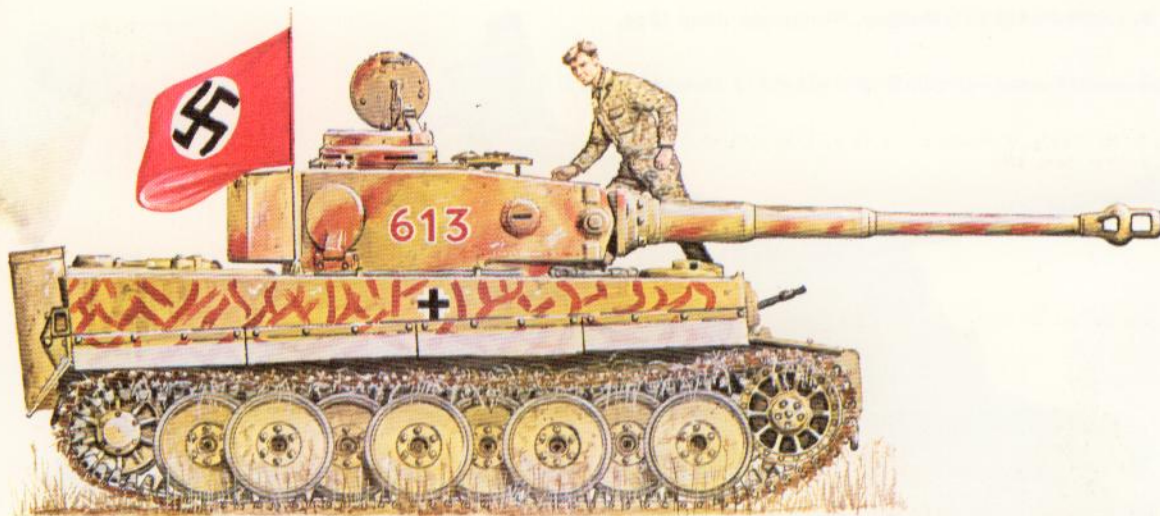


2. Tiger E turret detail, unit unknown;
Russia, 1943



3. Tiger E, 8/sPzKp, 3.SS-Pz-Gren-Div. 'Totenkopf';
Kursk, summer 1943

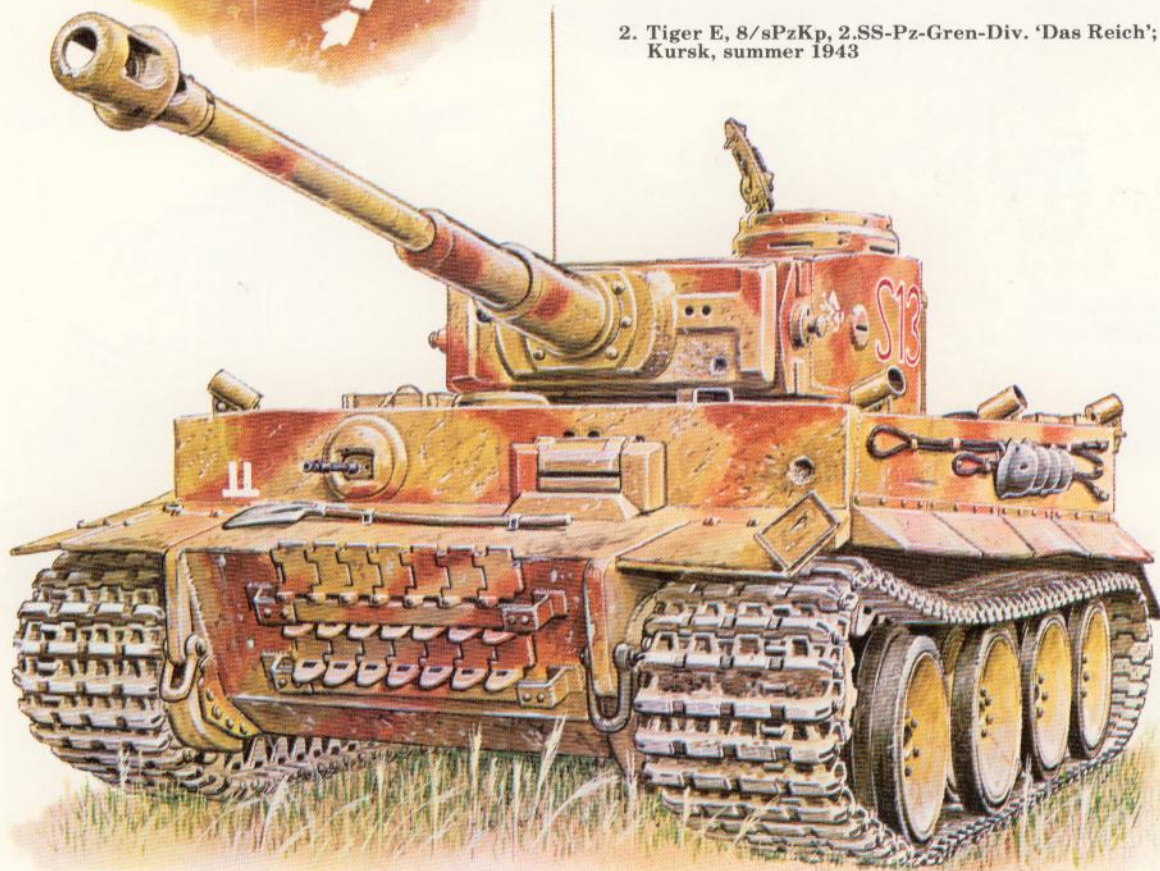




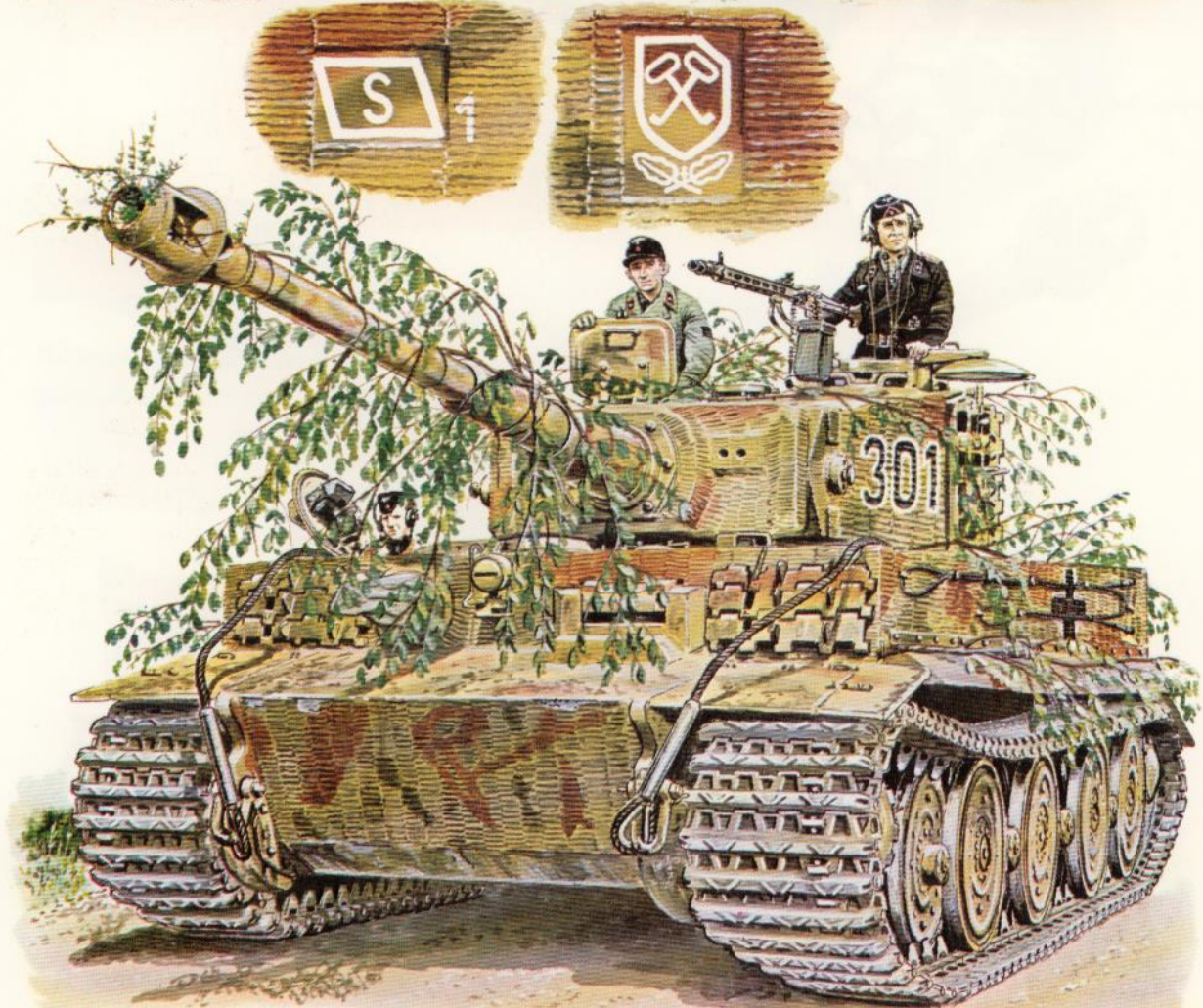
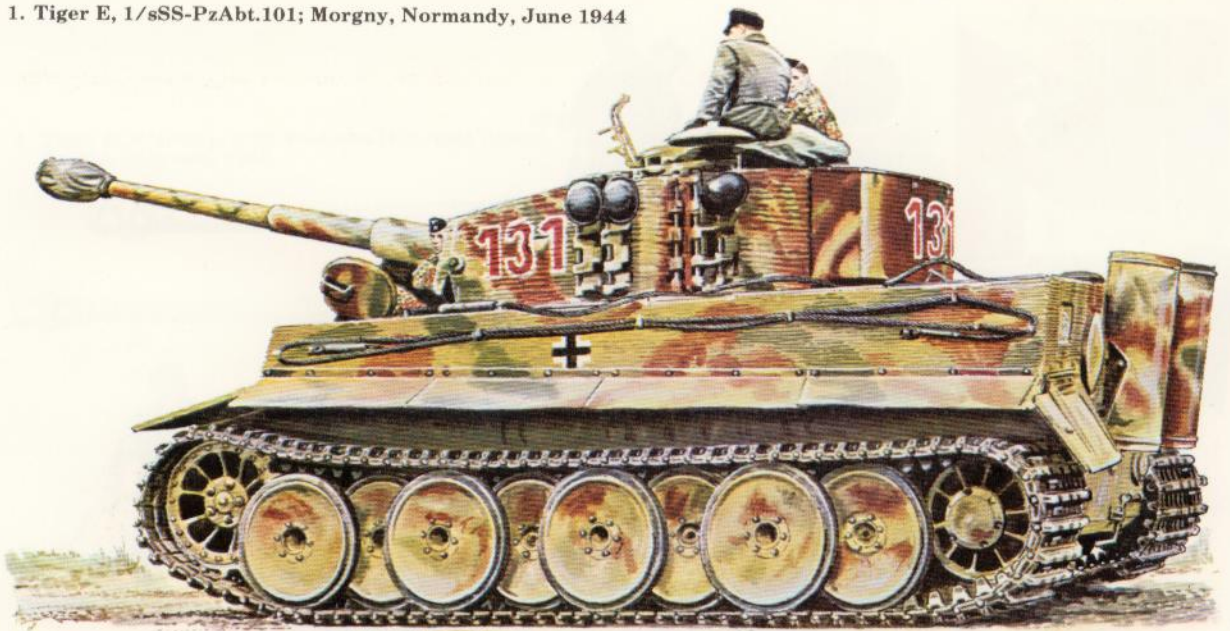
1. Tiger E, 13/sPzKp, 1.SS-Pz-Gren-Div. 'Leibstandarte Adolf Hitler'; Kursk, summer 1943



