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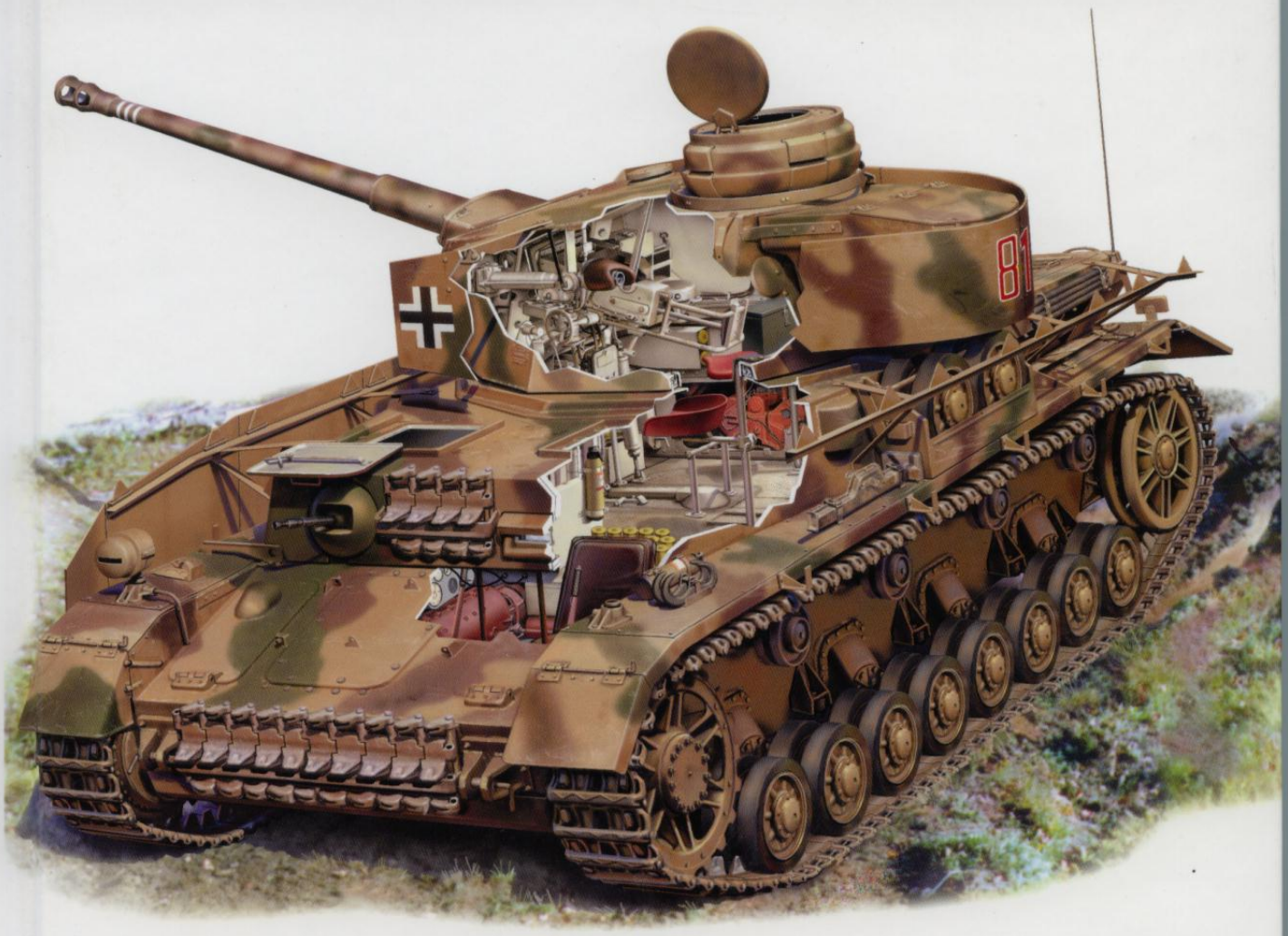
PANZERKAMPFWAGEN IV MEDIUM TANK 1936–1945



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FIGHTING ARMOR OF WWII

PANZERKAMPFWAGEN IV MEDIUM TANK 1936-1945

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Publisher's note

Readers may wish to study this title in conjunction with the following Osprey publications:

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Editor's note

This book is a revised edition of Vanguard 18 *The Panzerkampfwagen IV*, first published in 1983. The text has been revised, new black and white photos included and a detailed cutaway of a PzKpfw IV added.
Although the main period covered by this book is as suggested by the title, 1936–1945, the text also briefly covers deployment of the PzKpfw IV up unitl 1967.

Artist's note

Readers may care to note that copies of the computer-generated cutaway are available for sale from the artist. All reproduction copyright whatsoever is retained by the Publishers. Enquiries should be addressed to:

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The Publishers regret that they can enter into no correspondence upon this matter.

TITLE PAGE **mounting a dozer blade, this composite PzKpfw III/IV with interleaved suspension clears rubble in a heavily bombed German city. (Imperial War Museum)**

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PANZERKAMPFWAGEN IV MEDIUM TANK 1936–1945

DEVELOPMENT HISTORY

During the 1920s and early '30s armoured and indeed mechanised warfare passed through a period of trial and error in which theorists' views often clashed violently with each other. The protagonists of the 'armoured idea' were convinced that the very existence of the tank made battles in the mould of 1914–17 tactically impossible; while others, like the French, concentrated on building steel and concrete tank-proof defences which were eventually linked to form permanent defended zones such as the Maginot Line. Some said that the tank's primary armament should be the machine gun, which would be used against the enemy's infantry and artillery; the more extreme proponents of this school even considered that in such circumstances an engagement between opposing tank formations would be pointless since neither side could do much damage to the other. Others, with logical foresight, appreciated that since tanks were bound to meet on the battlefield the side which could knock out its opponents' vehicles would inevitably win, and began fitting guns with an armour-piercing capability. At this point a third philosophy intruded, arguing that the very existence of such weapons, fitted to field carriages to become purpose-built anti-tank guns, rendered the tank itself obsolete. The fact was, nobody really knew quite what to expect; theories were all that were available and

The Ausf. F1 carried 50mm frontal armour and had wider tracks than previous marks. Note the deflector rail under the gun, designed to push back the aerial when the turret was traversed to the right. (Bundesarchiv)

these were neither confirmed nor denied by the events of the Spanish Civil War, the only major conflict to take place between the two World Wars.

The provisions of the Treaty of Versailles forbade Germany the possession of tracked fighting vehicles, but obviously could not prevent German officers from studying the implications of the various theories, nor indeed the secret design and construction of tanks under thinly veiled deception titles. By the time Hitler formally repudiated the treaty in March 1935 the infant Panzerwaffe had already decided to cover all the theoretical alternatives by issuing its tank regiments with a variety of weapons.

Two machine-gun armed light tanks, the PzKpfw I and II, were already in production under the guise of agricultural tractors. The PzKpfw I was intended as a training machine and the PzKpfw II as a reconnaissance vehicle, although the latter would form the major equipment of the Panzer divisions until eventually replaced by the medium PzKpfw III, which was armed with three machine guns and a 37mm gun firing AP shot. The PzKpfw IV, equipped with a 75mm L/24 howitzer, was also under development, the idea being that its direct fire with HE ammunition would suppress enemy anti-tank guns which were beyond the range of the other vehicles. As envisaged, the German Panzer regiment would consist of two battalions, each of four companies, one of which would be classed as a Heavy or Close-Support company and equipped with the PzKpfw IV, while the others were classed as Medium or Light companies and armed with the PzKpfw III; in the event, because of low production, this dream never approached reality.

The design of the PzKpfw IV dated from January 1934, when the specification for the new close-support tank was put to the manufacturing industry by the Army, together with the overall weight limitation of 24 tons. During the next 18 months three firms, Rheinmettal-Borsig, Krupp and MAN, each produced their own design for the project under the deception title of **Bataillonsführerwagen** ('battalion commander's vehicle'), generally shortened to BW. Of these

Two PzKpfw IVs Ausf. A in Poland, September 1939. The plain white national cross was considered to be too conspicuous and was often daubed with yellow paint, as in the case of the leading vehicle. Reading their markings in conjunction with those of the motor cycle in the foreground, the tanks belong to the fourth, or Heavy company of their regiment's 1st Battalion. (Bundesarchiv)

This Ausf. B proba to the same unit a identifiable by the front plate incorpo machine-gun. The carries a small fas unditching purpos See Plate A1. (Bu

This Ausf. B probably belonged to the same unit and is identifiable by the straight front plate incorporating the hull machine-gun. The vehicle carries a small fascine for unditching purposes. See Plate A1. (Bundesarchiv)

the Krupp design, designated VK2001/K, was most acceptable, having some resemblance to the contemporary PzKpfw III in its hull and turret.

However, the VK2001/K did not go into production. The Army had requested, and been given, a six-wheeled interleaved suspension, but by the time the plans had been completed it had changed its mind in favour of a torsion bar system, which provided a better ride and which permitted the road wheels a greater degree of vertical lift. At this point Krupp took issue with the **Heereswaffenamt**, the Army's procurement agency, agreeing to dispense with the interleaved suspension but insisting on employing the leaf-spring double bogie unit that had been a feature of their unsuccessful design for the PzKpfw III; the Army gave way, since a production run of PzKpfw IVs was urgently required, and appointed Krupp to oversee the project.

As finalised, therefore, the PzKpfw IV design combined many features of the VK2001/K hull and turret with the Krupp suspension. A standard layout was adopted with the engine mounted at the rear. Inside the turret the commander sat centrally beneath his cupola, with the gunner on the left of the gun breech and the loader on the right. In the forward compartment the driver was located on the left and the radio operator/hull gunner on the right, with the transmission between them. The final drive ran to the sprockets across the front of the forward compartment. A point of interest is that the turret was offset 2⅝in. to the left of the vehicle's centre line and the engine 6in. to the right, thus permitting the torque shaft connecting the engine with the gearbox to clear the rotary base junction, through which power was supplied to the turret's electrical systems. The effect of this was to provide a greater internal stowage area on the right than on the left, this being usefully absorbed by the installation of generous ready-use ammunition lockers for the loader.

The suspension and running gear consisted of eight small-diameter road wheels suspended in pairs from leaf-spring units, front drive sprocket, rear idler and four top return rollers. Throughout the PzKpfw IV's long service life the vehicle's basic layout and suspension system remained essentially unchanged, save for minor details.

The **Ausführung A**, or first production version of the vehicle, appeared in 1936 and was powered by a 250hp 12-cylinder Maybach 108TR engine. The transmission was by means of a five-speed gearbox, which also provided one reverse gear.

The 75mm main armament was mounted coaxially with a 7.92mm machine gun, while a further 7.92mm machine gun was carried in the front plate of the hull, the hull gunner's position being stepped back slightly from that of the driver. A simple cupola, consisting of a slotted 'dustbin', rose from the rear wall of the turret, which was also fitted with one-piece side hatches. Electrical power traverse was available to the gunner, and an advanced feature of the design was the provision of a DKW 2-stroke auxiliary generator, located at the left-hand side of the engine compartment, which enabled the vehicle's batteries to be kept charged without recourse to the main engine. The Ausf. A was protected

by 14.5mm hull and 20mm turret armour, weighed 17.3 tons and had a maximum speed of 18.5mph. A total of 35 vehicles of this Mark were produced.

The **Ausführung B** entered production in 1937 and incorporated a number of improvements, the most notable of which was the installation of the more powerful 320hp Maybach HL 120TRM engine, together with a new gearbox with six forward and one reverse gear. A straight 30mm front plate was introduced, and some vehicles were fitted with a cupola of more sophisticated design, its vision slits now being protected by latched visors. The Ausf. B weighed 17.7 tons, but the extra power available produced an improved top speed of 24.5mph.

Russia 1941. A PzKpfw IV of an unidentified unit crosses a railway bridge, using additional decking laid by engineers to protect the track beneath.

In contrast to the 42 vehicles of this type manufactured, the **Ausführung C**, which appeared in 1938, had a production run of 140. Superficially Ausf. B and C were almost identical, although on the latter the thickness of the turret armour had been increased to 30mm, raising the overall weight to 20 tons without impairing performance; and the hull machine gun had been replaced by a covered carbine port.

The Ausf. A, B and C had each been fitted with an internal mantlet which was found to be vulnerable to bullet-splash, and this was remedied in 1939 by the fitting of an external mantlet to the **Ausführung D**, on which the hull machine-gun was also re-introduced. Only 45 vehicles of this type were built before the outbreak of war.

If the Polish campaign vindicated the concept of *blitzkrieg*, it also demonstrated that the armour basis of existing German tank designs was entirely inadequate, although this was by no means apparent to the world at the time. The Polish anti-tank guns had torn great holes in the ranks of the thin-skinned PzKpfw Is and IIs, and the larger PzKpfw IIIs and IVs suffered severely as well. Thus the next step in the development of the PzKpfw IV, the **Ausführung E**, saw an increase in the thickness of the bow plate to 50mm, while an additional 30mm plate was fixed to the front plate and 20mm plates to the hull sides, raising the overall weight to 21 tons. These modifications were also carried out retrospectively to earlier Marks which had been returned to the manufacturers for refitting. The Ausf. E additionally saw the cupola moved forward into the body of the turret.

The Ausf. E production run commenced in December 1939, but the system of fitting *appliqué* armour to existing models could not be regarded as anything but a temporary expedient. However, some 280 vehicles of this type had been built by the time a redesigned model, the **Ausführung F**, began entering service in the spring of 1941. This vehicle had single-thickness 50mm hull and turret frontal armour, the effect being to raise the weight to 22.3 tons. As this would have increased the ground pressure to an unacceptable figure, the track width was increased from 380mm to 400mm, necessitating wider drive sprockets and idlers; older vehicles fitted with the new track retained their original sprockets and idlers, supplemented by spacer rings. On the Ausf. F the earlier one-piece turret hatches were replaced by split hatches, and a large stowage bin was mounted across the turret rear.

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In the months directly preceding Operation '*Barbarossa*', plans were being made for the PzKpfw IV to be fitted with the 50mm L/42 gun already in service in the PzKpfw III. (See New Vanguard 27, *Panzerkampfwagen III Medium Tank 1936–1944*) Hitler was greatly interested in the project, evincing his remarkable prescience concerning weapon development, and was fully convinced that the PzKpfw IV should change its role from close-support to main battle tank. Events in Russia were to prove that the L/42 gun was not only outranged by the Soviet 76.2mm weapons, but also that it was incapable of defeating the stout Russian armour. Interest therefore turned to the 50mm L/60 gun, and an experimental PzKpfw IV fitted with this weapon was eventually produced.

This was, of course, symptomatic of the German Army's having prepared for a short war without adequate consideration being given to longer term considerations such as the design of a second generation of tanks. Moreover, with the Panzerwaffe's morale jolted off balance by the discovery that the Red Army had better tank designs, the problem of restoring parity had acquired a desperate urgency. It was pointed out that the L/60 was already being fitted to the PzKpfw III, and since the PzKpfw IV's turret ring was larger, if the same weapon was fitted it would produce, in simple terms, a case of too much chassis for too little gun. By the greatest of good fortune, however, the PzKpfw IV's wide turret ring was not only capable of accommodating much greater recoil movement than that of the L/24 howitzer but would also permit the handling of larger rounds of ammunition, and as the vehicle already carried a 75mm mounting it was decided to adapt this to take a high-velocity gun. The choice of weapon fell upon the 75mm L/43 KwK 40, with a basic muzzle velocity (AP) of 2,428 feet per second and the ability to penetrate 89mm armour set back at 30°; and this, fitted with a spherical single-baffle muzzle brake, was mounted on an Ausf. F to produce **PzKpfw Ausführung IVF2**, the original Ausf. F vehicles that retained their L/24 howitzers being known thereafter as **Ausfhrung IVF1s.**

The hull machine-gun was re-introduced with the Ausf. D, of which only a few models were built, and was retained on all subsequent models. The Ausf. E, an example of which is seen here on a north German tank range, saw the cupola moved forward into the body of the turret. The smoke-bomb rack is visible at the rear of the vehicle. (Bundesarchiv)

The Nashorn (Rhino) was a first-generation heavy tank destroyer and was armed with the L/71 PAK 43/1 88mm anti-tank gun. This example was stalked and killed with a PIAT by Canadian infantry near Pontecorvo, Italy. Unfortunately, the censor has erased every detail of cap badges and shoulder titles. (Public Archives of Canada)

The Ausf. IVF2 entered service early in 1942 in Russia and proved to be a match for the Soviet T-34 and KV, although it remained under-armoured by Eastern Front standards, and the increase in weight to 23.6 tons brought about a slight reduction in performance.

An attempt to remedy the deficiency in armour led to the appearance of the **Ausführung G** later the same year. The designers were conscious that they were very close to the chassis' viable weight limit and were therefore forced to produce a compromise solution, removing the 20mm plates which had been added to the hull sides from Ausf. E onwards and increasing the thickness of the basic side armour to 30mm. The saving thus made was transferred to the vehicle's front armour in the shape of 30mm *appliqué* plates.

In addition, the single-baffle muzzle brake of the Ausf. IVF2 was replaced by a more efficient double-baffle system. However, the improved 75mm L/48 gun, with a basic AP muzzle velocity of 2,461 feet per second, became available towards the end of the Ausf. G's production run and was thereafter fitted as standard.

