2020

T-34 in action

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ARMOR NO. 20

T-34
in action

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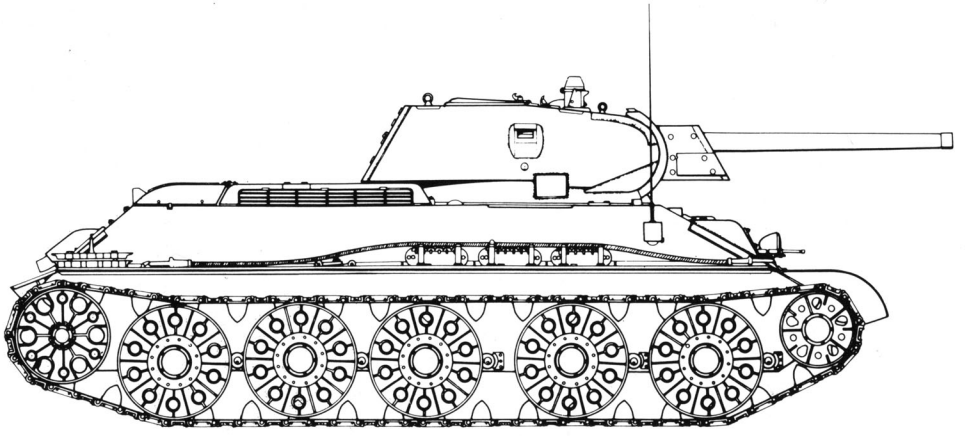

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(Cover) L2-IS, "Dzherzhinski", runs across the open steppes of the South Western Front in the spring of 1942. It is a T-34 Model 1941/42 (STZ).

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Dedicated to the IPMS-NENY Gang

(Right) A column of T-34-85s march into Germany in May 1945. This vehicle is a factory rebuild with an old T-34 Model 43 hull with rounded front fillet. The turret is of the angle-jointed style with the distinct upturn in the forward casting seam. (Sovfoto)

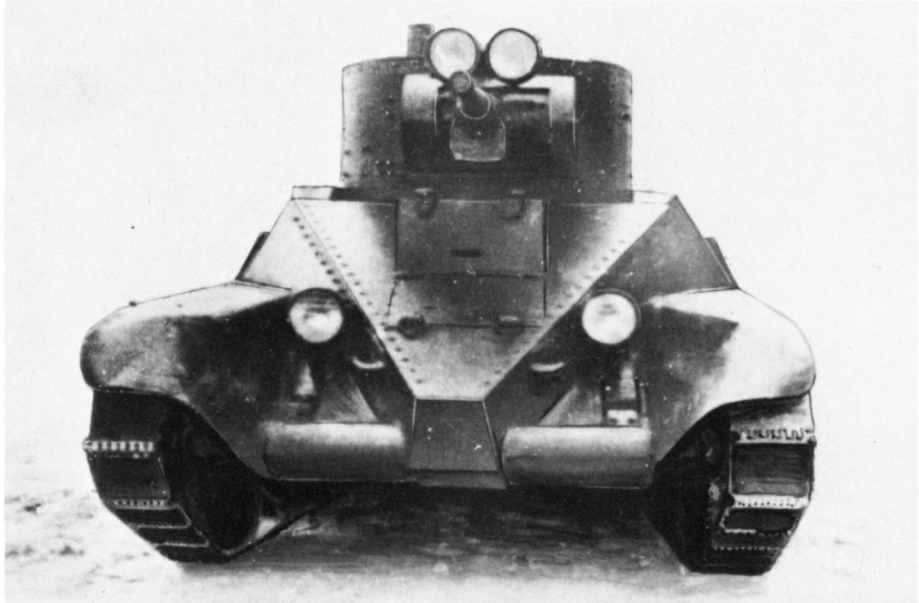
Introduction

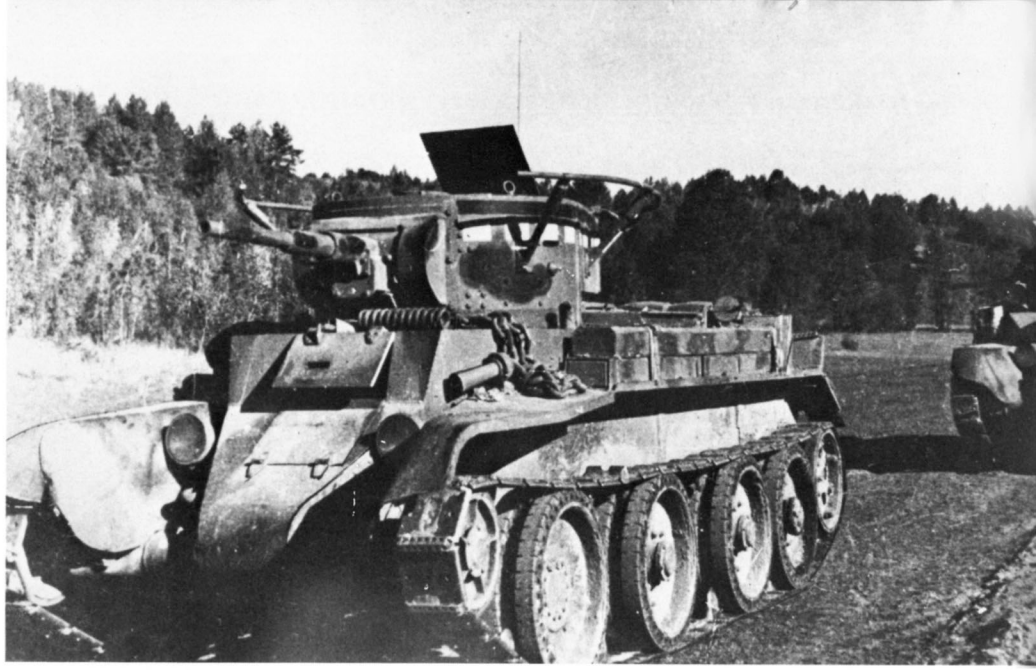
The T-34 was the single most effective tank design of the Second World War. It was produced in larger numbers than any other tank and few subsequent tank designs escaped its revolutionary influences. When it originally entered combat in the summer of 1941, it was markedly superior to any tank in the German arsenal. The Wehrmacht was able to eventually counter the T-34 with heavier tanks like the Panther, Tiger and Royal Tiger, but the introduction of the improved T-34-85 and the new IS-2 restored Soviet superiority. The Wehrmacht paid for the technical ingenuity of the Panthers and Tigers by their enormous cost, complexity and frequent unreliability. The smaller and more robust T-34 could be produced in quantities, two or three times greater than its German adversaries and, in the end, emaciated German tank regiments were routed by an overwhelming wave of Soviet tank brigades.

The T-34 was the progeny of the BT family of 'fast tanks'. The BT, popularly called the *Betushka* in the Red Army (*RKKA*), was a direct development of American Christie tanks purchased by the Soviet government in the early 1930s. Nearly 5,000 tanks of the improved BT-2 and BT-5 type were produced at the Kharkov Locomotive Factory *Nr. 183 im. Komintern (KhPZ)* up to 1936 when the modernized BT-7 was introduced. This model, in conjuntion with its later variants, the BT-7M and BT-8 brought the total production of the *Betushka* to over 7,000 vehicles. The BT series was the principal type of tank employed in the mechanized and cavalry divisions, and corps of the *RKKA,* while its even more numerous counterpart, the T-26, was used in infantry divisions in the direct support role.

The BT served as the basis for a number of experimental variants. In 1935-36, design teams under M. Tarshinov and N. Cygankov at *KhPZ* developed the BT-IS and the BT-SV-2, which provided the BT with ballistically improved hull and turret shapes. By angling the hull and turret armor, it was possible to increase effective armor protection without having to resort to heavier and thicker armor plate. In 1933, the engineer teams at *KhPZ* succeeded in mounting the new BD-2 diesel experimentally in the BT-5 and, in 1938-40, the production version of the engine, the V-2, was mounted in the BT-7M. In its final modernized form, the BT-7M was also called the BT-8. These experiments opened many promising new avenues of research which were more fully explored in the development of the BT's successor, the A-20.

Tarshinov's BT-IS project was the first attempt to improve the *Betushka's* armor by angling the plates. It was based on the earlier BT-5.





The BT-7-TU fast tank, like this one on maneuvers in 1937, was a derivative of the Christie tank family. This *Betushka* with the early BT-5 style turret has the common style of pre-war turret markings consisting of a serrated white band below and a red band on top. Less common is its blotchy brown camouflage over the standard Soviet olive green finish.

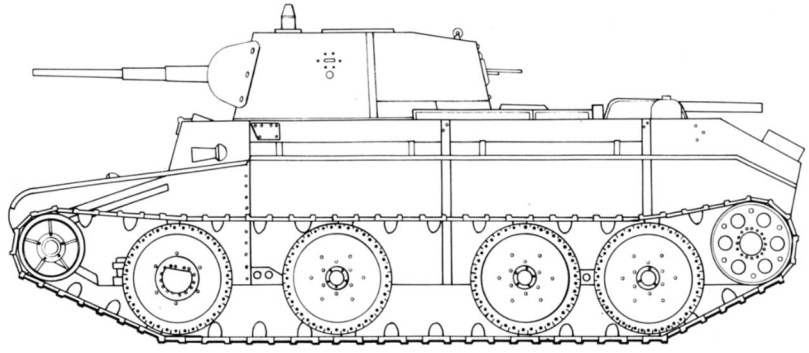
In 1936, the design bureau at *Zavod Nr. 183* in Kharkov built the sleek BT-SV-2 prototype which was the culmination of their studies on improving the ballistic qualities of the *Betushka.*

In November 1937, Mikhail I. Koshkin was appointed to head the *KhPZ* tank design bureau engaged in the A-20 studies. Koshkin had previously apprenticed at the *Zavod Nr. 185 im. S.M. Kirov* in Leningrad, having worked on the T-29-5 project and subsequently the T-111, which had earned him the Order of the Red Star. A core of talented designers were drawn into the A-20 project, including A. Morozov, who was Koshkin's assistant and in charge of powertrain development; N. Kucherenko, who was production manager; M. Tarshinov, in charge of hull and turret design; and many others. The design specifications had called for a wheeled and tracked propulsion system, 20mm armor and a 45mm gun. Neither Koshkin nor Morozov were overly enthusiastic about the Christie propulsion configuration which was designed to run on the tracks or the roadwheels themselves without tracks. They were of the opinion that such a layout needlessly complicated the design, added extra weight and was off dubious combat utility in view of the progress in track design since the early 1930s. Their feelings were echoed by A. Vietrov, the commander of the *Regimento de Carros Pesados,* a BT-5 unit of the International Tank Brigade which had seen action at Fuentes-de-Ebro during the Spanish Civil War. Vietrov presented testimony to the Defense Committee of the Council of People's Commissars (*SNK)* in May 1938 about his experiences in Spain, pointing out the inadequacy of the 15-20mm armor on the BT-5 in the face of new 37mm anti-tank guns - doubting the effectiveness of the 45mm gun should it have to face heavier tanks. He expressed reservations about the track-and-wheel mode of propulsion and was pleased to learn of the development of diesel tank engines in view of the lack of reliability of the aircraft engine used to power the BT-5. In spite of these views, Col. Gen. D.G. Pavlov, who had commanded the Soviet tank units in Spain, and was at that time head of the Directorate of the Armored Forces (*ABTU),* strongly supported the immediate accpetance of the A-20 for service use. That month, a wooden model of the A-20 was presented before the Defense Committee of the *SNK (KO pri SNK).* After having heard the testimony of the Spanish veterans, Stalin concurred with the engineers' views and, over-ruling the Defense Committee, authorized the development of a variant of the A-20 using only tracked propulsion, to be fitted with a 76mm gun and 30mm of armor. This project was initially called the A-30, soon changed to T-32.

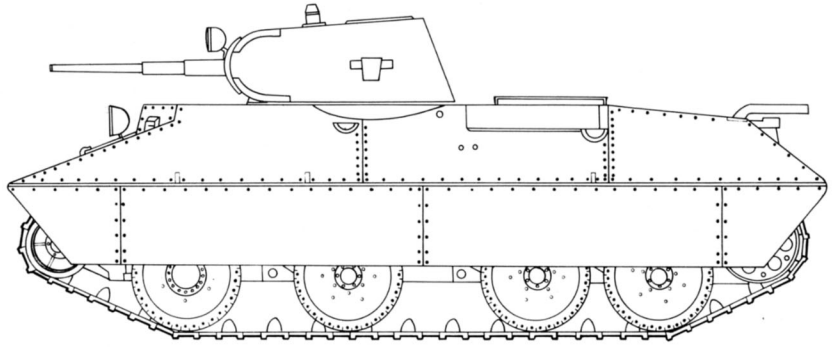
In August 1938, the designers presented their proposals to the Main Military Council (*GVS).* There they were challenged by some of the council members who felt that the existing BT-5 and T-26 had proved themselves battleworthy in Spain and questioned the need for a vehicle like the T-32 which would cost as much as three T-26s. The technical staff of the People's Defense Commissariat favored the A-20, as did the *ABTU.* Stalin's personal interest in the T-32 led the *GVS* to authorize the construction of a prototype of both the A-20 and the T-32.

The prototypes were completed at *KhPZ* in July 1939 and were sent to the Research Institute and Proving Grounds of the Armored Force outside of Moscow for trials. Both vehicles were found capable of road speeds of 65 km/hr on tracks, but the A-20 fared poorly in cross-country performance when in the wheeled mode. The engineers in charge of the tests were very complimentary about the performance of the V-2 diesel. Various improvements were suggested including the possibility of uparmoring the T-32. The vehicles remained in the Moscow area until 1 September 1939, when a display of all the new weapon prototypes was conducted for the *GVS* and high ranking officials of the *RKKA.* Still, there was no firm decision on either the A-20 or the T-32.

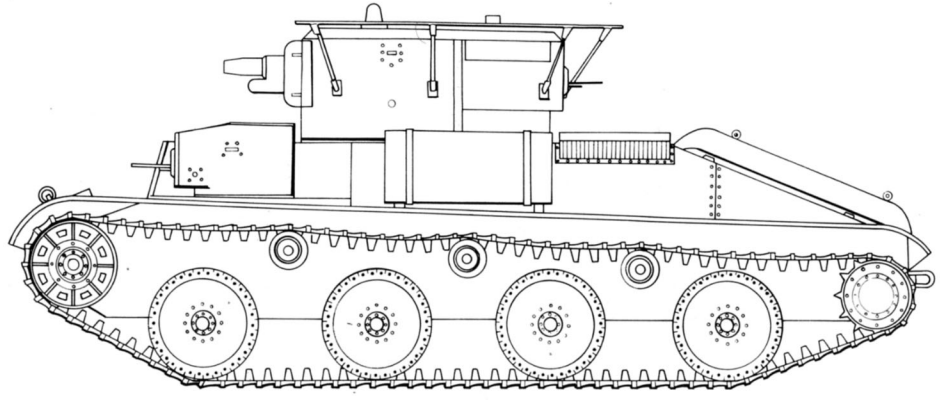
When the prototypes returned to Kharkov, Koshkin and Morozov proceeded to examine the possibility of thickening the T-32's armor. The new armor would add a further seven tons to the vehicle's weight, but would boost its armor basis to between 40 and 45mm. The armor changes would also necessitate other modifications such as wider tracks. On 19 December 1939, the *KO pri SNK* met to make final decisions on the official service acceptance of new tank designs. In the forefront of their minds were reports coming from the fighting in Finland which had noted the ease with which the armor of the T-26 and BT could be penetrated by newer small caliber anti-tank guns. The new KV heavy tank was immediately accepted for production as was the small T-40 amphibious scout tank. The *KO pri SNK* examined the uparmored T-32 proposals, authorizing the immediate production of two prototypes and changing the designation of the new version to T-34. The decision in favor of the T-32/T-34 was made even firmer when the Committee authorized the production of 220 T-34s during 1940 and instructed industry representatives to begin planning for mass production in 1941.



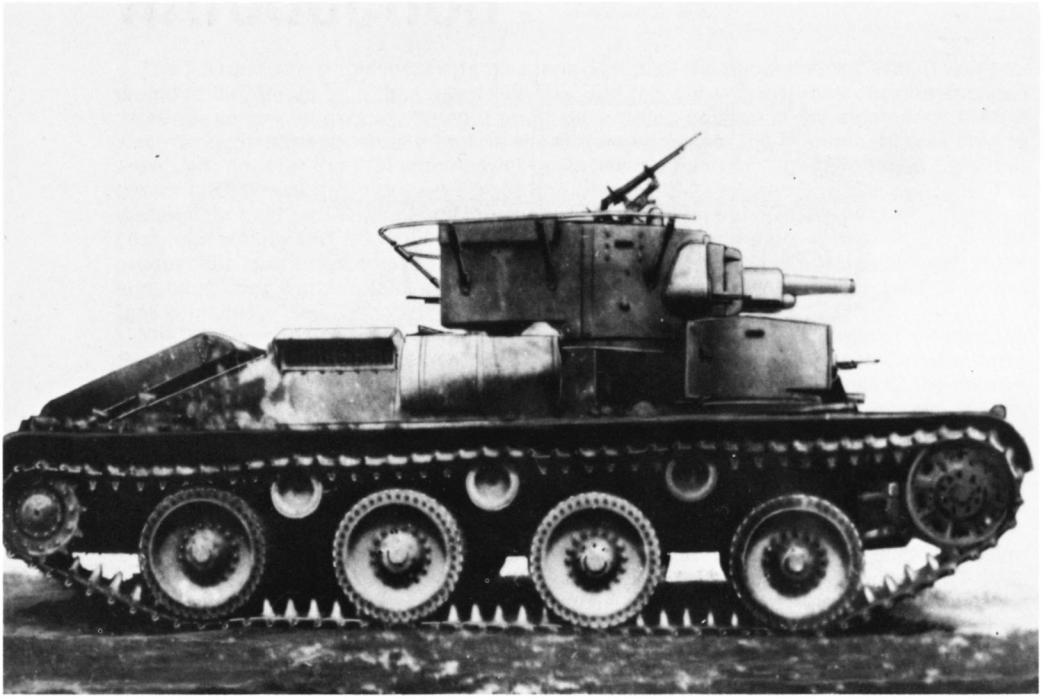
BT-8



BT-SV-2



T-29-4



At the end of February 1940, the first two *srednii tank T-34* (Medium Tank T-34) prototypes were completed. On 5 March, Koshkin led a convoy consisting of both vehicles along with some Voroshilovietz tractors from Kharkov to Moscow through a snow storm, arriving twelve days later. On 18 March, both were displayed to Stalin. One was sent to the Proving Grounds and the other to the Finnish front where it arrived too late to see action. In April and May, the prototypes were put through a grueling 2000km marathon from Kharkov to Moscow, then down to Smolensk and Kiev and finally back to Kharkov. The trials were a success but pointed up some technical shortcomings. The main problems were in the powertrain and engine cooling, and work proceeded to correct the problems.

In June, Koshkin and Maksarev, the director of *KhPZ,* were called to a session of the Central Committee of the Communist Party *(TsK VKP (b)).* The collapse of the French Army greatly worried the Soviet leadership and they changed the production quotas from 200 T-34s to 600, with 500 to come from *KhPZ* and the remaining 100 from the Stalingrad Tractor Factory *(STZ).* On his return to Kharkov, Koshkin came down with a serious case of pneumonia. The doctors were not overly optimistic and Morozov was instructed to take over the design bureau during its efforts to initiate mass production of the T-34.