2. Tiger E, 8/sPzKp, 2.SS-Pz-Gren-Div. 'Das Reich'; Kursk, summer 1943

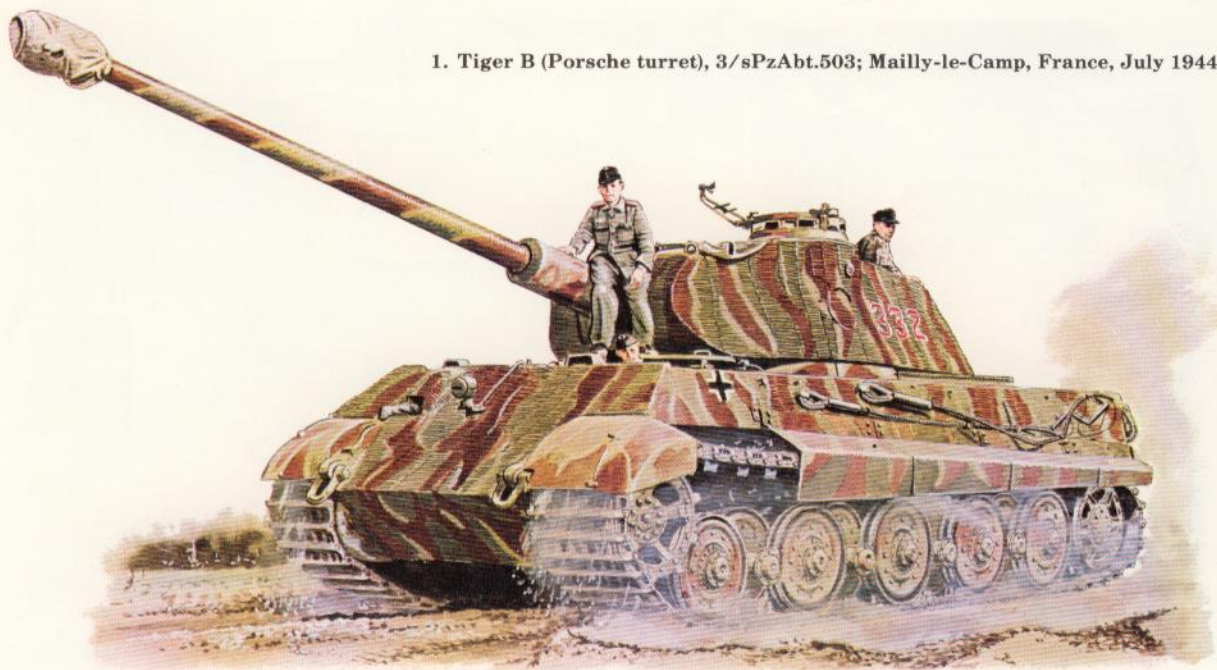


1. Tiger E, 1/sSS-PzAbt.101; Morgny, Normandy, June 1944

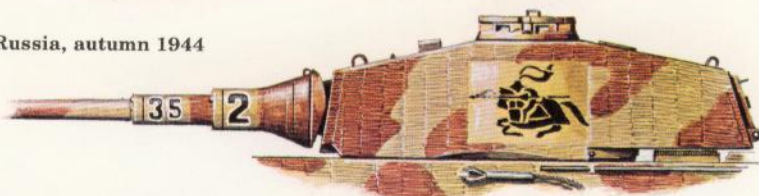


2. Tiger E, 3/sPzAbt.503; Normandy, July 1944

1. Tiger B (Porsche turret), 3/sPzAbt.503; Mailly-le-Camp, France, July 1944



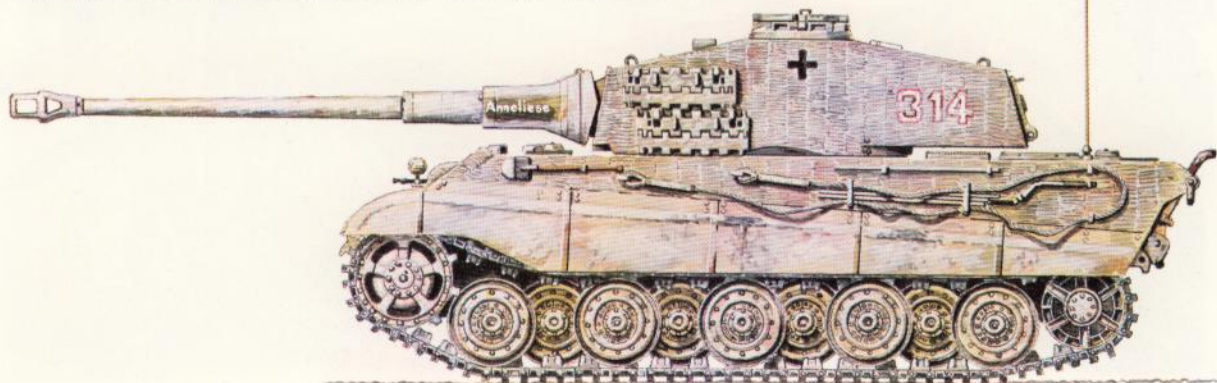
2. Tiger B (Henschel turret), 2/sPzAbt.505; Russia, autumn 1944