In one way the longer 75mm guns were a very mixed blessing. In spite of the designers' efforts to conserve weight, the new weapons made the vehicle nose-heavy to such an extent that the forward suspension springs were under constant compression, with the result that the tank tended to sway about even when no steering was applied. The effect of this was compounded when the **Ausführung H** was introduced in March 1943, as this model not only had integral 80mm armour on the bow, front plate and mantlet, but also had 5mm side skirts and a turret girdle as a defence against hollow-charge ammunition. The Ausf. H weighed 25 tons, and in spite of a new six-speed transmission borrowed from the PzKpfw III its performance was inferior to earlier models, cross-country speed dropping as low as 10mph on anything but good, hard, level going. An experimental version of the Ausf. H was fitted with an hydrostatic transmission, but was not proceeded with.

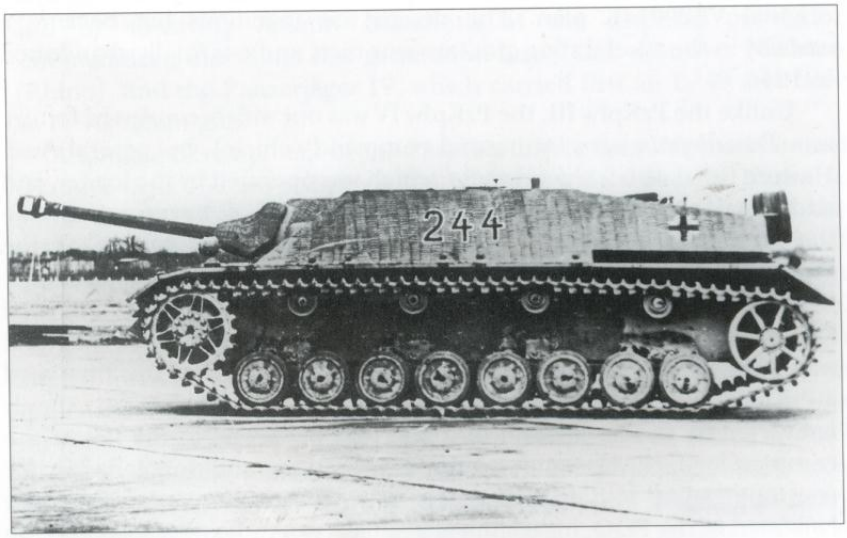
The Panzerjäger second-generati destroyer mount (as seen here) a 75mm gun. The a full coating of anti-magnetic m

The PzKpfw IV was now the mainstay of the Panzerwaffe, and as production had been greatly accelerated it was leaving the factories in some numbers, over 900 Ausf. G being completed in 1942, and 3,000 Ausf. H in 1943. In spite of this, sectional interests within the Third Reich almost succeeded in persuading Hitler to abandon PzKpfw IV manufacture in favour of its Panzerjäger derivative; fortunately for Germany, General Heinz Guderian, now Inspector General of Armoured Troops, was on hand to point out forcefully and with irrefutable logic that as mass production of the Panther was still some way off, the loss of the PzKpfw IV would mean that the only new tanks reaching the German Army in the field would be the handful of Tigers that were being built each month. The PzKpfw IV remained in production until the war ended.

The final production version of the tank, the **Ausführung J**, entered service in 1944, and in design terms must be regarded as a retrograde step induced by necessity. The electrical power traverse was discarded in favour of a purely manual system, the additional space available being filled by an auxiliary fuel tank of 200-litre capacity. This increased the vehicle's theoretical road range from 125 miles to 187 (cross-country from 82 to 113) at a time when the Panzer divisions were conducting a mobile defence along the Eastern Front in the face of supply difficulties. Some attempt to reduce weight was evident in the substitution of wire mesh side skirts for solid plate, although this did not apply to the turret girdle.

By 1944 there was general acceptance that the design had reached the limit of its development potential, and an attempt by Krupp to fit a Panther turret, complete with 75mm L/70 gun, simply confirmed that the chassis was already overloaded.

As a result of the German system of thoroughly up-dating vehicles returned for refit, a number of hybrid types were produced, so that it was by no means unusual to find, for example, an Ausf. D chassis carrying an Ausf. G turret and main armament. No system of classifying these sub-Marks was adopted, and they are generally referred to by the standard up to which they had been refitted.



The Panzerjäger IV was a second-generation tank destroyer mounting first an L/48 (as seen here) and later an L/70 75mm gun. The vehicle displays a full coating of *zimmerit* anti-magnetic mine paste.

SPECIAL-PURPOSE VEHICLES

Following the Wehrmacht's complete victory over the British and French armies in 1940, plans were made for the invasion of Great Britain. It was appreciated that no landing could hope to succeed unless it was supported by armour at a very early stage, and submerged wading experiments were carried out with the PzKpfw III and, to a lesser extent, with the PzKpfw IV, the converted vehicles being known as **Tauchpanze**r or 'diving tanks'.

All openings to the exterior of the vehicle were sealed with watertight compound and the gap between hull and turret closed by an inflatable rubber ring. Rubber sheeting covered the commander's cupola, the mantlet and the hull machine gun, but this could be blown away from inside the tank by means of an electrical detonator. Air was supplied to the engine by a flexible 18-metre hose which was held on the surface by a buoy, while exhaust gases were carried upwards through a tall vertical pipe fitted with a non-return valve. Maximum safe diving depth was 15 metres, and the crew's submerged endurance was set at 20 minutes. Once submerged, a speed of approximately 3mph could be maintained along the bottom.

The intention was for the tanks to launch themselves from lighters and then motor ashore along the sea bed, direction being maintained by instructions passed through a radio link from the parent vessel. The design was, on the whole, successful, and found a practical application at the crossing of the River Bug during '*Barbarossa*'. The crews were drawn from volunteer battalions, which were later formed into the 18th Panzer Regiment.

By September 1941 PzKpfw III and PzKpfw IV were performing a similar battlefield role; and as the two designs had much in common it was felt that numerous benefits, including the standardisation of parts, would accrue if they were to be merged. The composite vehicle was given the title of **PzKpfw III/IV**, and several prototypes were constructed in which the parentage of the hull and turret were clearly identifiable, although the suspension now carried six large interleaved wheels, so that the finished product bore a startling resemblance to the original VK2001/K plan. The design was ingenious but became a casualty in the accelerating gun/armour race, and was finally abandoned in 1944.

Unlike the PzKpfw III, the PzKpfw IV was not widely converted for use as a *Panzerbefehlswagen* (armoured command vehicle), but several Ausf. Hs were fitted with a second radio, which was operated by the loader, and additional antennae bases, so that they could if necessary assume the command rôle. In this version the vehicle was known as the **Panzerbefehlswagen IV**.

Again, the requirements of the Panzerartillerie's Forward Observation Officers were successfully met by the PzKpfw III until mid-1944, when existing stocks began to run down. After this they used a PzKpfw IV, more often than not an Ausf. J, which had been very simply converted by the installation of a tall, thin periscope to the left of the commander's cupola, and by the provision of additional radios for communication with the tank as well as the artillery net. The crew consisted of the FOO, his technical assistant, two radio operators and the

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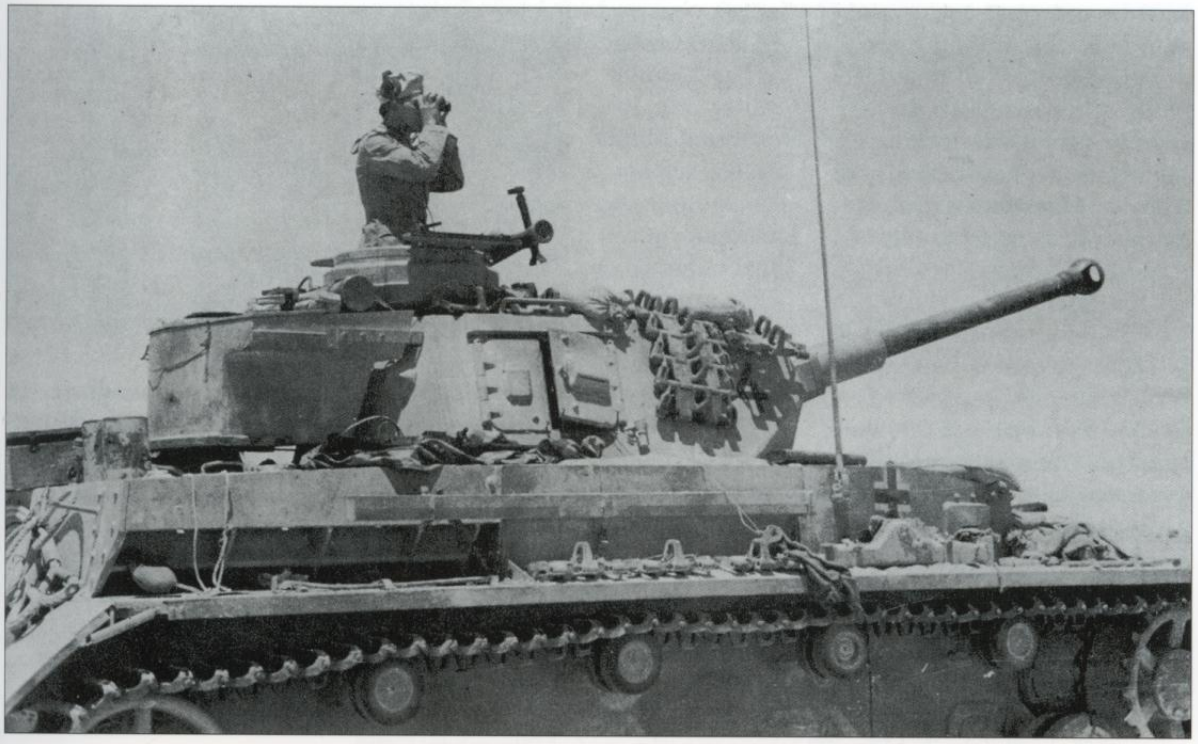

Until the arrival of the Tiger in Tunisia the PzKpfw IVF2 was the most powerful tank possessed by either side during the North Afican campaign. (Bundesarchiv)

driver, all of whom were artillery personnel. Between September 1944 and March 1945 some 96 PzKpfw IVs were converted to the role of **Panzerbeobachtungswagen** (armoured observation vehicle).

The chassis of the PzKpfw IV was eminently suitable for employment in a variety of tasks and formed the basis for a number of other first-line combat vehicles, including the **Sturmgeschutz IV**, armed with a 75mm L/48 gun which equipped the élite Sturmartillerie, supplementing the more numerous StuG III; the **Brummbär** (Grizzly Bear), also known as Sturmpanzer IV, a heavy assault gun designed for street-fighting and mounting a 150mm L/12 howitzer which, from April 1943, served with the Heavy Infantry Gun Companies of Panzergrenadier Regiments and in 45-strong Assault Battalions at the disposal of senior commanders; the 88mm first generation heavy tank destroyer **Nashorn** (Rhino); and the **Panzerjäger IV**, which carried first an L/48 and later an L/70 75mm gun.

A notable development in the Panzerartillerie field was the **Hummel** (Bumble-bee) 150mm self-propelled howitzer which, like the Nashorn, employed a PzKpfw IV chassis incorporating the final drive of the PzKpfw III. The engine was located amidships so as to leave the rear of the vehicle clear for the gun mounting, and the fighting compartment was enclosed by a fixed, open-topped superstructure of 10mm plate. Early models of the vehicle were fitted with a muzzle brake and had an angled driver's cab, but as the series progressed the former was dispensed with as being unnecessary, and the latter was extended across the front to include the radio operator's compartment. The Hummel weighed 23.5 tons, had a maximum speed of 25mph and carried a crew of six. It entered service during 1943 and equipped the six-gun heavy battery of the Panzer division's artillery regiment; such an allocation was

far from universal, as the total production run was only 666, and only the most favoured divisions would have received their full quota. The 150mm howitzer threw a 96lb shell 16,500 yards; only 18 rounds of ammunition could be stowed, but immediate replenishment was generally available from a **Munitionsträger Hummel**, amunitions carrier with the same layout but without a gun, several of which formed part of the battery establishment.

Additional 30mm *appliqué* frontal armour and the 75mm L/48 gun identify these Ausf. Gs in transit by rail through the Balkans. In such circumstances it was normal practice to lock the gun in elevation by means of an internal crutch. (Bundesarchiv)

Like any branch of the service, the Panzer-artillerie possessed its reactionary elements, and these expressed themselves as being far from satisfied with the designs for the Hummel and its lighter companion, the 105mm self-propelled howitzer **Wespe** (Wasp). Their principal complaints were that the mountings had insufficient traverse and were too high and too poorly protected, and some effort was made to produce a gun carriage which would remedy these defects.

The simplest of the new designs went by the cumbersome title of **1eFH 18/1 (Sf) auf GW IVb** (self-propelled Light Field Howitzer 18/1 on Gun Carriage IVb), and employed a shortened PzKpfw IV chassis carried on six slightly increased-diameter road wheels per side, the number of return rollers being reduced to three. On this was mounted a better shaped but still open-topped turret of 20mm plate, the total traverse available being 70°. The 105mm howitzer had a heavy muzzle brake and could be elevated to +40° and depressed to -10°. Eight of these vehicles were built and saw active service in Russia, but it was felt that manufacturing capacity could not be diverted for a purpose built artillery chassis, and the Wespe continued quantity production, employing the obsolete PzKpfw II chassis.

A more complex design for use with the same weapon was the **Heuschrecke** (Grasshopper), which was based on a slightly lengthened version F the standard PzKpfw IV chassis. The turret was of similar pattern to that of the vehicle described immediately above, but had all-round traverse. In addition, by using a crane-rail gantry which formed an integral part of the design, the turret could be lifted bodily from its seating and lowered over the tail onto a ground mounting, leaving the vehicle itself free to act as an ammunition carrier. The Heuschrecke, which did not proceed beyond the prototype stage, formed part of a whole series of projected artillery equipment known collectively as **Waffenträger** (weapon carriers), the majority of which never left the drawing-board. Guderian thought they were interesting, but hardly worth the disruption of tank production.

By 1943 the Luftwaffe had lost its overall command of the air and could no longer guarantee the Army protection against hostile aircraft. As the situation in the air continued to deteriorate the ground troops were forced to rely to an ever-increasing extent on their own resources. For the Panzer divisions this meant acquiring a more powerful mobile anti-aircraft equipment than the single 20mm automatic cannon carried by the Flakpanzer 38T, and the chassis of the PzKpfw IV offered an obvious alternative for the installation of heavier weapons.

The massive co some buildings during the stree Stalingrad induc a heavy assault was the Brumbä based on the Pz which mounted howitzer in a fix supestructure. (US National Arc

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Hitler's own preference was for a twin 37mm mounting, but a quadruple 20mm equipment was immediately available and went into production on Ausf. H and J chassis, the first examples reaching the divisions in the autumn of 1943. The mounting was protected by four hinged rectangular flaps which earned the vehicle the title **Mobelwagen** ('furniture van'), but a major disadvantage of this system was that these had to be lowered when the weapon was in action, reducing the crew's protection to a simple gunshield. An alternative type of mounting carried a single 37mm cannon. A total of 211 Mobelwagen of both types was eventually built.

A much improved Flakpanzer, the **Wirbelwind** (Whirlwind), appeared in December 1943, consisting of a 20mm quadruple mounting in an open-topped fully-rotating turret with 16mm armour. This was joined in March 1944 by the **Ostwind** (East Wind), which was almost identical in layout but had 25mm armour and carried a single 37mm cannon. Both Wirbelwind and Ostwind used the Ausf. J chassis, and production figures for each model were respectively 140 and 40. The maximum rate of fire of the quadruple 20mm system was 1 ,800 rounds per minute, but a lower rate was generally set; the 37mm's maximum output was 160 rounds per minute.

The last of the PzKpfw IV anti-aircraft series was the **Kugelblitz** (Fireball), which was armed with twin 30mm cannon enclosed in a domed turret. This required only 25 seconds for a complete traverse of 360°, and provided an elevation of +80°. The Kugelblitz was a most efficient design and had a rate of fire of 900 rounds per minute, but only half a dozen or so had been built by the time the war ended. Like the other Flakpanzer IV mountings it was powered by an improved-performance version of the standard engine.

It had originally been intended that each Panzer division's assault engineer battalion should be issued with three **Bruckenlegepanzer** (armoured bridgelayers), and in 1939/40 such a vehicle was constructed in small numbers using the PzKpfw IV Ausf. C and D chassis. The nine-metre bridge, which had a 28-ton capacity, was launched over the bows, but the complete equipment so overloaded the suspension that the design was not taken up, and in fact bridge-layer production was officially terminated in 1941.

The massive construction of some buildings encountered during the street fighting in Stalingrad induced a demand for a heavy assault gun. The result was the Brumbär (Grizzly Bear), based on the PzKpfw chassis, which mounted a 150mm L/12 howitzer in a fixed supestructure. (US National Archives)

Another assault engineering device which employed the PzKpfw IV chassis was the **Infanterie-Sturm-Steg** (infantry assault bridge). This consisted of a telescopic catwalk launched rather like a fire-engine ladder from the back of the carrying vehicle, and dropped into place over an anti-tank ditch or small river for the infantry to swarm across and secure a bridgehead. Not many of these vehicles were built, but several were used during the 1940 campaign in the West and again during the early days of Operation '*Barbarossa*'.