The new tank presented problems since no previous mass-produced Soviet tank had carried such thick armor. The efforts of the *KhPZ* had to be coordinated with subassembly contractors, such as *Zavod Nr. 75* in Kharkov which manufactured the V-2 engine, the Kirovski Works in Leningrad which provided the L-11 gun and the Dynamo Factory in Moscow which supplied the electrical components. The Academy of the Armored Forces in Moscow was instrumental in coordinating these efforts. The process was a slow one and inevitably ran into snags. The first batch of armor plate was of poor quality and had to be replaced. Some of the members of the *KO pri SNK* were still skeptical about the need for some of the new weapons being prepared for the RKKA, in particular, the T-34. They often failed to lend their heartfelt support when it was needed.

Mikhail Koshkin who would eventually head the T-34 design team came to prominence with his design work on this T-29-5 medium tank. This vehicle mated the T-28 medium tank with a more advanced independent suspension and had wheel-and-track drive.

(Below Left) The A-20 prototype was a revolutionary advance in tank design when it first appeared in 1938. Its archaic wheel-and-track arrangement and small 45mm gun led engineers to prefer its fully tracked competitor, the T-32.

The T-32 was very similar in appearance to the A-20 and in prototype form used the older L-10 gun developed for the T-28.

T-34 1940

T-34 Model 1940
(welded turret, *KhPK* 1940 production)

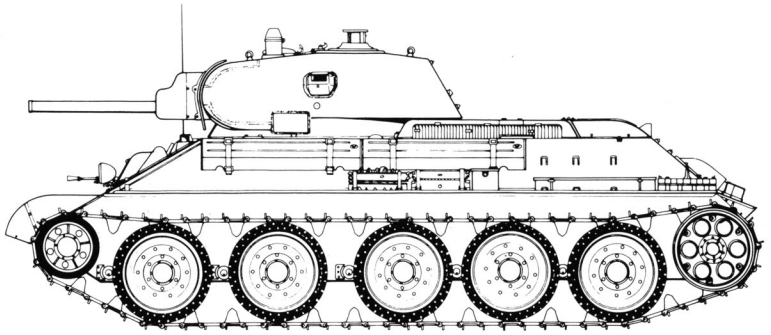
Finally, in September 1940, the first series production T-34 was rolled out of the assembly halls at *KhPZ Nr. 183.* Later that month, its designer, M.I. Koshkin, died of pneumonia. By year's end, 115 **T-34 Model 1940s** were produced, all at *KhPZ.*

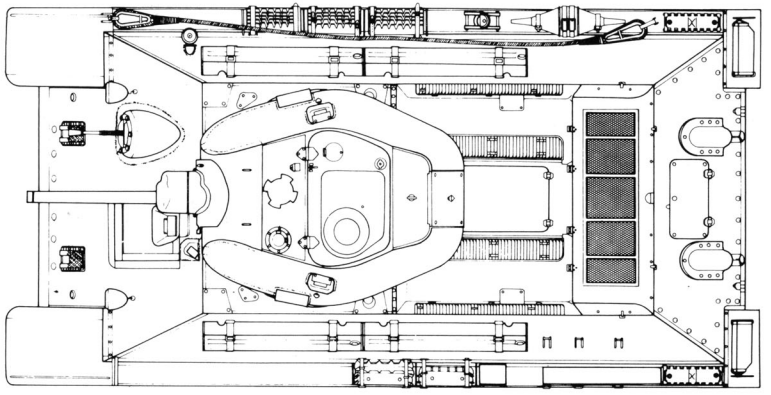
Like most new tank designs, the first T-34s had their share of teething pains. Complicating this, there were some who felt that the T-34 did not fulfill the full needs of the *RKKA* and that it should be supplemented with an infantry tank, the so-called *Soprovozhdieniya Piekhoty (SP),* just as the BT had been used in conjunction with the T-26. The Troyanov-Bushniev T-50 light tank project at *Zavod Nr. 174* in Leningrad was seen to fit these needs. The whole matter was raised before a session of the *GVS* and a thorough reworking and redesign of the T-34 was urged. Not only did its detractors urge adoption of a still experimental planetary gearbox, but a new suspension, hull, turret and gun as well. Some went so far as to urge that T-34 production be halted altogether and BT-8 production reinstituted until the redesigned **T-34M** could be manufactured.

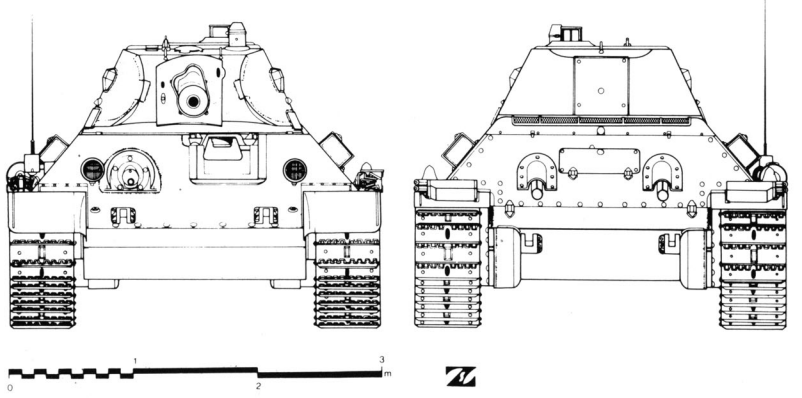
Fortunately, Maksarev, with the support of the People's Commissariat for Intermediate Machine Industries, interjected a measure of reason into the arguments and suggested that the T-34 with the necessarry improvements be left in production until the T-34M project neared completion. The 5 May 1941 meeting of the *SNK* concurred and authorized the production of a further 2800 T-34s in 1941 along with prototypes for the T-34M. As it turned out, the outbreak of the war forced the abandonment of the T-34M project, though many of its features were adopted in subsequent models of the T-34.

Aside from the mechanical bugs that plagued the Morozov team, the L-11 gun of the T-34 Model 1940 did not live up to design specifications. In 1939, P. Muraviev of the V. Grabin design bureau at *Zavod Nr. 92* in Gorki developed the excellent F-34 76.2mm gun to fit into the T-34 and trials were very successful. Both *Zavod Nr. 92* and the *KhPZ* had tooled up to begin supplementing the *Zavod Nr. 185* L-11 guns with the F-34 but, according to Grabin's memoirs, none of the relevant bureaucrats would take the responsibility for authorizing the new gun. Grabin and Maksarev decided to proceed anyway. Official sanction to do so did not come until after the outbreak of the war, when Soviet tanker's sent letters of praise for the F-34. In the meantime, the F-34 armed **T-34 Model 1941s** were produced alongside nearly identical T-34 Model 1940s with the L-11. The F-34 armed T-34s were initially used as platoon and company commander's vehicles. The first of these was finished in February 1941 at *KhPZ Nr. 183.* By late summer, the F-34 had totally replaced the L-11.

In the spring of 1941, V. Buslov and V. Nitsenko developed an uparmored cast turret for the T-34 which brought the armor basis up to 52mm. This entered production in June 1941 alongside the standard welded turret. While early runs of the T-34 Model 1940 with the cast turret had an integral side vision port, on later batches this was a welded addition as on the welded turrets. On the T-34 Model 1941, the commander's periscope in the roof hatch was omitted. The Stalingrad Tractor Works *(STZ)* produced its first T-34 in 1941. These were basically similar to those from *KhPZ* but there were a few minor detail differences. In 1942, the welded turrets produced at *STZ* were simplified by using a single flat plate at the rear and the hull plates were interlocked before welding due to different styles of jig assemblies between *STZ* and *KhPZ.* The cast turret produced at *STZ* was different in detail, but not shape, from the type produced at *KhPZ.* By the outbreak of the war, *KhPZ* and *STZ* succeeded in manufacturing 1225 T-34 Model 1940s and Model 1941s.

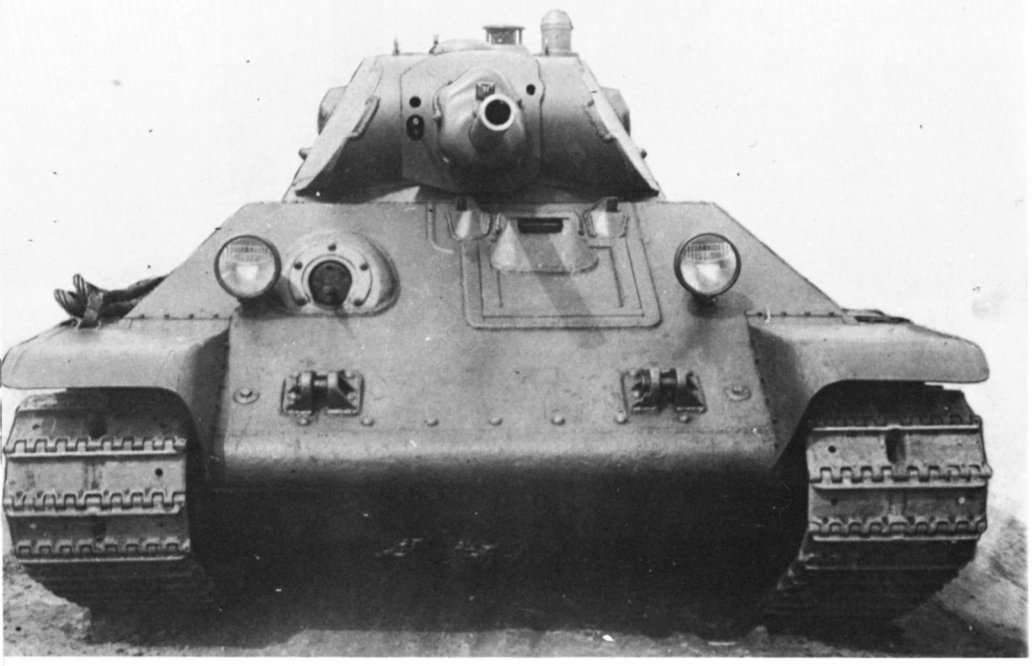




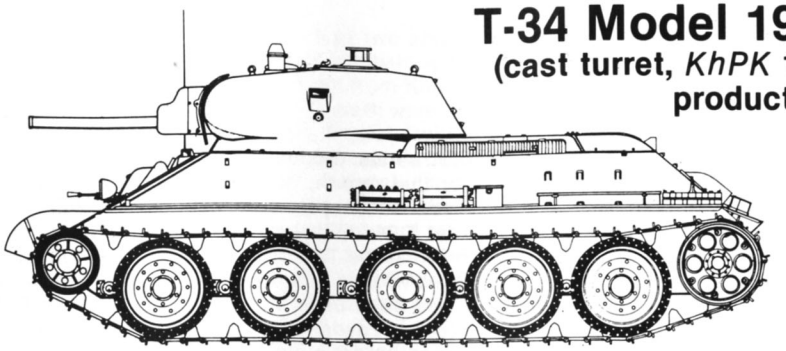


The T-34 Model 1940 in its original form was a clean and elegant design notable for its fine craftsmanship. As the war progressed, craftsmanship was sacrificed for mass-production.

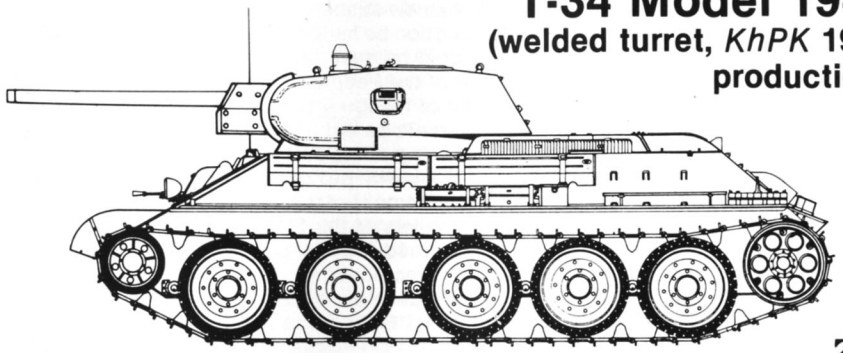
Besides having its armor well sloped, the T-34 Model 1940 had thicker armor than most medium tanks of the time. The short L-11 gun designed by Machnov was one of its main shortcomings.



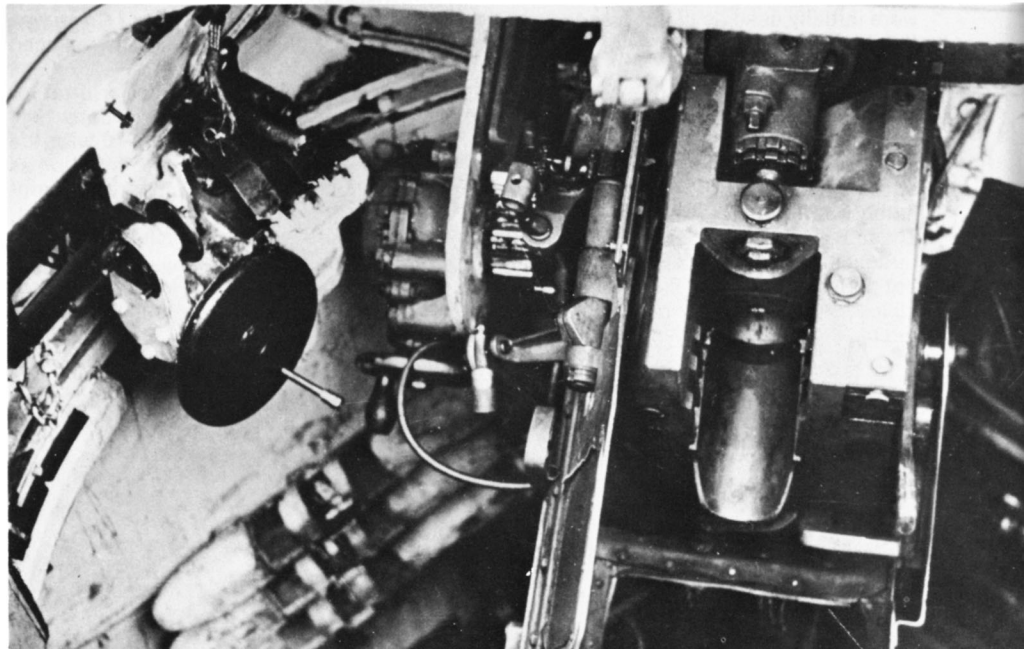
T-34 Model 1940
(cast turret, *KhPK* 1941 production)

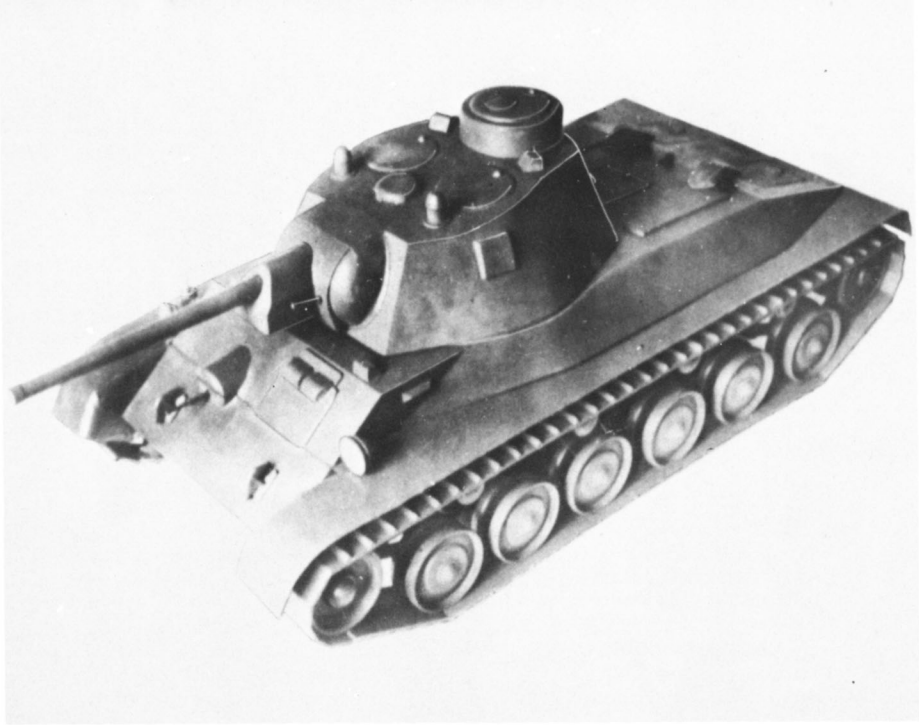


T-34 Model 1941
(welded turret, *KhPK* 1941 production)



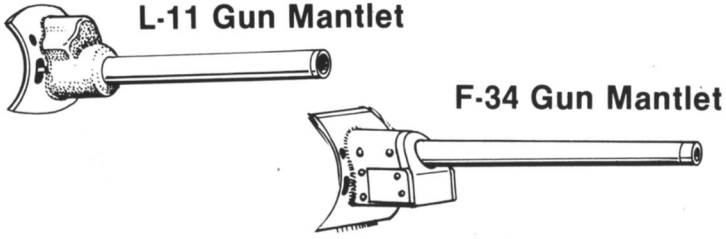
This interior view of a T-34 Model 1940 turret shows the gunner's position and the breech of the L-11 gun. Turret traverse was electrical or mechanical. Note the troughs for three ready rounds just below.





Teething problems with the T-34 led critics within the Red Army to propose withdrawing it from production entirely. They proposed replacing it with an improved form, the T-34M, shown here in model form. While the T-34M was never built, many of its features were incorporated on subsequent models of the basic T-34.

(Above Right) Other critics of the T-34 felt it should be supplemented with a smaller infantry support tank, the T-50. The T-50 however proved to be nearly as expensive to manufacture as the T-34 and inferior in performance. Very few saw service. This one was captured by the Finnish Army and is currently on display in Parola. (James Cockran)



In 1941, Nitsenko and Buslov developed a new cast turret for the T-34 Model 1940 which had thicker, 52mm armor. This particular example was knocked out by the Germans in 1941 and sent back to Krupp for tests. Many of the small fittings, such as the hull machine gun, headlight, roof periscope and view ports have been badly damaged. On the early cast turret like this one, the large bulging side view ports were integrally molded with the rest of the turret casting.

Several Wehrmacht soldiers inspect a disabled T-34 Model 1940 with cast turret. The boxes on the hull side are stowage panniers. Note that on these early machines, even the front idler wheel was rubber-rimmed. (Bundesarchiv)

The T-34 Enters Combat

The outbreak of the war caught the Soviet tank forces in a sorry state. The Mechanized Corps were in the process of reforming and reequipping. Many of the older BTs and T-26s were completely worn out and there was little chance to repair or rebuild them. Small dribbles of the new T-34s and KVs were arriving, but transition to them was complicated and slow. The new tank divisions were each supposed to be equipped with 210 T-34s but, on 22 June 1941 when the Germans invaded, there were only 967 T-34s in all of the western military districts and only a few of them had trained crews. Of the 160 tanks of Maj. Gen. N. Fieklenko's 19th Mechanized Corps, only two were T-34s. Most other units were in similar straits but a few were better off. Maj. Gen. D. Riabyshev's 8th Mechanized Corps in Lvov had 600 tanks including 170 KVs and T-34s; Maj. Gen. I.I. Karpezo's 15th Mechanized Corps had 133 T-34s and KVs. Soon after the invasion, these units were engaged in furious combat around Brody and Dubno in what proved to be the greatest single tank clash of the opening phase of the war. By 30 July, the Soviet units had been decimated, but had dealt opposing Wehrmacht tank units severe losses. Many of the Soviet losses came when older BTs and T-26s had to be abandoned for lack of parts and fuel.

The Wehrmacht encountered small numbers of T-34s all along the front during the first few weeks of the campaign. Much to the chagrin of the infantry, who were still equipped with the 37mm PAK, light anti-tank rounds pinged harmlessly off the thickly armored side of the T-34. The new 50mm PAK 38 had assured penetration of the T-34's armor only when firing from within 100 meters against the thinner side armor. Only the 88mm FLAK could effectively deal with this new threat. The Panzerwaffe had for the first time encountered a tank distinctly superior to its own, which led to a desperate scramble to uparmor and upgun its tanks.