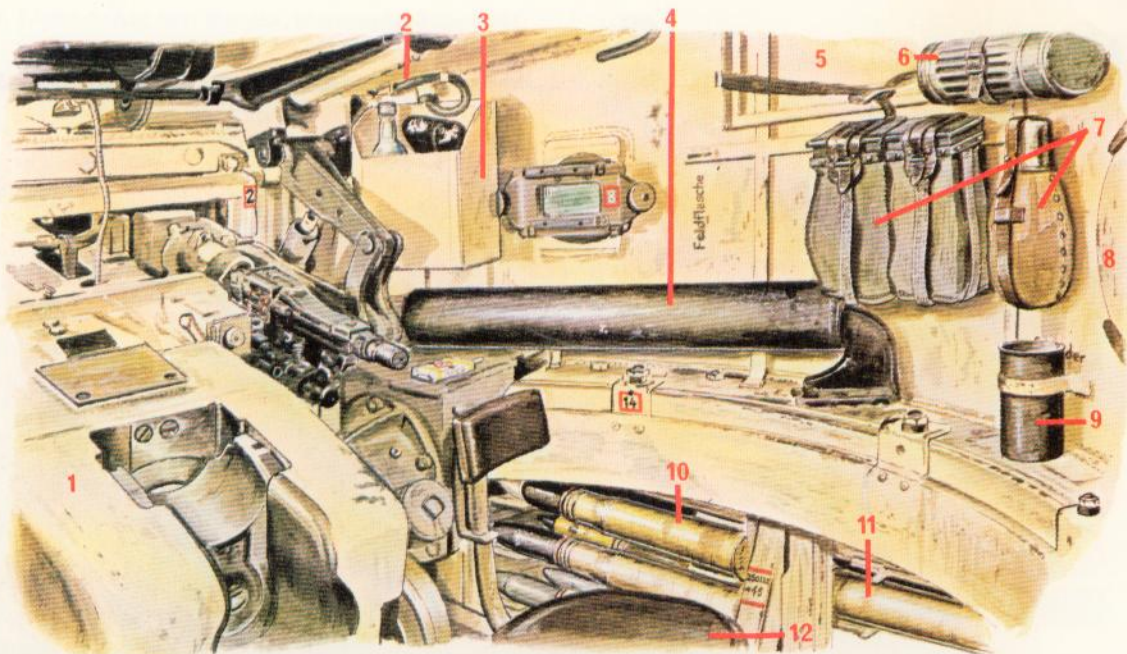


3. Tiger B (Henschel turret), 2/sPzAbt.503; Budapest, early 1945

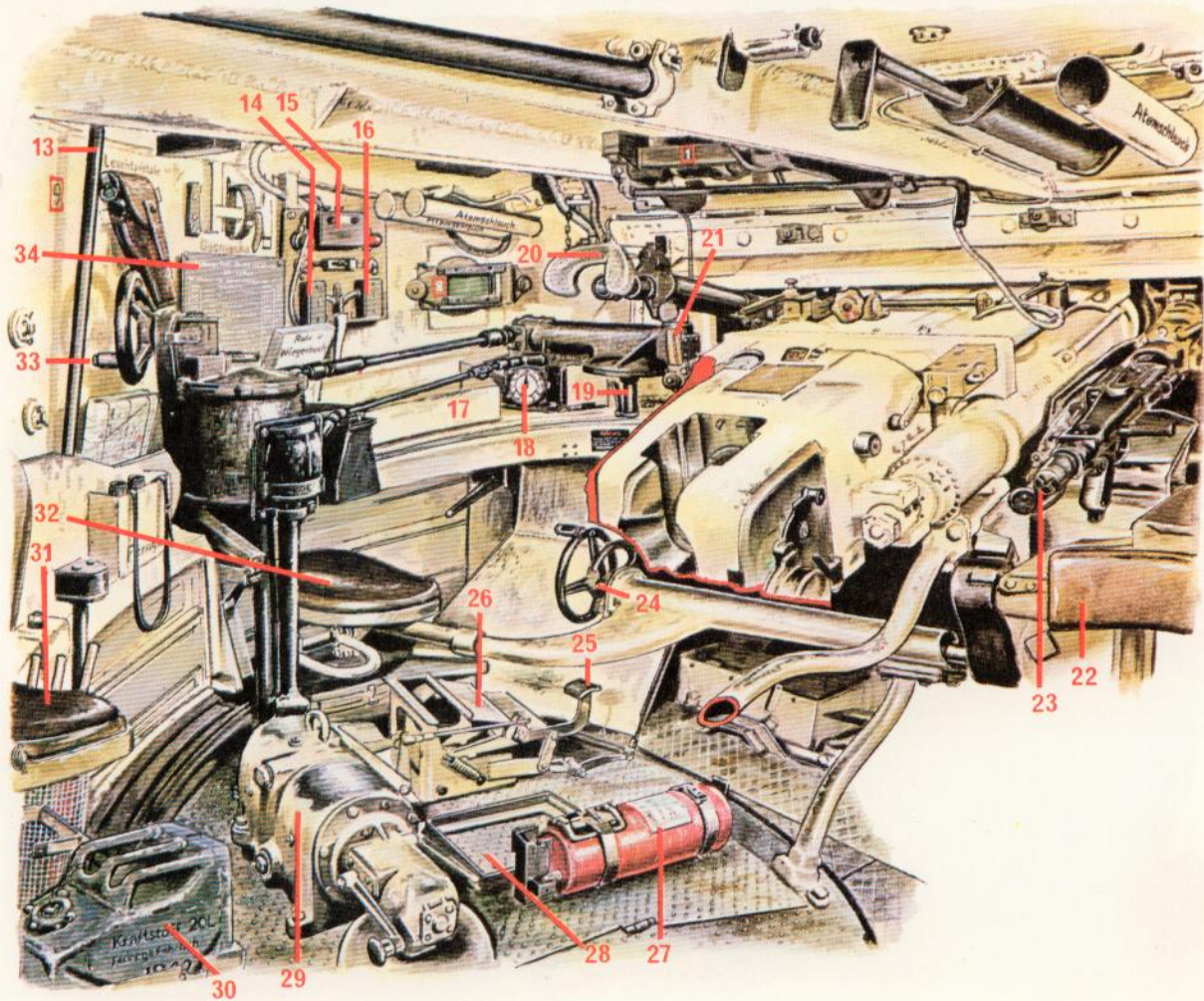


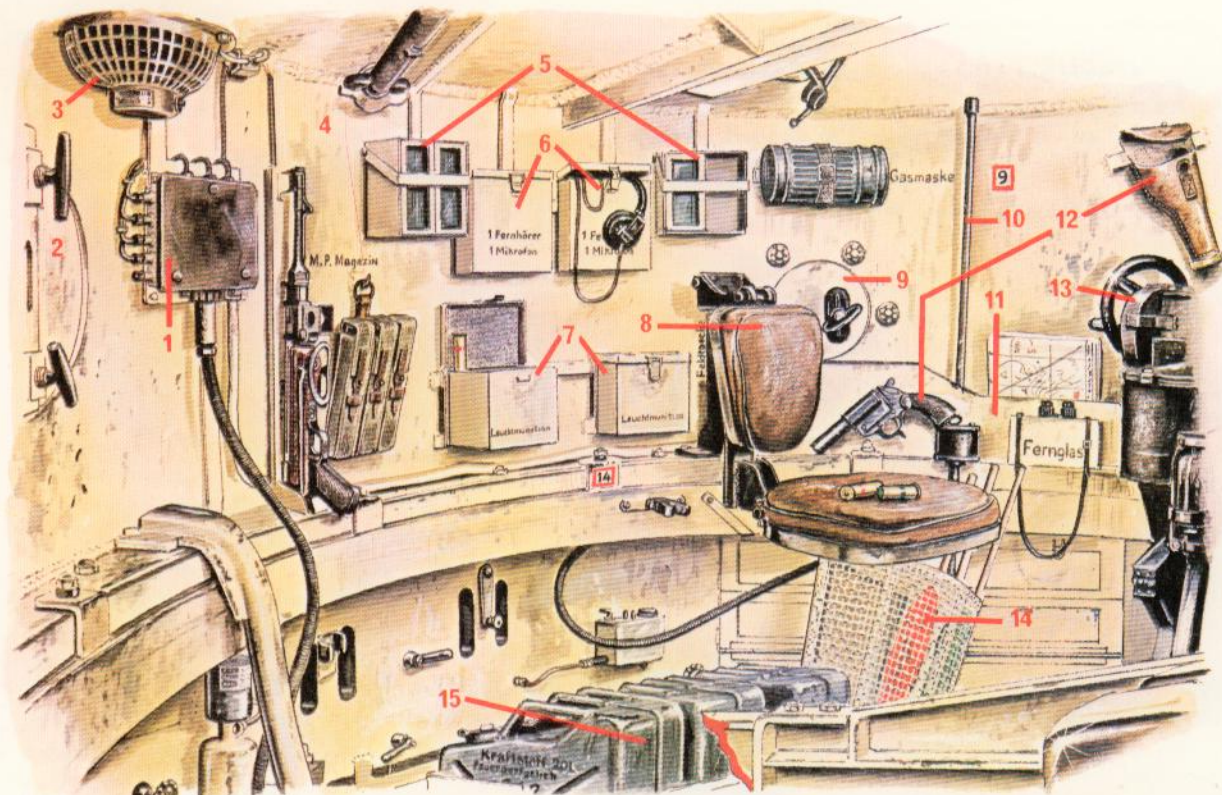
4. Tiger B (Henschel turret), 3/sPzAbt.503; Hungary, winter 1944/45



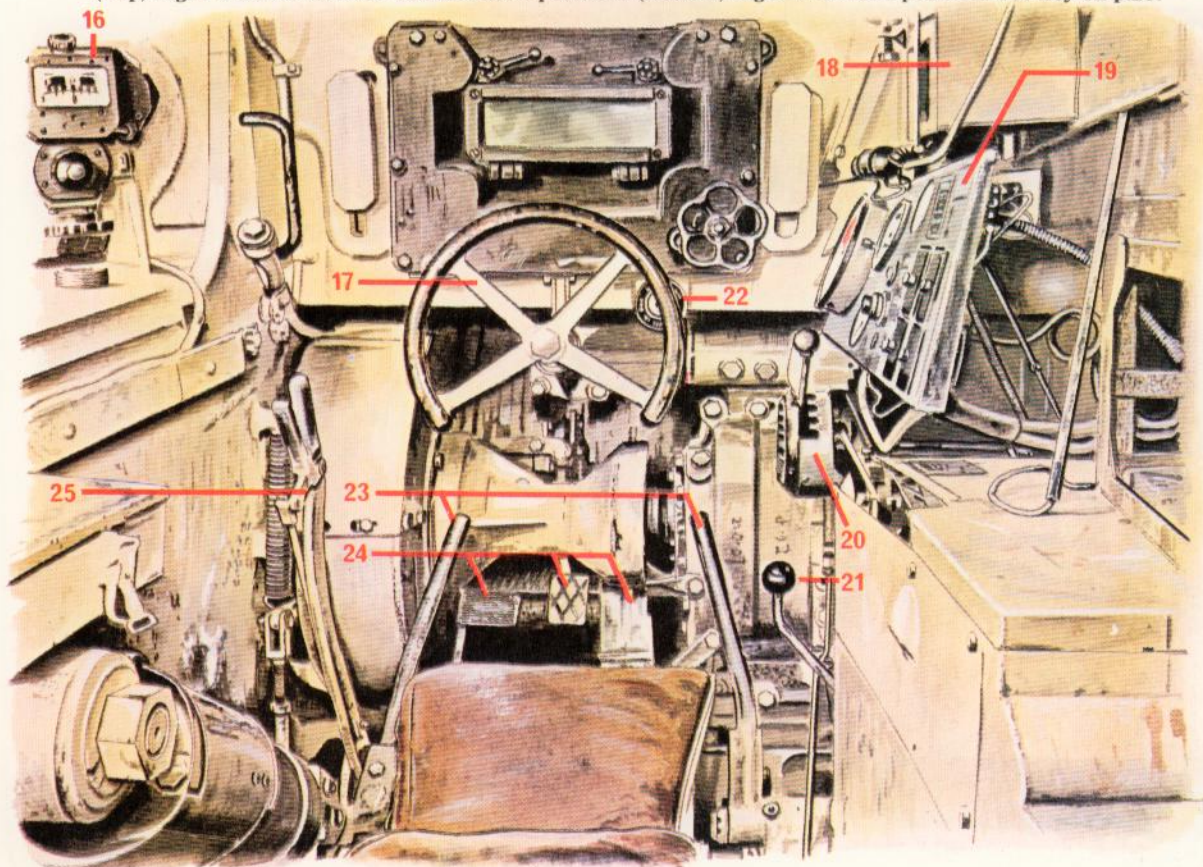


(Top) Tiger E turret interior: loader's position. (Bottom) Gunner's position, seen from loader's position. See key on p.25.

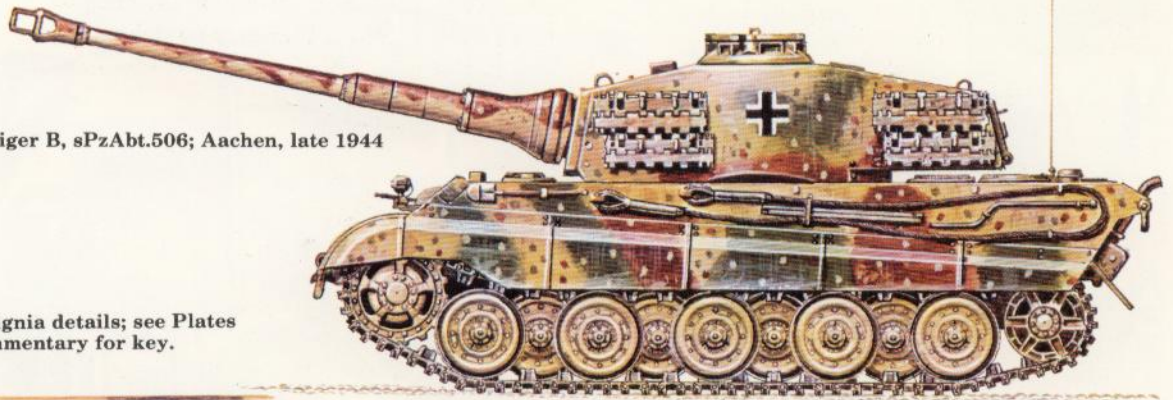




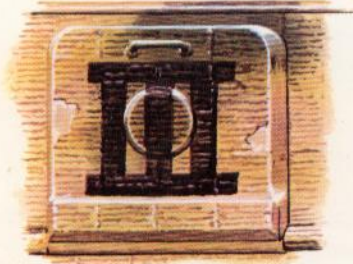
(Top) Tiger E turret interior: commander's position. (Bottom) Tiger E driver's position. See key on p.25.