Because of the roomy interior of the hull, a turretless PzKpfw IV was chosen as an ammunition carrier for the enormous 600mm Karl mortars which saw service at the siege of Sebastopol and during the Warsaw Uprising. Only three of the huge 2.2-ton shells could be stowed, and a

The Ausf. H had 80mm integral front armour and was fitted with side skirts and a turret girdle of spaced armour to protect it against hollow charge ammunition. The colour scheme of this particular vehicle, serving with a Waffen-SS division, is basic German dark yellow oversprayed with large dark green and rust-red patches. (Bundesarchiv)

three-ton electric crane was installed over the radio operator's compartment to effect the transfer of these. A further supply version was the **Land-Wasser Schlepper** (amphibious tractor), which performed the same function as the American Buffalo LVT, and which it closely resembled. Also known as the Panzerfahre, it consisted of a large pontoon fixed to the upper hull of the tank with a control cabin mounted forward and a small cargo space amidships.

Some PzKpfw IVs were fitted locally with recovery equipment to become **Bergepanzer** (armoured recovery vehicles), and the fitting of a dozer blade was not unknown. In addition to the tank's hull and chassis finding such diverse employment, the turret was also used to provide the main armament of the armoured trains which patrolled the German rear areas in Russia.

PZKPFW IV DESCRIBED

Armour

In 1942 the consulting engineers Messrs Merz and McLellan performed a detailed evaluation of a captured Ausf. E, including an analysis of the armour plate.

'Hardness tests were carried out on a number of armour plates and it was concluded that they were all of machinable quality with the exception of the spaced armour plate over the hull machine gun mounting. The port armour covers and the hull machine gun mounting were found to be face hardened. The hardness of the inside and outside surfaces of the machinable quality plates lay between 300 and 460 Brinell.

'The additional 20mm plates which form the reinforced side armour are of homogenous quality and have a Brinell hardness of about 370 on the front surface. Resistance of reinforced side armour will not withstand 2pdr. attack at 1,000 yards at normal impact.'

On the other hand, firing trials carried out in the Middle East during

ad 80mm armour and was le skirts and a f spaced tect it against ammunition. heme of this icle, serving with ivision, is basic yellow oversprayed k green and es. (Bundesarchiv)

June 1941 showed that 500 yards could be considered as the maximum effective range for the 2pdr. when engaging the PzKpfw IV's frontal armour, and this was confirmed by similar trials at Woolwich, the report on which noted that 'the armour is 10 per cent better than British machinable quality plate, and in some respects better than our homogenous hard'.

However, the method of joining plates drew unfavourable comment from Leyland Motors 'The quality of welding did not, at first sight, appear to be very good. In two or three places, near the regions where the plates had been damaged by shellfire, the welded joints had broken and the plates separated.'

The danger of bullet-splash penetrating the vehicle's hatches was removed by incorporating channels to catch the molten metal as it forced its way through the apertures.

Automotive

The Maybach engine had been designed to operate in temperate climates, in which it performed satisfactorily. However, in tropical or dusty conditions it was subject to breakdown and overheating, and a British intelligence summary of February 1942, prepared after examination of abandoned vehicles, concluded that 'the engine trouble was due chiefly to sand blocking oil supply pipes damaging crankshafts and pistons, and sand in the distributor, dynamo and starter. The air filter is entirely inadequate.' A further cause of breakdown was sand penetrating and blocking the carburettor throttle tubes.

The user handbook specified that the engine was only to be used with 74 octane fuel, with a complete oil change after 200, 500, 1,000 and 2,000km, and thereafter every 2,000km. It went on to recommend a maximum engine speed of 2,600rpm for normal usage, but in hot climates, which included southern Russia as well as North Africa, it was suggested that employment of a lower gear than was necessary would produce cooler running. Use of the engine as a brake was permissible at

Two Ausf. Gs provide a demonstration of recovery techniques. (Bundesarchiv)

2,200–2,400rpm, but was to be avoided in the 2,600–3,300 band. Overheated engines tended to 'diesel' after being switched off, a fault which could be corrected by switching on again and either opening the throttle or idling until the temperature dropped; of the two methods, the former was preferred, since continuous use below 1,800rpm tended to oil up the plugs. The principal components of the cooling system were two radiators coupled and mounted side by side at 25° to the horizontal. Through these air was dragged by two fans driven by triple V-belts from the crankshaft, and the coolant circulated by a centrifugal water pump. Air was drawn into the engine compartment through a protected opening in the right-hand side of the hull and expelled through a similar opening on the left, provision also being made for aspiration into the turret, where the increased pressure assisted the dispersal of fumes.

The synchromesh gearbox. was efficient, although the tractive effort in top (i.e. 6th) gear was low, and this was largely reserved for road use. The handbook recommended that 'when changing to a lower gear on turnings, hills or bad roads, *two* gears lower than the one already engaged should be selected'.

The final drive and clutch-and-brake steering assembly was complex, and by British standards incorporated an excessive number of ball-races. Cooling for these units was provided by a centrifugal fan located on the left of the main clutch casing. Simultaneous application of the steering levers provided an effective parking brake, the brakes being held on by ratchet.

As already described, the later models of the tank tended to overload the leaf-spring suspension, although replacement of complete bogie units, damaged in action, was a fairly simple matter. Track adjustment was achieved by movement of the rear idler, the mounting of which included an eccentric axle with a splined end. The axle could be rotated by a suitable tool and the adjustment retained by ratchet rings, the whole being secured by locking nuts. On the Eastern Front track extensions known as *Ostketten* were fitted to increase traction during the winter months.

An extremely simple but efficient track repair device was tested experimentally on the PzKpfw IV. This consisted of a length of industrial belting the same width as the track, with perforations along its edges to match the teeth of the drive sprocket. One end of the belting was clipped to the rear end of the broken track, while the other was led forward over the return rollers and married to the sprocket. The engine was then started and a gear engaged; the sprocket turned, hauling the belting forward until the track itself engaged the teeth. This performed effortlessly and in minutes a task which otherwise involved the whole crew in the back-breaking job of lifting and pulling forward the track by hand, with the aid of a wire hawser.

The vehicle was equipped with a 24-volt electric self-starter, and because the auxiliary generator kept the batteries fully charged this could be used more consistently than that fitted to the PzKpfw III. If the self-starter failed, or if it was

All dressed up and nowhere to go! PzKpfw IV broken down and blocking a ford which the quantity of water on the glacis plate suggests had been taken too quickly; the commander's frantic expression tells its own story. The padded black beret was worn during the Polish campaign, and by some units in France. (Charles K. Kliment)

The combined weig and thicker frontal tended to overload suspension of the keeping the leaf-sp permanently bowe of this can be seen nearest vehicle. Al retaining the turret vehicles have shed skirts, the mountin which are clearly v nearest the camera be badly distorted. position of the aer Russia, early 1943 (Bundesarchiv)

The combined weight of the L/48 and thicker frontal armour tended to overload the front suspension of the Ausf. H, keeping the leaf-springs permanently bowed. The effect of this can be seen on the nearest vehicle. Although retaining the turret girdles both vehicles have shed their side skirts, the mounting rails for which are clearly visible; the rail nearest the camera appears to be badly distorted. Note the new position of the aerial mounting. Russia, early 1943. (Bundesarchiv)

inadvisable to use it because extreme cold had chilled the sump oil to a semi-solid state, thus increasing resistance, the crew used an inertia starter, the handle for which entered the engine compartment through the stern plate. The handle was swung by two men until the flywheel had reached 60rpm, when the power was tripped to turn the main engine. The inertia starter was geared, but its operation in the depths of the Russian winter required a great deal of initial effort; although the driver could eliminate the additional drag of the gearbox oil by depressing his clutch. Cold starting was assisted by a starter carburettor which was not to be used in conjunction with the accelerator. Minimum unassisted working temperature for the engine was set at 50° centigrade at 2,000rpm with an oil pressure of not less than 60lb per square inch.

A further aid to cold starting on the Eastern Front was a system known as the **Kühlwasserübertragung**, or cold water exchanger. When one tank had been started and had reached its normal operating temperature, the warm coolant was pumped from it to the next vehicle by the exchanger, in return for cold coolant. In due course the rise in temperature would permit the second vehicle to be started. The system required slight modification to the tank's cooling system by the provision of inlet and outlet valves.

Gunnery and Optical

The 75mm L/24 howitzer was rifled clockwise with 28 grooves 0.85mm deep, its breech being closed by a semi-automatic vertical sliding block. Its artillery origins were evident in that a clinometer remained fitted to those PzKpfw IV models equipped with the gun, so providing the vehicle with an indirect fire capability. The recoil cylinders projected beyond the mantlet and the barrel was covered for most of its length by a steel protective jacket to which a deflector guard was attached, its function being to sweep the tank's aerial out of the line of fire when the gun was traversed to the right. The gun cradle was heavier than was strictly necessary, putting the turret slightly out of balance.

A full range of ammunition was developed for the howitzer, including HE shell, AP shot, smoke and canister, but essentially it remained an HE

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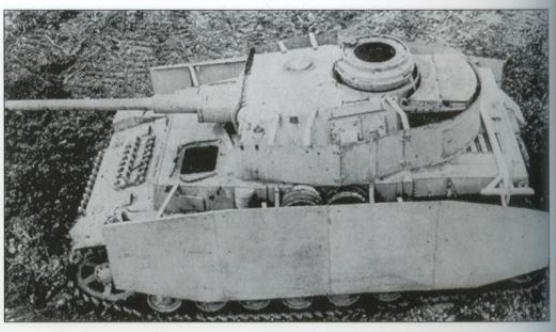
weapon system with a lazy muzzle velocity of 1,263 feet per second and a sharply curved trajectory. The PzKpfw IV's firing trials were conducted concurrently with those of the Sturmgeschutz III, which mounted the same weapon, and the *Sturmartilleristen* took a certain amount of malicious pleasure in noting that the tank crews were a lot slower getting onto the target. (Perhaps such feelings were understandable, as the Panzerwaffe had attempted to strangle their own branch of the service at birth!) However, once they had mastered the idiosyncracies of the high-angle weapon, the tank men quickly perfected their own three-round bracketing technique which, given an experienced crew, could be considerably shortened.



A useful high-angle shot of the Ausf. H, showing detail of turret girdle and skirt mounting stanchions. Later the skirts were mounted on a toothed rail, so that they were knocked off in collisions instead of tearing, and perhaps fouling the suspensions. (RAC Tank Museum)

Elevation of the main and co-axial armament was by means of a handwheel operated with the gunner's left hand. Traverse could be either manual or powered, and a selector lever switched in whichever system was required. The traversing handwheel was located immediately to the right of the elevation control and included a release latch. It was sometimes linked under the gun to a hand crank which could be turned by the loader; if the turret was being traversed manually the gunner could produce 1.9° per turn of his wheel and the loader 2.6°. If the power traverse was engaged, power was supplied via the rotary base junction to a motor located on the left of the turret, the speed of the motor being controlled by the traverse handwheel through a chain and sprocket. Using this system the maximum rate of traverse obtainable was 14° per second (about half that available in British tanks) and the minimum 0.14° per second. As the motor's response to control signals was generally abrupt, this made the tracking of moving targets extremely difficult. The main armament was fired electrically by a trigger on the traverse handwheel, and its recoil was controlled by a hydro-pneumatic buffer system. A number of safety devices were installed, including a loader's safety switch and a misfire lamp.

The final production version of the PzKpfw IV, the Ausf. J, dispensed with the power traverse system in favour of an increased fuel capacity. The crew of this vehicle have made good use of captured T-34 and other track links. (Bundesarchiv)

The substitution of the longer L/43 and L/48 guns for the short L/24 howitzer produced a situation in which the tank's main armament was muzzle-heavy in its mounting, and to compensate for this a compression spring in a cylinder was fitted to the right/forward segment of the turret ring and connected to the gun. The more powerful weapons naturally produced recoil forces well in excess of those of the L/24, and this was allowed for by extending the mounting cradle and providing recoil buffers that were both wider and longer – so long, in fact, that part of the breech-ring had to be cut away to accommodate them. Even so, the recoil of the long guns was 50mm greater than that of the L/24. A recoil indicator with a scale of 430-520mm was fitted, and this was marked *Feuerpause* at 505mm. During road marches or for transit by rail the L/43 and L/48 guns could be locked at +16° by means of a

PzKpfw IV Aus manoeuvres in 1944. They ar tanks of 2.Par Plate F1. (Bun

quick-release internal crutch, mounted along the underside of the turret roof.

The telescopic sight for the long 75mm was extremely complicated, and contained two movable plates. The first or range plate rotated about its own axis, the main armament and co-axial machine gun scales being marked on various quadrants; the HE scale (Gr34) and the machine gun scale were common and were marked from 0-3,200 metres, while the two AP scales (PzGr39 and PzGr40) were marked respectively from 0-2,400 and from 0-1,400 metres. The second or sighting plate moved in a vertical plane and contained the sighting and aim-off markings. The two plates moved simultaneously, the sighting plate rising or falling as the range plate turned. To engage at a selected range, the range wheel was turned until the required marking was opposite the pointer at the top of the sight, and the sighting mark laid onto the target by the traverse and elevation controls.

In many ways, the PzKpfw IV was a very sophisticated vehicle for its day. Around the inside of the commander's cupola was a scale marked from 1 to 12, with 24 sub-divisions. When the turret was traversed a pinion which 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 centre-line, looking directly forward. This enabled the commander to determine the bearing of his next target and inform the gunner accordingly. To the gunner's left was a repeat target position indicator in the form of a dial identically marked to the cupola scale, and also driven from the turret rack. Upon receiving the order the gunner would quickly traverse the turret to the bearing indicated, e.g. 10 o'clock, using his own indicator, and find the gun approximately on line for the target. Early models had a single dial target – or more precisely, turret-position indicator but this was subsequently replaced by a two-dial system the left-hand dial showing 1-12 with 64 sub-divisions each of 100 mils, the right-hand dial being divided into mils with 100 divisions. It is, perhaps, a little surprising to find that having gone to so much trouble to install an accurate traverse

PzKpfw IV Ausf. Hs on manoeuvres in Picardy early in 1944. They are almost certainly tanks of 2.Panzer-Division – see Plate F1. (Bundesarchiv)

indicator, the authorities decided to dispense with the clinometer on vehicles fitted with the long 75mm gun.

The driver was provided with a gun warning indicator in the form of two blue lamps mounted on either side of his compartment. When the gun was traversed over the side of the vehicle a switch was tripped automatically and the corresponding lamp lit up, warning him to allow extra room if the tank was passing between trees or buildings. Failure to do this could result in the barrel striking an obstruction and causing damage to the gun mounting. This device was not fitted on later production models.

Vehicles fitted with the L/24 howitzer stowed 80 rounds of main armament and 2,700 rounds of machine gun ammunition; those with the longer gun, 87 rounds and 3,150 rounds respectively. The majority of ammunition lockers and racks were within easy reach of the loader, the open racks being protected by canvas covers secured by press-studs. Evidence suggests that the secondary armament was drum fed up to Ausf. E and employed belts thereafter, each belt containing 150 rounds and being housed in a bag. The bag system was less efficient than the drum or the British metal box 'liner', and required one hand to control the feed of the belt into the gun. The hull machine-gun was

A Hummel crew prepares to fire a sustained support programme. Panzerartillerie officers were critical of the vehicle, their principal complaints being its limited traverse, excessive height and poor protection. (Bundesarchiv)

breech-heavy in its mounting, and to overcome this a counter-balance spring was fitted. Unfortunately this tended to drag the gun into a central position, but the problem was resolved by the operator inserting his head into a moulded rubber cap linked to the butt by a bar; he would then lower his head to obtain elevation, and raise it for depression. For emergency use a 17in.-diameter escape manhole was sited in the floor of the radio operator's compartment.

The earlier models of the PzKpfw IV were fitted with a smoke-bomb rack mounted on the stern plate. The rack carried five bombs, held in position by spring-loaded catches. The vehicle commander released the bombs singly by a wire control which operated a ratchet wheel coupled to a camshaft. Each pull of the wire rotated the camshaft one-fifth of a turn, releasing a bomb, the pin of which was drawn by a fixed chain, and the ratchet was returned by a second spring. Thus, five pulls on the control wire would release all the bombs in succession, enabling the tank to reverse out of sight into its own smoke screen. The system was abandoned following the introduction of turret smoke-bomb dischargers. The design of the commander's cupola incorporated armoured shutters which could be latched in the open, intermediate or closed positions to protect the safety-glass vision blocks. The driver's direct-vision safety glass block could also be protected by a latched slab. The German safety-glass of the period had a slightly greenish tinge.