As startling as the performance of the T-34 proved to be to German field commanders in the summer of 1941, it was in the hard, cold fall and winter that it really made its impression. Many of the new tank brigades being formed for the defense of Moscow had at least a few platoons of the new T-34. Among these was the 4th Tank Brigade of Col. M. Katukov which had 22 T-34s among its 60 tanks. The Brigade fought the German 4th Panzer Division in the Orel region south of Moscow and inflicted heavy losses while suffering only minimally themselves. While the panzers proved balky and unreliable due to the frigid weather and the alternating cycles of mud, slush, ice and snow, the German tank crews looked on in grim astonishment at the ease with which the T-34s maneuvered over snow and mud in the worst of weather conditions. Guderian wrote in his memoirs that it was only after the encounters outside Mtsensk on 6 October 1941, when a company from the 4th Tank Brigade mauled one of his units, that the 'vast superiority' of the T-34 became clearly apparent. But there were too few T-34s to have a decisive impact and through the winter months there would be even less as the factories were forced eastward.

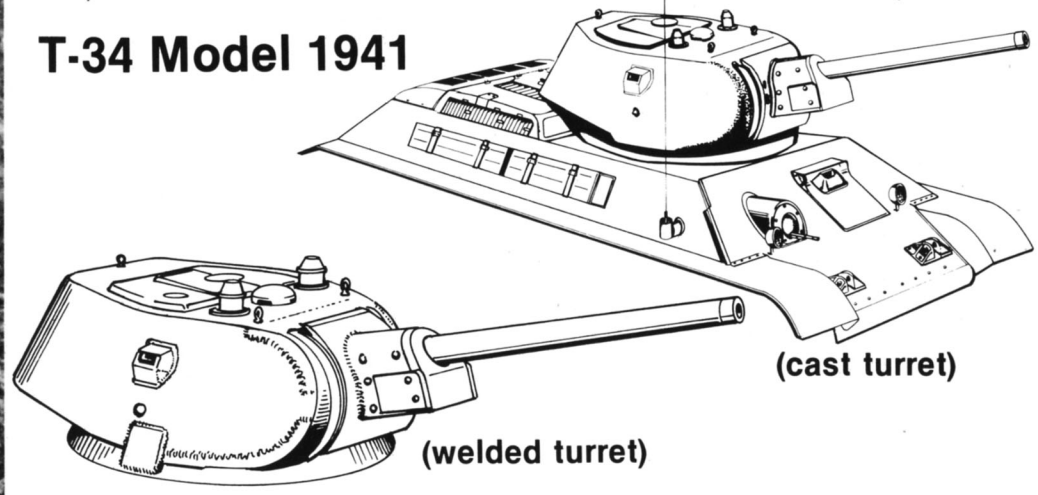
(Above Right) The first combat action of the T-34 came in the battles at Brody and Dubno in the first week of the war. These vehicles, a T-34 Model 1940 in the foreground and an F-34 armed Model 1941 behind, were trapped in a peat bog and had to be abandoned. (National Archives)

The new T-34 Model 1941 was far more popular with the troops than the Model 1940 because of the better performance of its gun. This vehicle is a platoon leader's vehicle with a 71-TK-3 radio. It is lacking the panniers on the hull side and has an unditching beam in their place. The slogan on the turret rear, *Za Rodinu!*, means "For the Motherland". Note that the vehicle has two PT-4-7 periscopes on the turret roof. This photo was supposedly taken in May 1942. (Sovfoto)

This is a stock shot of a freshly manufactured T-34 Model 1941 (cast turret, commander's vehicle) with full stowage and fittings. It is unusual in that it is fitted with the later style waffle pattern track.

(Above Left) The new T-34 Model 1941 was manufactured with either a cast or welded turret. As on the Model 1940, the cast turret was 52mm thick. This is one of the earliest cast turreted Model 1941s produced, which was knocked out in the opening days of Barbarossa. It still has the panniers fitted. (National Archives)

T-34 Model 1941



This cast turreted T-34 Model 1941 was abandoned in an enormous water-filled crater. It is fitted with two PT-4-7 periscopes, the slotted grill work on the engine deck air intakes was peculiar to the Model 40 and 41. (National Archives)

The Battle of the Factories

In the fall of 1941, the new *GKO* (National Defense Committee) headed by Stalin was faced with painful decisions that would affect the outcome of the war as surely as any major battle. The advance of the Wehrmacht into industrialized Russia threatened to cut off the supply of critical war materiel. Even before the war, Soviet industrial production was less than Germany's and the losses in 1941 nearly delivered a fatal blow. The decision had to be made whether to keep some of the tank factories in the threatened areas operating, thus benefit in the short run from a continued flow of tanks, or to wrench the factories from their centers of supply and relocate them thousands of kilometers to the east, thus ensuring tank production in the long run but strangling the supply of tanks in the critical months of the winter and spring of 1941-42. In September 1941, the *GKO* ordered the factories to the Urals. Soviet tank units would be obliged to make do with what they had, plus the output from the factory at Stalingrad, the only one not to move. In July 1941, the *Krasnoye Sormovo* Works *(Zavod Nr. 112)* in Gorki began T-34 production but it would be months before it became a substantial supplier. Its first shipments only began to trickle into Moscow in November 1941. On 15 September, *KhPZ Nr. 183,* the largest tank factory in the Soviet Union, began to be moved by rail to Nizhni Tagil, deep in the Urals. The new factory, to be called the Ural Tank Factory *im. I. Stalin* was to be built around the exisiting Ural Railcar Factory *im. Dzherzhinski,* with the equipment from *Zavod Nr. 183* and others. Most of the equipment came from *KhPZ,* but a portion of the Tank Works *im. Voroshilov (Zavod Nr. 174)* from Leningrad was moved in as were metal and foundry concerns from other areas of Russia. In the last six months of 1941, 1886 T-34s were produced from all locations.

With its workers still living in tents and the assembly halls hardly complete, the first T-34s from the reconstructed *Zavod Nr. 183* were completed on 8 December and by the month's end they were on the way to the front. By March 1942, the pre-war production level had been reached and, by the year's end, the workers could proudly boast that they had tripled the pre-war production rate.

The *Kirovski* Works was reluctantly pulled out of Leningrad only weeks before the city was surrounded. It was reassembled in Chelyabinsk around the Chelyabinsk Tractor Works *im. Stalin (ChTZ),* and soon acquired the nickname *'Tankograd'* (Tank City) in view of its size. Several other industries were added to the complex, including Diesel Motor Works Nr. 75 from Kharkov which had been the largest supplier of the T-34's V-2 engine. Assembly of T-34s began hurriedly in August 1942, in response to the loss of the *STZ* factory during the Stalingrad fighting. Production of the T-34 at Tankograd ceased in April 1944.

A portion of *Zavod Nr. 174 Voroshilov* from Leningrad was evacuated to Nizhni Tagil while the remainder was shipped to Omsk, *Zavod Nr. 174* in Omsk was to become a major subcontractor for T-34 components, but was not deeply concerned with assembly work until the advent of the T-34-85 in 1944. The Ural Heavy Machine Tool Works *(UZTM) im. Ordzhonikdze* in Sverdlovsk absorbed many other smaller machine tool factories and in May 1942 began producing hulls and other T-34 components. Later in the year, it began assembling whole T-34s and subsequently converted over to self-propelled guns.

It was primarily the output of *STZ* that prevented the production of the T-34 from totally drying up in the trying winter months of 1941-42. The assembly halls in Stalingrad depended heavily on several dozen small contractors for various sub-assemblies, but many of these factories were in the process of moving eastwards or had already been overrun. Fortunately, several large Stalingrad firms remained and continued to supply *STZ.* The Red October plant provided armor plate, the Stalingrad Shipyard fabricated the turret and hull and the *Barrikady* factory initiated production of the F-34 gun. Shortages soon became felt. By October, rubber was in short supply and new wheels had to be designed for the T-34 without a rubber rim. Other assemblies, such as the gun, engine and internal layout had to be simplified to cut down on time and material. By the fall of 1942, *STZ* had produced about 3600 T-34s which amounted to about 40% of the total output of the T-34 to that time. Soon, as the Wehrmacht continued its assault on the city, the assembly halls of *STZ* would become a battleground. But, by then, the other factories had had time to plant their roots in the Urals and a flood of T-34s would soon be coming to the front.

While a new Model 1942 was being developed in the Urals, STZ staff proceeded along in its own course. The weakest point on the welded turret had been found to be the lower chin of the turret front. To reinforce this and at the same time to simplify production, the lower corner was simply cut off and a single flat plate of thicker armor welded in its place.

The T-34 Model 1941s produced at *STZ* with welded turrets had simplified turret rears with a flat rear plate like the one seen here from the South West Front in April 1942. The large circular object on the hull side is an extra brake lining for the transmission. This vehicle was named *Ordzhonikdze* after the Soviet leader and has the script *L2-IS* on the rear access panel. (Sovfoto)

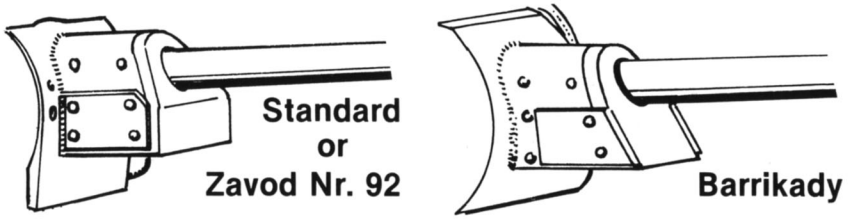
This *STZ*-manufactured T-34 Model 1941 has just captured a German Citroen-Kegresse halftrack. The T-34 is fitted with the all steel roadwheels and is using the special, wide 550mm track for improved handling on soft ground and snow. (Sovfoto)

This *STZ*-manufactured T-34 Model 1941 was captured by the Finnish Army and put back into action with the *Rask. Ps. K./Ps. Pr.* (Heavy Tank Company, Finnish Tank Brigade). The T-34 was popularly called the *Sotka* in Finnish service. A black *hakaristi* with white outline was used as the national insignia during the war. (Klaus Niska)

This was one of the last production batches assembled at *STZ* before it was caught up in the fighting. The vehicles in the background are all T-34 Model 41/42s with the revised welded turret, while the vehicle nearest the camera is a cast turret model. The vehicles to the side are STZ-5 artillery tractors. This photo was taken in August 1942. (Sovfoto)

In 1942, an improved welded turret was developed at *STZ* with a cutaway chin and thicker armor and was used on the Model 41/42 (a hybrid vehicle produced at *STZ* including some simplified features later adopted for the Model 42). As can be seen on this vehicle, the new driver's hatch has two flap-covered visors, the new hammerhead tow shackle is fitted, there is a new wire grill on the air intake along the edge of the engine deck and the pointed gun housing peculiar to *STZ*-manufactured vehicles is fitted. The interlocked glacis armor of the *STZ*-assembled T-34s is also evident. This vehicle has been fitted with 10mm of added armor on the hull front and the turret slogan is *Za Stalina!* The stowage in the middle of the fender is a clump of ice cleats and spare track sections. (Bundesarchiv)

STZ T-34 1941 Model Modifications

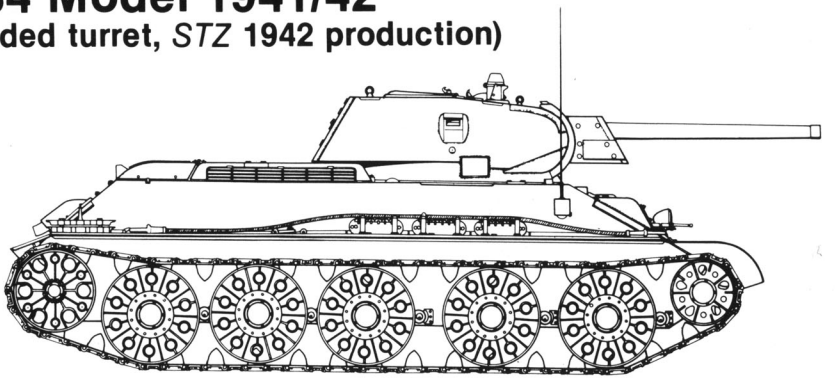


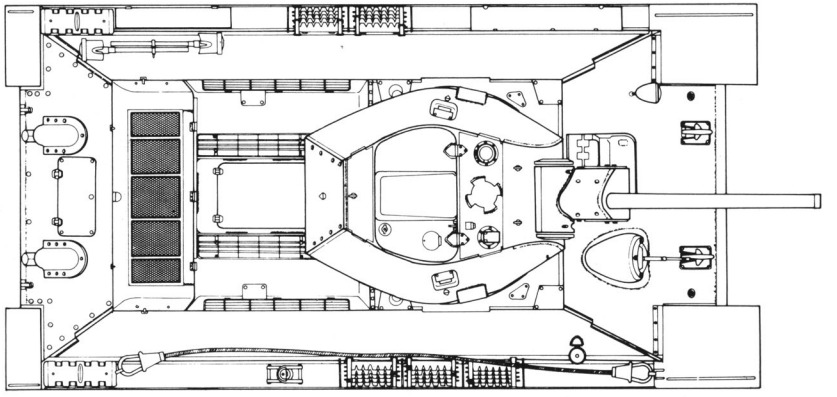
The modified F-34 gun mantlet provided by *Barrikady* came to a sharp point in contrast to the blunt nose type produced at *Zavod. Nr. 92* in Gorki. *STZ* benefitted from the modernization program initiated by Morozov's *GKB-T-34* but their production model was something of a hybrid, hence it has been referred to here as the **T-34 Model 1941/42.** This variant used many of the new features developed for the simplified Model 1942. The noticeable exception was in the rear area, where the old rounded-off hull was retained as was the rectangular access port. A modification of the *STZ* type appeared on the Volkhov Front and in Leningrad. These T-34s were fitted with added armor plate on the hull front and sometimes on the turret sides and front as well. These were *STZ*-produced machines, but the modification work was done in Leningrad at Repair *Zavod Nr. 27.* These vehicles were not the only T-34s to see action with added armor *(z ekranami).* Some photos show T-34 Model 1942s from *Krasnoye Sormovo Zavod Nr. 112* with a similar fit.

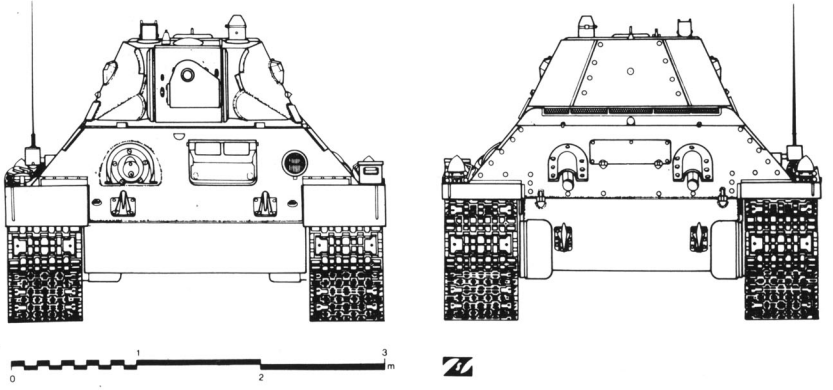
On these flatcars are two *STZ* T-34 Model 41/42s with cast turrets and one with a welded turret. They all have the wide 550mm track and all steel roadwheels. As is evident in this view, they still have the Model 41 rear features like the rectangular access port but have certain Model 42 features like the hammerhead shackle and new driver's hatch. On the nearest vehicle, the white roof air identification band runs the length of the vehicle, while

One of the odder features about this T-34 Model 41 entering Viipuri in Finland in June 1944 is that it is fitted with the cupola off of a German Pz Iv. The cupola was probably fitted well to the rear of the turret behind the main hatch. (Sovfoto)

T-34 Model 1941/42
(welded turret, *STZ* 1942 production)



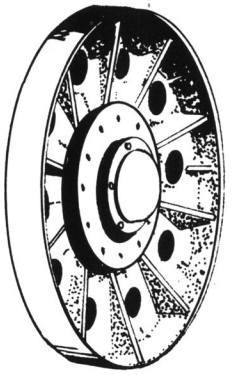


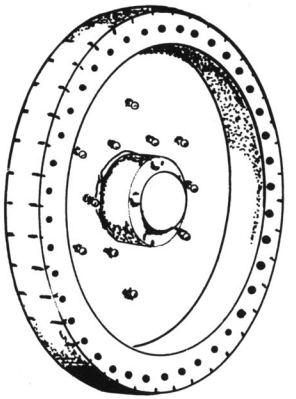


Many of the cast turret *STZ* T-34 Model 41/42s near Leningrad had added armor (*z ekranami*) fitted to the hull and turret front. These two are going into action outside of the city with a complement of tank infantry in November 1942. (Sovfoto)

A column of *STZ* T-34 Model 41/42 cast turret (z ekranami) drive through the rain-slicked streets of Leningrad on their way to the front on 21 January 1944. The front armor was added by Repair *Zavod Nr. 27* from scrap plate and was probably 20mm thick. (Sovfoto)

All-Steel Road Wheel

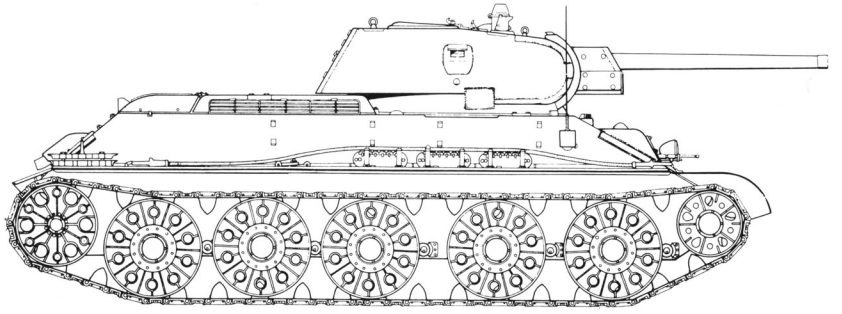




Early Rubber-rimmed Road Wheel

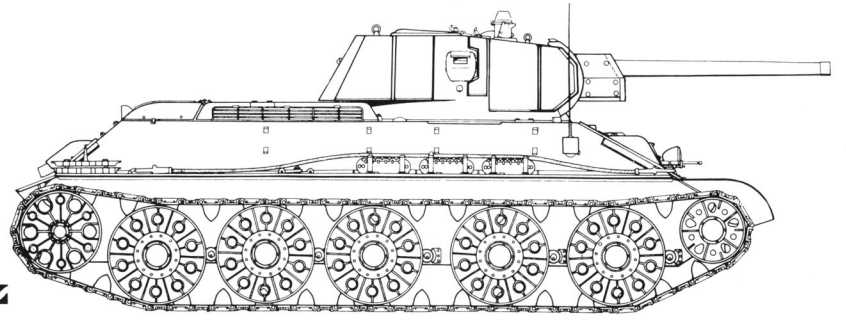
T-34 Model 1941

(welded turret, *STZ* October 1941 production)



T-34 Model 1941/42

(cast turret, *STZ* 1942 production, *Zavod Nr. 27* version)



T-34 Model 1942

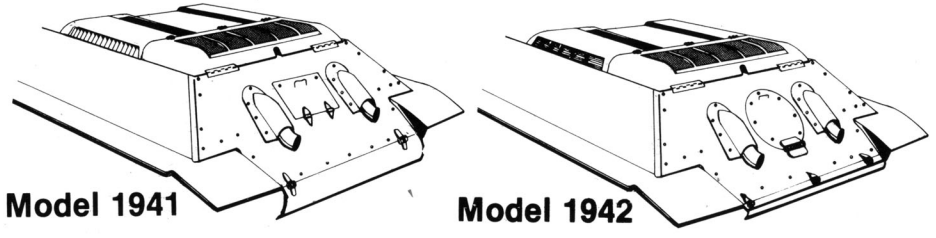
The T-34 Main Design Bureau *(GBK-T-34)* at *Zavod Nr. 183* in Nizhni Tagil, headed by Morozov, was determined to simplify the T-34 as much as possible without hurting performance so as to speed up production and keep down labor and material costs. The early T-34s like those produced at *KhPZ* in 1940 and 1941 had been beautifully crafted machines with excellent exterior finish comparable or superior to those in Western Europe or America. The new T-34s had a much rougher finish, though at no point did the finish on critical working parts or assemblies suffer. Besides outright simplification, several technical innovations were introduced which speeded production. Prof. E. Paton developed the *ASS* automatic welding system used on hull construction and other engineers developed a method of using high frequency electrical currents for hardening metal components in place of the traditional and time consuming heat-treatment methods.