1. Tiger B, sPzAbt.506; Aachen, late 1944



Insignia details; see Plates commentary for key.



2



3



4



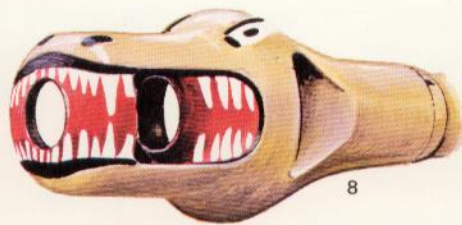
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11



10

Key, Plate F (top): Tiger E turret interior, looking right and forward:

- 1 Breech of KwK 36 88mm L/56 gun
- 2 Lead to smoke grenade dischargers
- 3 Loader's kit bin
- 4 Compressed spring counterweight cylinder
- 5 Stowage position for box containing butt and bipod for co-ax MG when dismounted.
- 6 Gasmask canister
- 7 Stowage, MG belt bags and water canteens; in all four bags and two canteens could be stowed here.
- 8 Turret escape hatch
- 9 Projectile ejector
- 10 16 rds. 88mm ammunition—see text for colour code details
- 11 16 rds. 88mm ammunition
- 12 Loader's seat

Plate F (bottom): Turret interior looking left and forward; note gun breech and basket cut away for clarity, indicated by red sectioning:

- 13 Drive shaft to traverse indicator
- 14 Commander's radio sockets
- 15 Emergency battery for firing circuit
- 16 Gunner's radio sockets
- 17 Gunner's kit bin
- 18 Traverse indicator
- 19 Hand traverse wheel
- 20 TZF 9b sighting telescope
- 21 Elevation clinometer
- 22 Loader's seat
- 23 Co-ax MG
- 24 Elevating handwheel
- 25 Co-ax MG trigger pedal
- 26 Rocker plate control, power traverse
- 27 Tetra fire extinguisher
- 28 Stowage position, breech spares bin
- 29 Power traverse motor
- 30 Stowage, three water cans
- 31 Commander's seat
- 32 Gunner's seat
- 33 Commander's hand traverse wheel
- 34 Instruction board (for sealing turret)

Plate G (top): Turret interior looking to left and rear from loader's position; again, breech of KwK36 is cut away for clarity:

- 1 Turret fuse box
- 2 Escape hatch
- 3 Extractor fan housing
- 4 Stowage for MP.40 and mag. pouches
- 5 Spare vision block stowage
- 6 Stowage, microphones and headsets
- 7 Flare pistol ammunition stowage
- 8 Commander's seat; canteen stowage behind.
- 9 Pistol port
- 10 Drive shaft to traverse indicator
- 11 Commander's kit bin
- 12 Flare pistol and holster stowage—pistol displayed here purely for clarity.
- 13 Commander's hand traverse wheel
- 14 Signal flag basket
- 15 Stowage, three water cans

Plate G (bottom): Driver's position:

- 16 Gyroscopic direction indicator
- 17 Power steering wheel
- 18 Spare vision block stowage
- 19 Instrument panel
- 20 Selector control
- 21 Drive change lever (direction control)
- 22 Electric starter
- 23 Emergency track steering levers
- 24 Clutch, foot brake and accelerator pedals
- 25 Hand brake

The PzKpfw VI

BASIC TECHNICAL DETAILS

Model E

Weight:	54.1 tons
Armour:	110mm
Speed:	23mph
Overall length:	27ft. 9in.
Width:	12ft. 3in. (with service track)
Height:	9ft. 6in.

Model B

Weight:	68.7 tons
Armour:	185mm
Speed:	23.6mph
Overall length:	33ft. 8in.
Width:	12ft. 3½in. (with service track)
Height:	10ft. 1½in.



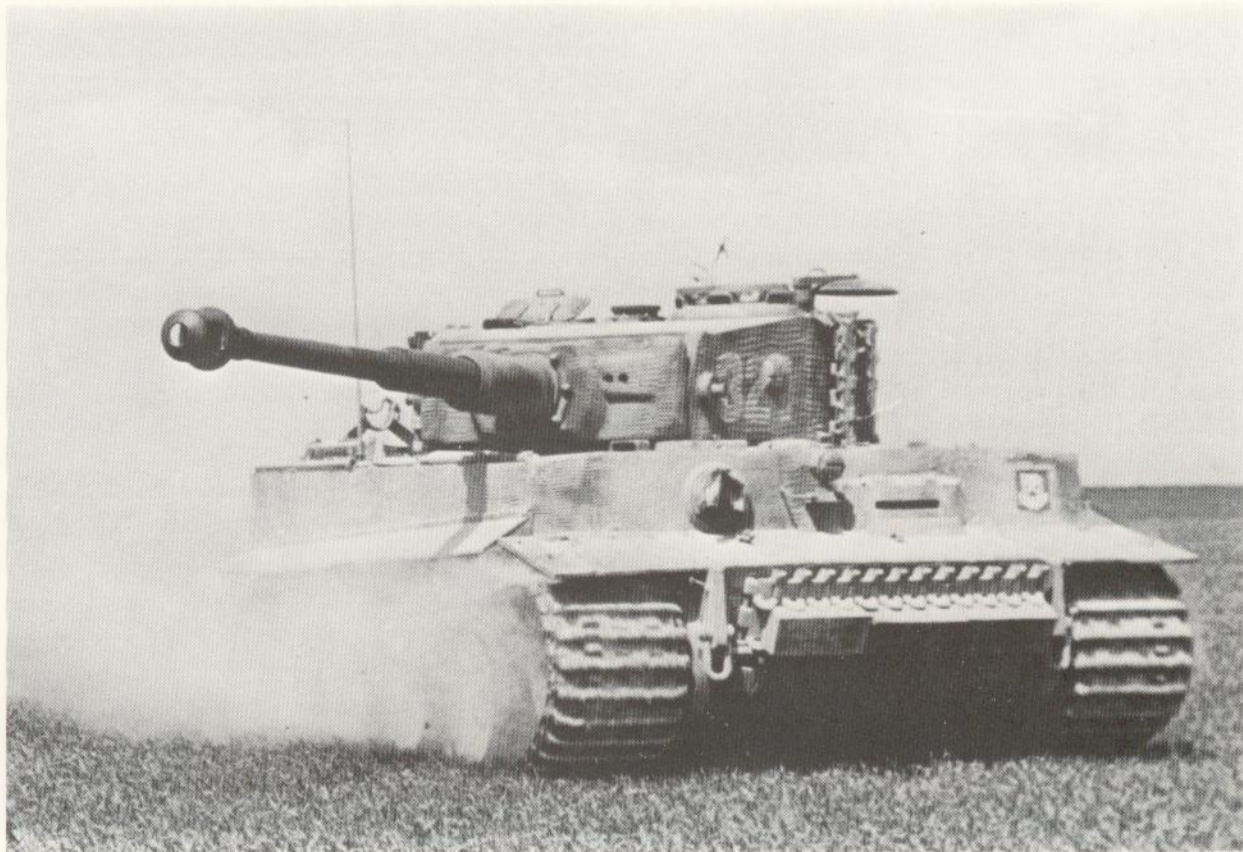
Tiger E of 1/sSS-PzAbt.101 passing through the village of Morgny, France, en route for the Invasion Front on 10 June 1944: see Plate D1. (Bundesarchiv)

it was subject to breakdown—sPzAbt. 501 was equipped with early production models still prone to teething troubles—and its inhibiting dimensions and limited operational radius became clearly apparent following technical examination of a captured example which had had its tracks blown off by the 6pdrs. of 72 Anti-Tank Regiment RA on 31 January.

Towards the end of January 2/501 moved into the southern sector of the line near Pont du Fahs, and on 14 February 1/501 took part in the operations against the US II Corps in the Faid-Kasserine Pass area, destroying 15 Shermans, one of which was knocked out at a recorded range of 2,700 metres.

On 26 February 1/501, now at full strength with 14 Tigers, joined II/Panzer-Regiment 7 in *Kampfgruppe Lang*, which had the task of seizing the major road junction of Beja as part of an Axis

counter-offensive. From the outset, almost everything went wrong. The battlegroup's route wound through twisting mountain valleys which left little room for the tanks to deploy, and a stubborn British outpost at Sidi Nsir took a day's hard fighting and cost several valuable tanks to subdue. During that time a strong defensive position was constructed at Hunt's Gap, so that when the Panzers reached the area on the 27th they rolled onto a carefully prepared killing ground, several vehicles being lost on mines while the others were subjected to the combined fire of hull-down Churchills, anti-tank guns, field and medium artillery, and swooping Hurri-bombers. 1/501 lost seven of its Tigers through various causes, one being knocked out by a Churchill's 6pdr. penetrating its thinner turret side armour. Two men were killed and 18 wounded, including Major Leuders and most of the company's officers; the battalion history subsequently referred to Hunt's Gap as The Tiger Graveyard. II/PR 7 suffered even more severely and was reduced to a handful of vehicles. Much of the



damage was caused by the concentrated fire of the superbly handled British artillery, particularly the medium batteries. Not even Tigers could afford to ignore shelling by 5.5in. howitzers, which the British used regularly as an effective counter in later campaigns. So traumatic had been the experience that in later years the survivors erected a stone memorial on the site. The battlegroup commander, Oberst Rudolf Lang, received the scornful soubriquet of 'Tank Killer', somewhat harshly, since he had merely followed his orders. (See also Vanguard No 13, *The Churchill Tank*.)