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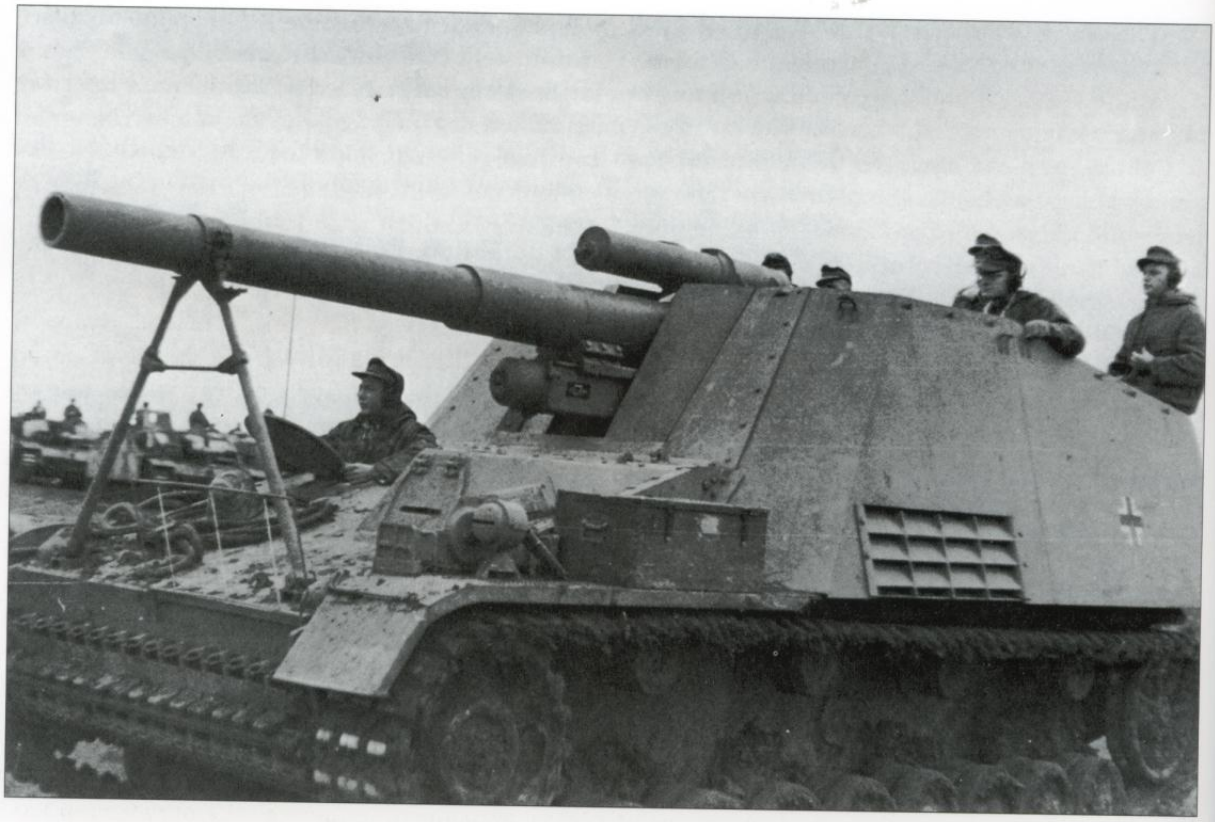
ORGANISATION AND TACTICS

As already indicated, the primary function of the L/24 PzKpfw IV was the close support of the other tanks within the Panzer regiment by suppressing the fire of strong points and anti-tank guns which were causing loss and delaying the advance. Although in theory they formed a Heavy company of their own, in practice battalion commanders could, and frequently did, distribute their PzKpfw IVs among the other companies so that each would have its own platoon of close support vehicles immediately available and at the company commander's disposal. In such circumstances PzKpfw IV commanders who were unable to identify their targets at first glance would have them indicated either by radio, by a burst of tracer fired from another vehicle, or by a smoke marker shell. The Heavy company or platoon would then set about their systematic destruction.

The Panzer regiment fought its tank-vs.-tank battles in a concentrated *Keil* or wedge. The PzKpfw IIIs and PzKpfw 38Ts would form the front ranks of the wedge while the lighter PzKpfw Is and IIs retired to the flanks. The PzKpfw IVs tended to lie back, choosing their targets and sending their low-velocity shells over the vehicles in front. During the early war years a direct hit from a 75mm shell was a serious matter for all but the most stoutly armoured tanks, and even these could have their tracks blown off or turrets jammed by splinters.

By no means every operation carried out bv the Panzer divisions required the full presence of their tank element. Numerous secondary operations could be undertaken bv their motor rifle regiments known after 1942 as Panzergrenadiers, and for these the temporary attachment of a complete Heavy company, with its considerable direct fire capability,



An early model of the 150mm SP howitzer Hummel (Bumble-bee), seen here on parade with an assault gun battalion. (Bundesarchiv)

was particularly suitable. As a general rule, however, the Panzerwaffe was against the support of infantry by tanks outside the context of the armoured division. this being considered to be a dissipation of resources and a rôle for which the Sturmartillerie had been specifically designed.

During the campaigns of 1939 and 1940 the establishment of the Panzer division included two two-battalion armoured regiments, each battalion consisting of four companies. However, despite the re-armament programme, German tank production in the immediate pre-war years had been so sluggish that when war was declared in September 1939 the average division possessed no more than 24 PzKpfw IVs, or two three-tank platoons per battalion. The overall shortage of tanks was so bad that each battalion was forced to leave the personnel of one of its companies behind in their depots.

By May 1940 the situation had improved sufficiently for each of the three divisions of Guderian's XIX Panzer Corps to have been allocated 36 PzKpfw IVs, or three three-tank platoons per battalion. Other divisions, however, had to be content with the original allocation of 24.

Following the startling success achieved in France, Hitler decided to double the number of Panzer divisions. This was achieved by halving the tank element, which was generally reduced to a single regiment of two battalions, although six of the regiments had a three-battalion establishment. In June 1941 Operation '*Barbarossa*' was mounted with 17 Panzer divisions, equipped with a total of 3,200 tanks of which 517 were PzKpfw IVs. The average division therefore possessed 30 close-support tanks, or enough to equip three five-tank troops per tank battalion. The ratio of PzKpfw IVs to other tanks had now risen to 1:6,

Upper view of
self-propelled
the internal la
compartment.
(RAC Tank Mus

f the 150mm
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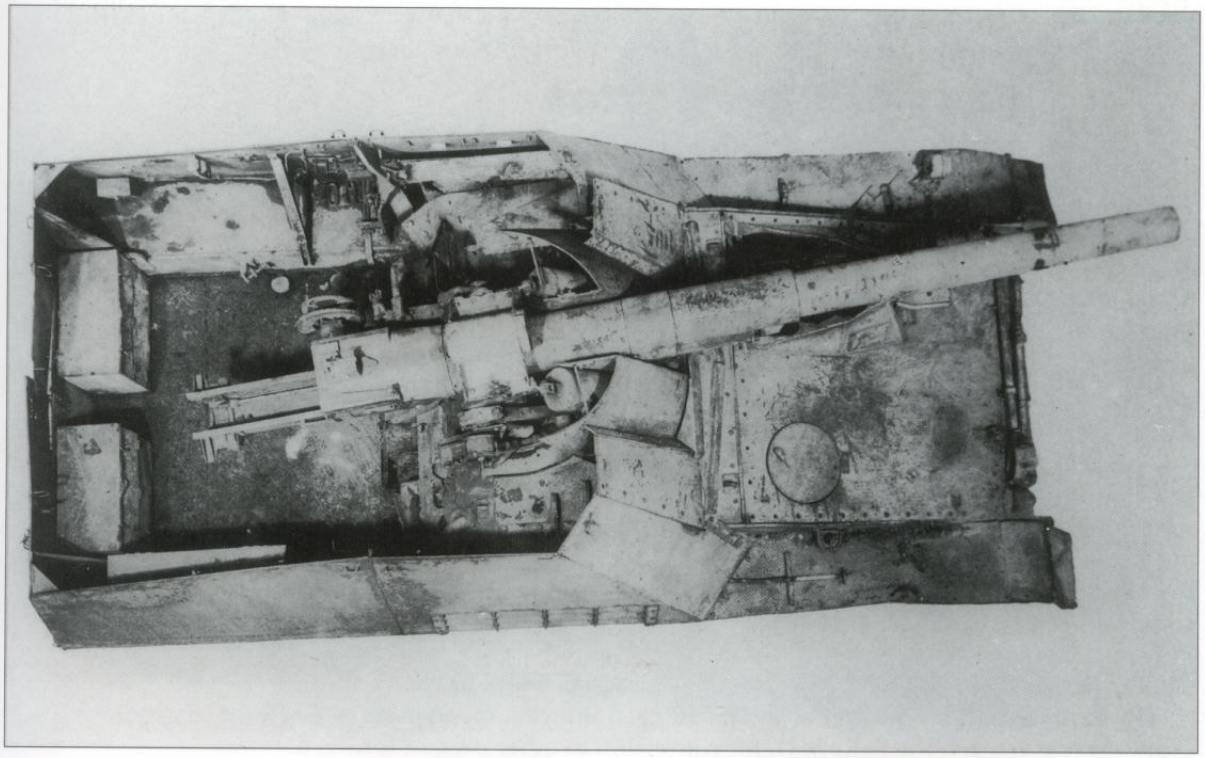
but this still fell a long way short of the original intention of approximately 1:4.

The appearance of the superb T-34 and the thick-skinned KV-I was directly responsible for the re-equipment and internal re-organisation of the Panzer battalions. The few remaining PzKpfw Is and IIs disappeared, and for a while battalions were equipped with a mixture of 50mm L/42 and L/60 PzKpfw IIIs and 75mm L/24 PzKpfw IVs. However, as the 75mm L/43 and L/48 PzKpfw IV models began reaching the front they gradually replaced both types automatically assuming the rôle of main battle tank as opposed to close-support vehicle. The concept of the integral Heavy company therefore became obsolete, and battalions operated with three similarly equipped companies.

The major problem facing the Panzerwaffe was that tank production remained sluggish, and in consequence there were never enough PzKpfw IVs to go round. The situation was aggravated when in 1942 Hitler ordered a further increase in the number of Panzer divisions, in spite of the fact that the serious equipment losses of the previous year had to be made good. On the Eastern Front the northern and central sectors remained relatively quiet, and Panzer regiments were reduced to a single battalion: on the active southern sector regimental strength was increased to three battalions, but in practical terms this meant a mere 170 tanks, a sharp contrast to the 320 tanks with which regiments had begun the Polish campaign of 1939.

At this stage it was decided to increase the number of battalion companies to four, the old pre-war figure, but in the majority of cases the equipment was simply not available to implement the directive. Indeed, following the Stalingrad campaign and the withdrawal from the

Upper view of a Hummel 150mm self-propelled howitzer showing the internal layout of the fighting compartment.
(RAC Tank Museum)



Caucasus, the average Panzer division on the southern sector possessed about 27 tanks.

With the Panzerwaffe sliding rapidly into a state of administrative chaos, Hitler recalled Guderian to active duty and appointed him Inspector General of Armoured Troops on 1 March 1943. At the same time the energetic Albert Speer was made Minister of Production. One result of these appointments was that the number of completed PzKpfw IVs leaving the factories began to rise sharply. The new main battle tank, the PzKpfw V Panther, also made its first appearance in 1943, but although it was to play an increasingly important part in events, it never replaced the PzKpfw IV.

From the middle of 1943 onwards Germany was on the defensive, the rôle of the Panzerwaffe becoming more and more that of the spearhead of the strategic counter-attack. Favoured or more fortunate Panzer regiments might be able to equip one of their battalions with the PzKpfw V and the other with PzKpfw IVs, but this was not the common experience. Indeed, the equipment shortage remained so serious that assault guns were supplied to replace the missing tanks, so that by 1944 most Panzer regiments contained one or two companies so armed, if not a complete battalion. Because of the limited traverse of their weapons the assault guns could not be substituted for tanks in the attack, although they could supply direct fire support, providing a curious reversion to the purpose for which the PzKpfw IV had originally been designed.

During the closing months of the war the Panzer regiments employed any vehicle that they could lay their hands on, provided it could move and shoot. Formal organisation disappeared and *ad hoc* battlegroups, based on a few tanks or assault guns, became the order of the day.

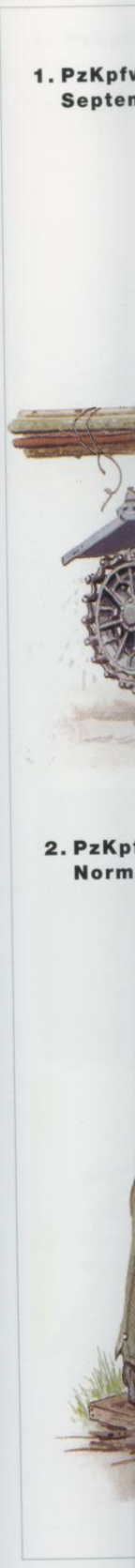
PZKPFW IV IN ACTION

The Early Campaigns 1939–1942

During this period the PzKpfw IV shared the fortunes of the contemporary German main battle tank, the PzKpfw III, fuller details of which can be found in New Vanguard 27 *Panzerkampfwagen III Medium Tank 1936–1944*. As the PzKpfw IV was essentially an integrated support weapon it is virtually impossible to separate the strands of its involvement from the story of the Panzerwaffe as a whole, although by studying statistics related to prevailing conditions it is possible to gauge its relative importance.

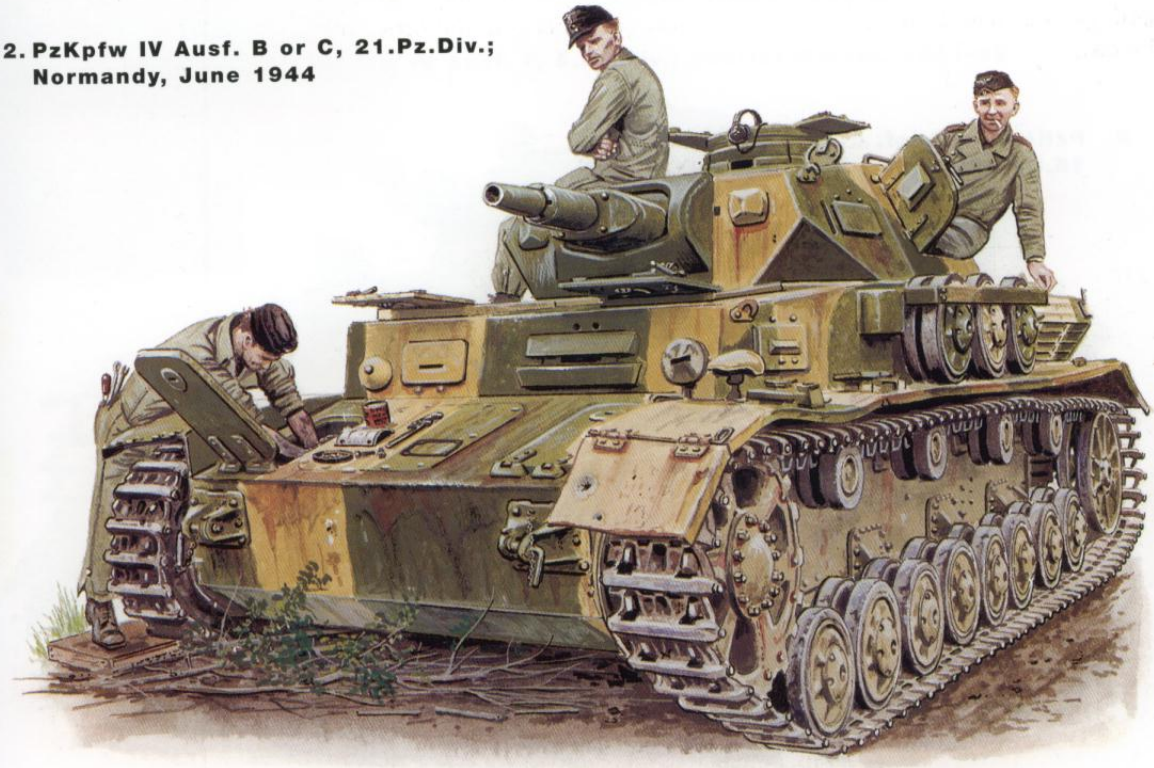
For example, in Poland the lion's share of the fighting fell to 1,445 PzKpfw Is and 1,223 PzKpfw IIs, led by 98 PzKpfw IIIs. These vehicles were supported by 211 PzKpfw IVs, or less than 10 percent of the whole. By the time the campaign in the West opened in June 1940 the number of PzKpfw Is had dropped to 619, including 96 converted to command vehicles, while only 955 PzKpfw IIs were available. Thus in nine months, including only a few weeks of fighting, 826 PzKpfw Is and 268 PzKpfw IIs had been removed from the German order of battle.