Subassemblies were carefully examined and redundant parts omitted or integrated into other pieces. For example, the F-34 Model 1941 gun had 861 parts, while the Model 1942 had only 614. By the end of 1942, production time had been cut in half. The cost per vehicle in terms of manpower and metal had fallen from 269,500 rubles in 1941 to 193,000 in 1942 and finally to 135,000 in 1943. All of this had been accomplished in spite of the fact that much of the skilled manpower in the plants had been stripped away to serve in the Army, and the plants' workers were now 50% women, 15% underage boys and 15% invalids and old men.

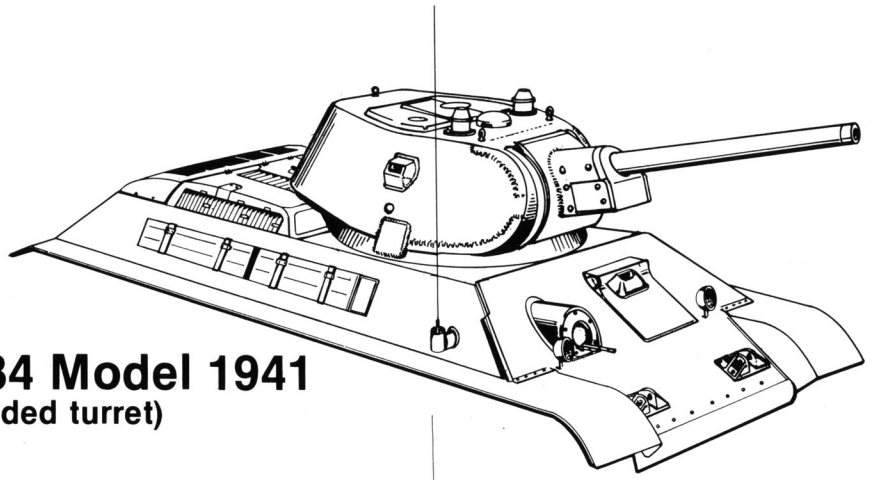
The result of all these efforts was the **T-34 Model 1942.** This type can be distinguished from the earlier models in a number of details. The appearance of the hull front was altered by a new driver's hatch with two flap-covered periscopes and by the gradual adoption of welding to attach the fillet which joined the glacis plate to the lower bow plate. On late production machines, a mantlet was fitted over the hull machine gun. The eight attachment lugs were omitted from the hull side since it was no longer the practice to fit the four BT-type stowage panniers to the hull side. A single *zip* (stowage box) was fitted to the left fender at the front. It contained brushes for cleaning the gun barrel and other tools. New tow shackles with a hammerhead-shape were bolted on at front and rear, and eventually on the later production batches, hand holds were added for tank infantry. The small rectangular access port on the upper rear plate gave way to a circular access port. The vertical grills on the air intake along the upper lip of the hull side were replaced with a simpler wire guard. At the rear, the rounded fillet that had joined the upper and lower hull plates was omitted entirely, giving the rear a pointed appearance. The T-34 Model 1942 appeared with both the welded and cast turret, though the new, thicker 60mm cast turret types eventually predominated.

The T-34 Model 1942 differed in detail from factory to factory. Those produced at *Krasnoye Sormovo Zavod Nr. 112* are the most distinctive due to the extensive use of hand holds on the front plate, hull sides, hull rear and engine deck, as well as the use of splash strips along the turret race, a distinctive cast turret style, the use of the new PTK periscope and the frequent fitting of fuels tanks of either square or cylindrical style. In comparison, the T-34 Model 1942s from *Zavod Nr. 183* look rather austere with their near total lack of exterior fittings. Total T-34 production 1942 was 12,553.

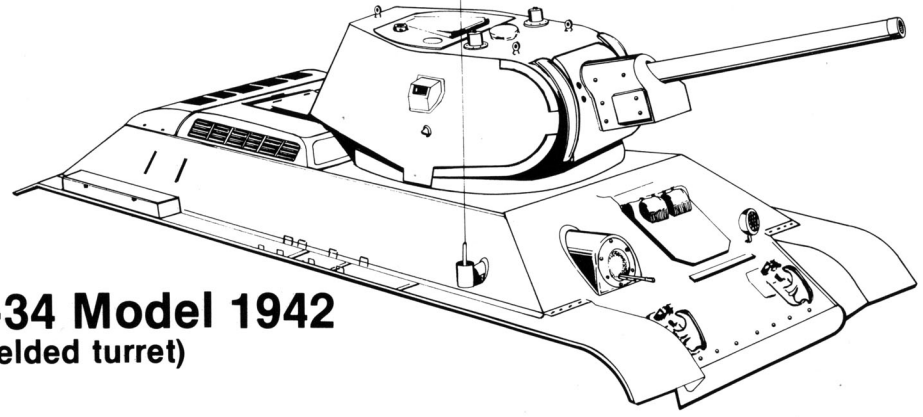
Rear End Modifications



Model 1941 Model 1942

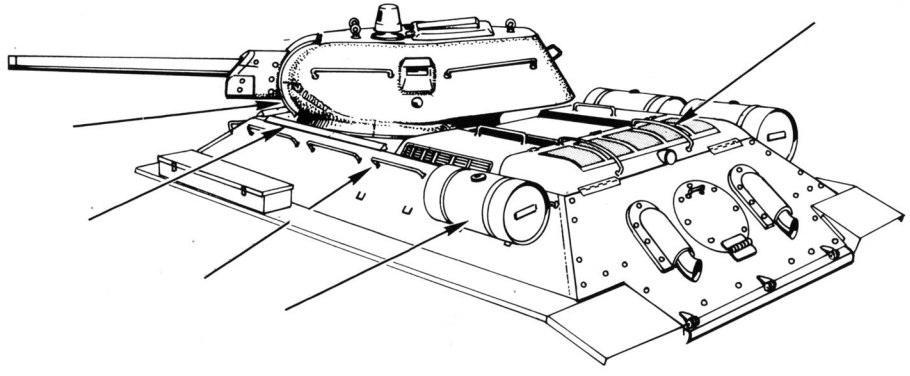


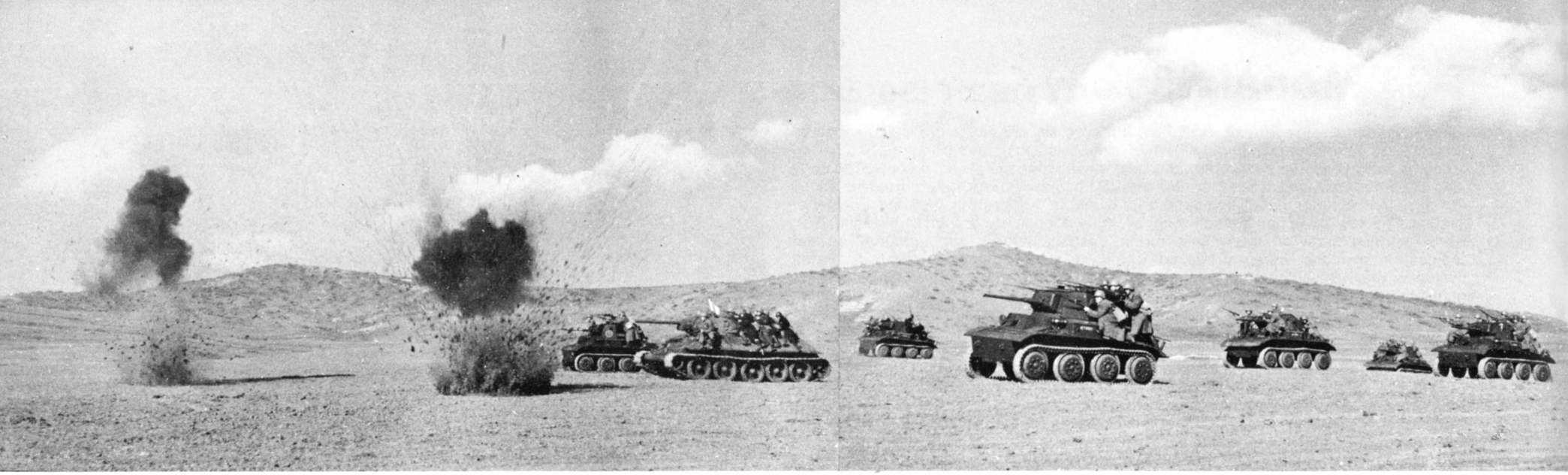
T-34 Model 1941
(welded turret)



T-34 Model 1942
(welded turret)

Krasnoye Sormovo Zavod Nr. 112 Modifications



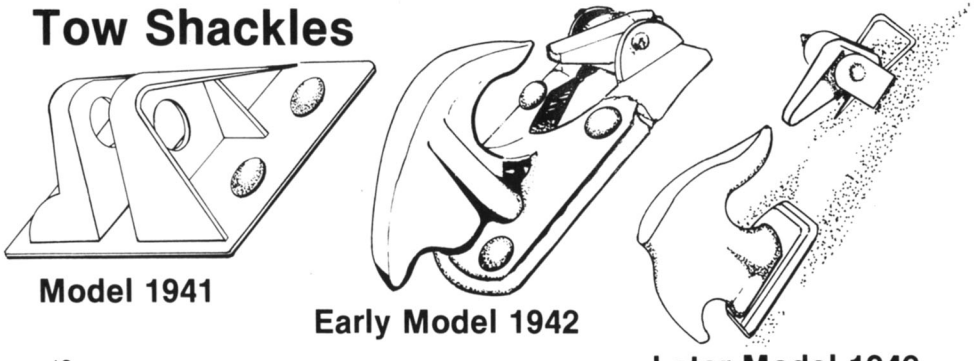


A T-34 Model 42 leads an attack of little Lend-Lease Tetrarch airborne tanks in the Caucasus in the fall of 1942. The Tetrarch was roughly comparable to the Soviet T-60, but was not particularly popular due to poor armor and balky performance. (Sovfoto)

The early T-34 Model 42 like these used the older welded turret. These vehicles are identifiable by the new driver's hatch and the hammerhead shackles. They differ from *STZ*-built Model 41/42s in the retention of the early turret. They are in operation in the Caucasus in the fall of 1942. (Sovofoto)

One of the more surprising details on this Model 42 is the fact that it is fitted with the old BT style panniers on the hull side. It is a platoon commander's vehicle and besides the radio, has two PT-4-7 periscopes. Early Model 42s like this one still had the glacis/bow fillet bolted on, though later it was welded.

Tow Shackles



Model 1941

Early Model 1942

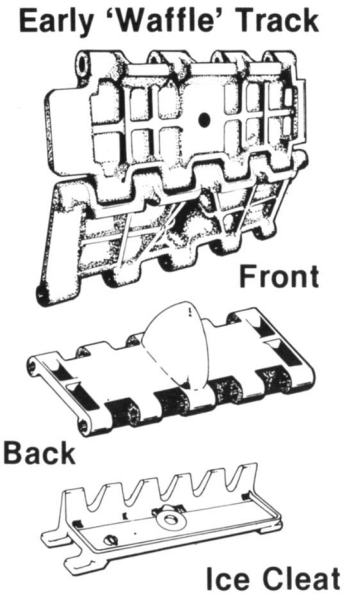
Later Model 1942

The T-34 Model 1942s produced at *Zavod Nr. 112* were different from those from other factories in many small detail fittings. It used the later PTK-5 periscope, regularly had a hull machine gun mantlet fitted, had numerous hand holds and had splash strips welded around at the base of the turret. This is a later production machine with the cylindrical fuel tanks standard in 1943.

This disabled T-34 Model 1942 from *Zavod Nr. 112* has the early box style fuel containers on the hull rear. A dedication marking beginning *Brianskaya. . .!* is barely evident in yellow paint under the numbers on the turret rear. (Bundesarchiv)

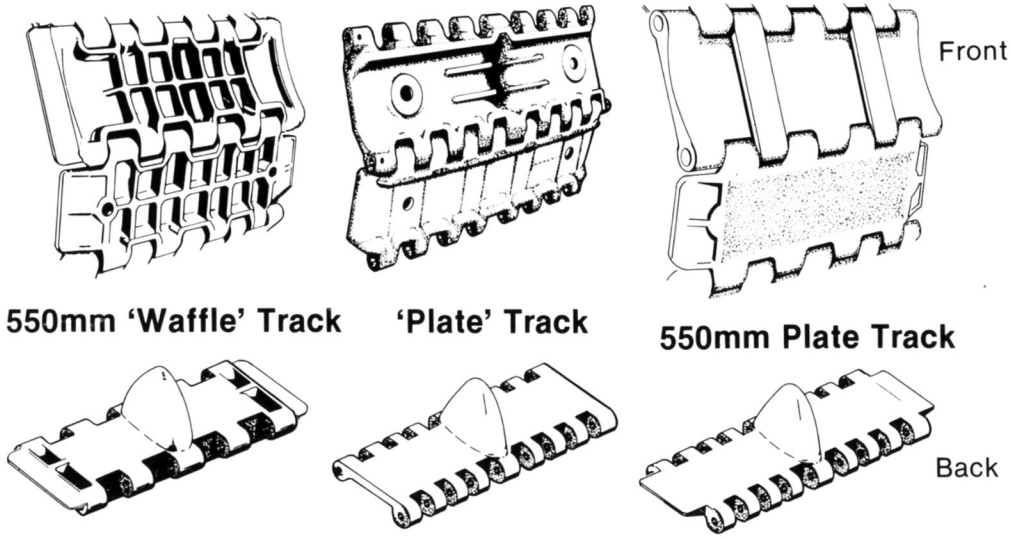
A newly finished T-34 Model 42 is driven out of the assembly hall at *Krasnoye Sormovo Zavod Nr. 112* in Gorki. This vehicle is from one of the earlier production batches without added external fuel tanks, has the early hammerhead shackle and the wide 550mm track. (Sovfoto)

A T-34 Model 42 from *Zavod Nr. 112* burns after being hit, summer 1943. The star marking on the recuperator housing is unique. (Bundesarchiv)



A T-34 Model 42 of the Polish *2 pulk czolgow* (1 Tank Regiment) moves forward near Sielce in July 1943. Note the early style fuel boxes.

(Above Left) This burnt-out T-34 Model 42 is unusual in that it has been fitted with added armor on the hull front. (National Archives)



German troops examine a pair of disabled T-34 Model 42s from *Zavod Nr. 112.* The vehicle in the foreground has very thick added armor, probably as much as 35mm.

T-34 Model 1943

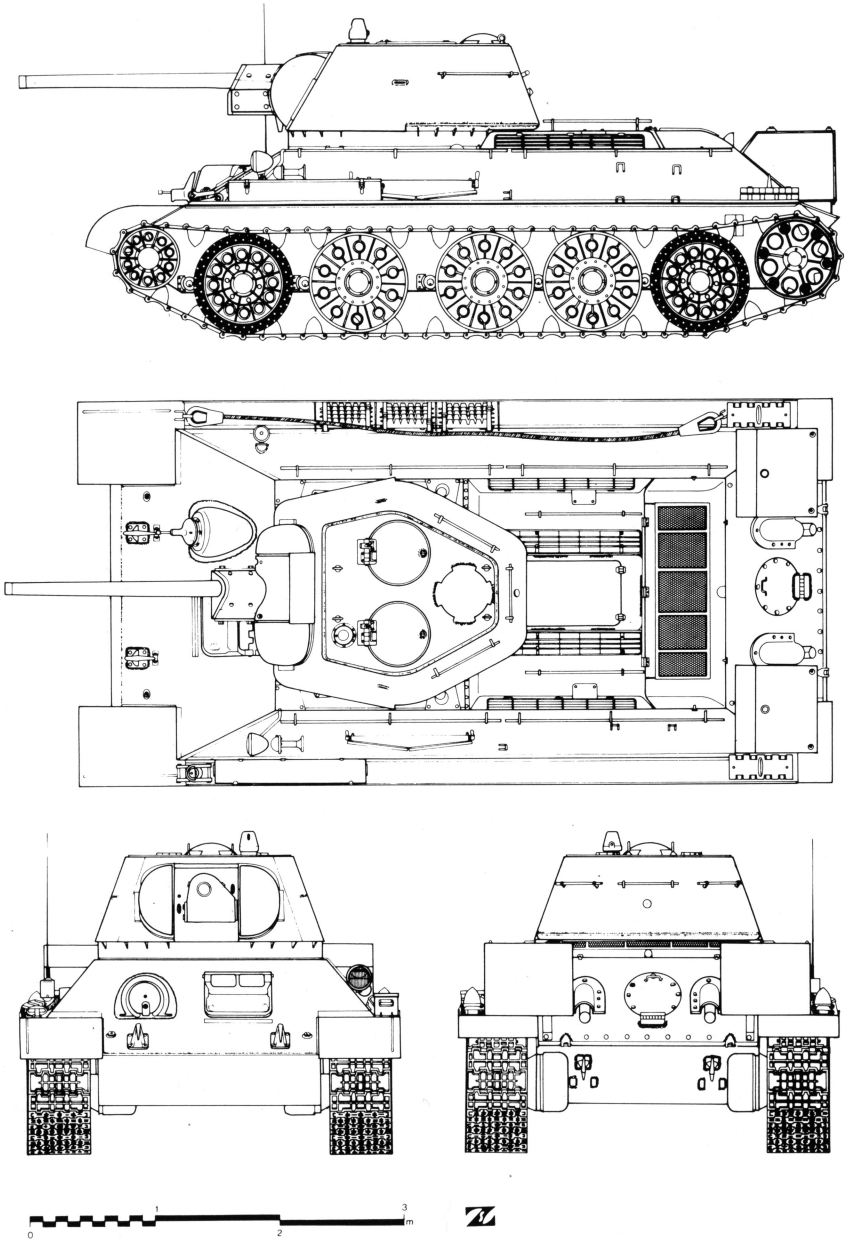
GKB-T-34 in Nizhni Tagil had been reluctant to introduce any substantial changes in the T-34 aside from manufacturing shortcuts, due to the desperate need for tanks at the front. In the summer of 1942 with the factory relocation behind them, they completed their first major modification of the T-34, the **T-34 Model 1943** (also sometimes called the **T-34 Model 1942/43** to distinguish it from the same type with the addition of a cupola). The T-34 Model 1943 in its initial form was identical to the preceding model except for a new hexagonal turret which was derived from the abandoned T-34M project. The new turret was added to improve the habitability of the vehicle. Earlier models had been very cramped and this affected crew performance. Other changes followed suit, most noticeably the thickening of the frontal armor to 60mm. This type entered production at *Zavod Nr. 183, UZTM* and *ChTZ* in the fall of 1942 and entered combat in time to see action around Stalingrad. It proved to be the most numerous of all the 76mm-armed versions of the T-34, remaining in production until the spring of 1944.