For the next few weeks both Tiger companies were employed in minor defensive operations along the front. On 17 March Major August Seidensticker of sPzAbt. 504 arrived in Tunisia, followed by the first six Tigers of 1/504, and assumed command of all the heavy companies in the theatre. The first task of the combined unit, which numbered only a dozen tanks, was to assist 10. Panzer-Division at Maknassy in preventing the US II Corps breaking out of the mountains

'321' of 3/sSS-PzAbt.101 training in France prior to the invasion; the insignia of 1.SS-Panzer Korps is clearly visible on the front plate. Wittmann's Tiger must have presented a very similar appearance as it thundered into the attack at Villers-Bocage. (Bundesarchiv)

and driving across the rear of the Wadi Akarit Line, the defenders of which were coming under pressure from the British 8th Army. The American 1st Armored Division was stalled by the obstinate defence, losing 44 tanks on 24 March alone. Long after the war Seidensticker, serving in the Bundeswehr, met the commander of one of the American tank battalions, who commented: 'It was your goddam Tigers that stopped us getting to the sea that night'. The new commander of II Corps was George S. Patton Jr, whose operational directive to his troops had been tersely encapsulated in the sentence: 'Go take a bath!'

Reduced in number to eight, the Tigers fought their last African battles in the Medjerda Valley in April and May 1945, the survivors of sPzAbt. 501 and 1/504 surrendering on 12 May. Tiger '131', the last in running order, was examined

with great interest by HM King George VI before being shipped to England for evaluation.

Taken together, the lessons of Leningrad and Tunisia confirmed that even though the Tiger had been designed as a breakthrough tank, it produced its best results when fighting defensively. Naturally, most of its subsequent battles were fought on the Eastern Front, where the sheer scale and longevity of operations permits mention of only the briefest details.

On the Leningrad sector sPzAbt. 502 attained three-company status in the spring of 1943, remaining in the area until the Russians finally broke the siege, and then serving with Army Group North until the latter was dismembered during the Red Army's 1944 series of offensives. The battalion fought at Riga, Memel, Königsberg and in East Prussia, where its career ended on 9 May 1945. It has been calculated that this longest-serving battalion destroyed not less than 1,400 tanks, 2,000 anti-tank guns and as many artillery weapons during its years of almost continuous involvement.

During the Stalingrad débâcle sPzAbt. 503 had assisted in holding open a corridor at Rostov through which the German troops in the Caucasus retreated from the trap into which they had driven. At Kursk the Army Group South wing of the German attack was given the greatest concentration of Tigers yet seen, including not only sPzAbt. 503's three fully equipped companies (45), but also the Heavy Companies of the favoured divisions 'Grossdeutschland' (14), 1. SS-Panzer 'Leibstandarte' (13), 2. SS-Panzer-Grenadier 'Das Reich' (14), and 3. SS-Panzer-Grenadier 'Totenkopf' (15), a grand total of 101 Model Es. The story of Operation *Zitadelle* is too well known to require repetition in detail here, but it is worth mentioning that at the climactic tank battle of Prokhorovka the Russian counter to the Tiger's obviously superior firepower was to close the range as quickly as possible and, on occasion, to ram. Further details will be found in Vanguard Nos: 12, *Sturmartillerie and Panzerjäger*, 14, *The T-34 Tank*, 16, *The Panzerkampfwagen III* and 18, *The Panzerkampfwagen IV*.

After Kursk, Army Group South was pushed steadily west until by the end of 1943 it had been forced across the Dniepr. In January 1944

Superb portrait of '232', a late-production Tiger E of 2/sSS-PzAbt. 101, posed in the summer woodlands of Normandy: a photograph which gives a good idea of the sheer menacing bulk of the beast. To many Allied tank men in Normandy the Tiger's fearful reputation made it a 'bogeyman'. (Bundesarchiv)

sPzAbt. 503, still in possession of 34 Tigers, was joined by a 46-strong Panther battalion to form a Heavy Tank Regiment which would operate under the command of 1st Panzer Army. Named *Panzer-Regiment Bäke* after its commander, Oberstleutnant Dr Franz Bäke, the regiment also included a self-propelled artillery battalion and an engineer bridging battalion.

Much of the fighting took the form of *Kesselschlachten* (literally, cauldron battles) in which Bäke's regiment either fought its way to the relief of pockets of German troops trapped by Hitler's insane stand-fast orders, or was compelled to fight its own way out of trouble. These actions were never less than desperate and at the Balabonowka Pocket 267 Russian tanks were destroyed in five days and nights of fighting; the German loss was not believed at first and had to be carefully verified—it amounted to one Tiger and four Panthers.

During the spring of 1944 sPzAbt. 503 was withdrawn and re-equipped with Model Bs. After serving in France the battalion returned to the Eastern Front in October, fighting in Hungary until the general collapse.

At Kursk sPzAbt. 505, with two companies, had fought under Army Group Centre on the northern wing of the German attack. To maintain a balance of heavy breakthrough vehicles the northern wing was also supported by Jagdpanzer-Regiment 656, which contained two battalions of Porsche Elefants (653 and 654). After *Zitadelle* 505 remained with Army Group Centre until the latter was virtually destroyed during the Red Army's summer offensive *Bagratiön*. The battalion was then refitted and served with Model Bs in East Prussia.

Schwere Panzer-Abteilung 506 came into the line under Army Group South in September 1943, subsequently taking part in various cauldron battles near Lemberg and Tarnopol. In April 1944 it disabled the first JS-II so far encountered, the vehicle being despatched to the Kammersdorf proving grounds for evaluation.



The battalion was withdrawn for re-equipment in August 1944 and did not return to the Eastern Front.

Also serving on the Tarnopol sector was sPzAbt. 507, which arrived in March 1944, and was transferred to the crumbling northern front in November. It received its last replacement vehicles—15 Model Bs—in March 1945 and during the following month was fought to destruction.

Schwere Panzer-Abteilung 509 arrived on the Army Group South front in November 1943, being involved in numerous actions designed to stabilize the front around Proskurov. The battalion then replaced sPzAbt. 503 in *Panzer-Regiment Bäke* and fought at the notorious Kamenets-Podolsk pocket. In September 1944

sSS-PzAbt.102's approach march to Normandy was made in the face of total Allied air superiority, hence the liberal use of foliage for camouflage. The extra fuel drums on the engine decks are a reminder of the Tiger's greedy consumption. (Martin Windrow)

sPzAbt. 509 returned to Germany for re-equipment with Model Bs and arrived back on the Eastern Front in January 1945, fighting in Hungary. The survivors surrendered to the American Army near Linz, Austria.

A battalion which had a comparatively short active history was sPzAbt. 510, which fought on the northern front and in Courland from August 1944, blowing up its last Tigers on 8 May 1945.

Schwere Panzer-Abteilung 501 returned to the line in December 1943, having been re-formed from a nucleus of 150 men from the original battalion who had not been involved in the Tunisian débâcle. The battalion served on the Vitebsk sector, where it was involved in heavy fighting during the Russian summer offensive, and was re-equipped with Model Bs in July 1944. For the remainder of the year it fought in southern Poland at Sandomierz, Radom and Kielce. On 21 December sPzAbt. 501 became an integral part of General Walther Nehring's XXIV Panzer Korps, changing its title to Korps-





Tiger-Abt. 424; its role was summed up by its more unofficial title of *Korps-Feuerwehr*, or Corps Fire Brigade. The battalion was destroyed during the Red Army's 1945 New Year offensive; until overwhelmed it formed the defensive heart of a *wandernder Kessel* or 'moving pocket' in the manner of the Old Guard at Waterloo.

The three SS Heavy Battalions all finished their days on the Eastern Front. Schwere SS-Panzer-Abteilung 101 went straight from the Ardennes to Hungary, where it arrived too late to affect the outcome. On the other hand, sSS-PzAbt. 102 made a formidable contribution to 9th Army's defence of the vital Kustrin sector, inflicting grievous loss on Zhukov's 1st Belorussian Front as it strove throughout April 1945 to storm the Seelow Heights, the last natural feature between the Red Army and Berlin. Schwere SS-Panzer-Abteilung 103's career as an armoured unit came to an end in Danzig the previous month, although many of its men fought on as infantry. Something of the ferocity of these last battles can be gauged by the fact that between 2 February and 18 March one Tiger alone (that of Untersturmführer Karl Brommann of 2/103) destroyed 66 tanks, 44 guns and 16 lorries.

The first Königstiger company to see active service in France was 1/sPzAbt.503, seen here training shortly before D-Day; they came into the line east of Caen. (Bundesarchiv)

It will be recalled that 1/504 had been lost in Tunisia; 2/504, however, fought throughout the short campaign in Sicily and succeeded in evacuating its surviving vehicles across the Straits of Messina. Schwere Panzer-Abteilung 504 refitted in Holland and after a short spell on the Eastern Front was posted to Italy in June 1944, going into action against the 5th Army near Massa Marittima. The Italian landscape was particularly suitable for the type of defensive warfare in which the Tiger's capacity for long shooting could be used to its best advantage. On 22 June at Parolla a single platoon commanded by Oberfahnrich Oskar Röhrig, a young cadet officer, destroyed 11 out of 23 Shermans leading an American attack; the German account claims the capture of the remaining 12 after they had been abandoned by their crews.¹ It is easy enough

¹Fahnrich = Ensign; Oberfahnrich = Senior Ensign. Interposed between the warrant and commissioned officers, these ranks had no precise equivalent in the British and American Armies. Röhrig was awarded the Knight's Cross.

to deplore such conduct—unless one has been in a similar position oneself. British crews have also unashamedly evacuated their vehicles just in time to witness their destruction by Tigers which remained impenetrable even at short range. 'Like shooting ducks on a pond', was the Tiger crews' verdict on the Shermans.

In the autumn sPzAbt. 504 crossed the Apennines to assist in the defence of the Gothic Line near Rimini. Here its strength was steadily eroded by the combined effects of naval gunfire, medium artillery and the methodical British infantry/tank drill. The battalion remained in action against the British 8th Army until the German forces in Italy surrendered on 3 May 1945.

Schwere Panzer-Abteilung 508 was formed in August 1943 and was for a while associated with trials of the Goliath self-propelled bombs, which proved to be such a dismal failure at Anzio. Although 3/508 was also present at Anzio from February to May 1944, it is not clear from the records available whether it was involved in these abortive attempts; the impression given is that it fought as a conventional Tiger company, inflicting loss but suffering severely from the effects of naval gunfire. Nor is much known of the battalion's actions during the withdrawal to northern Italy, although in January 1945 it handed over its remaining vehicles to sPzAbt. 504 and returned to Germany.