Obviously a high proportion of these had been diverted for training purposes (particularly the PzKpfw I), for conversion to other uses, or for



1. PzKpfw IV Ausf. A; Poland, September 1939

2. PzKpfw IV Ausf. B or C, 21.Pz.Div.; Normandy, June 1944



1. PzKpfw IV Ausf. F, 11.Pz.Div.; south Russia, 1941

2. PzKpfw IV Ausf. F, 5.Pz.Div.; central Russia, 1941-42

PANZERKAMPFWAGEN IV AUSF. H

KEY

1. Front armour plate 80mm
2. Spare track links
3. 20mm armour glasis plate
4. Final drive inspection hatch
5. Brake cooling air intake
6. Steering brake inspection hatch
7. Tow bracket
8. Headlights with blackout covers

8a. Schuertzen 5mm armour plate protection against anti-tank rifle fire

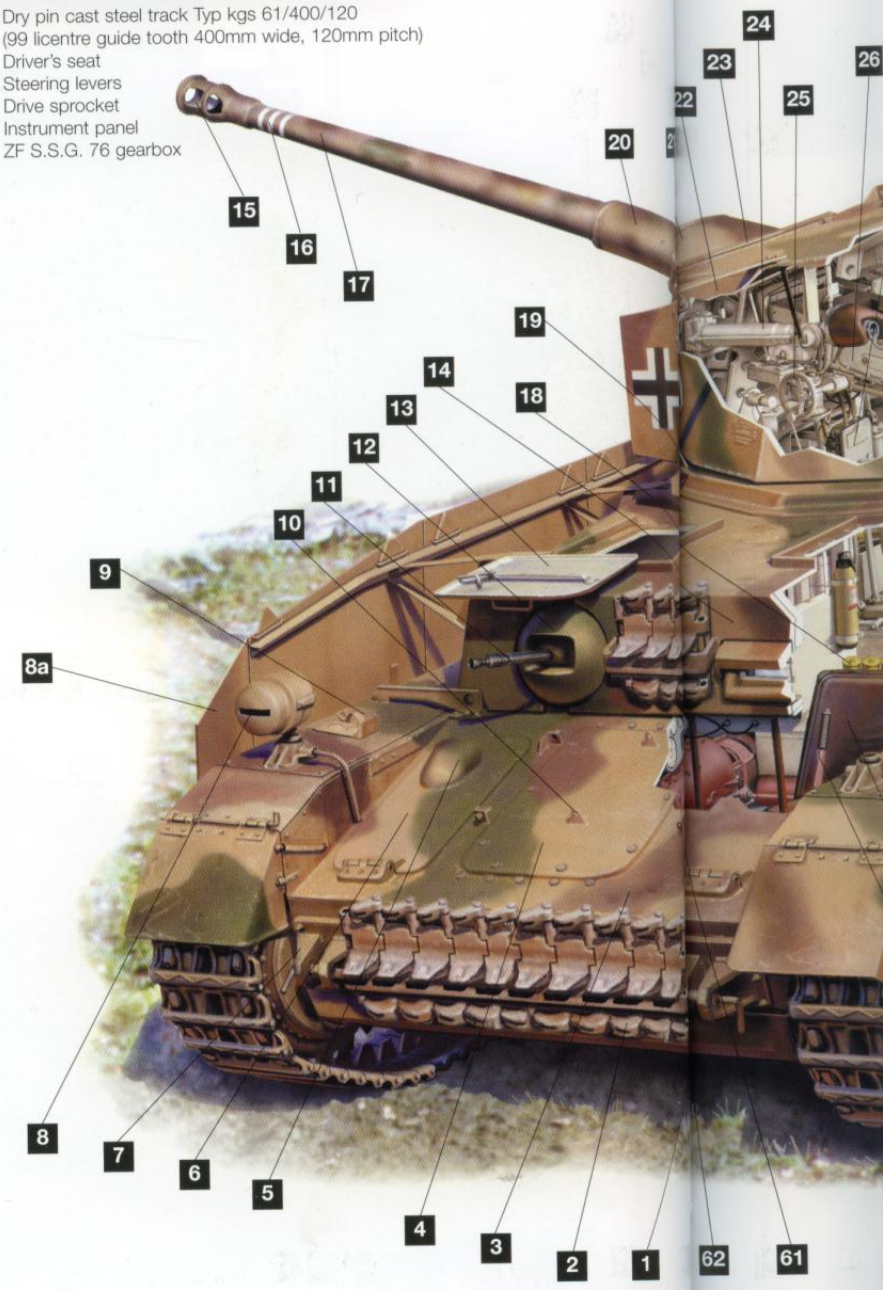
9. Stowage clips for axe
10. Brackets for stowage of spare track links
11. 7.92mm MG 34
12. Kugelblende, armoured ball mount
13. Radio operator's roof escape hatch
14. 80 mm superstructure armour plate
15. Muzzle brake
16. Kill rings painted on gun
17. 7.5cm KwK 40 L/48 main gun
18. Forward ammunition bin 23 rounds
19. Turret ball race bullet splash guard
20. Armoured sleeve for supporting gun during recoil
21. Armoured covers for recoil brake and recuperator
22. 30mm side armour on turret
23. 50mm front armour on turret
24. TZF 5f (2.5 x 24°) telescopic gun sight
25. Hand wheels for gun elevation and turret traverse
26. Breech
27. Fume extractor fan
28. Electric turret traverse motor
29. Travel lock stay
30. Single piece hatch
31. Commanders cupola with vision blocks
32. Spare glass vision blocks
33. Recoil guard
34. Pistol port
35. Stowage bin for crew belongings

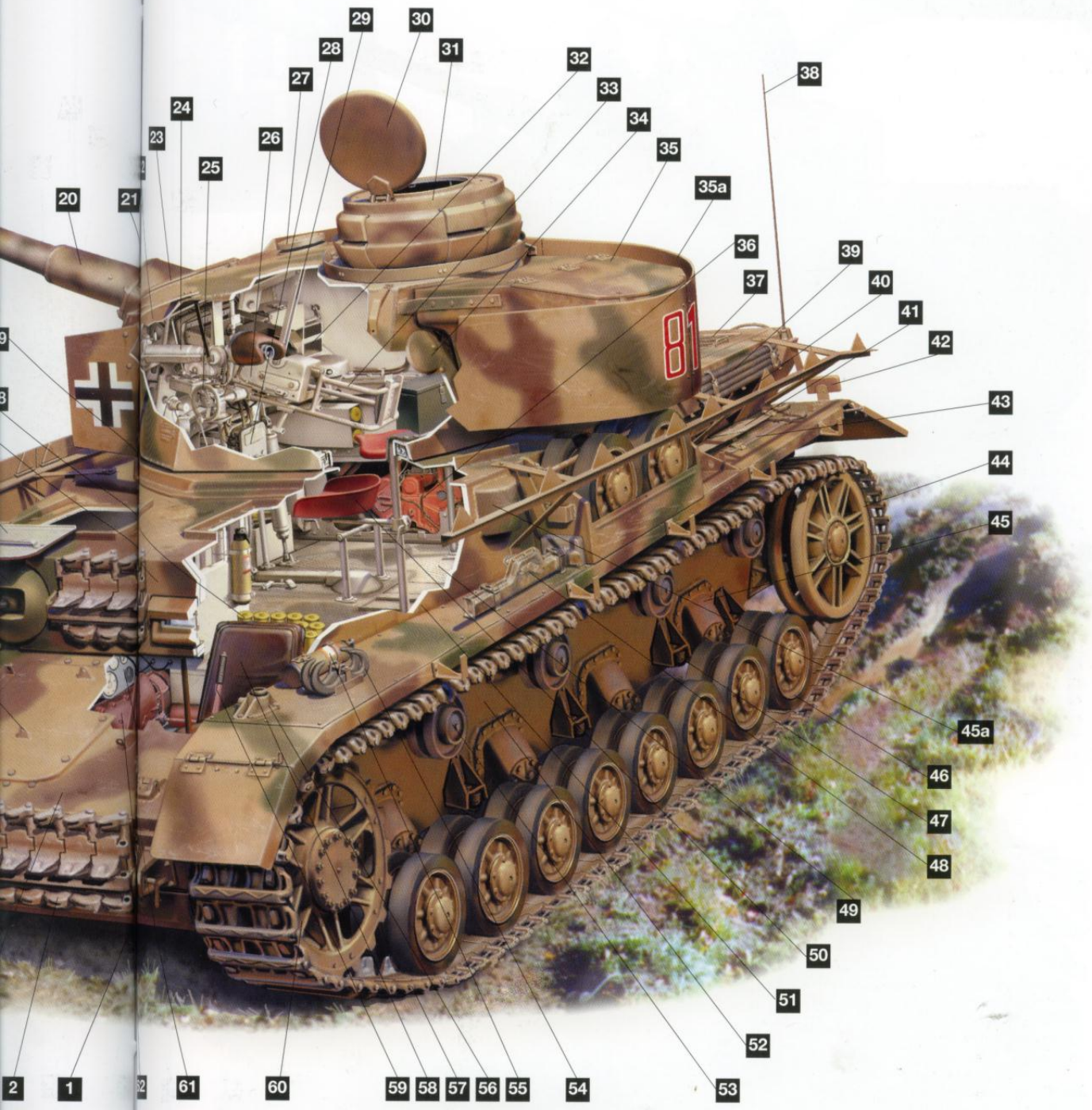
35a. 5mm schuertzen armour surrounding turret

36. Maybach HL 120 V-12 300 PS petrol motor (hatch in firewall removed)
37. Cooling air outlet
38. 2 meter rod antenna for Fu.G. 5 radio system
39. Gun cleaning rods
40. Cooling air intake
41. Sheet metal covers for sealing off air intake in cold weather
42. Column distance light
43. Crowbar
44. Cast idler wheel, adjustable for track tensioning
45. Quarter elliptic sprung 2 wheel bogie

45a. Air exhaust outlet from steering brakes and gearbox

46. 8 double road wheels, rubber tyres 470/90
47. Bogie bumpstops
48. Jack
49. Fuel tanks under floor
50. Gunner's seat
51. Side armour upper 30mm
52. Side armour lower 30mm
53. Steel tyred return rollers (rubber saving)
54. Hooks for use with towing cable
55. Fire extinguisher
56. Base socket for headlight (removed for combat)
57. Dry pin cast steel track Typ kgs 61/400/120 (99 licentre guide tooth 400mm wide, 120mm pitch)
58. Driver's seat
59. Steering levers
60. Drive sprocket
61. Instrument panel
62. ZF S.S.G. 76 gearbox

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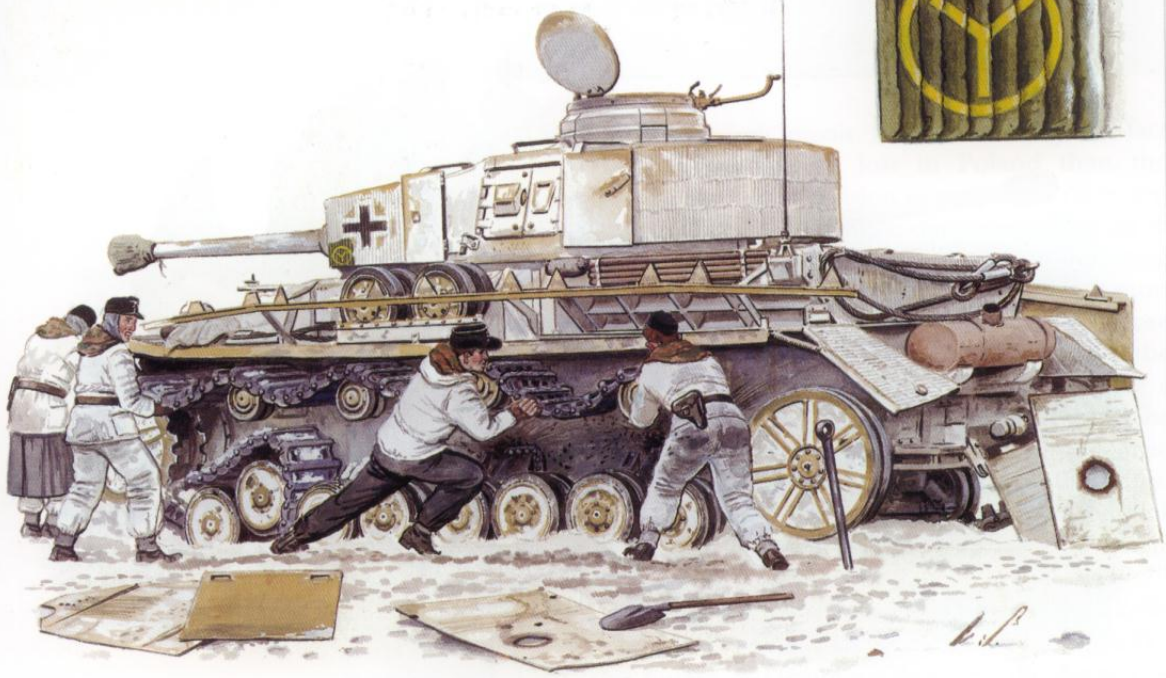
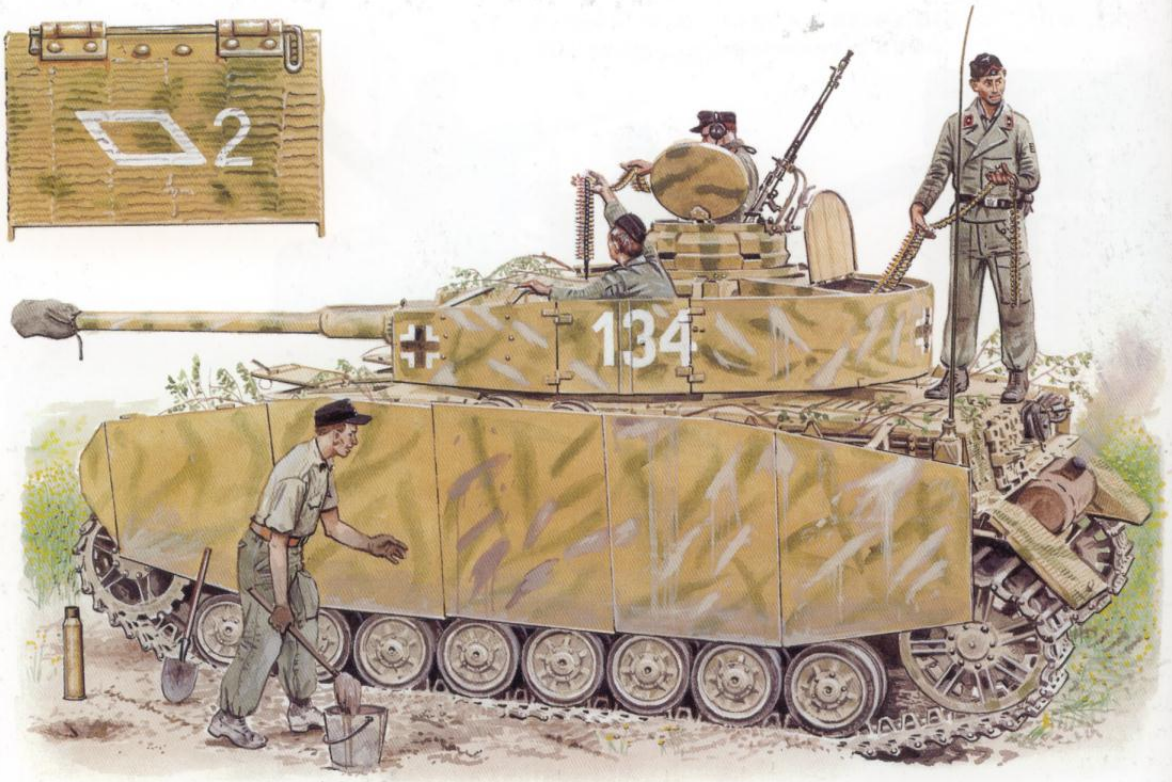
1. PzKpfw IV Ausf. H, 12.SS-Pz.Div. 'Hitlerjugend'; Normandy, 1944

2. PzKpfw IV Ausf. H, 12.SS-Pz.Div. 'Hitlerjugend'; Normandy, 1944

1. PzKpfw IV Ausf. J, 2.Pz.Div.; France, spring 1944



2. PzKpfw IV Ausf. J, 12.Pz.Div.; north Russia, early 1944



1. PzKpfw IV Ausf. H, 21.Pz.Div.; Normandy, July 1944

2. PzKpfw IV Ausf. J, unit unknown, Ukraine, 1943

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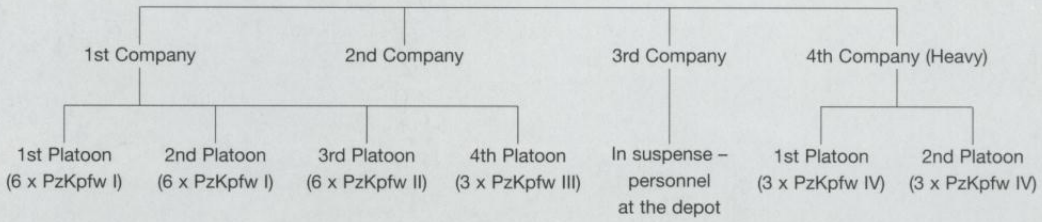
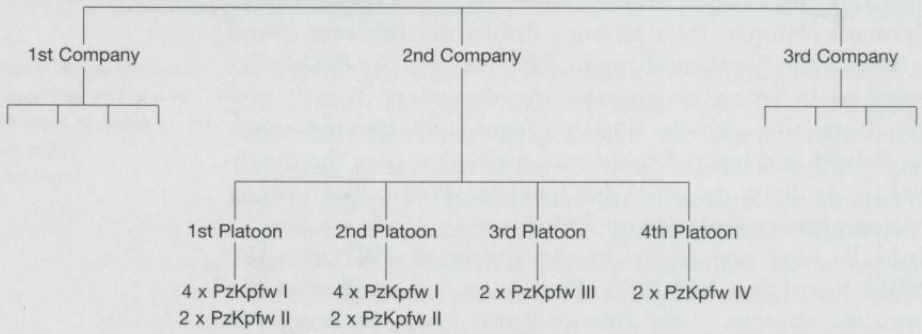
Administrative Order of Battle: Panzer Battalion, 1939



Possible Redeployment of Battalion to achieve three balanced Companies



simple scrapping if beyond economic repair. Notwithstanding, the fact remains that more German tanks were lost in Poland than the authorities were prepared to admit; one division subsequently recorded in its history that it had lost 60 tanks in a single day's street-fighting in Warsaw. The Poles had only 190 tanks with an armour-defeating capability, and most of the damage had been caused by anti-tank guns and artillery, which ripped great gaps in the ranks of the more lightly-armoured German vehicles. The campaign confirmed that the architects of the Panzerwaffe had been absolutely right to include a close-support tank within the battalion establishment; and although the PzKpfw IVs, stretched painfully thin on the ground, were unable to prevent their comrades' serious losses, it was their presence, aided on occasion by the Luftwaffe, which enabled the Panzer divisions to break the Polish anti-tank gun screens and maintain an advance which might otherwise have stalled.