While all hexagonal turret T-34 Model 1943s were basically similar in appearance, there were slight assembly differences between them. The most easily recognizable among them was produced at *ChTZ*. The whole upper turret was a single casting with a pronounced rounding around all edges of the turret roof and a peculiar dip along the lower rim of the turret. There were three other styles of hexagonal turrets, all nearly identical in appearance, produced by the various turret casting subcontractors. They are distinguishable by careful examination of the joint between the lower forward edges of the turret side and the turret ring casting. Needless to say, there were no Soviet designation changes for such trivial differences in detail but for the sake of convenience, the drawings and photo captions here refer to these different castings as 'hardedged', 'softedged' or 'laminate' style.

Progressive improvements in the T-34 Model 1943 were very numerous. Several of the factories had adopted the all metal road wheel developed at *STZ* but problems occured with its use. It accelerated the wear on the tracks and the clattering of metal on metal when in motion set up harmonic vibrations which loosened parts. To solve the problem, a rubber-rimmed road wheel was frequently mounted at the front and rear leaving three steel roadwheels in the center. This was a standard factory arrangement except at those factories where rubber supplies became plentiful again. It was during this period that a new style, pierced, rubber-rimmed roadwheel was adopted. A new five-speed clutch and modified transmission was added which, in conjunction with engine improvements, extended the time between repairs.

While crews were generally happy with the changes introduced in the T-34 Model 1943, some further improvements were requested. Captured German tankers were of the opinion that the T-34 Model 1943 had many blind spots. This led to *GBK-T-34* developing a simple cupola with vision ports all around for the vehicle commander. Pistol ports were added to the turret sides. It was also decided to add external fuel tanks to increase the vehicle's range. The first style adopted was a simple boxlike structure. Two were usually carried at the rear. These were not entirely successful and in 1943 were replaced with cylindrical fuel drums which were strapped to the side on the hand holds. Late production machines had the same type of fuel tank cradles as the T-34-85 which, when in use, increased the number of drums that could be carried from two to three. Two were carried on the right, and one on the left. In 1943, 15,812 T-34 Model 42s and Model 43s were manufactured.

T-34 Model 1943
('hardedge' turret, fall 1942 production)

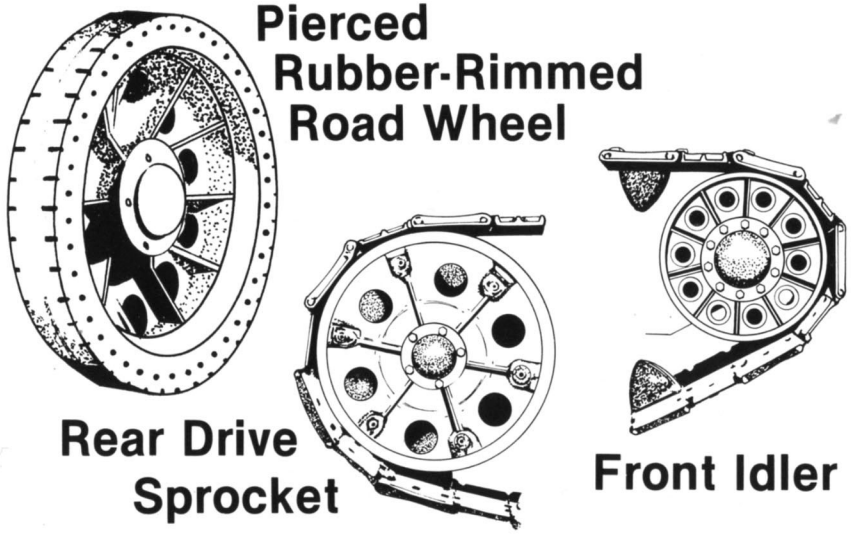


A crew hops aboard its T-34 Model 43 with a 'Laminate' turret during the Kursk battle in summer 1943. This method of mounting the T-34 often left a strip of clean paint below the driver's hatch which is easy to mistake for an air identification band.

This T-34 Model 43 was among the first of the new hexagonal turret types to be built. It still has many outdated features like the lack of a hull machine gun mantlet, a rubber-rimmed idler wheel and an old PT-4-7 periscope. This particular casting style is believed to be characteristic of the machines produced at *UZTM*. The slogan in Ukrainian reads 'For the Soviet Ukraine'. Note the raised casting number, '79', on the turret side. This vehicle was knocked out by the *SS Wiking* Division in spring 1943. (National Archives)

A T-34 Model 43 with 'laminate' turret on fire during the Kursk battle. The vehicle has the characteristic mixture of steel and rubber-rimmed roadwheels. The word above the turret number in white paint is 'Lenin'. (Bundesarchiv)

This early production T-34 Model 43 with 'softedge' turret has very few exterior fittings and carries a rather unusual swirl-style camouflage paint finish. It was disabled in a bog, winter 1942. (Bundesarchiv)



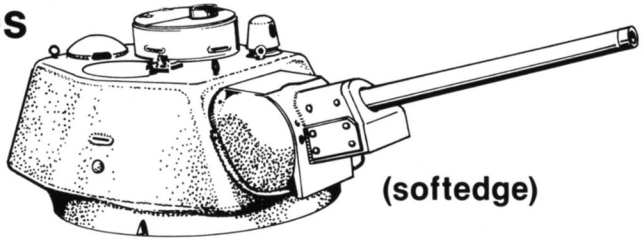
Another T-34 Model 43 from the same unit as above has an equally unusual whitewash finish and a peculiar turret band reminiscent of the pre-war style of markings. (Bundesarchiv)

Finishing touches are being made on a 'hardedge' T-34 Model 43. (Sovfoto)

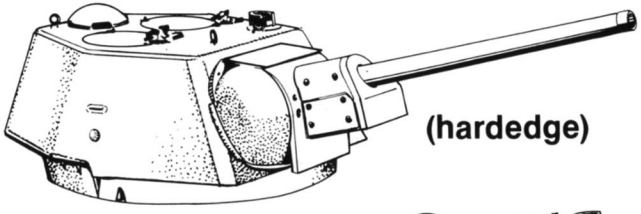
(Above Left) A closeup of the turret of a 'laminate' T-34 Model 1943 captured by the Germans in the summer of 1943. Barely evident on the hull side behind the battalion rhomboid is a red star and the inscription 'In memory of the 26th PGD' in red paint. This vehicle has added armor on the glacis plate. (Bundesarchiv)

This weatherbeaten T-34 Model 43 with the 'hardedge'-style turret has the mixed wheels common in this series. This photo was taken in the winter of 1942/43. (Bundesarchiv)

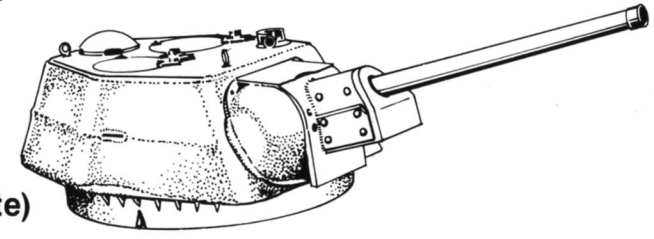
Turret Types



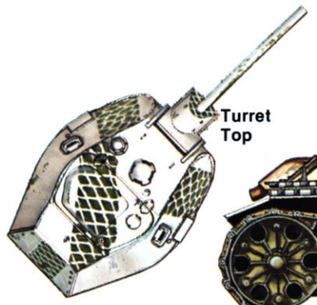
(softedge)



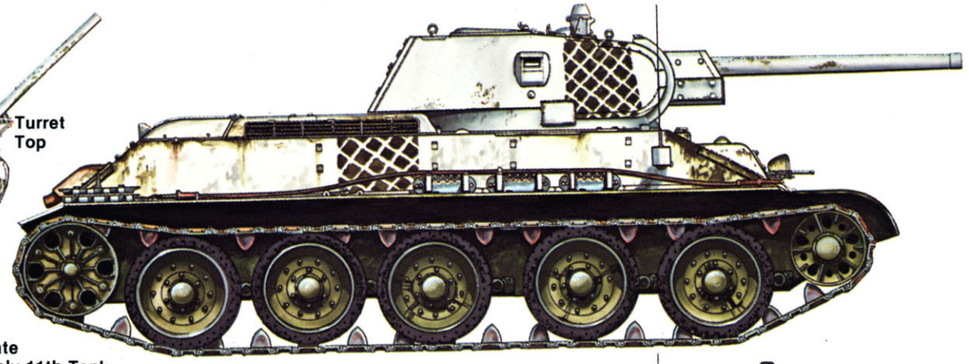
(hardedge)



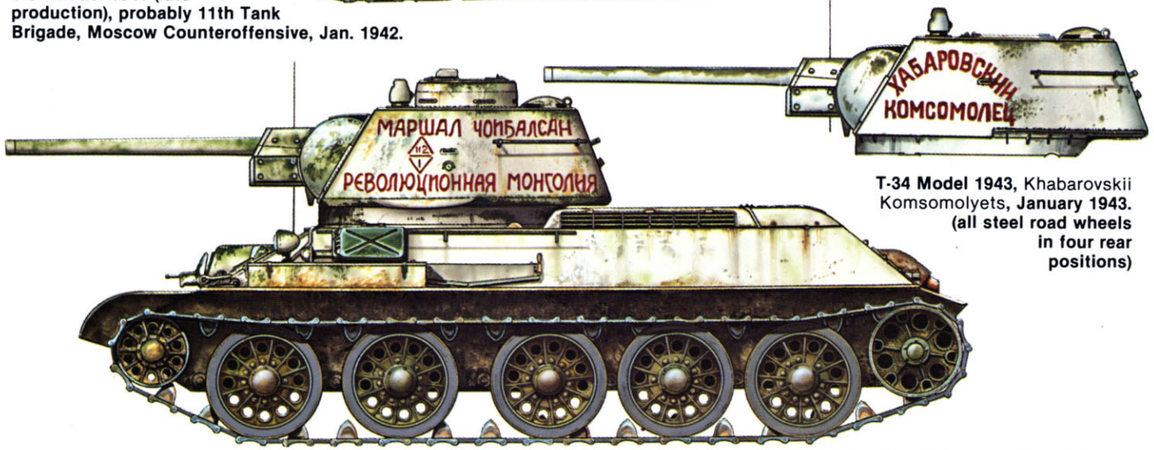
(laminate)



Turret Top

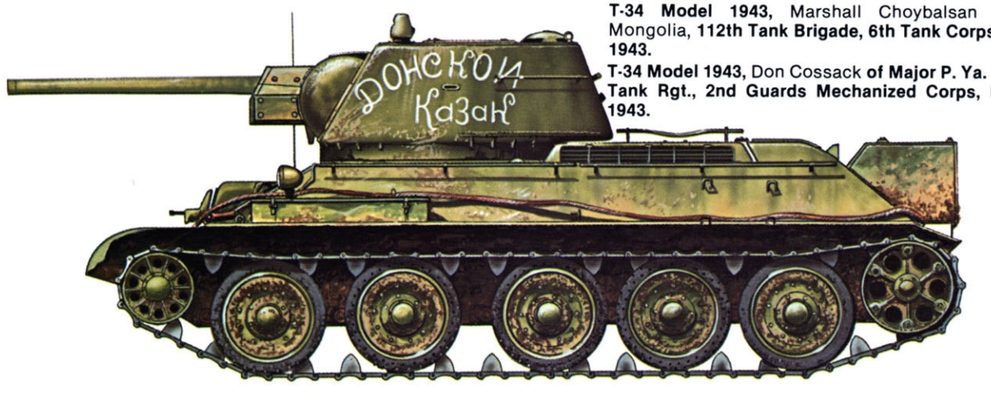


T-34 Model 1941 (late production), probably 11th Tank Brigade, Moscow Counteroffensive, Jan. 1942.

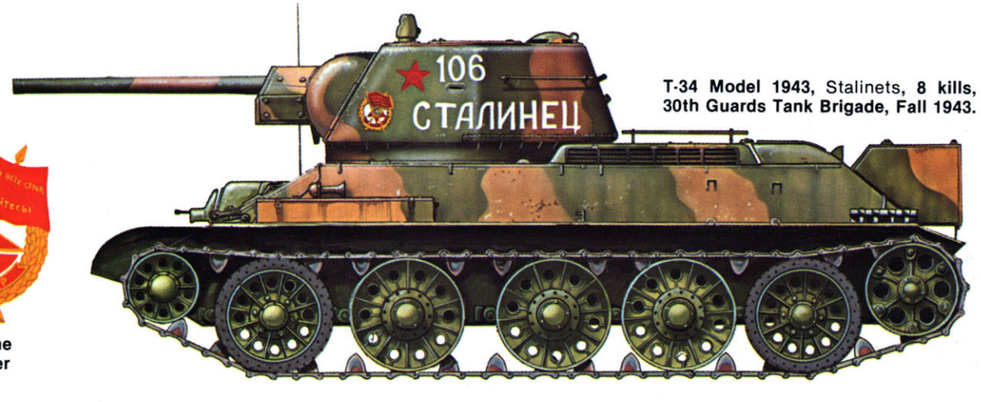


T-34 Model 1943, Khabarovskii Komsomolyets, **January 1943. (all steel road wheels in four rear positions)**

T-34 Model 1943, Marshall Choybalsan - Revolutionary Mongolia, **112th Tank Brigade, 6th Tank Corps, Oboyan, March 1943.**

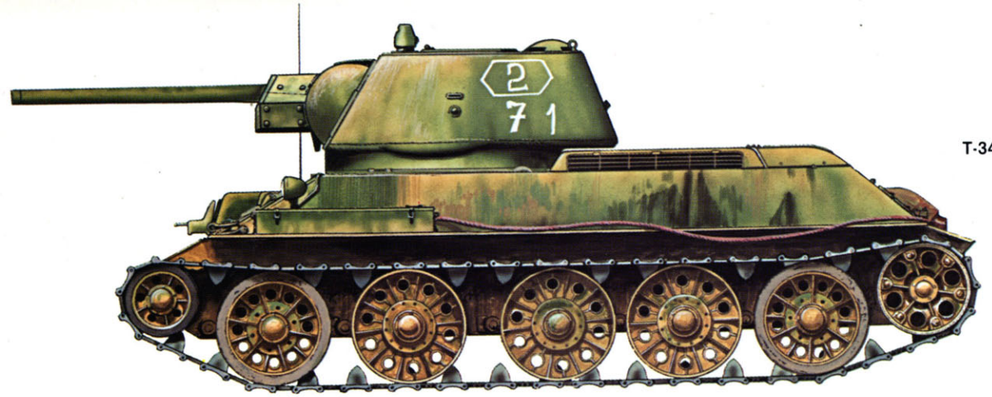


T-34 Model 1943, Don Cossack **of Major P. Ya. Roi, 25th Guards Tank Rgt., 2nd Guards Mechanized Corps, Mius River, July 1943.**

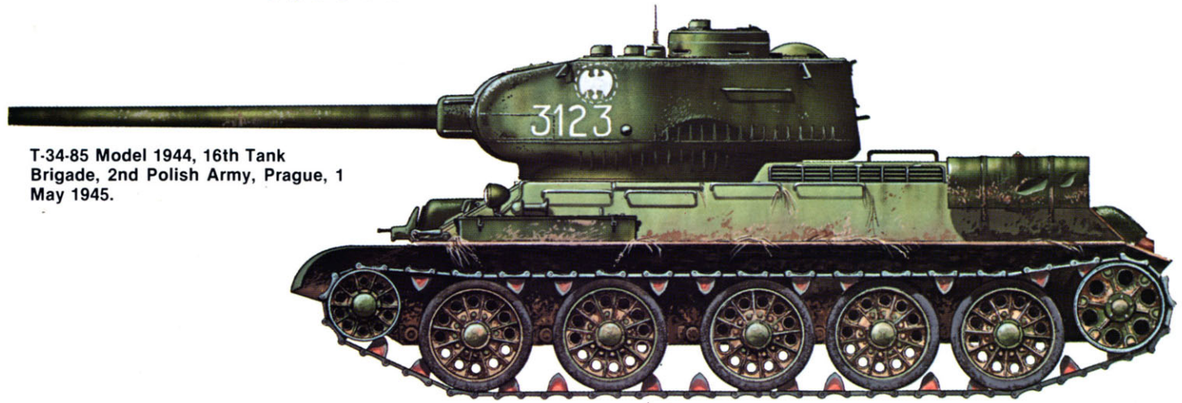


T-34 Model 1943, Stalinets, **8 kills, 30th Guards Tank Brigade, Fall 1943.**

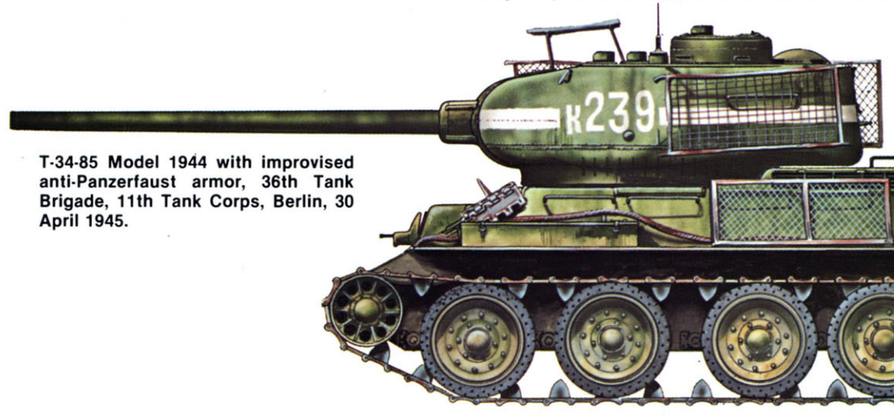
Order of the Red Banner



T-34 Model 1943, 1944.

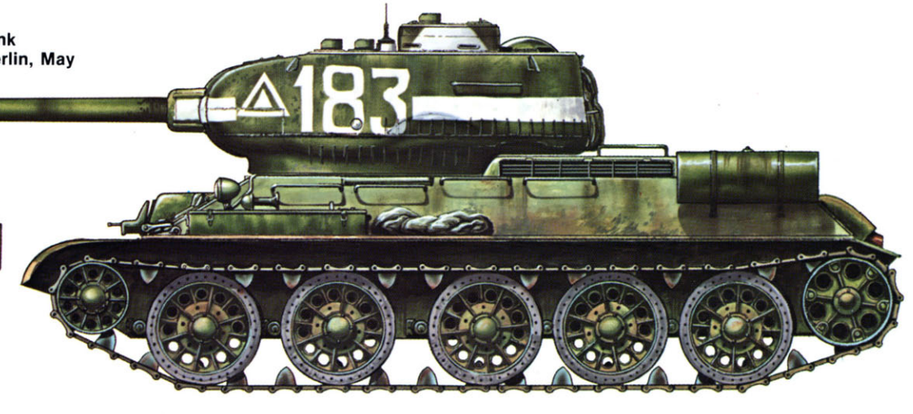


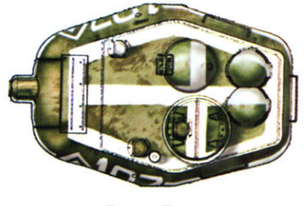
T-34-85 Model 1944, 16th Tank Brigade, 2nd Polish Army, Prague, 1 May 1945.



T-34-85 Model 1944 with improvised anti-Panzerfaust armor, 36th Tank Brigade, 11th Tank Corps, Berlin, 30 April 1945.

T-34-85 Model 1944, 95th Tank Brigade, 9th Tank Corps, Berlin, May 1945.