In France the first Tigers to meet the Allies belonged to sSS-PzAbt. 101, the Corps Tiger Battalion of I SS Panzer Korps. On 13 June the British 7th Armoured Division was engaged in a wide right hook which, if successful, would not only lever the defenders of Caen out of their positions but would also isolate the *Panzer Lehr Division*. Shortly after dawn the leading British brigade, 22nd Armoured, approached Villers-Bocage and its advance guard—'A' Squadron, 4th County of London Yeomanry, and 'A' Company, 1st Bn. The Rifle Brigade—passed through the village and halted at the roadside beyond. The tanks, carriers and half-tracks were then closed up nose-to-tail to allow sufficient room for the relief point units to pass.

The road climbed to the summit of Hill 213, where the whole course of events was watched by

the commander of 2/101, Obersturmführer Michael Wittmann. Aged 30, Wittmann was already credited with the destruction of 119 Russian tanks; he had been awarded the Knights' Cross on 14 January 1944, gaining the Oak-leaves only 16 days later, both while serving with 13/SS-PR 'LSSAH'. On the morning of 13 June his No 2 Company mustered only six Tigers, of which only four were in a fit state to fight, the battalion having just completed a difficult road march from Beauvais. Nearby was No 1 Company, also reduced to a handful of vehicles.

Wittmann realized that the British had halted in such a manner as to trap themselves if attacked, since the narrow road left no room for turning. His Tiger lurched out of its position and onto a track running parallel with the road, the first round smashing into a half-track with such force that it was thrown, blazing, across the highway. The great machine lumbered the length of the column, its gun belching flame and each round claiming another victim. Then Wittmann directed his driver onto the road itself and into the village. A Cromwell fired at point-blank range, without result, and then erupted in flames and smoke as the 88's return round tore through it. The Tiger rolled on, devouring everything in its path, including the Yeomanry's RHQ Troop and several OP Shermans. Another Cromwell reversed into a side road, hoping to send a shot into the German's thinner rear armour, but Wittmann was expecting something of the kind and had his turret traversed ready to blow his opponent apart. He then turned off the main street and returned to Hill 213 across country. Virtually alone, he had stopped 7th Armoured Division in its tracks: from start to finish the action had taken a mere five minutes.

Less well known is the immediate sequel. During the afternoon 2/101 and elements of 2. Panzer-Division entered Villers-Bocage, to be savagely assailed on all sides. 'A troop of Cromwell tanks of the CLY, commanded by Lieutenant Cotton, edged its way towards the centre of the town. Turning into the main street the crew of the leading tank, commanded by Corporal Horne, saw a PzKpfw IV 20 yards away, while behind were two alert Tiger tanks, the foremost of which started to swing its gun to

engage them. Trooper Wood, the gunner, quickly shot up the PzKpfw IV, which burst into flames, and the driver, Trooper Grimshaw, reversed the tank into a side street with commendable celerity.

'The German tank men dismounted to peep round the wall at the British tank, and a game of hide-and-seek began. Armour-piercing shells were fired at our tank through the intermediate buildings. The crew noted the words "*Justice et Paix*" on a battered building with mixed feelings.

'After a time the Huns seemed to consider that our tank had been knocked out, and one of the Tigers started up. As the hull appeared at the end of the street, Trooper Wood fired one shot which put the tank out of control and it crashed into a building. One Tiger tank remained to be dealt with.

'In the meantime the troop commander, Lieutenant Cotton, had entered a house overlooking the Tiger. Seeing that the tank was shut down and that there was no sign of activity, he assumed that the crew had bailed out. He collected some petrol, poured it over the tank, and was about to set it alight when, to his surprise, the tank moved off. Once again, Corporal Horne was on the alert and dealt with it in the same way as it crossed the end of his street.

'By this time fierce battles were going on all over the town and men of the Queen's Royal Regiment had arrived to play their part with 6pdr. anti-tank guns. About five o'clock in the afternoon it was realized that the opposition was too strong and a withdrawal was made to a high feature west of the battered town.¹

The day's fighting cost 7th Armoured Division 25 tanks, 14 half-tracks and 14 carriers, the majority lost during the morning. The afternoon attack saw three Tigers written off, a further three immobilized (including Wittmann's) and several of 2nd Panzer's tanks knocked out. Wittmann was awarded the Swords to his Knights' Cross on the recommendation of General Bayerlein of the *Panzer Lehr*, and was immediately promoted. He declined an appointment to an officers' tactical school, and was killed on 8 August in a battle with a troop of



Hauptmann Walter Scherff of sPzAbt.503 was awarded the Ritterkreuz on 23 February 1944 while serving in Russia. During the Normandy campaign he commanded the battalion's 3.Kompanie, which was wiped out on two separate occasions; see Plate D2. (ECPA)

British Shermans at least partly equipped with 17pdr. Fireflies.

Arriving in Normandy in early July, sSS-PzAbt. 102 (the II SS Korps Tiger battalion) went into action immediately on the vital Odon sector. On 10 July at Maltot 1/102 destroyed 12 out of 14 Churchills belonging to 9th Royal Tank Regiment, but elsewhere Hill 112, the linchpin of the German defence, fell to a determined British attack. It was sSS-PzAbt. 102 which led II SS Korps' panzer-grenadiers in a series of night attacks which succeeded in recapturing half of the hill, which became the most bitterly contested feature in Normandy. The Germans held their ground with Tigers, the British with massed artillery fire; so bad was the latter that Tiger crewmen on standby were often unable to dismount for the most urgent personal reasons, nature's calls being answered with the aid of an empty shell case. The battalion left the Odon valley at the end of July, moving west to the American sector and the eventual shambles of the Falaise pocket. During the campaign in

¹Club Route—30 Corps in Europe, Hannover, 1946.



3/sPzAbt.503 'shooting in' their new Königstigers;note the heavy muzzle blast of the '88. The two tanks on the right have their guns locked in elevation while gunnery instructors discuss the results of their shooting with the crews. (Bundesarchiv)

Normandy it destroyed 227 tanks and 28 anti-tank guns.

Schwere Panzer-Abteilung 503 came into the line east of Caen on 11 July. At first only No 1 Company was fully equipped with Model Bs, but as refitting continued the issue became general. On 18 July No 3 Company was caught in the bomb carpet which opened Operation 'Goodwood' and was all but destroyed, although later in the day Nos 1 and 2 Companies arrived in time to repulse the British attack on Bourgeubus Ridge. 3/503 re-equipped at Mailly-le-Camp but did not return to Normandy, losing its last Tigers in a vain attempt to hold the line of the Seine at Amiens. In September the battalion was re-equipped yet again before leaving for the Eastern Front.

Thanks to Hitler's no-withdrawal order, which kept them within range of the Allied naval guns, the effects of massed artillery—quite unlike anything experienced in the East—and the incessant activities of ground-attack aircraft, all the Tiger battalions which fought in Normandy were slowly battered to destruction, although many of their personnel managed to escape.

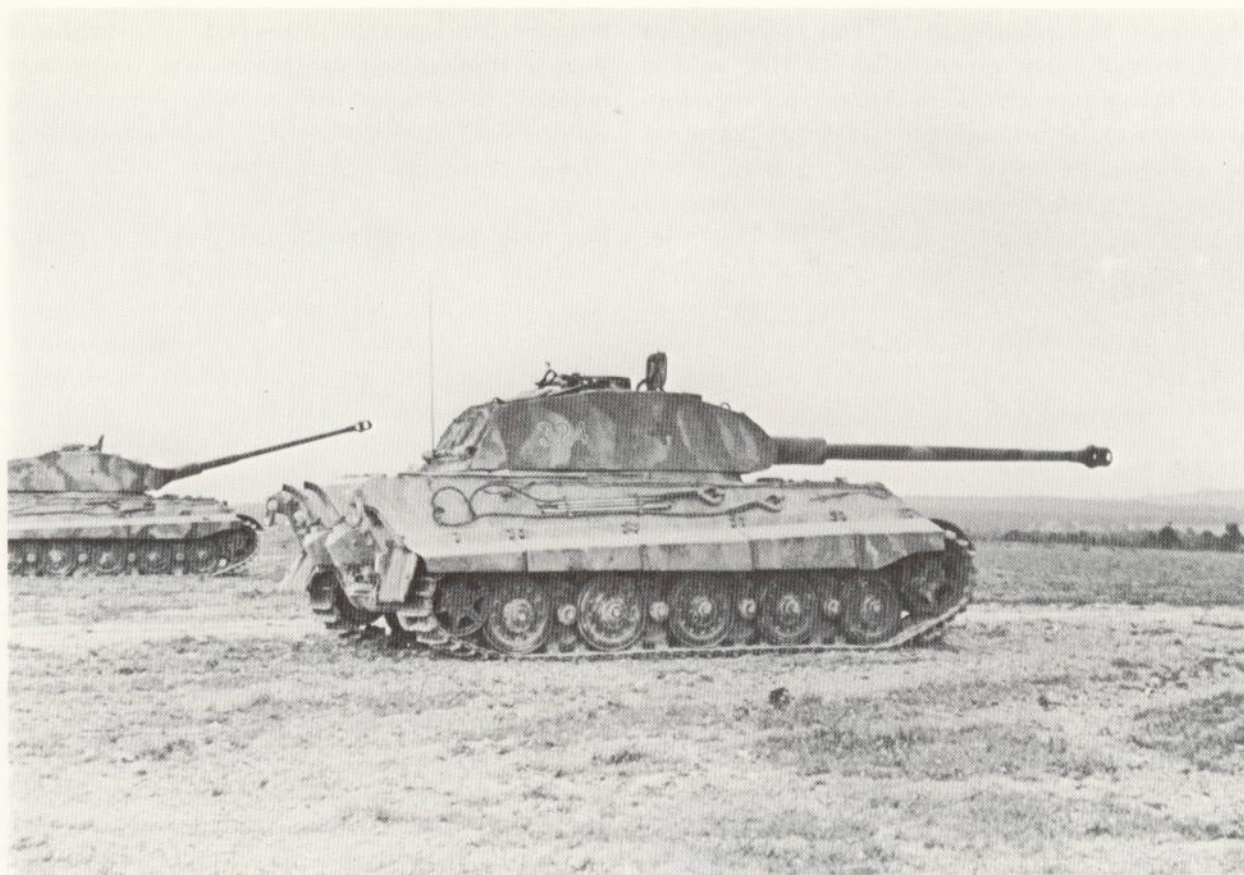
As previously mentioned, sPzAbt. 506 left the Eastern Front for refitting in August 1944. The battalion's first actions in the West were a direct response to the Allied airborne operations at Arnhem and Nijmegen, and it was then employed against the Americans at Geilenkirchen and Aachen, becoming a four-company battalion by

absorbing the independent Heavy Tank Company 'Hummel' in December. (A number of independent Heavy Companies were planned for the local 'Fire Brigade' role, but of these only sPzKp 'Hummel', named after its first commander, was given substance.)