For the campaign in the West the Germans fielded a total of 2,439 tanks of which 278, or slightly more than 10 per cent, were PzKpfw IVs. A major tank battle was fought at Gembloux between the French 3e Division Légère Méchanique and 4.Panzer-Division, each side losing about 100 vehicles, following which the French withdrew. The 3e DLM

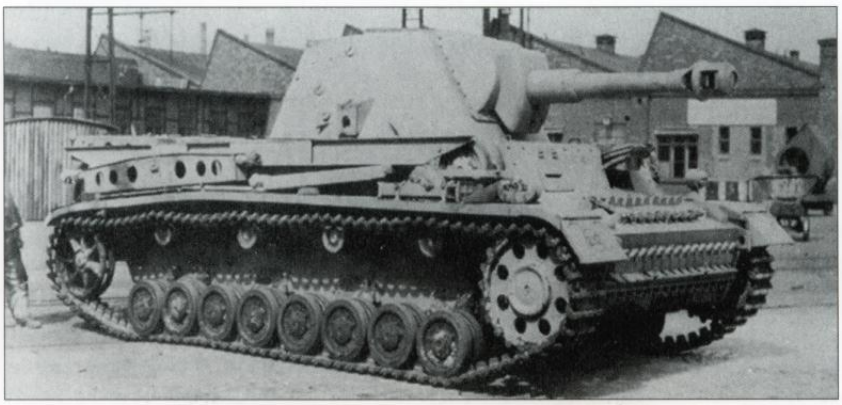
was equipped with the heavily-armoured Somua medium tank, backed by Hotchkiss H35 light tanks, and against the latter the 75mm howitzer of the PzKpfw IVs was particularly effective.

The principal German thrust traversed the Ardennes to secure crossings of the Meuse between Dinant and Sedan. Here the front was held by second-line French divisions whose morale was broken by sustained dive-bomber attacks. Something like a panic rout ensued, and through the gap poured no less than three Panzer corps. In such circumstances the Panzerwaffe's philosophy was that safety lay in continuous movement and, once through the defended zone, the German tanks advanced almost unopposed across France to the Channel coast, isolating the Allies' northern army group and compelling the evacuation of the British Expeditionary Force from Dunkirk. As far as the Heavy companies were concerned, the campaign thus far had presented less difficulty than that in Poland.

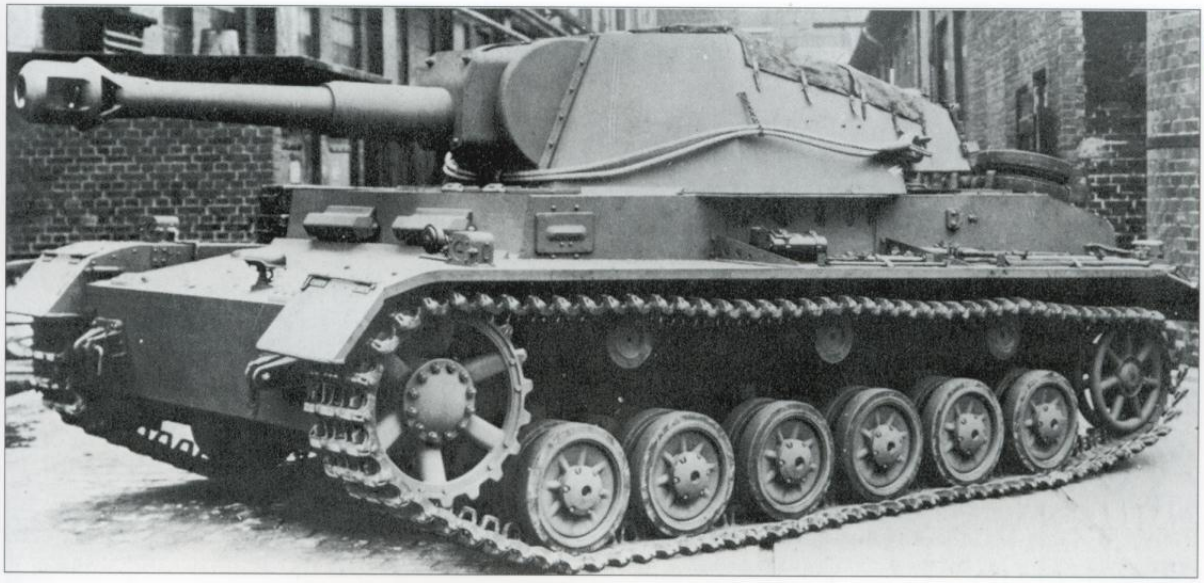
What remained of the French Army formed a fresh line based on the Somme, relying on a defence in depth consisting of fortified villages and woods with carefully sited artillery and anti-tank killing grounds between. When the Germans resumed their advance the Panzer divisions found considerable difficulty in breaking through this zone, and the PzKpfw IVs were fully engaged in trying to suppress the defenders' fire. It was, however, the Luftwaffe, which had perfected its ground-attack techniques in Poland and refined them ever since, that gave the death-blow to the French artillery, and when that had gone France had nothing left to offer. An armistice was signed on 22 June.

The PzKpfw IV next saw action in the spring of 1941 with the Deutsches Afrika Korps, but had little effect upon the conduct of the desert war until the autumn of the following year when the first L/43 models arrived in the theatre. The close-support version took part in all the major actions of the campaign, but in a war of movement British attention was more fully absorbed by the 50mm gun of the PzKpfw III and the dual-purpose 88mm AA/AT gun.

The PzKpfw IV found more useful employment in the short but successful campaigns which resulted in the conquest of Greece and Yugoslavia. The Yugoslav army, riven as it was by racial, religious and political differences, was in no condition to fight a war, let alone one against as experienced and efficient as the German Panzerwaffe, which quickly broke through the cordon of frontier defences and advanced



The Heuschrecke (Grasshopper) was armed with the light 105mm howitzer, and was based on a slightly lengthened version of the standard PzKpfw IV chassis. (RAC Tank Museum)



The light 105mm SP howitzer employed a modified PzKpfw IV chassis. Only eight of these vehicles were built. (RAC Tank Museum)

along the principal valleys to carve the country into sections. In this way the major cities were taken by simultaneously converging attacks from different directions, long before the enemy high command could establish a coherent defence. There was little fighting and on 17 April 1941, only 11 days after the invasion commenced, Yugoslavia surrendered unconditionally. No fewer than 345,000 of her soldiers marched into captivity; German personnel casualties amounted to a mere 558. Greece proved to be a tougher nut to crack, but with 15 of her 21 divisions already engaged with the Italians in Albania, and the left flank of her defence lines fronting Bulgaria wide open to attack from Yugoslavia, an Axis victory was a virtual certainty. In places, however, the Panzer divisions encountered the toughest imaginable opposition; nowhere more so than in the famous Pass of Thermopylae, where 19 tanks of I/Panzer Regiment 31 (5.Panzer Division), unwisely tried to batter their way through the defile occupied by British troops despatched from Egypt; every one was set ablaze or knocked out. When the campaign ended on 28 April, Greek casualties amounted to 340,000, including 270,000 captured, British to 12,000 plus a great deal of heavy equipment lost, and German to 12,000 plus an acceptable number of tanks. On the one hand, the Balkan campaigns had demonstrated beyond doubt that the Panzerwaffe was a formidable weapon system honed to perfection; on the other, these easy victories had cost irreplaceable time and been won in difficult terrain which imposed mechanical wear and tear on the Panzer division's vehicles; both these factors would produce baleful consequences during the months to come.

In June 1941 Hitler launched Operation '*Barbarossa*', and the Panzer divisions began to probe their way deep into the heartland of Soviet Russia. On paper their task seemed well-nigh impossible, for the huge Red Army possessed limitless reserves of men and had not less than 20,000 tanks. However, many of these were of obsolete design or doubtful fighting value; equally important, only a tiny proportion of the Russian tank strength was fitted with radio, so that flexible control in the manner of the Panzerwaffe simply did not exist. Again, the Soviet

Grasshopper)
e light 105mm
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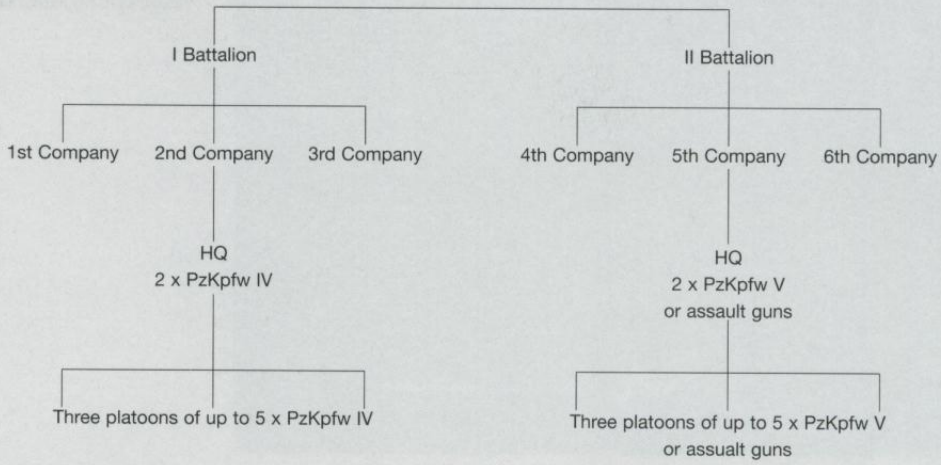
armour was in the throes of a major re-organisation in an attempt to emulate the Panzer division, and many formations which had only recently been raised had little or no practical experience of what was involved. Added to this, the Red Army's command system was rigidly hierarchical in the traditional Communist mould, so that field commanders, living with the recent memory of the Great Purge of the officer corps, were reluctant to take decisions without the direct approval of their superiors.

In contrast, the German Panzergruppen were experienced, flexible, led from the front and at the peak of their morale. As the advance continued enormous pockets were formed and subsequently reduced by the follow-up infantry divisions, yielding vast numbers of prisoners and untold quantities of equipment. By the time winter put an end to the German drive the Red Army had lost 1,000,000 men and 17,000 of its tanks.

There was, however, another side to the coin. Moscow, the all-important hub of the Russian railway system, remained untaken, partly because of the delay stemming from the Balkan campaigns and partly because Hitler had personally altered the disposition of the Panzergruppen at the critical moment. German tank losses amounted to 2,700 vehicles, incurred either in action or because of sheer mechanical attrition, so that the Panzer spearheads were reduced to mere shadows of their former selves. The repair and supply organisation had broken down, and men were forced to face a Russian winter in the summer uniforms in which they had begun the campaign, while the warmly-clad soldiers of the Red Army began a series of counter-attacks all along the Front. For the tank crews there was the bitter realisation that the despised Russians possessed in the T-34 and KV-1 better machines than their own, and that they would have to fight at a qualitative as well as quantitative disadvantage until the situation could be remedied. The Germany Army, used to quick, easy victories, was now faced with a very long war, and its morale plummeted. It would recover, but never again reach quite the level of self-confidence that it had possessed in June 1941.

In the meantime, frantic efforts were made to provide equipment that could defeat the new Russian tanks. Expedient tank destroyers, consisting of obsolete tank chassis fitted with 75mm anti-tank guns, were rushed into production; the Sturmgeschutz was up-gunned; the L/42 weapon of the PzKpfw III was replaced by the longer L/60, which was still unable to bridge the performance gap. Only the up-gunned PzKpfw IV could restore the situation, and until that reached the front the Panzer divisions would have to soldier on, defeating the Russian mass with their own expertise.

Panzer Regiment, 1944



THE EAST 1942–1945

Some units had to wait a very long time before they received an allocation of the new vehicles. Panzer-Regiment 35 of 4.Panzer-Division, for example, did not receive theirs until the spring of 1943, the occasion being recalled by Gefreiter Rudolf Meckl of No.2 Company:

'Shortly before the attack on Ssewsk the great day arrives for us – general issue of the long-barrelled PzKpfw IVs! The term "general issue" meant in fact that each company was given six or eight of these vehicles, but in spite of this we feel that this is worthwhile.

'Near Ssewsk, the Ic of our division monitors the radio traffic on the Russian command frequency. As our "Hams" move forward a Russian commander is heard calling for help:

"German heavy tanks are advancing towards me!" With *these* heavies we have long looked forward to challenging the Snow Kings.

'Sometimes we wish we had a little more armour. Our own tank is fitted with armoured side skirts, and as a matter of fact these give us a rather menacing appearance. Now we have the long gun, it is the start of a "Happy Time" for us Panzer crews. Even when the company was sometimes reduced to three or four vehicles, this did not bother us unduly.'

For the Wehrmacht, the major event of 1942 was the great drive into the Caucasus, designed to capture the Baku oilfields. The advance was almost unopposed, for the Red Army had learned the lessons of the previous year and had side-stepped the principal thrust. However, on the eastern flank of the advance lay Stalingrad, with which Hitler developed a complete fixation. Everything was thrown into capturing the city to the exclusion of all other considerations. The Russians responded with a gigantic double envelopment which trapped the German 6th Army and part of 4th Panzer Army as well, compelling their surrender on 2 February 1943 after months of bitter fighting.

Street fighting on the Eastern front. Soviet sub-machine gunners double past a sullenly smouldering PzKpfw IV.

The disaster shook the German Army to its foundations, and caused even Hitler to have some temporary doubts concerning his own judgement. Meanwhile *Stavka*, the Russian High Command, was planning an even more spectacular *coup*; nothing less than the encirclement of those forces which were being hastily withdrawn from their deep penetration into the Caucasus. This could be achieved by a determined thrust south-west to the Sea of Azov, and two armies, Vatutin's South-West Front and Golikov's Voronezh Front, were detailed for the task.

The Russian intentions were quickly appreciated by Field Marshal von Manstein, the Commander-in-Chief of Army Group South. He was aware that because of the Red Army's inexperience in deep-penetration operations and their poor logistic back-up, both Soviet Fronts would quickly outrun their supply echelons, and that the inevitable breakdowns would steadily drain away the strength of their tank formations; conversely, although under pressure from Hitler, he did not wish to launch his own counteroffensive until the German armour had been sufficiently concentrated for a knock-out blow, for Stalingrad had cost 800 tanks, and the strength of his Panzer divisions had reached an all-time low.

On 20 February 1943 he moved at last, slicing into Vatutin's flank and finding most of the Russian columns stalled for want of fuel. With the long-barrelled PzKpfw IVs' capacity to defeat the T-34/76s, the Panzer divisions' second 'Happy Time' had begun. South-West Front was routed and hurled into a precipitate retreat, losing 615 tanks, 400 guns, 23,000 men killed and 9,000 captured. Golikov, hastening to his stricken comrade's aid, was caught whilst deploying and handled even more severely, leaving behind 600 tanks, 500 guns and 40,000 casualties. Only the spring thaw, which turned hard-frozen ground into impassable mud, brought an end to Manstein's runaway progress.

This operation completely restored the integrity of the Eastern Front, but its curtailment by the thaw had left the Russians in possession of a deep salient in the centre of which lay the town of Kursk. The elimination of that salient, Hitler decided, would be the major objective

of the 1943 summer campaign. His plan called for converging attacks by Army Groups Centre and South against respectively the northern and southern flanks, which, if successful, would trap so many divisions that the Red Army would be decisively weakened. The idea found few supporters among senior German commanders, but Hitler insisted that it be implemented, using the bulk of the Panzerwaffe which Guderian and Speer had so painstakingly rebuilt.

The German preparations did not escape Russian notice. The walls of the salient were fortified to a depth of several miles with successive defended zones, each stiff with anti-tank guns and protected by deep mine belts, while most of the Russian armour was held back in the counter-attack rôle. Save in artillery, in which the Red Army had a superiority of two to one, the two sides were fairly evenly matched, 3,300 Russian tanks being opposed by 2,700 German, the latter including Tigers, Panthers, PzKpfw IVs and PzKpfw IIIs. Since the Tigers were few in number and the Panthers not yet fully cured of their teething troubles, the mainstay of the German effort would be the newer models of PzKpfw IV

The great offensive, codenamed '*Zitadelle*', began on 5 July. On the northern sector the Germans advanced only 10 miles; in the south the figure was 25 miles, bought at a terrible price. Given time, the Panther would evolve into one of the finest medium tanks of the war, if a little heavy for its classification. In its present untried state, however, it proved to be a disaster. Even before the fighting began, the routes between railheads and operational assembly areas were littered with broken-down Panthers, mainly transmission failures and engine fires. In Fourth Panzer Army alone, breakdowns and battle casualties during the first day reduced the number of Panthers available from a theoretical 200 to just 40, a situation which showed no signs of improving.