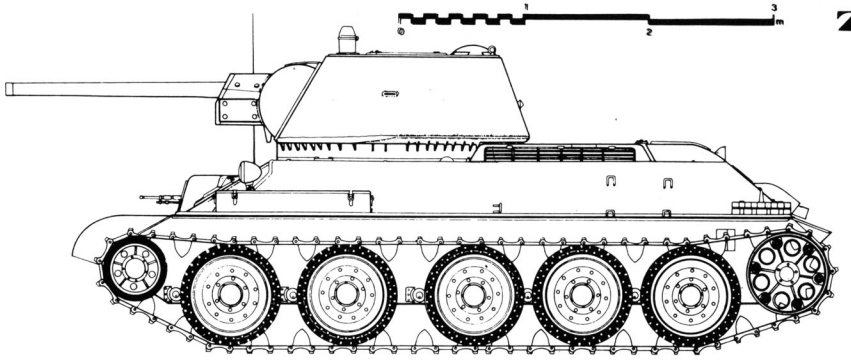
Turret Top

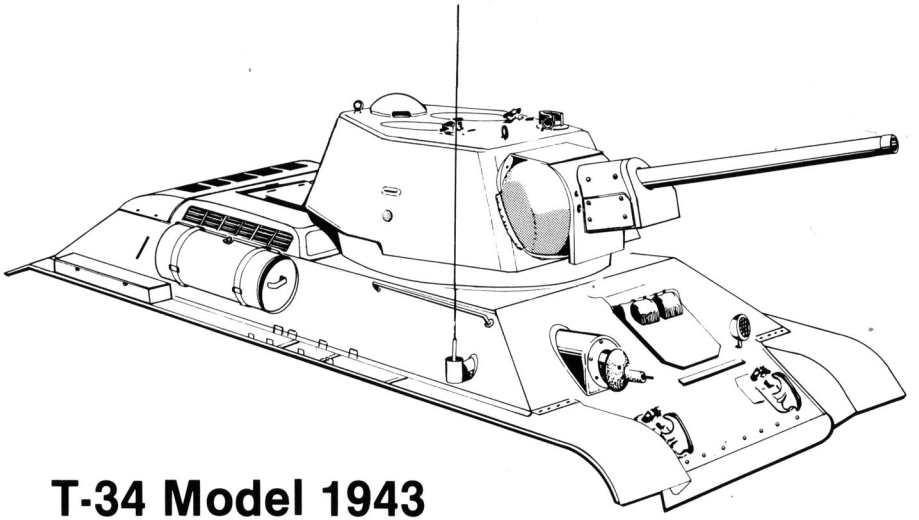
This T-34 Model 43 currently preserved at the Poznan Museum in Poland is a curious example of a remanufactured battle-damaged tank. The hull is from an *STZ* T-34 Model 1941/42 with the square rear access panel and interlocked armor, while the turret is from a T-34 Model 43 of the 'hardedge' style. There are numerous plugs where penetrations had been made in the armor and there are many added fittings which the original vehicle did not have. This sort of remanufacture was common after 1944.

This T-34 Model 1943 'hardedge' turret, knocked out in the Stalingrad fighting, has a white triangular air identification marking with a yellow circle in the center and the remnants of a white band around the edge of the roof. (Bundesarchiv)

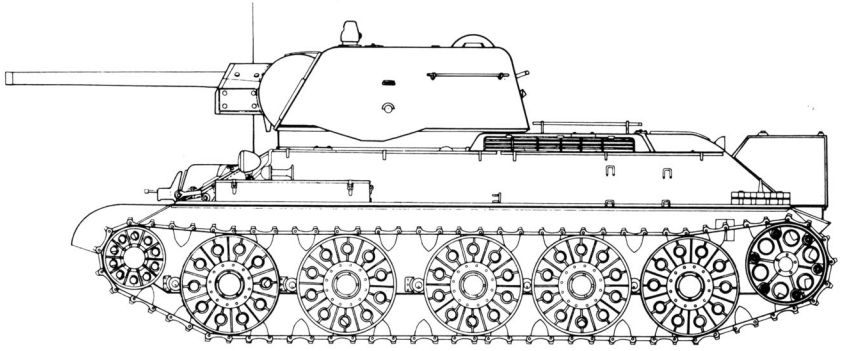
This sideview of a T-34 Model 43 preserved at the Studzianki battlefield in Poland shows the 'softedge' casting style of this particular turret. The purpose of the cylindrical object to the left of the PTK-5 periscope is not certain, but was seen on many T-34 Model 43s.

T-34 Model 1943
('laminate' turret, fall 1942 production)



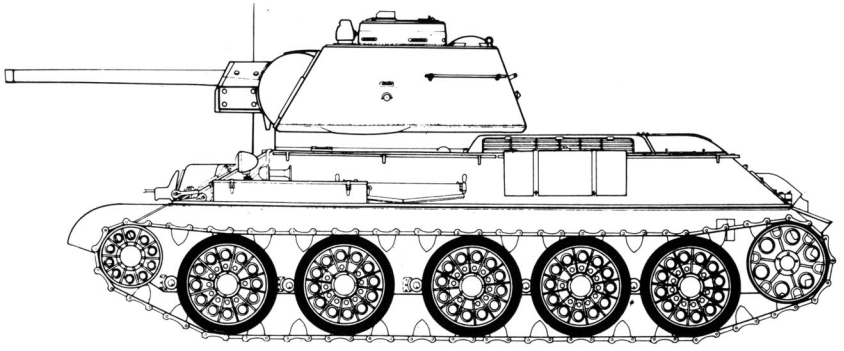


T-34 Model 1943
(*ChTZ*, fall 1942 production)



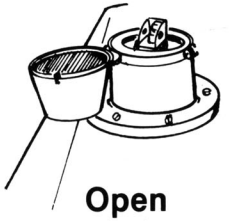
T-34 Model 1943
('hardedge' turret)

T-34 Model 1943
('softedge' turret, 1943 late production with cupola)

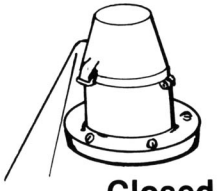


Periscopes

PT-4-7
Early Type

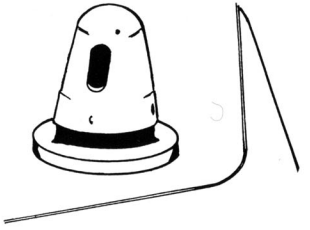


Open

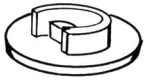


Closed

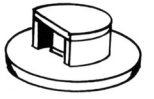
PTK-5
Intermediate Type



MK-4
Late Type



Uncovered

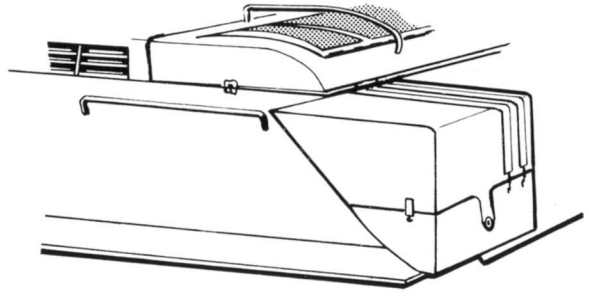


Covered

A T-34 Model 43 with the 'softedge'-style turret from the 2nd Regiment of the Polish 1st Tank Brigade in autumn 1943. This vehicle has the traditional white Polish eagle insignia.

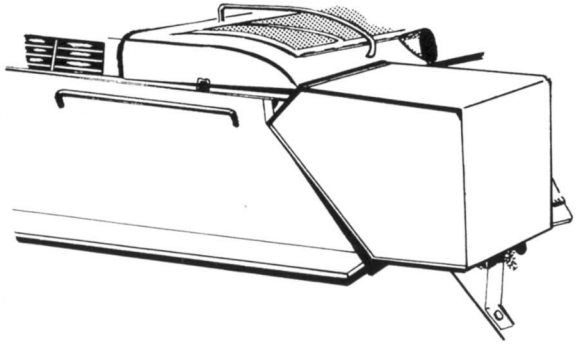
This vehicle carries the less-common, small rear fuel containers. This vehicle is in actuality an OT-34 flamethrower tank, as is evidenced by the radio pot barely visible on the turret rear. The basic chassis is a T-34 Model 43.

This T-34 Model 43 was modified to carry armored loudspeaker. It was used near the frontlines to broadcast propaganda to German troops. (James Loop)



Small
Fuel 'Box'

Large
Fuel 'Box'



This view of a pair of T-34 Model 43s shows a *ChTZ*-style in the foreground and a 'hardedge'-type behind it. These vehicles were disabled during the fighting at Kursk in 1943. (Bundesarchiv)

This captured T-34 Model 43 is being repainted in German dark yellow before being used by the Wehrmacht. It gives a very good view of the casting details at the base of a 'softedge' Model 43 turret.

Flying the national flag and a naval ensign, this 'hardedge' T-34 Model 1943 was one of the first tanks into Sevastopol. On the turret side, caked under a layer of dust, is the name *'Mstitel'* (Avenger). It is a later production machine with the commander's cupola. (Sovfoto)

Model 1943 Cupola

These T-34 Model 43s with 'softedge' turrets push on through the streets of Berlin. They carry the white turret band and air identification cross adopted by the Soviet Army in April 1945 to prevent accidental air attacks by American ground attack planes as had occured in Yugoslavia. (Sovfoto)

A T-34 Model 43 precedes a column of T-34-85s into Berlin, April 1945. (Sovfoto)

T-34-85

In January 1943, the Red Army captured its first Tiger I tank outside of Leningrad and, in the spring, Soviet intelligence learned of the new Panther medium tank. For the previous two years of the T-34's development, the focus of attention had been on wringing out the bugs in the design with a special eye towards ease of manufacture. The advent of these two new German opponents forced the Morozov team to consider substantial new qualitative improvements.

At first, the team considered simply uparmoring the T-34 Model 43. A prototype was built, called the T-43, which used the chassis of a series production machine but with glacis armor raised to 70mm, turret to 90-110mm and turret sides to 90mm. Logically, weight quickly rose to 32 tons, hampering the vehicle's handling. Moreover, the new armor was no sure proof against the Tiger's 88mm gun and the F-34 gun was only marginally effective against the thick hide of the new German tanks. The T-43 was realistically perceived as a dead end and was dropped. In April 1943, the *GKO* authorized the Artillery Design Bureau to begin examining the possibility of uparming the T-34 with a larger caliber gun.

Ironically, one of the greatest victories of the Red Army in World War II, at Kursk, was won at a point in time when the Soviet armored force was qualitatively weakest compared to the Panzerwaffe. Much like the situation of the undergunned Sherman in Normandy in 1944, Soviet tank brigades in the summer of 1943 depended on their greater numbers to overwhelm the new Tigers and Panthers. Only under very favorable tactical conditions, like the vicious close-range melee at Prokhorovka where the T-34s were able to close to a pointblank range of 500-600 meters, did the Panthers and Tigers prove really vulnerable to gunfire from the 76.2mm F-34 gun.

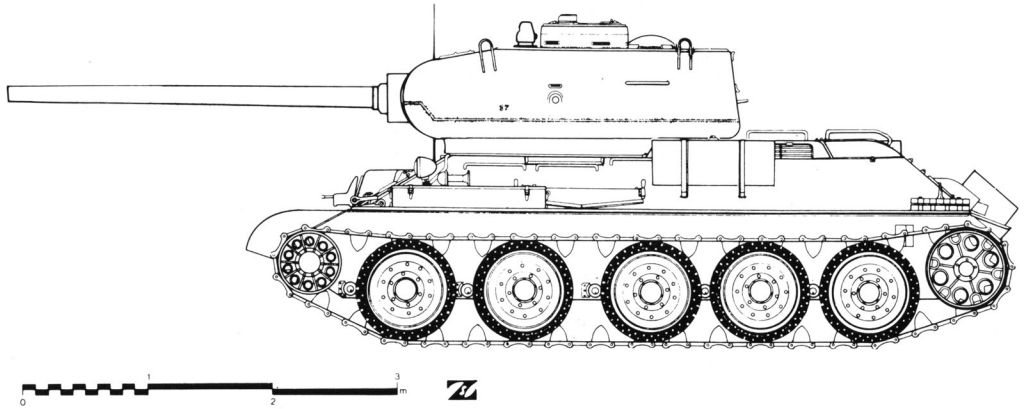
In August 1943, at a session of the *GKO*, the implications of the battle at Kursk were studied. The German tanks not only had thicker armor but their excellent guns gave them a 'longer arm'. Work on an 85mm-armed T-34 assumed considerable urgency.

Three teams worked on the new weapon. The team of Gen. F. Petrov, who had developed the 85mm D-5 gun used on the KV-85, SU-85 and IS-1, and that of V. Grabin of the *TsAKB* (Central Artillery Design Bureau) in Moscow prepared designs. A third project at *Zavod Nr. 92* in Gorki, was under study by a 23-year old engineer, A. Savin who had taken charge in place of Grabin. At the end of 1943, all three prototypes were installed in two-man turrets on T-34 chassis and sent to the Gorokhovieski Proving Grounds outside of Gorki for trials. The turret was clearly too small for efficient handling of the gun and the guns themselves clearly had problems.

In the meantime, the design bureau at *Krasnoye Sormovo Zavod Nr. 112* in Gorki, under V. Krylov, began final preparation for the production of a three-man turret. The larger turret, designed by V. Kerichev, easily accomodated the 85mm gun. Unfortunately, it was soon realized that the winning ZiS-53 gun, as designed, would not mate properly with the new turret. Both design teams were insistent on staying with their own scheme. Finally, *GKO* had to step in, ordering Grabin to modify his gun to fit. On 15 December 1943, even though it existed only in the form of two unarmed prototypes, the new T-34-85 was accepted for service use in the Red Army and production orders were given.

Firing tests of the modified ZiS-53 85mm gun revealed more problems. As a stop-gap measure, the runner-up D-5T gun was selected for use in the first production batch of **T-34-85 Model 1943s.** These entered production at *Zavod Nr. 112* in January 1944. That same month, the modification of the ZiS-53 was taken in hand by Petrov, Savin and Grabin. The resulting ZiS S-53 Model 1944 (S for Savin) finally resolved the gun's problems and was approved for production. In March 1944, it replaced the D-5T on the assembly lines at *Krasnoye Sormovo* resulting in the standard **T-34-85 Model 1944.**

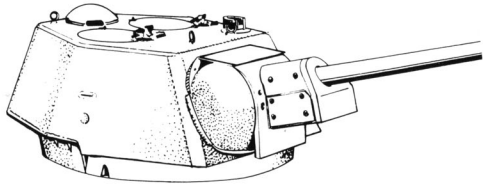
T-34-85 Model 1943
(*Zavod Nr. 112*, winter 1943-44 production)



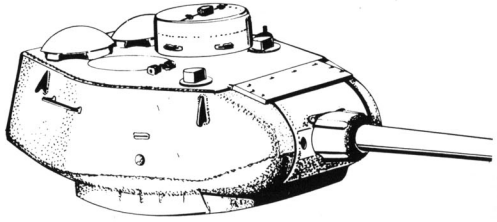
The T-34-85 Model 1943 manufactured at *Zavod Nr. 112* was characterized by the early D-5T gun mount with its large circular mounting, an older PTK-5 periscope in front of the turret cupola, a hull radio mount and the inverted 'U' turret hooks.

Following the liberation of Kharkov, a display of new weapons was held, including this T-34-85 Model 43 with the D-5T gun. (Sovfoto)

T-34/76 Turret



T-34/85 Turret




Дмитрий
Донской

(Above) In 1943, the Russian Orthodox Church raised over 8 million rubles to pay for a tank battalion. In February 1944, the Patriarch Sergius presented this independent tank flamethrower battalion named after the famous Russian historical figure, Dmitri Donskoi, to the 1st Guards Tank Army. It was one of the first units to receive the new T-34-85 Model 1943. Behind the first row of T-34-85s is a row of OT-34 flamethrower tanks based on the T-34 Model 43. (Sovfoto)

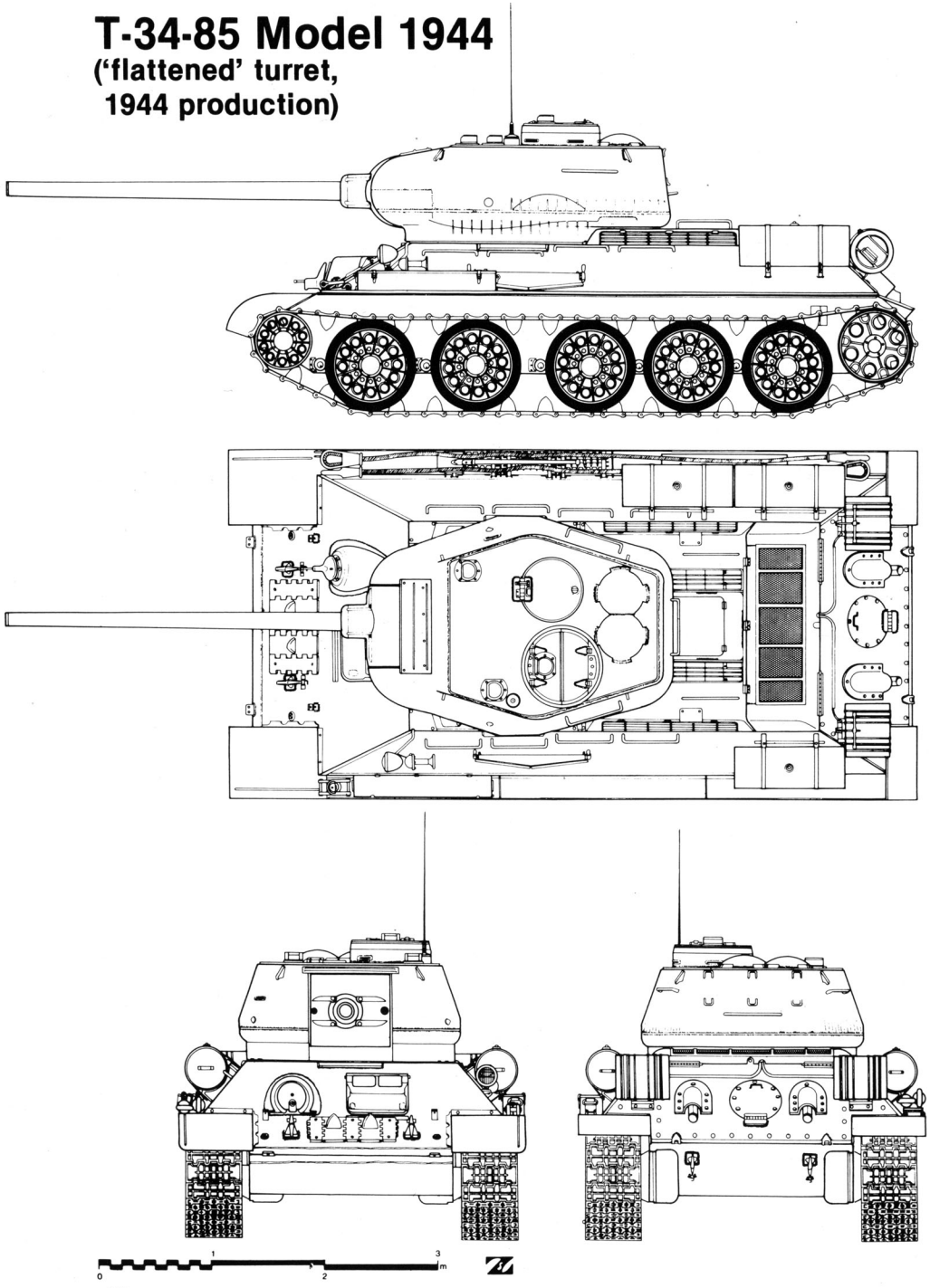
(Left) The tanks of the presentation unit were finished in white with the name 'Dmitri Donskoi' painted in red. The long 13 foot aerial for the 9R set in the hull is clearly visible in this photo. (Sovfoto)

(Right) There were some changes made when the ZiS-S-53 was first fitted in the new T-34-85. The hull radio antenna was moved to the turret roof, though, on this machine, the plug for the old hull radio pot is still evident. This T-34-85 Model 1944 is finished in a scruffy light grey winter finish with red numbers. Note also the retention of the older style inverted U turret lifting hooks.