Together with sSS-PzAbt. 101, sPzAbt. 506 took part in the Ardennes offensive. That Tigers were employed at all confirmed Germany's acute shortage of tanks, since they were quite unsuitable for the type of fast-moving, deep-penetration operation that was planned. In the film *Battle of the Bulge* the cinematic equivalent of Obersturmbannführer Joachim Peiper expressed delight at the prospect of his battlegroup being led by Königstigers. In reality Peiper spoke out against the whole concept of the Heavy Battalions, suggesting instead that each Panzer division should have its own Tiger company which would provide a firm base around which the lighter tanks could exercise their more flexible tactics. Again, he was too experienced an officer to permit his line of advance along the narrow, tortuous Ardennes roads to be blocked by broken-down Tigers. For the most part, the Heavy Battalions trundled along behind the more mobile PzKpfs IVs and Panthers, burning huge quantities of petrol that could have been put to good use elsewhere.

The end was inevitable even before the failure of this last great German offensive. During the few remaining months of the war sPzAbt. 506 was swallowed in the Ruhr pocket. The last Tigers to serve on the Western Front were manned by crews from sPzAbt. 508, the incomplete sPzAbt. 511, and the personnel of training establishments.

Hitler once commented that each Tiger battalion was worth a Panzer division to him, although the former could never perform the duties of the latter, nor was it ever intended that they should. The influence of the Heavy Battalions was purely local; they won their battles but they never altered the course of a campaign. For all that, the Tiger in both its forms remains one of the world's most legendary weapon systems.



Further views of the same scene. These tanks have the Porsche turret, which identifies them as among the first 50 Königstigers to be built. (Bundesarchiv)

The Plates

A1: *Tiger E, 1/sPzAbt. 502; Leningrad front, winter 1942/43*

This vehicle is finished in standard Panzer grey with roughly applied whitewash snow camouflage, and the tank number '123' in yellow on the turret sides. 502's insignia was a mammoth (detail inset) and this may have been painted on the front plate close to the driver's visor; certainly this area has been left grey deliberately, and our source photograph shows white markings which give a strong impression of the insignia. A rubber tyre from a roadwheel is stowed on the hull side. Slightly later photographs of 502 show Lieutenant Meyer's Tiger with an all-white turret and upper hull but grey roadwheels and lower hull, the overall effect being extremely smart; no turret number was carried by Meyer's vehicle.



A2: *Tiger E, 1/sPzAbt. 501; Tunisia, early 1943*

This detail was taken from a limited-view photograph contained in the contemporary British intelligence file on the Tiger. The vehicle is light sand yellow and the white turret number '7' is probably the only one carried. The placing of the battalion's stalking tiger insignia is most unusual, as is that of the name *Norbei*. Inset is a detail view of sPzAbt. 501's insignia.

A3: *Tiger E, 1/sPzAbt. 504; Tunisia, spring 1943*
The overall olive green finish of this vehicle confirms its late arrival in Africa and therefore indicates a tank belonging to 504 rather than 501, whose vehicles were the more common sand yellow. The turret is marked 142 in red trimmed with white. The vehicle is fitted with the Feifel air filter system.

B1: *Tiger E, 8/sPzKp (Tiger), 2. SS-Panzer-Grenadier Division 'Das Reich'; Russia, February/March 1943*

'Das Reich's' Tiger company was formed in December 1942 and first went into action in February 1943. The photograph on which our painting is based was probably taken near Belgorod, and the all-white colour scheme and runic divisional sign (detail inset) have enabled us to date it fairly accurately. The vehicle number '332' is painted in black on the turret sides: in Tiger battalions the normal numbering sequence—company/troop/tank—seems to have

One of Abteilung 503's King Tigers abandoned by a French roadside. The major disadvantage of the Porsche turret was the rounded front, which could deflect shots downward through the roof of the driving compartment. (RAC Tank Museum)

been rather less than universal. The fitting of S-mine dischargers, as shown, was never very popular; the weapon was too indiscriminate in its effect, and not sufficiently 'soldier-proof' to prevent accidents.

B2: *Tiger E, turret detail, unit unknown; Russia, 1943*

The vehicle was finished in factory yellow ochre and lightly sprayed with brown camouflage paint. On the turret side is the vehicle number '334' in red outlined in white and in front of this is an unusual placing of a large national cross; both number and cross are repeated on the rear bin.

B3: *Tiger E, 8/sPzKp (Tiger), 3. SS-Panzer-Grenadier Division 'Totenkopf'; Kursk, summer 1943*

German tank crews were issued with tins of green and brown camouflage paste which could be diluted and applied to their vehicles as the situation demanded. In this case a continuous brown wavy line has been painted over the ochre finish. The turret number '111', in black outlined in white, is repeated on the rear bin. Not all of





Kompanie 8's Tigers carried the division's black three-bar sign, but we have traced one example in which the insignia has been painted on the front plate, close to the hull machine-gun (detail inset). Ingenious use has been made of a torn side skirt to stow a jerrican.

C1: *Tiger E, 13/sPzKp (Tiger), 1. SS-Panzer-Grenadier Division 'Leibstandarte'; Kursk, summer 1943*

In this case the basic ochre colour scheme has been oversprayed with areas of brown on the turret, hull front and back, leaving soft edges; the hard-edged brown hatchings on the hull sides have, however, been applied with a brush. Markings are limited to a small '613' on the turret side, and the national cross on the hull; no frontal markings are visible on our source photograph. It is unusual to see the quick-recognition large swastika flown from the radio aerial rather than spread over the rear decking.

C2: *Tiger E, 8/sPzKp (Tiger), 2. SS-Panzer-Grenadier Division 'Das Reich'; Kursk, summer 1943*

This vehicle provides an interesting contrast with that shown in Plate B1. The ochre finish has been oversprayed with large diagonal areas of brown. This company used turret numbers in sequence with the prefix 'S' for Schwere, HQ tanks being marked e.g. S01. Also on the turret side is the Kompanie 8 'imp', who appears regularly in

The Henschel turret, being flat-fronted with a slight backwards tilt, presented no such shot-traps. Note hooks for spare track links on the turret of this vehicle. (RAC Tank Museum)

1943 photographs of this unit (detail inset). The original runic divisional insignia has been replaced by the white double-bar emblem used by 'Das Reich' at Kursk. The national cross on the hull side is trimmed very narrowly in white. The crew's helmets are slung from a wire alongside the hull.

D1: *Tiger E, 1/ss-PzAbt. 101; Morgny, France, June 1944*

The vehicle has a coat of factory-applied *Zimmerit* overpainted with yellow ochre, following which a heavy green and brown camouflage has been applied. The vehicle number '131' appears on the turret side. The insignia of 1. SS-Panzer Korps 'Leibstandarte' (detail inset right) appears on the front and rear plates in squares which have been left free of *Zimmerit*. Also inset are the old markings used by Heavy Tank Companies; use of these was now rare, but two vehicles of this unit which were knocked out at Villers-Bocage carried them on the left end of their front and right end of their rear plates, opposite the Corps insignia. Both had resilient steel wheels, so neither can have been this particular vehicle, but there is no reason why it should not have been so marked.

D2: *Tiger E, 3/sPzAbt. 503; Normandy, July 1944*
 Known to have been commanded by Hauptmann Walter Scherff, this vehicle has an almost identical camouflage scheme to that illustrated in Plate D1, supplemented by heavy foliage for the final approach march into position. The turret number '301' indicates the company commander's tank, and is repeated on the rear bin, apparently in black trimmed with white, although we are working from a high-contrast night photograph. This vehicle, like that in D1, has the improved cupola fitted to later versions of the Model E; note the resilient steel wheels.

E1: *Tiger B (Porsche turret), 3/sPzAbt. 503; Mailly-le-Camp, July 1944*

After being all but wiped out during Operation 'Goodwood' 3/503 refitted with Porsche turret King Tigers at Mailly-le-Camp. In this instance the tank's basic ochre has been almost covered with olive green with a pattern of vertical brown streaks. On most Model Bs the national cross was painted centrally on the turret side, but here it appears well forward on the hull. 3/503 lost several more vehicles when attacked from the air while returning to the front, its last Tigers being destroyed near Amiens.

E2: *Detail of Henschel-turret Tiger B, 2/sPzAbt. 505; Army Group Centre, Eastern Front, autumn 1944*

Abteilung 505 took great pride in their charging knight insignia, leaving a large rectangle clear of *Zimmerit* on the turret side so that it could be painted on; the device was also painted on the turrets of the battalion's Model Es before it was equipped with Königstigers, sometimes in black, sometimes in brown. Another distinctive marking of 505's was the system of vehicle numbering using the inner and outer sleeves of the gun barrel, the company number generally being closest to the mantlet. On this particular turret large areas of the ochre finish have been sprayed with green and brown.

E3: *Detail of Henschel-turret Tiger B, 2/sPzAbt. 503; Budapest, early 1945*

Once again, the ochre-painted *Zimmerit* has been oversprayed with areas of green and brown, but

88mm KwK 36 Ammunition

	Muzzle Velocity ft/sec	Weight, Round (lbs)	Weight, Projectile (lbs)
PzGr 39 (APCBC)	2657	33.75	20.75
PrGr 40 (APCR)	3000	—	16.00
HEAT	1968	—	16.75
HE (Percussion fuse)	2690	32.00	20.30
HE (Time fuse)	2690	31.75	20.06

Most commonly stowed were PzGr 39, PzGr 40, HEAT and HE (percussion fuse), identified by their respective colour-coded projectiles, black with white cap, black, grey and yellow; additionally the PzGr 39 case was marked '8.8cm Flak 18' and the HE (percussion fuse) case '8.8cm 398 T'. HE (time fuse) was in short supply, but there is reason to believe that it was used by Tigers in Normandy to air-burst over the turrets of Allied tanks at extreme range.

At shorter ranges APCR (Armour Piercing Composite Rigid) ammunition, relying on a high density core to achieve penetration, produced better results than APCBC (Armour Piercing Capped Ballistic Cap) because of its higher muzzle velocity. However, the lighter projectile resulted in a sharp fall-off in performance above 1,000 yards, whereas the APCBC projectile was capable of penetrating 80mm plate set back at 30° at 2,000 yards.

here the turret carries more conventional markings, the vehicle number '233' being painted centrally and ahead of the national cross and repeated on the turret rear escape hatch. For extra protection spare track links have been suspended from hooks fore and aft.