The battle reached its climax on 12 July when the 700 tanks of II SS Panzer Corps, attempting to break out of the last of the defended zones, were met head-on by the 850 tanks of 5th Guards Tank Army at the village of Prokhorovka. The Russians were aware that their 76.2mm guns no longer provided a decisive advantage, and had been ordered to close the range. This they did with a vengeance, driving right into the German ranks to engage in a murderous close-quarter mêlée in which tanks resorted to ramming each other. In the end 5th Guards Tank Army drew off, leaving 300 of its tanks behind. The SS Panzer Corps lost about the same, but the Germans had shot their bolt; '*Zitadelle*' was over.

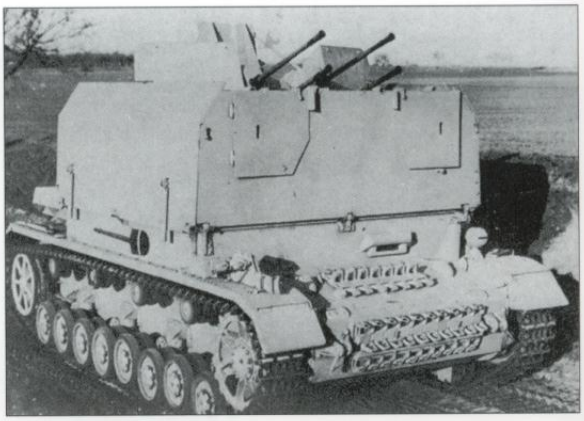
PzKpfw IVF2 captured at Second Alamein; note the size of the two 75mm rounds of ammunition. The tank immediately to the right is an Italian M13/40.

The Red Army went over to the offensive almost immediately, grinding away at the Wehrmacht in a series of massive set piece attacks which pushed the German line steadily away to the west. In August Kharkov was abandoned; in September Army Group South retired across the Dniepr; on 6 November Kiev was recaptured, and by the New Year most of the Ukraine had been liberated.

The pressure never let up. Tied hand and foot by Hitler's 'no withdrawal' directives, Von Manstein was unable to offer an effective defence to the Red Army's 1944 spring offensive. Many

German formations were surrounded in their defences and overwhelmed, although 1st Panzer Army, isolated at Kamenets-Podolsk, was just able to cut its way out. By the end of March Army Group South was fighting with its back to the Carpathians.

Farther north Field Marshal Busch, the commander of Army Group Centre, realized that he was the Red Army's next target. He could oppose 4,000 Russian tanks with only 900 of his own, and had virtually no reserves as almost all his resources were committed to holding the line. His suggestion that a tactical withdrawal would not only save his own troops but also disrupt Soviet plans was received with outrage by the Führer, who insisted that Army Group Centre should fight where it stood. In July it was ripped to pieces, and 40 Russian tank brigades poured onto the Polish plain through the 250-mile gap that had been torn in the line.



The Mobelwagen 20mm quadruple anti-aircraft vehicle with flaps raised. (RAC Tank Museum)

The destruction of Army Group Centre isolated Army Group North in the Baltic States. Here the Red Army opened a fresh offensive in the autumn, culminating in the capture of Riga on 15 October, following which the Army Group's survivors remained blockaded on the Courland peninsula for the remainder of the war.

Throughout these operations the Panzer divisions had fought hard to stem the Russian advance, and had inflicted losses which against any other enemy would have been regarded as crippling. During the last months of the war the Red Army would pay an even higher price for every mile of German territory it occupied, but it was not enough; for every T-34 destroyed there were three more on their way to the front.

The PzKpfw IV remained in action to the end, outgunned in the final stages by the 122mm gun of the Russian heavy IS series, and by the 85mm gun of the T-34/85. It was the only German tank design to have been in continuous service throughout the entire war.

NORTH AFRICA 1942–1943

The first effects of the Eastern Front's gun/armour spiral became apparent in the Mediterranean theatre of war during the spring of 1942. An airborne invasion of Malta was to have been followed up with an amphibious landing during which captured KVs and heavily up-armoured PzKpfw IVs were to have fought their way off the few beaches available, but this operation, codenamed '*Herakles*', was cancelled. In the Western Desert, General Erwin Rommel launched an offensive on the night of 26/27 May and during the subsequent battle of Gazala/Knightsbridge inflicted a severe defeat upon the British 8th Army, causing it to withdraw deep into Egypt.

Rommel's victory was crowned by the capture of Tobruk, for which he received his Field-Marshal's baton. Present during the battle were 117 recently arrived Marder III tank destroyers, consisting of the chassis of the obsolete PzKpfw 38(t) tank armed with a captured Russian 76.2mm anti-tank gun re-chambered to take German 75mm ammunition. So

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successful were they that for a while the British believed that they were faced by a mechanised version of the dreaded 88mm. Four PzKpfw IVF2s had also arrived, but for the moment they lacked ammunition and took no part in the battle. In view of his precarious logistic situation, Rommel's decision to pursue his opponents was unwise. In July he was halted during a series of hard-fought engagements known collectively as First Alamein.

On the night of 30/31 August 1942 Rommel threw all his resources into one last attempt to reach the Nile delta and the Suez Canal, fighting his way through the southern flank of the Alamein defences to initiate a right hook that would take Panzerarmee Afrika northwards through the British rear areas and on to the coast. His progress was delayed by difficulties in 8th Army's minefields and by incessant air attack, but by the following evening his Panzer divisions had shaken themselves free and were advancing on Alam Halfa ridge. In the lead were 27 PzKpfw IVF2s that had only recently arrived in Africa.

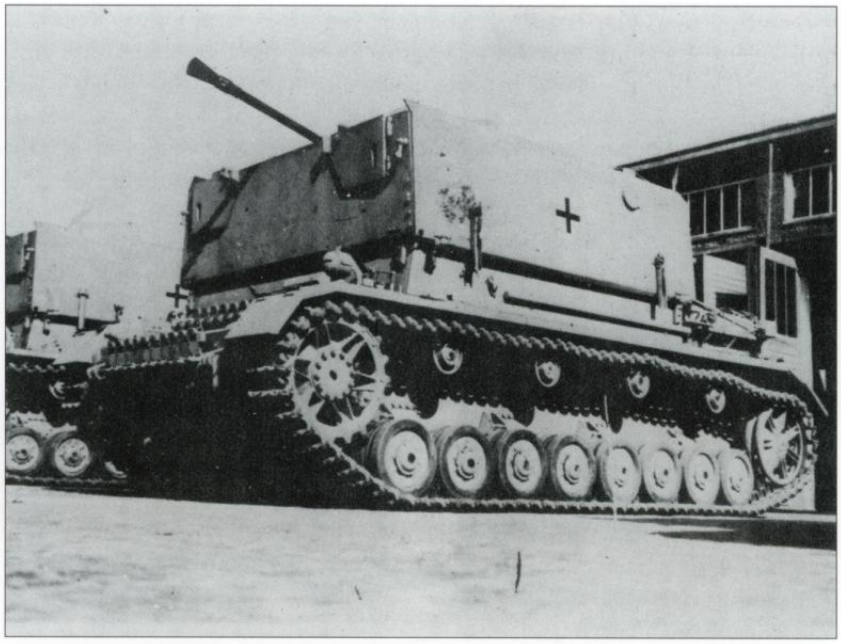
Alam Halfa was held by 22nd Armoured Brigade, a Grant formation commanded by Brigadier G. P. B. Roberts. Three of the brigade's regiments were deployed in prepared positions on the forward slope, while the fourth was kept in reserve beyond the crest. As the *Panzerkeil* emerged from the desert to the south Roberts noticed something different about it: 'Some of the leading tanks are Mark IVs, and Mark IVs have in the past always had short-barrelled 75mm guns used for close-support work, and consequently they are not usually in front. But these Mark IVs have a very long gun on them; in fact it looks the devil of a gun.'

It was. At 1810hrs both sides opened fire at 1,000 yards and within minutes one of Roberts's squadrons had lost all 12 of its Grants. The German attack was ultimately defeated by the arrival of the brigade's reserve regiment.

The British referred to the up-gunned PzKpfw IV as the 'Mark IV Special', and 30 of these vehicles, the most powerful on either side, were present at Second Alamein along with eight of the older models, 88 L/60 PzKpfw IIIs, 85 L/42 PzKpfw IIIs, and 278 Italian M.13s. Here Rommel's principal difficulty lay in his lack of fuel, a factor of which Montgomery took full advantage, attacking first in one place and then another, forcing Panzerarmee Afrika to burn up its priceless supplies in the counter-attack rôle.

On 2 November Montgomery launched an attack that was designed to draw the Axis armour into battle and destroy it. The operation would have two phases, the first of which would involve the 9th Armoured Brigade storming its way into the enemy's anti-tank gun screen in a pre-dawn attack, following which the inevitable counter-attack would be met and defeated by 1st Armoured Division's two armoured brigades, the 2nd and 8th.

9th Armoured Brigade's task was suicidal; its commander, Brigadier John Currie, had been told to accept 100 per cent casualties if necessary. In fact the brigade lost 75 out of its 94 tanks, but destroyed a large number of anti-tank guns in return and succeeded in attracting the concentrated counter-attack that Montgomery had wanted. The subsequent battle, which took its name from the nearby Tel-el-Aqqaqir, lasted throughout the day, with the artillery of both sides joining in. By



The 37mm version of the Mobelwagen. A total of 211 Mobelwagens of both types were built. (RAC Tank Museum)

evening Rommel had lost 117 tanks and his armour, which had also been mauled on successive occasions during the previous 11 days, was reduced to impotence.

The technical superiority of the new PzKpfw IV over the Sherman was more than outweighed by the numbers in which the latter vehicle was becoming available to the Allies. In Tunisia the PzKpfw IVs were second only in importance to the few Tigers which had arrived in the theatre, but there were never sufficient available to provide the three Panzer divisions with more than a modest allocation each. Even so, Rommel's energetic defence succeeded in inflicting a sharp reverse on the inexperienced US 1st Armored Division at Kasserine Pass, where one of the American Combat Commands drove into an ambush and was all but destroyed by the fire of tanks and anti-tank guns from the flanks. This was, however, to be Panzerarmee Afrika's last success. On 28 February 1943 a major thrust at the important communications centre of Beja on the northern sector, led by 14 Tigers and 12 PzKpfw IVF25, was broken up and turned back by a combination of medium artillery, anti-tank guns and the fire of hull-down Churchills. A week later a massed Panzer attack on the 8th Army's position at Medenine was decisively repulsed by concentrated artillery fire with the loss of 50 tanks. For the remainder of the campaign the PzKpfw IV was employed in the counter-attack rôle, fighting its last African battles in the Medjerda Valley (see New Vanguard 4, *Churchill Infantry Tank 1941-1951*).

NORTH-WEST EUROPE

Allied strategy in Normandy required incessant pressure to be maintained by the British and Canadian armies on their sectors while the Americans prepared to break out of the beachhead to the south. In the Caen area a series of operations which had all the appearance

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of an attempted break-out by the British succeeded in tying down the bulk of the German armour, which was forced to fight defensively for most of the campaign.

Because of total Allied air superiority Panzer crews were forced to pay greater attention to their camouflage than at any other time of the war, and most movement took place at night. Here, again, the Germans fought at a numerical disadvantage, counterbalanced to some extent by their more powerful armament and the difficulties experienced by their opponents in the *bocage* country. On occasion the German armour was destroying four Allied tanks for the loss of one of its own, and a major defensive success was achieved in the repulse of Operation 'Goodwood', when the advance of no less than three British armoured divisions was brought up short east of Caen.

On the other hand, most German counter attacks ended disastrously. The Panzers found it no easier to attack in the *bocage* than did their foes, and they sacrificed the potential of their superior armament by doing so. In the close-quarter fighting among the hedgerows and orchards they were vulnerable to the infantry's bazookas as well as the fire of anti-tank guns, tank destroyers and tanks; they were strafed mercilessly from the air, pounded by massed artillery, and subjected to the terrible ordeal of naval gunfire.

During the early days of the campaign the PzKpfw IVs, firing hull-down from carefully concealed positions, received a slightly backhanded compliment from the outranged British crews, whose contact reports frequently described the German vehicles as Panthers. In long-range shooting the only Allied vehicles capable of defeating the PzKpfw IV were the 17pdr. Sherman Firefly and the Achilles and M10 tank destroyers.

Ultimately the Panzer divisions, almost totally lacking in reinforcements and replacement vehicles, were bled white by Hitler's 'no withdrawal' order, and what remained of them was battered to

Knocked out Syrian PzKpfw IV on the Golan Heights, June 1967. This photograph emphasises the huge field of fire possessed by the Syrians. (Eshel Dramit)

scrap in the Falaise Cauldron. The PzKpfw IV's last major offensive employment in the West was during the December 1944 Ardennes offensive. Following the failure of this offensive the tank was only encountered again in declining numbers, most of the crumbling German defence relying on small battlegroups built around a few assault guns or Panzerjäger.

POSTSCRIPT

At various times during the Second World War Germany supplied small numbers of PzKpfw IVs to her various allies and sympathizers, including Finland, Rumania, Bulgaria, Hungary, Spain and the Yugoslav Cetniks. Bulgaria received 88, which were promptly employed against her beneficiary when she changed sides in 1944. The vehicle remained in service with the Finnish and Spanish armies for some years after the war ended, but gradually disappeared from view.

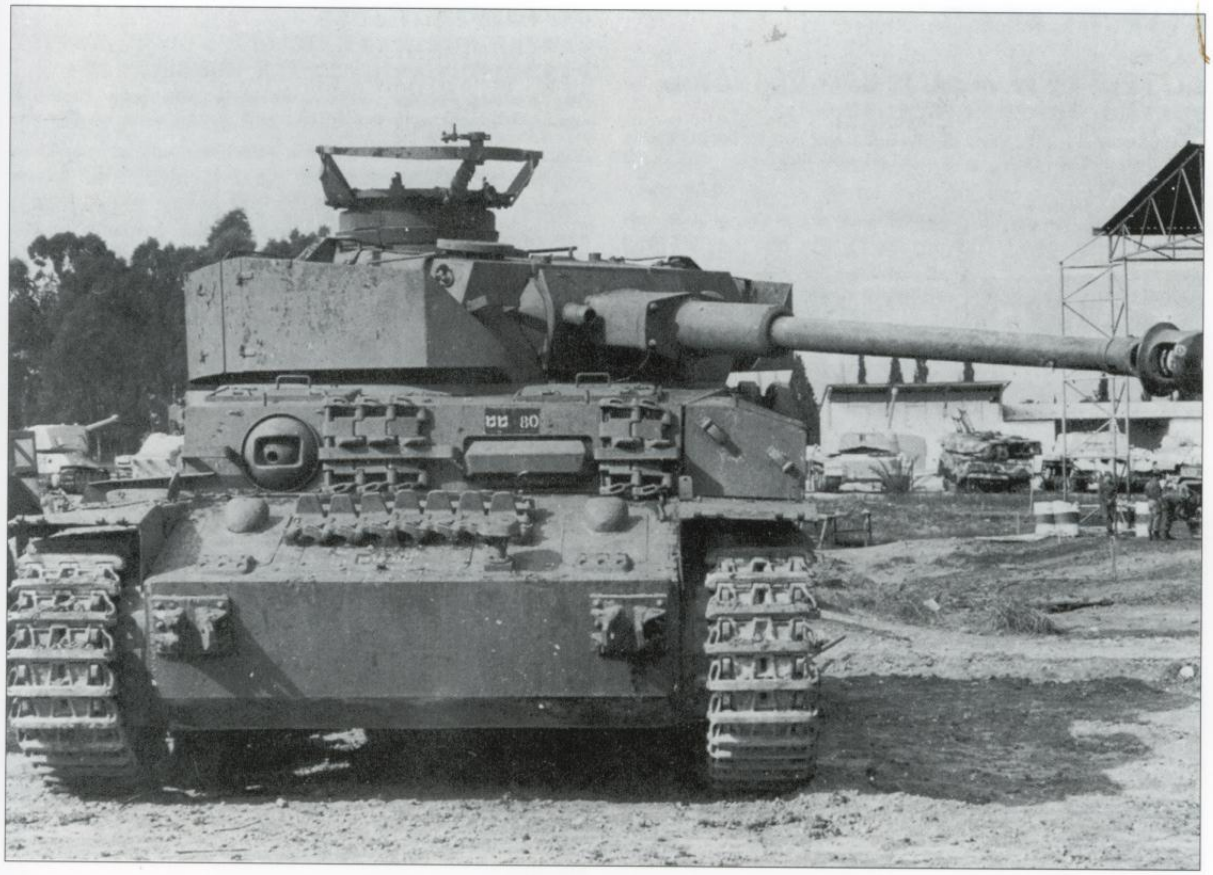
It was not until the 1965 'Water War' between Israel and Syria, fought for possession of the Jordan headwaters, that the PzKpfw IV fired its next shots in anger. The Syrian Army had acquired several from the French and these, their appearance altered only by the addition of a Russian 12.7mm heavy machine gun to the cupola, were emplaced in prepared positions on the slopes of the Golan Heights above Dikkeh, where they fired down into the Israeli settlements on the plain below.