(Below Right) In the summer of 1944, the Germans first began to run into the new T-34-85 Model 44 in substantial numbers. This machine, a fairly early production version with the 'flattened'-style turret, still has the small plug for the hull radio even though the radio is now carried in the turret. The thick collar for the new S-53 gun is evident. (Bundesarchiv).

(Below) As the production of the D-5T armed T-34-85s was drawing to a close, some, like this machine, were manufactured with features characteristic of the later Model 1944 like the use of the MK-4 periscope in place of the PTK-5 and the fitting of the radio in the turret instead of the hull. This particular T-34-85 has been knocked out and its gun is jammed at full recoil. It is being passed by a Tiger I of *Sch. Panzer Abteilung 505* in 1944. (Bundesarchiv)

T-34-85 Model 1944
('flattened' turret, 1944 production)



T-34-85 in Production

Aside from the new turret, the T-34-85 Model 1943 was basically the same as the T-34 Model 1943. The radio was still retained in the right hull front and the turret periscopes were a mixture of the older PTK-5 type and the newer MK-4. Gradually, changes were introduced. The cupola on the early T-34-85s, which was identical to that on the T-34 Model 43, was positioned near the midpoint of the turret roof. This left a great deal of stowage space at the rear of the turret but left the gunner virtually sitting in the commander's lap. To relieve this congestion, the cupola and double mushroom vents were moved back on early spring 1944 production batches. The PTK-5 periscope was dropped in favor of a uniform use of MK-4 and the radio was moved from the hull front up into the left side of the turret. By the time that production had switched to the ZiS S-53 gun, most of these modifications had been made. Early *Zavod Nr. 112* T-34-85 Model 44s still retained the four inverted 'U' turret lifting hooks but these were shortly replaced by the smaller, less conspicious type used at other assembly factories. The D-5T and ZiS S-53-armed versions are easily distinguishable from one another by examination of the gun mantlet. The D-5T version had the same type of mantlet as used on the SU-85 characterized by a large circular facet at the base of the casting. In contrast, the ZiS S-53 had a distinctive armored collar around the gun where it met the mantlet. The performance of both guns was nearly identical; the ZiS S-53 was adopted due to assembly and servicing advantages.

By the early spring of 1944, two other factories initiated T-34-85 production, *Zavod Nr. 174* in Omsk and *Zavod Nr. 183* in Nizhni Tagil. Of all the factories connected with T-34 production, *Zavod Nr. 183* (formerly *KhPZ Nr. 183*) was by far the largest producer, accounting for 35,000 by May 1945. *Krasnoye Sormovo Zavod Nr. 112* was second with some 10,000 built during the war years. The T-34-85s produced at the three factories were basically similar though there were some differences in the contours of the turret castings and in small fittings. The source of these casting variations is not yet confirmed, but is suspected to have been related to the assembly factories. For convenience, these variations have been labeled 'flattened', 'composite' and 'angle-jointed'. Besides the turret differences, there were minor differences in the hull fittings.

The mass-production of the T-34-85 also brought about other changes from the automotively similar T-34 Model 43. The fillet joining the glacis plate with the lower box plate was gradually changed in shape, becoming quite pointed. Splash strips were added at the furthest extremities of the turret ring at the front and both sides. At the hull rear, electrical conduits were welded on leading to the detonaters in the MDSh smoke cannisters. The hand holds on the hull side were modified and instead of the long rod style commonly used on the T-34 Model 43, separate hand holds were introduced. On some late machines, the rounded forward fenders gave way to folding, squared-off fenders.

In 1945, some modifications were made to the hull roof. The earlier cupola with split hatches was replaced by a slightly larger one with a one piece hatch. On some of the T-34-85s with the 'composite' and 'angle-jointed' turrets, the joined mushroom vents at the turret rear were replaced by a pair of separate dome vents, one at the rear and one further forward.

The T-34-85 first entered combat with the 1st Guards Tank Army in the spring of 1944. It was a welcome counterweight to the numerous Tiger and Panther tanks encountered during the offensives through Byelorussia and Ukraine into Poland. Besides carrying the potent new ZiS S-53 gun, the T-34-85 was the first Soviet medium tank to use a three-man turret. Previous T-34s had all relied on a two-man turret with the commander obliged to assist the turret gunner in his chores. On the T-34-85, the commander was freed of these responsibilities and could concentrate on his central task of directing his vehicle within the context of a platoon action. The greater experience and better crew training of Soviet tankmen during this period was complemented by other technical advances which enhanced their performance. While at earlier points in the war, radios were allotted only to platoon and company commanders, from 1943 all of the vehicles were so equipped.

The T-34-85 was clearly superior to its most comparable German opponent (in terms of weight), the PzKpfw IV Ausf. J, as well as in firepower, armor and mobility. While some analysts have compared the T-34-85 unfavorably to the Panther, especially in terms of armor, it should be kept in mind that, by Soviet standards, the Panther was a heavy tank in the same weight class as the IS-2 (about 45 tons). The decision by the OKH to adopt so heavy and costly a vehicle as the Panther as the Wehrmacht's main battle tank was a major factor in allowing the Soviet armored force to maintain a substantial numerical superiority in the closing two years of the war. The Soviets were far more prudent in trying to balance the qualitative needs of their tank brigades with the need to provide their units with tanks in adequate numbers. In the first half of 1945, about 7,230 T-34s were produced.

This T-34-85 Model 1944 of the 'flattened' turret type uses the common, spoked, rubber-rimmed roadwheel. The early split hatch on the turret cupola is visible. (Bundesarchiv)

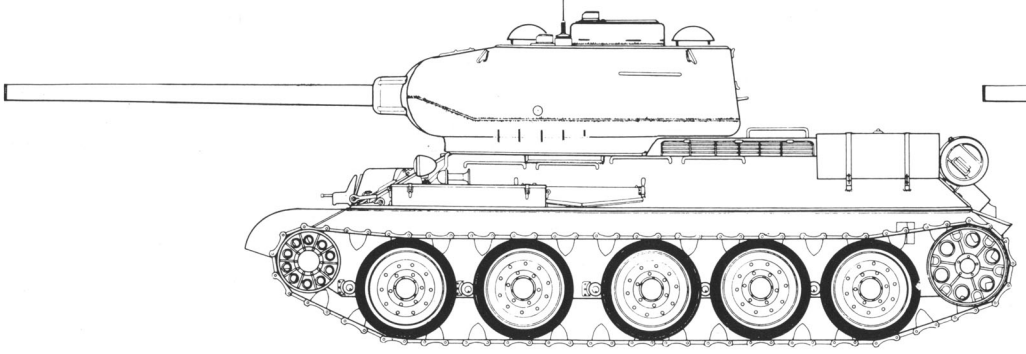
(Above Right) T-34-85s of the Polish 1st Tank Corps enter Czechoslovakia in 1945. The lead vehicle is of the 'flattened' turret style. The crew is evidently taking a breather judging from the feet poking out of the driver's hatch. The insignia, a white eagle in a circle, is barely visible on the turret side.

A pair of T-34-85s were knocked out along this road during the drive of the 1st Baltic Front through East Prussia to Koenigsberg. The vehicle is of the 'flattened' turret style. The turret tactical number is P-87. (Bundesarchiv)

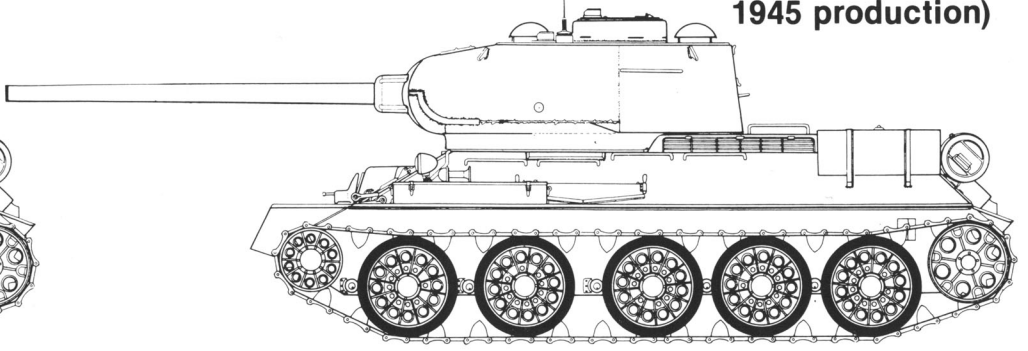
During the fighting in Berlin, tank losses from Panzerfaust were particularly heavy, leading Soviet tank crews to weld confiscated bed springs to their tanks to prematurely detonate the Panzerfaust's shaped-charge warhead. This vehicle is a T-34-85 with the 'flattened' turret.

These late production T-34-85s of the 'flattened' turret style were purchased by an Estonian committee and bear the name 'Lembitu', an Estonian hero. They are fitted with the later style single-piece cupola hatch. The tactical insignia, a divided diamond, is typical of independent tank brigades during this period. The upper half contains the battalion letter (V) and the lower half contains the platoon and individual vehicle number (23). This photo was taken in East Prussia in the winter of 1945. (Sovfoto)

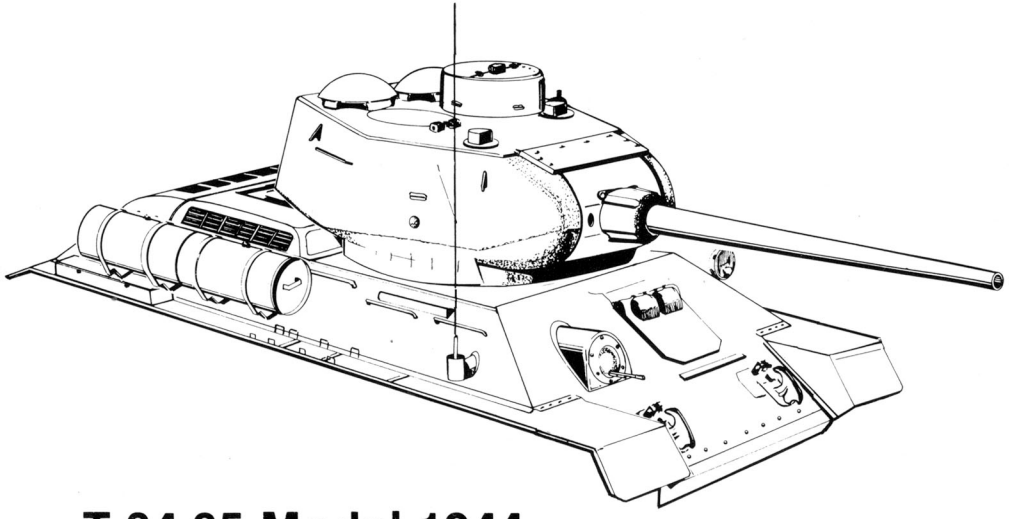
T-34-85 Model 1944
('angle-jointed' turret, 1945 production)



T-34-85 Model 1944
('composite' turret, 1945 production)



A Soviet tank company is briefed in the outskirts of Berlin before the final drive. The T-34-85s are of the later 'composite' turret style and lack the pronounced flattening at the turret sides which was characteristic of those produced at other factories. (Sovfoto)



T-34-85 Model 1944
('angle-jointed turret)

T-34-85s of the Czechoslovak 1st Tank Brigade enter liberated Prague in May 1945. These machines have the 'composite' turret. Their distinctive midriff bulge is particularly evident in this shot. (Sovfoto)

This closeup of the turret of a late war T-34-85 with the 'composite'-style turret was taken in November 1945. It shows the separate dome vents later used on the T-34-85. Note also that the later style one piece hatch is in use. The rough, almost porous appearing surface texture of the armor was particularly evident on machines from this factory. This insignia is that of the 4th Guards Tank Corps. (Sovfoto)

This knocked-out OT-34 is based on the chassis of a late-production T-34 Model 43 with a -85 style pointed nose. The turret number is D-44. Note that the radio hull mount is plugged over due to the transfer of the radio to the turret. The skull, possibly that of a crew-member, is a token of the great price paid by the Russians in the 'Great Patriotic War'. (Bundesarchiv)

Support T-34s

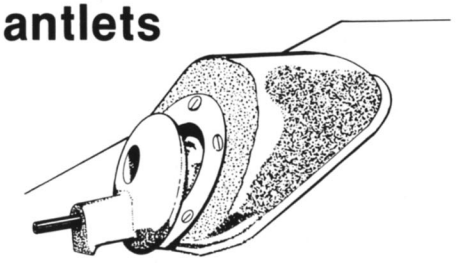
There were three major categories of support vehicles based on the T-34 during the war years: flamethrower tanks, mineroller tanks and bridging tanks.

The OT-34 flamethrower tank was developed in 1942, equipped with the ATO-41 projector. This flamethrower was fitted in place of the hull machine gun and the fuel and air tanks took the place of the hull machine gunner. Most of the ATO-41 equipped OT-34s were based on the T-34 Model 42. A pudgy mantlet was fitted over the projector port. The ATO-41 had a 100 liter capacity for the benzine and oil mixture. This gave way to the more advanced ATO-42 with a 200 liter capacity. The ATO-42 was usually fitted to the T-34 Model 43. Since most T-34 Model 43s also carried radio, it was moved up into the rear of the turret in place of some of the machine gun ammunition racks. The ATO-42 could fire 4 to 5 bursts every ten seconds, each burst consuming 10 liters of mixture. The range was between 60 and 120 meters depending upon the viscosity of the fluid. The ATO-42 unit was later fitted in T-34-85s as well, which were known as TO-34s to distinguish them from earlier variants. Flamethrower tanks were usually formed into independent battalions attached to tank corps for special operations. These originally had 10 KV-85 heavy tank flamethrowers and 11 medium OT-34s, but later in war it was more common to have a mixed battalion with one company of T-34s and two of OT-34s.

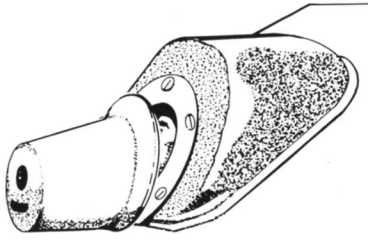
The bridging tanks based on the T-34 during the war were not of uniform construction and were often modified in the field or at tank repair factories. The most common types were based on worn-out turretless chassis and were used to provide quick tactical bridging over ditches or shallow rivers. When used for river crossings, they were simply driven into the river, usually two abreast, with additional tanks leapfrogging over the previous ones until the river was breached. This often left parts of the bridge underwater. Once conventional bridging could be brought up, the expended bridgers were hauled out of the river for remanufacture. Needless to say, these vehicles were only used for very special operations. The first recorded encounter of these by the Germans came on the Upper Donets river south of Belograd on 3 August 1944, when the 320th Infantry Division was surprised by a totally unexpected attack of a company of T-34s. The T-34 bridge, consisting of several dozen vehicles, was totally underwater and had not been spotted by German scouts.

Minerollers, designated PT-34, were first developed by A.P. Mugalev in 1942. They were of a fairly conventional design with four thick banks of cast disks pushed in front of each track. They were first experimentally used in combat on the Voronezh Front in 1943 by the 4th Independent Guards Tank Regiment and were used throughout the remainder of the war by specially trained regiments. The mineroller was attached to the lower plate of the hull front with a large 'Y' girder fork which allowed the assembly of roller disks to turn somewhat. When not actually in use, the roller assembly was removed from the tank though, often, the fork was left attached to speed refixing of the rollers. The PT-34 was usually based on the T-34 Model 43 or T-34-85.

Mantlets



Standard DT 7.62 mm MG Mantlet



ATO Mantlet

The pudgy mantlet of the ATO-41 distinguishes this OT-34 as a flamethrower tank. These vehicles stowed their fuel internally and were otherwise identical to regular gun tanks. The flamethrower replaced the hull machine gun.

The fuel container in this OT-34 exploded, blowing off the turret. This OT-34 is based on a T-34 Model 1942 and the flame projector mantlet is clearly visible in place of the machine gun.

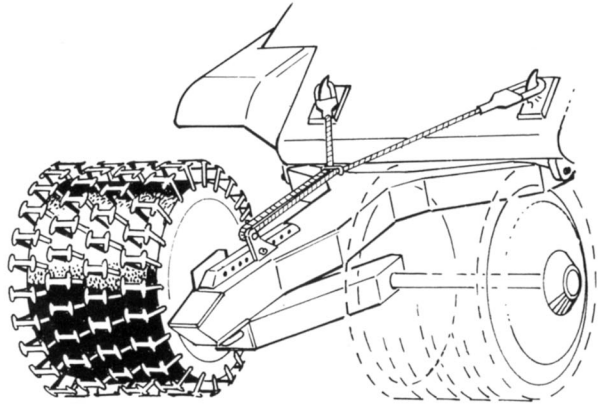
Tank infantry stand beside their OT-34 flame tanks during dedication ceremonies in 1944. These vehicles are from the famous battalion subscribed for by the Russian Orthodox Church. The long 13 foot whip aerial of the 9r radio set is visible behind the turrets.

(Above Left) This OT-34 with the *ChTZ* Model 43 turret carries the improved ATO-42. The hull radio on these was usually carried in the rear of the turret but this one seems to have it on the other side of the hull near the driver.

A parade in Moscow's Red Square in 1946 is led by a column of TO-34 flamethrower tanks. Note that there are two different type of turret castings evident. (Sovfoto)

The PT-34 mineroller was seldom left attached to the vehicle except during actual mine clearing operations. This PT-34, based on a T-34-85, advances on the road to Mudadzyan in Manchuria in 1945 with only the Y-fork attachment brace for the roller assembly. (Sovfoto)

PT-34 Mineroller



The PT-44 was identical to the PT-34 except for the basic vehicle, which was, in this case, a series production T-44.

Self-Propelled Guns

The *GKO*, like the German *OKH*, favored the use of non-turreted guns based on tank chassis, either howitzers or anti-tank guns. These had the advantage of both being cheaper than the comparable gun tank version and capable of mounting a heavier piece. The first of these on the T-34 chassis was the SU-122 which carried the M-30S 122mm howitzer Model 1931/37. It entered production at *UZTM* in Sverdlovsk in December 1942. 1148 were manufactured until it was dropped in early 1944. It had indifferent anti-tank performance, though it was an excellent direct fire weapon. SU-122s first went into action on the Volkhov Front in the winter of 1942/43 and saw action at Kursk.

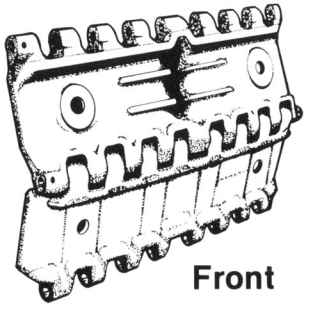
The second major type was the SU-85 which was armed with the D-5S 85mm gun Model 1943, which it entered series production at *UZTM* in August 1943. A total of 2050 were produced before production switched over in favor of the SU-100 at the end of 1944. It was a potent tank killer, entering combat for the first time during the Red Army's forcing of the Dniepr in the Ukraine. It was inevitably shortlived owing to the adoption of the same caliber gun on the turreted tank version. In 1944, it was replaced at *UZTM* by the SU-100 armed with the D-10S 100mm gun. This was a superior weapon with excellent tank killing properties. By the war's end, 1800 had been produced. Production of this type continued into the late 1940s in the Soviet Union and was resumed in Czechoslovakia in the 1950s.