E4: *Tiger B, 3/sPzAbt. 503; Hungary, winter 1944/45*

Although painted overall in white snow camouflage, this vehicle has a small area of the gun left in its original colour scheme so that the name 'Anneliese' is clearly visible. The vehicle number '314' is in white outlined in red, but is partly obscured by whitewash. The national cross has been painted centrally on the turret side.

F (top): *Interior, Tiger E turret, showing loader's position and adjacent ammunition bins.*

See key on p. 25.

F (bottom): *Interior, Tiger E turret, showing gunner's position as seen by loader.*

For clarity part of the breech has been cut away and the shield from the roof has been omitted. See key on p. 25.

G (top): *Interior, Tiger E turret, showing commander's position as seen by loader.*

Again the shield is omitted. See key on p. 25, and photograph elsewhere in this book.

Well-known but usefully detailed photograph showing a Henschel Tiger B, probably of sPzAbt.503, being sprayed with brown and green camouflage paint by its crew in a rear area during the Normandy campaign. This, and the vehicle's immaculate appearance, suggest that it is a brand new delivery. (Bundesarchiv)

G (bottom): *Interior, Tiger E, showing driver's position looking forward.*

See key on p. 25.

H1: *Tiger B, sPzAbt. 506; Aachen, late 1944*

This vehicle is shown in the 'ambush' colour scheme in which ochre, green and brown have been applied to resemble the sun-dappled leaf pattern of wooded country. The addition of vehicle numbers, insignia, etc., would have been incompatible with such a scheme.

H2: *Turret escape hatch marking, company commander's Tiger B, 3/sPzAbt. 505*

H3: *Battalion insignia, sPzAbt. 506*

H4: *Battalion insignia, sPzAbt. 508*

H5: Turret detail, Tiger E; Eastern Front, winter 1942/43

Beneath the carelessly applied whitewash the name 'Dorothee' remains visible on the gun. The unit could be sPzAbt. 502 but is more likely to be 503, which had a long tradition of naming its tanks after girls.

H6: Battalion insignia, sPzAbt. 504

H7: Turret numbering style, Tiger E, 1/sPzAbt. 507, Russia

H8: Muzzle brake painted to resemble tiger's jaws sPzErs-u-Ausb. Abt. 500, Paderborn 1943

H9: Battalion insignia, sPzAbt. 507

Known to have appeared on left upper rear plate of some of this unit's vehicles.

H10: Detail of Tiger E gun with name 'Hildegard' unit unknown

H11: Turret numbering style, Tiger E, 2/sPzAbt. 504, Italy

Farbtafeln

A1: Die normale 'panzergraue' Farbe noch benutzt zu dieser Zeit mit grober weisser Schneetarnung darübergemalt. Das Abteilungszeichen war ein Mammut, von dem man glaubt, dass es neben dem Schlitze des Fahrers an diesem Panzer gemalt war. **A2:** Ungewöhnliche Platzierung des Abteilungszeichens und des individuellen Panzernamens. **A3:** Panzer dieser Einheit, die in Afrika später als die der Abt. 501 eintrafen, waren oft grün gestrichen.

B1: Die Turmnummerierung folgte nicht der normalen Reihenfolge der früheren Tiger Einheiten der SS Divisionen. Beachte Einzelheit (rechts) der Markierungen links auf der hinteren Rumpflaste. **B2:** Beachte die ungewöhnliche Art der Benutzung des Hoheitskreuzes auf den Turmseiten und Rückseite. **B3:** Einige Panzer dieser Kompanie trugen das spezielle dreistreifige Divisionszeichen, das für den Kursk Feldzug benutzt wurde, auf dem vorderen Rumpf neben dem Maschinengewehr.

C1: Beachte das unterschiedliche Aussehen der Tarnung am Turm und Rumpf—eines gesprüht, das andere handgemalt. Die Flagge zur Erkennung durch Flugzeuge war gewöhnlich flach auf dem hinteren Deck gelegt und nicht wie hier an der Antenne befestigt. **C2:** Diese Kompanie nummerierte alle Panzer in Reihenfolge mit dem Vorzeichen 'S' für 'Schwere'. Der 'Kobold' war ein Kompaniezeichen.

D1: Das Zeichen des 1. SS Panzerkorps (eingesetzt, rechts) am linken Ende der vorderen und hinteren Rumpflaste. Einige Panzer trugen auch an den gegenüberliegenden Seiten dieser Platten das altmodische Schwere-Panzerkompaniezeichen (eingesetzt, links). **D2:** Dieser und der vorhergehende Panzer haben den Panzerturm und Stahlräder nach dem letzten Typ. Dies ist der Panzer von Hauptmann Walter Scherff.

E1: Ungewöhnliches senkrecht gestreiftes Tarnungsschema der üblichen drei Farben, und ungewöhnliche Platzierung des Hoheitskreuzes. **E2:** Das Ritterzeichen und die Platzierung der Nummern auf dem Geschützlauf waren eine Eigenheit der Abteilung 505 und erschienen auf beiden Panzern, dem Tiger E und dem Königstiger, 1943-45. **E3:** Typische Platzierung des Abzeichens am Turm des Königstigers. **E4:** Die weiße Tarnfarbe deckt alle Markierungen, ausser dem Namen 'Anneliese' auf dem Geschützlauf, ab.

F (oben): Innenansicht des Tiger E Turmes, rechts an die Position des Geschützladens schauend. **(Unten)** Links in die Richtung der Position des Schützen schauend. Siehe Titel in engl. Sprache auf Seite 25. Zur Klarheit haben wir die eiserne Schutzplatte, die vom Dach herunter hing, weggelassen.

G (oben): Die Position des Kommandeurs, von der Position des Geschützladens aus gesehen—und wiederum wurde die Schutzplatte zwischen dem Sitz und der Geschützbresche weggelassen. **(Unten)** Die Position des Fahrers. Siehe Titel in engl. Sprache auf Seite 25.

H1: 'Hinterhalt' Farbzusammenstellung, um mit der sonnendurchflutenden Waldlandschaft zusammenzublenzen; normalerweise waren keine Abzeichen darüber gemalt. **H2-H11:** Siehe Titel in engl. Sprache, die im Allgemeinen selbsterklärend sind.

Notes sur les planches en couleur

A1: La couleur standard 'gris-Panzer' est encore utilisée, avec un camouflage blanc ébauché par-dessus. L'abteilung avait un mammoth pour insigne et l'on pense que celui-ci avait été peint sur ce char près du kiosque de vision pilote, sur le devant de la caisse. **A2:** Place inhabituelle de l'insigne l'abteilung, et nom individuel du char. **A3:** Les chars de cette unité, arrivés en Afrique après ceux de Abt. 501, étaient souvent peints en vert.

B1: Le numérotage de la tourelle ne suivait pas l'ordre normal dans les premières unités des Tigres des divisions SS. Notez le détail de marques sur la gauche de la plaque arrière de la caisse. **B2:** Notez l'utilisation insolite du croix nationale sur les côtés et sur l'arrière de la tourelle. **B3:** Sur le devant de la caisse, à côté de la mitrailleuse, certains chars de cette compagnie portaient l'insigne spécial de la division, composé de trois raies, employé lors de la campagne de Koursk.

C1: Notez le différent effet du camouflage sur la tourelle, et sur la caisse une partie peinte au pistolet, et l'autre à la main. Le drapeau servant à l'identification par l'aviation reposait habituellement à plat sur le plateau arrière, plutôt qu'attaché à l'antenne comme dans cet exemple. **C2:** Cette compagnie numérotait chaque char dans l'ordre normal, avec le préfixe pour 'Schwere'. Le 'lutin' était l'insigne de la compagnie.

D1: L'insigne du 1er Corps SS Panzer (en cartouche, à droite) sur la gauche des plaques avant et arrière de la caisse. A l'extrémité droite de ces plaques certains chars portaient aussi le vieux symbole de la compagnie des chars lourds (en cartouche, à gauche). **D2:** Celui-ci, et le char précédent, ont un couplet d'un type plus récent, et les roues en acier complet. Voici le char du Capitaine Walter Scherff.

E1: Une façon peu usitée d'utiliser les trois couleurs habituelles dans le camouflage en bandes verticales; et position inhabituelle de la croix nationale. **E2:** L'insigne du chevalier, et l'inscription de numéros sur le canon, étaient particuliers à l'Abteilung 505, et se voyaient sur le Tiger E, et sur le Königstiger 1943-45. **E3:** Cette position de l'insigne est typique sur la tourelle du Königstiger. **E4:** La peinture blanche du camouflage couvre toutes les marques sauf le nom 'Anneliese' sur le canon.

F (haut): Intérieur de la tourelle du Tiger E, vue sur la droite vers la position du chargeur. **(Bas)** Vue sur la gauche vers la position du tireur. Voir les sous-titres anglais page 25. Pour plus de clarté, nous avons omis le bouclier qui pendait du toit.

G (haut): La position du chef de char, vue de la position du chargeur. Une fois de plus, le bouclier entre le siège et la culasse a été omis. **(Bas)** La position du pilote. Voir les sous-titres anglais page 25.

H1: La gamme des tons 'Embascade', pour bien se mêler avec les bois ensoleillés; normalement aucun insigne n'était peint sur ce camouflage. **H2-H11:** Voir les sous-titres anglais qui, en général, se passent d'explication.

A series of books describing key units and weapons systems of 20th century warfare, prepared by leading military experts for the enthusiast and modeller, and illustrating authentic details of armour and supporting vehicles, camouflage, markings, uniforms, insignia and weapons.

Avec annotations en français sur les planches en couleur

Mit Aufzeichnungen auf deutsch über die Farbtafeln

- 1. British 7th Armoured Division**
- 2. Panzer-Grenadier Division 'Grossdeutschland'**
- 3. US 1st Infantry Division**
- 4. Fallschirmpanzerdivision 'Hermann Göring'**
- 5. US 101st Airborne Division**
- 6. The Lee/Grant Tanks in British Service**
- 7. 2nd SS Panzer Division 'Das Reich'**
- 8. US 1st Marine Division**
- 9. British Guards Armoured Division**
- 10. Allied Tank Destroyers**
- 11. US 2nd Armored Division**
- 12. Sturmartillerie and Panzerjäger**
- 13. The Churchill Tank**
- 14. The T-34 Tank**
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- 19. Armour of the Middle East Wars 1948-78**
- 20. The Tiger Tanks**

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