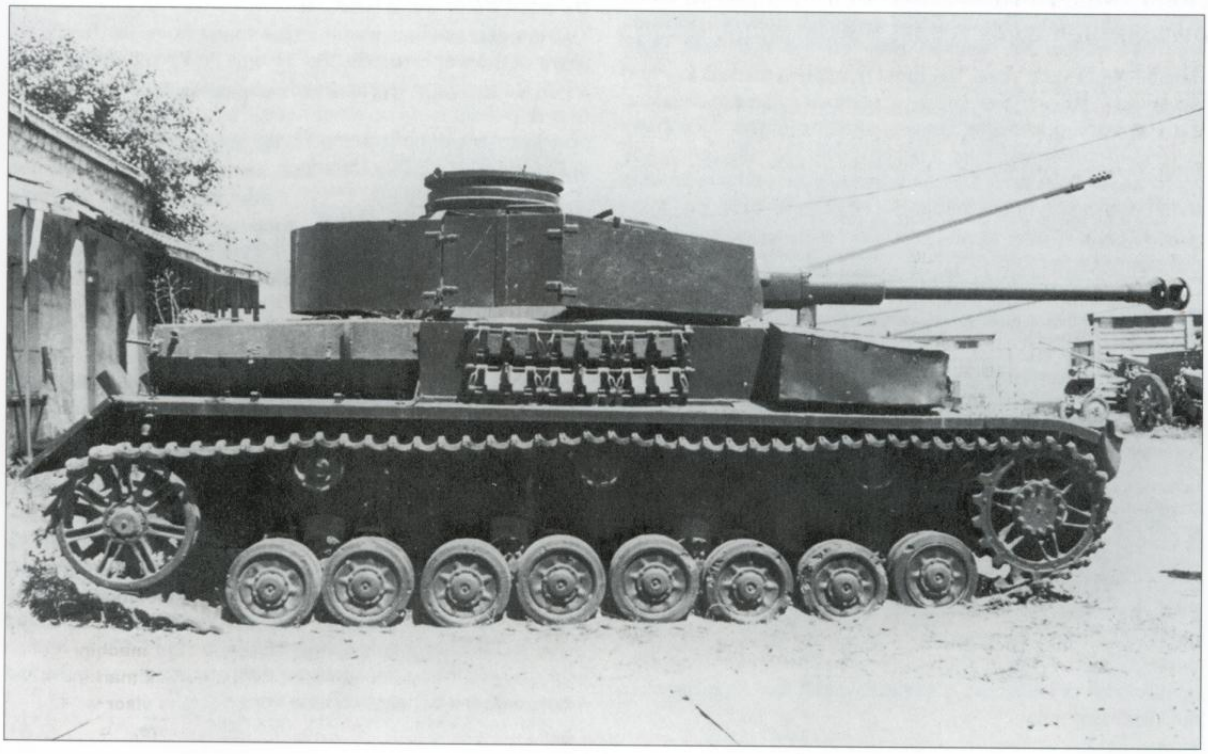
Israeli Centurions, which owed much in their original design to the PzKpfw IV, moved up to engage in a long-range duel with their 105mm guns. The Syrian artillery joined in, the shell-bursts sending up dust clouds which made target identification difficult; and following UN intervention the fire-fight ended inconclusively.

General Tal, commander of the Israeli Armoured Corps, had been disappointed by his men's poor shooting, and immediately ordered his Centurion crews to concentrate on their long-range gunnery techniques. When, on 12 August 1965, the Syrians again opened fire on the settlements, the Centurions were waiting for them. The tanks on the heights were quickly silenced, and the Israelis then turned their attention to a Syrian earth-moving plant which was working on an irrigation site deep inside Syria; this was destroyed in a startling display of HE gunnery at a range of not less than 11,000 yards. The Water War was over.

Those PzKpfw IVs which survived the Water War remained in their pits on the Golan Heights until the Six Day War of 1967. There they were captured as the dashing Israeli infantry swarmed over their position to rout the Syrians from their bunkers; the last PzKpfw IV to die in action fell to the long French 75mm gun carried by one of the Israelis' escorting Shermans.

ABOVE AND RIGHT **Two views of forest green painted, late-model PzKpfw IVs captured by the Israelis during the fighting against the Syrian Army on the Golan Heights in June 1967; the Syrians are believed to have acquired these antiques from Spain. Note the modified cupola with mounting for the Russian heavy anti-aircraft machine gun. The white-on-black marking above the driver's visor was added after capture.**





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THE PLATES

A1: PZKPFW IV AUSF. A, UNIT UNKNOWN; POLAND, SEPTEMBER 1939

One of only 35 examples of this initial version to be built, this tank is finished overall in standard dark blue-grey. The solid white national cross on the turret would have been overpainted yellow shortly afterwards – it proved an uncomfortably good aiming mark for the dangerous Polish gunners. The only other visible marking is the turret number, also in solid white, identifying the 4th Company, 3rd Platoon, 4th vehicle. A large 'fascine' of pine logs is carried on the rear decking, to assist the crossing of streams and similar obstacles.

A2: PZKPFW IV AUSF. B OR C, PANZER-REGIMENT 22, 21. PANZER-DIVISION; NORMANDY, JUNE 1944

An extraordinary survival at this late date, this tank is probably an Ausf. C; the regiment's II Abteilung was equipped with a mixed bag of these antiques and French Somuas. Photographs show some vehicles finished in plain dark yellow, others - like this example - with an unusual camouflage of broad dark green stripes; national crosses, turret numbers and unit insignia all seem to have been lacking. The battalion was wiped out in the Normandy fighting.

B1: PZKPFW IV AUSF. D, PANZER-REGIMENT 11, 6.PANZER-DIVISION; RUSSIA, SUMMER 1941

This division operated on the northern sector of the front in the initial drive into Russia. The tank is finished in standard dark blue-grey overall. The national cross is now marked in a narrow white outline presentation on the hull superstructure sides well forward. The divisional insignia from 1941 onwards was two yellow Xs, marked here on the hull front plate outside the driver's visor. The turret number is marked low and small; an '?02' number within a company usually indicated the 'spare' command tank, used by the company second-in-command and handed over to the company commander if his tank was knocked out. In some regiments solid coloured numbers followed a company sequence white, red, yellow and blue and we therefore assume this mid-tone number to be in blue.

B2: PZKPFW IV AUSF. E, PANZER-REGIMENT 8, 55.PANZER-DIVISION; LIBYA, 1941–1942

This tank is finished in an overall coat of light desert yellow, through which the original factory scheme of dark blue-grey shows in streaks and patches. The placing of the national cross, on the left end of the upper rear hull plate, in white outline only, is unusual; note that the cross does not appear anywhere on the side surfaces. The divisional insignia is stencilled at the right of the bottom rear hull plate, reversed out of a red disc; balancing it at the left end of the plate is the DAK palm-and-swastika sign, stencilled in white. The divisional insignia is repeated on the hull side in front of the driver's side visor. The turret number identifies the commander of I Platoon, 8 Company, in a low-visibility white outline presentation.

C1: PZKPFW IV AUSF. F, PANZER-REGIMENT 15, 11. PANZER-DIVISION; SOUTH RUSSIA, 1941

Still painted overall dark blue-grey, this tank bears a two-digit turret number only; several regiments followed this practice, and normally it was the company number which was omitted, identifying this tank as that of a 3rd Platoon commander. The white 'K' on the right of the rear hull plate is that of *Panzergruppe Kleist*, a temporary grouping of five Panzer divisions under Army Group South during the invasion of Russia. The official insignia of 11.Panzer-Division, a circle with a vertical central bar all in yellow, does not seem to be carried; instead, on hull sides and rear, we see the white 'unofficial' emblem from which the 'Ghost Division' took its nickname. Both divisional signs were often carried on the same tank. An air recognition flag is draped over the rear deck stowage.

C2: PZKPFW IV AUSF. F, PANZER-REGIMENT 31, 5.PANZER-DIVISION; CENTRAL RUSSIA, WINTER 1941–1942

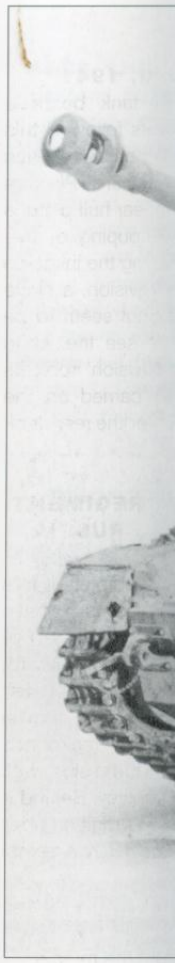
The tanks of this regiment received partial or complete coats of whitewash snow camouflage; if partial, it seems to have been popular to leave the dark grey exposed in a pattern of narrow streaks, basically vertical in arrangement, to blend with a forest background. The divisional sign is a yellow X, left visible on an exposed square of the dark grey paint on the front hull plate outside the driver's visor. The regiment's famous red devil insignia is carried large on the turret side, well forward, likewise on a panel of uncamouflaged grey. Behind it the turret side port is also left in grey, and a three-digit number is painted on the upper part of this in red. Note heavy external stowage.

D: PZKPFW IV AUSF. H

This is a representative of the type found from the middle years of the war onwards, the 'H' was first produced in 1943. Camouflage varied greatly as it was applied in the field and there were no strict rules. This cutaway is portrayed in camouflage markings for summer operations in France 1944 (D-Day Defence).

E1: PZKPFW IV AUSF. H, SS-PANZER-REGIMENT 12, 12.SS-PANZER-DIVISION 'HITLERJUGEND'; NORMANDY, 1944

A tank of the division which bore the brunt of the early fighting on the invasion front, this Ausf. H is finished in the overall dark yellow factory scheme ordered from February 1943, with *zimmerit* patterned plaster undercoating the vertical surfaces to repel magnetic and adhesive explosive charges. The tank has been camouflaged at unit level with the olive green and red-brown secondary colours, issued as pastes and diluted according to circumstances. The roughly hand-painted number on the turret girdle plates identifies this as the 5th tank of 3rd Platoon, 6th Company, II Abteilung. The buffer fluid designation is painted on both sides of the gun. Note that the camouflage painting extends over the track links fixed to the hull front. The commander wears black leather clothing and an odd grey cloth-and-fleece winter cap, apparently an individual whim, with the SS eagle on the front.



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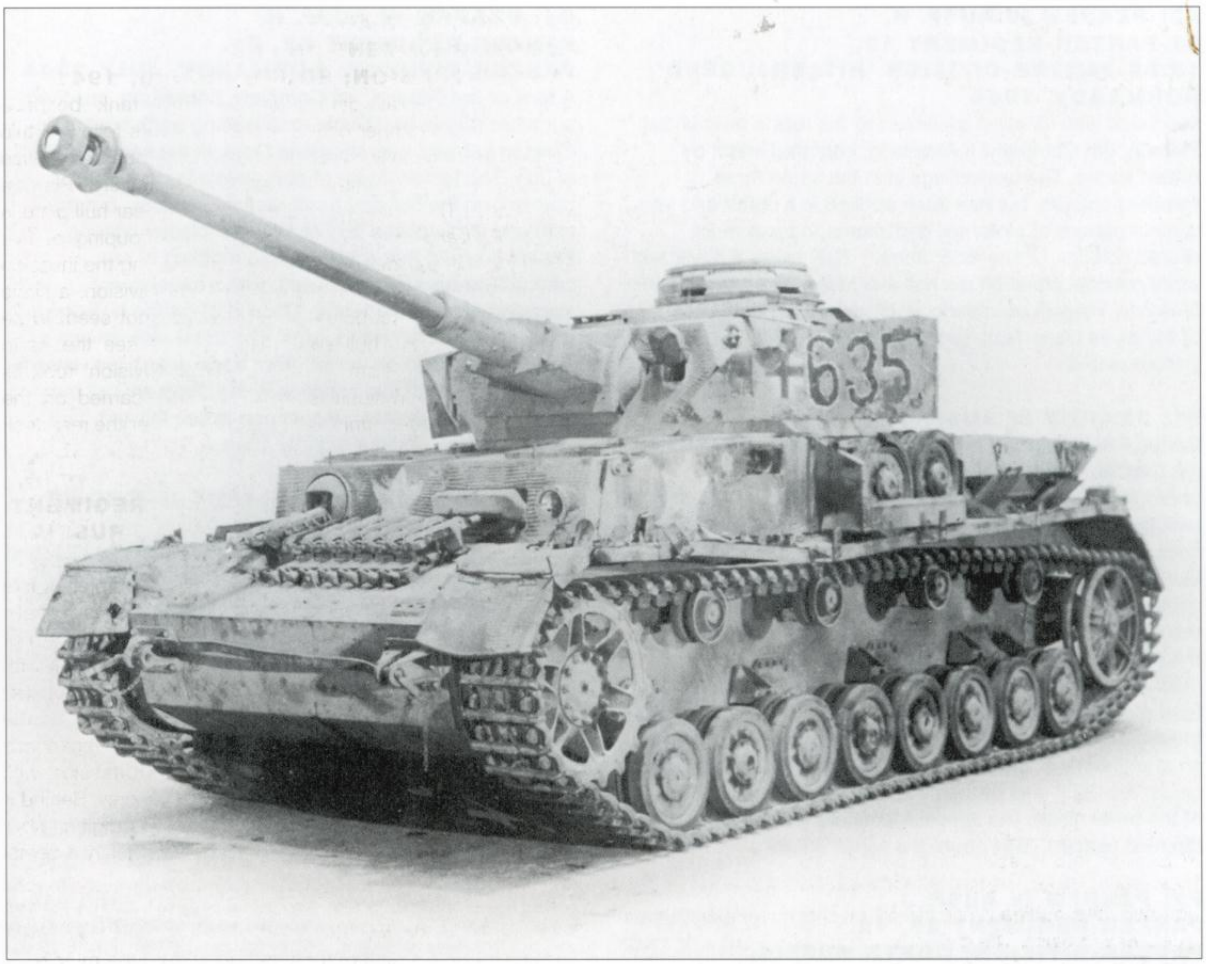

Front and rear three-quarter views of a battered Ausf. H captured more or less intact in Normandy by British forces. The accident that this tank bore non-symmetrical hand-painted turret numbers and a fluid designation on the gun allows certain identification as the subject of colour plate E1. This tank of II Abteilung, SS-Panzer-Regiment 12 'Hitlerjugend' was photographed from both sides while still under its original management; it is rare to find such complete 'before and after' reference material. Note that under the crude Allied star the number '635' is repeated on the rear of the turret girdle. (RAC Tank Museum)

E2: PZKPFW IV AUSF. H, SS-PANZER-REGIMENT 12, 12.SS-PANZER-DIVISION 'HITLERJUGEND'; NORMANDY, 1944

Seen here with its turret traversed to the rear, a tank of 3rd Platoon, 8th Company, II Abteilung, captured intact by British forces. The camouflage is in the same three standard colours, but has been applied in a softer and less distinct pattern of blotches, and seems to be in more diluted colours. Unlike '635' above, '837' bears a black and white national cross on the hull rear plate, and the divisional insignia of '*Hitlerjugend*' high in the right corner of the same plate. Note toothed rail for mounting skirt armour plates.

F1: PZKPFW IV AUSF. J, PANZER-REGIMENT 3, 2.PANZER-DIVISION; FRANCE, EARLY 1944

Photographed in Picardy in the early months of 1944, this tank is in a dense, dark-toned camouflage of the standard colours, applied in short, mainly diagonal streaks and blotches. The turret number '823' is neatly stencilled on the girdle plates in broken white outline; unusually, the manufacturer's serial number is also displayed, in white at the left top corner of the hull front plate outside the machine gun mounting it is '89272'. At the right end of the front plate is the divisional insignia used from 1943, a white trident; again, it was unusual to see divisional signs marked so prominently at this late date. There is no visible national cross; the '823' was probably painted centrally on the rear of the turret girdle. (An almost identically finished tank of the next platoon, '834', bore the serial '89589'.)

F2: PZKPFW IV AUSF. J, PANZER-REGIMENT 29, 12. PANZER-DIVISION; NORTH RUSSIA, EARLY 1944

This division distinguished itself in the fighting before Leningrad in February 1944. The tank has an overall coat of whitewash snow camouflage over its dark yellow factory scheme; the rough square of dark green left exposed as backing for the divisional sign, at the lower front corner of the turret girdle plate, suggests that it was in multi-colour temperate zone camouflage before being whitewashed. The national cross and divisional sign are the only visible insignia. Here, the crew are labouring to repair a broken track, having removed the skirt plates, holed by the projectile which did the damage.

G1: PZKPFW IV AUSF. H, PANZER-REGIMENT 22, 21. PANZER-DIVISION; NORMANDY, JULY 1944

A tank of 3rd Platoon, 1st Company, I Abteilung, knocked out while dug-in beside the road leading north-east from Caen to Lebisey, near the River Orne, in the second week of July. The factory finish of dark yellow is applied over *zimmerit* on the hull and turret vertical surfaces, but the skirt and girdle plates do not have the plaster coating. Photos suggest that a soft, sparse mottling of one camouflage colour was applied, with a subsequent streaking of pale dried mud. Once in its pit the hull-down tank was scattered with foliage. The detail view shows a marking observed on the left front track-guard (as viewed) of another tank of this battalion in the same area at the same date; it was most uncommon to see this old '2nd Tank Company' tactical sign by 1944.

G2: PZKPFW IV AUSF. J, UNIT UNKNOWN; UKRAINE, 1943

Despite the complete absence of visible markings, this vivid tiger-stripe camouflage scheme of red-brown over factory dark yellow makes a most attractive subject.

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