A battery of SU-122 move forward in the Briansk area in 1943. This was one of the first units to receive the new SU-122. It was a squat and inelegant design which made a potent close-in assault weapon. These particular vehicles have added armor plates over their gun recuperator housings. (Sovfoto)

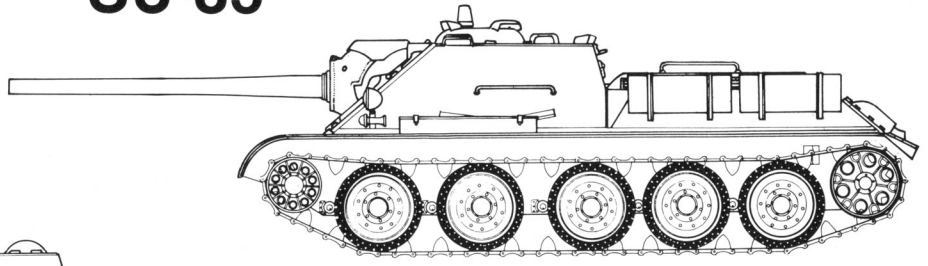
This SU-85 was knocked out during the vicious fighting in Central Poland in summer 1944. The SU-85 was armed with the same D-5 gun as the early T-34-85 and so, inevitably, was replaced by a more heavily armed version. (Bundesarchiv)

A column of new SU-100s move through a fog shrouded wood in East Prussia in January 1945. The SU-100 can be distinguished from the similar SU-85 by the larger gun, the commander's cupola on the right of the vehicle roof and double dome ventilators. (Sovfoto)

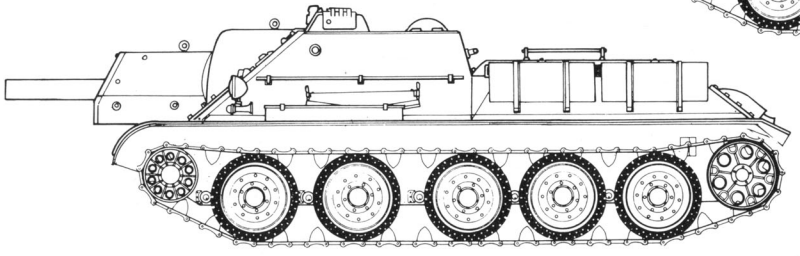
Plate Track



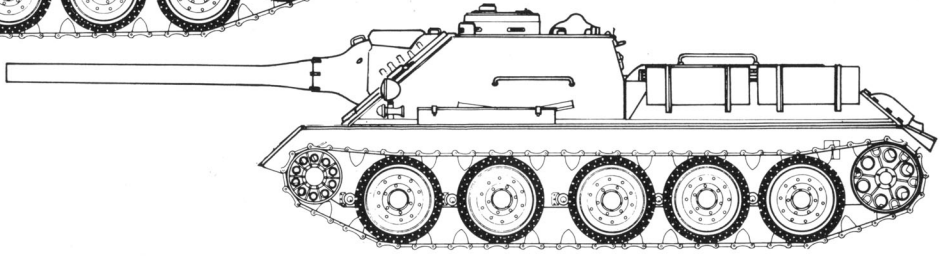
SU-85



SU-122



SU-100



The Czechoslovak-manufactured T-34-85 was the most numerous of the foreign-produced derivatives. The turret casting differed in small details and in contour, but was basically similar to the Soviet style. (Charles Kliment)

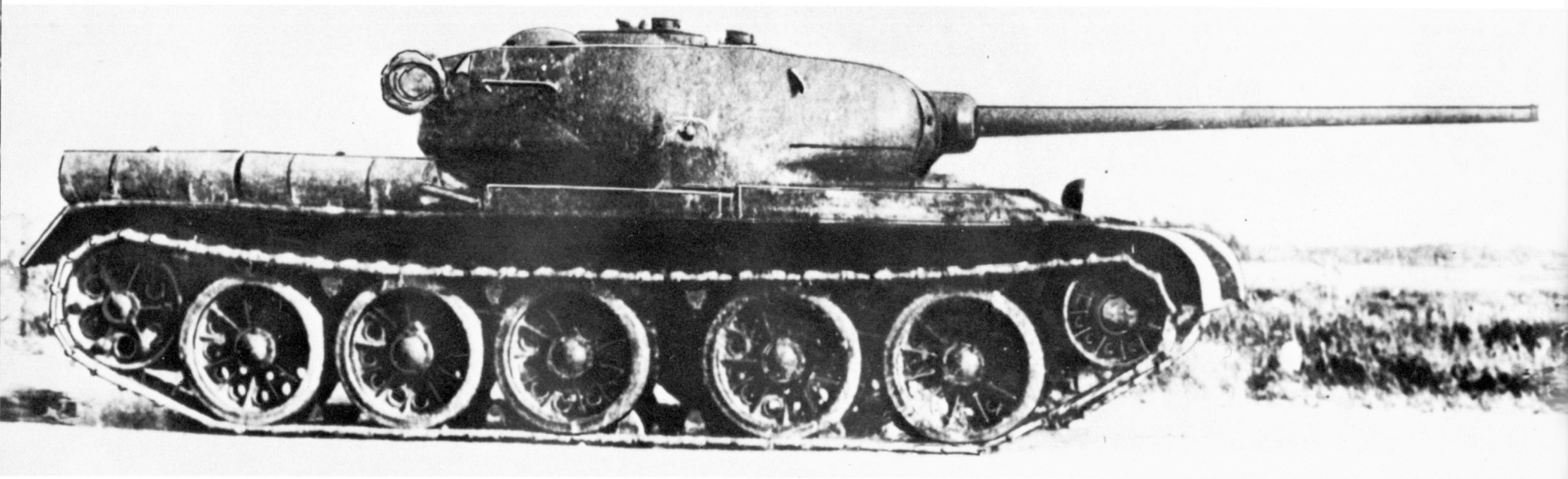
The second most numerous version of the foreign-produced T-34-85s were the Polish machines like this example preserved at the Poznan museum. The Poles also produced an improved type with deep wading capabilites.

This T-34-85 of the 1st North Korean Tank Brigade knocked out near the Naktong River in September 1950, clearly shows the distinctive casting features of the 'composite' turret. This vehicle uses the later style roof arrangement with separated dome vents. The rubber has been entirely burned off the wheel rims. (U.S. Army)

Post-War

The T-34-85 remained in production in the Soviet Union until the late 1940s. A modernized version appeared in 1947 and featured a progressively improved engine as well as sighting, communications and other small improvements. It is not easily distinguishable from earlier models. In the early 1950s, T-34-85 production was initiated in Poland, Czechoslovakia and Yugoslavia. The Yugoslav model, which was produced only in small numbers, was markedly different in appearance from the Soviet model due to the use of a whole new turret casting, new gun and a modified hull front. The Czechoslovak and Polish machines were almost identical to the Soviet models, though some turret casting differences are evident. Production of all models ceased in 1956. While there had been no production of the T-34 in the Soviet Union for well over a decade, in the late 1960s the Soviets remanufactured a great many T-34-85s for export and war reserve use. These T-34-85Ms had a V-54 engine, T-55-style roadwheels and numerous internal improvements. Some of these have seen combat in Vietnam and Angola.

Following the Second World War, the largest single involvement of the T-34-85 was their use by the North Korean 1st Tank Brigade in 1950. The T-34-85 has been used in a number of other border wars and civil wars but their only other major employment has been in the Mideast in 1956, 1967 and 1973. A large percentage of the Arab T-34-85s were the Czechoslovak model. The T-34-85 still sees first-line service in a number of Third World countries, though surviving examples in the Warsaw Pact and USSR have largely been relegated to the training role or reserve. Total T-34 output was probably in the area of 80,000 examples of the gun tanks alone, making it the most widely produced tank of all times with the possible exception of its replacement, the T-54/T-55 tank.



The design of the first prototype of the T-44 is clearly derived to the the T-34-85 but lower and sleeker. On the prototype, there was a gap between the second and third wheel while, on the production machines, it was between the first and second. The turret on the T-44 was slightly longer than on the T-34-85 and only one dome vent was fitted.

T-44 and Later

The T-34-85 stretched the capabilities of the basic T-34 chassis to the limit. Attempts were made to develop a 100mm gun armed version, the T-34-100, but these were not successful owing to the inadequate size of the turret. Furthermore, as more and more additional weight was being added in the form of larger guns, thicker armor and more fuel, performance suffered. As successful as the T-34 had been, a new design was certainly warranted.

In 1944, design work for the T-34's replacement was finally undertaken. Since 1941, when the war had cut short the T-34M studies, Morozov *GKB* had hesitated to plan any drastic changes in the basic production models for fear of interrupting supplies to the front. By 1944, the flow of tanks from the Urals was so steady that the *GKO* allowed itself the luxury of new medium tank design. The new vehicle, designated the **T-44**, clearly owed a great deal to the T-34-85. The turret, though longer and without the 85's distinctive turret ring collar, was clearly derived from the T-34-85 turret. The roadwheels and track were identical to those on the T-34, but the clumsy old Christie suspension with large bulky springs gave way to a space saving torsion bar layout pioneered in the KV and IS heavy tanks. The hull was lower and sleeker with 120mm frontal armor and, in the rear, a new planetary transmission was housed alongside a modernized version of the T-34's V-2 engine with 520hp. Production of the T-44 began in August 1944 at the rebuilt *Zavod Nr. 75* in Kharkov, but its combat record is largely unrecorded. Its development continued after the war, leading to the extremely successful T-54/55 family.

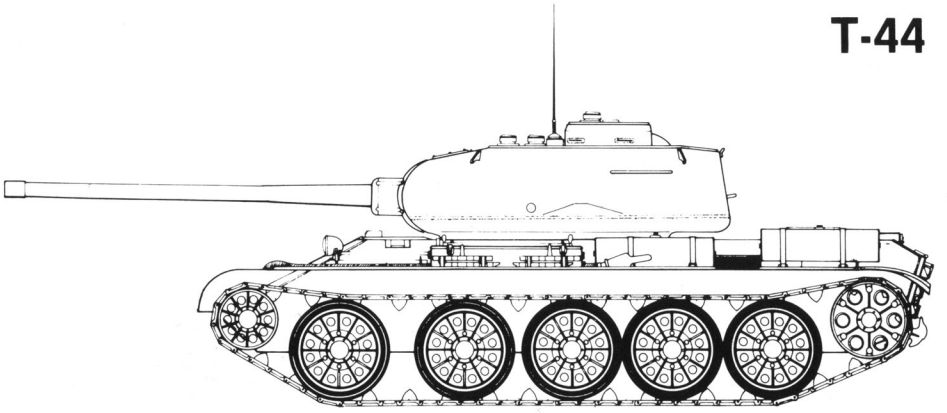
While sleek and streamlined, the T-44 was quite tight inside. This obliged her designers to fit some of the fuel externally as had been done on the T-34, as can be seen in this view of the second prototype. The cupola on the T-44 was lower than on the T-34-85 and the engine was mounted transversely.

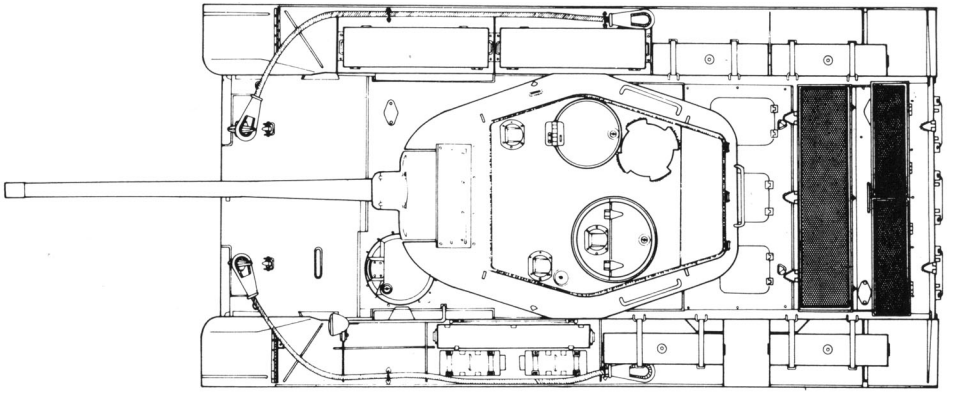
The standard production model of the T-44 came off the assembly lines in late 1944. The T-44 has received bad press in the West due to its teething problems, but was superceded mainly because of the inability of its small turret to mount the 100mm gun demanded by Soviet designers.

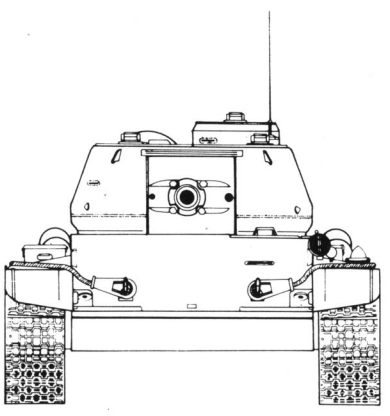
One of the off shoots of the T-34 was the tank-turreted armored train, *bronepoyezd*, used to provide mobile artillery fire and to protect trains. This particular one, the famous *Ilya Mourametz*, saw action from the first year of the war and, in this photo, is seen while engaged in shelling outside of Warsaw in August 1944. It used T-34 Model 42 turrets. Others used turrets from the Model 1941, T-26, T-28, T-35 or KV heavy tanks. (Sovfoto)

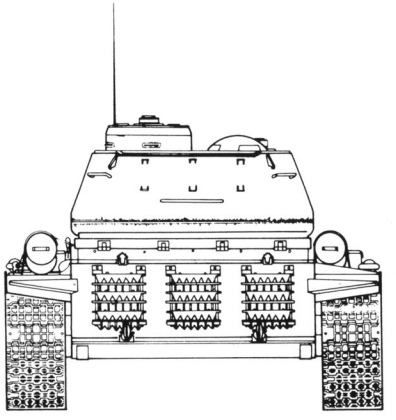
Surprisingly, large numbers of T-34 turrets were used on Type 1124 armored river gunboats, like this one, *Stalinetz*, of the Danube River Flotilla. This gunboat has a T-34 Model 43 turret fore and aft as well as a small machine gun turret amidships. They were used to patrol along contested river routes and to provide fire support. This particular monitor was photographed during the battle for Budapest. (Sovfoto)

T-44









U.S. Armored Vehicles

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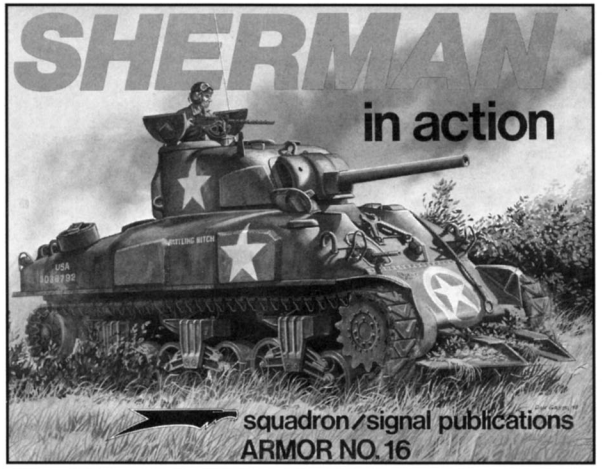
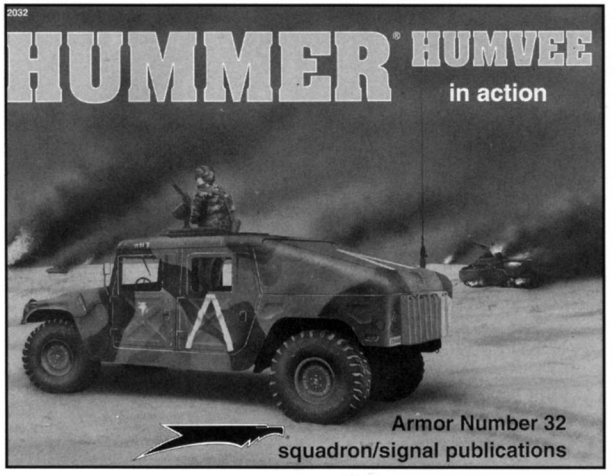
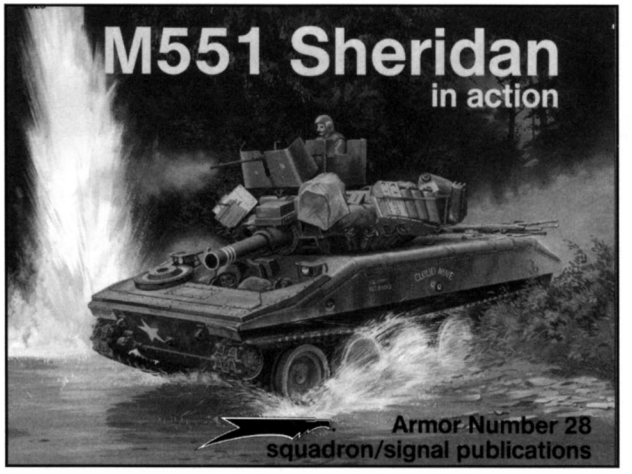
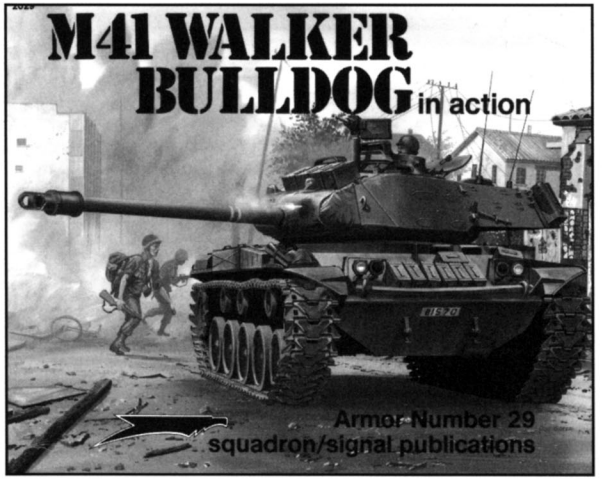
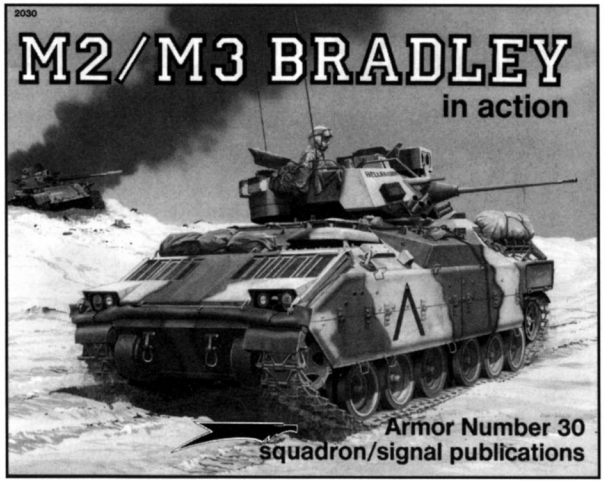
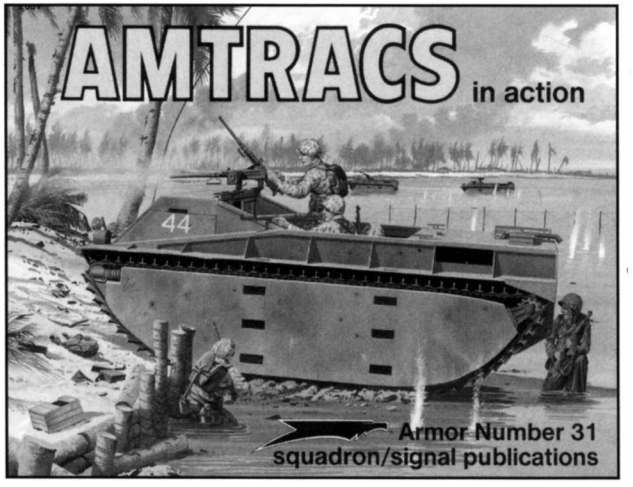


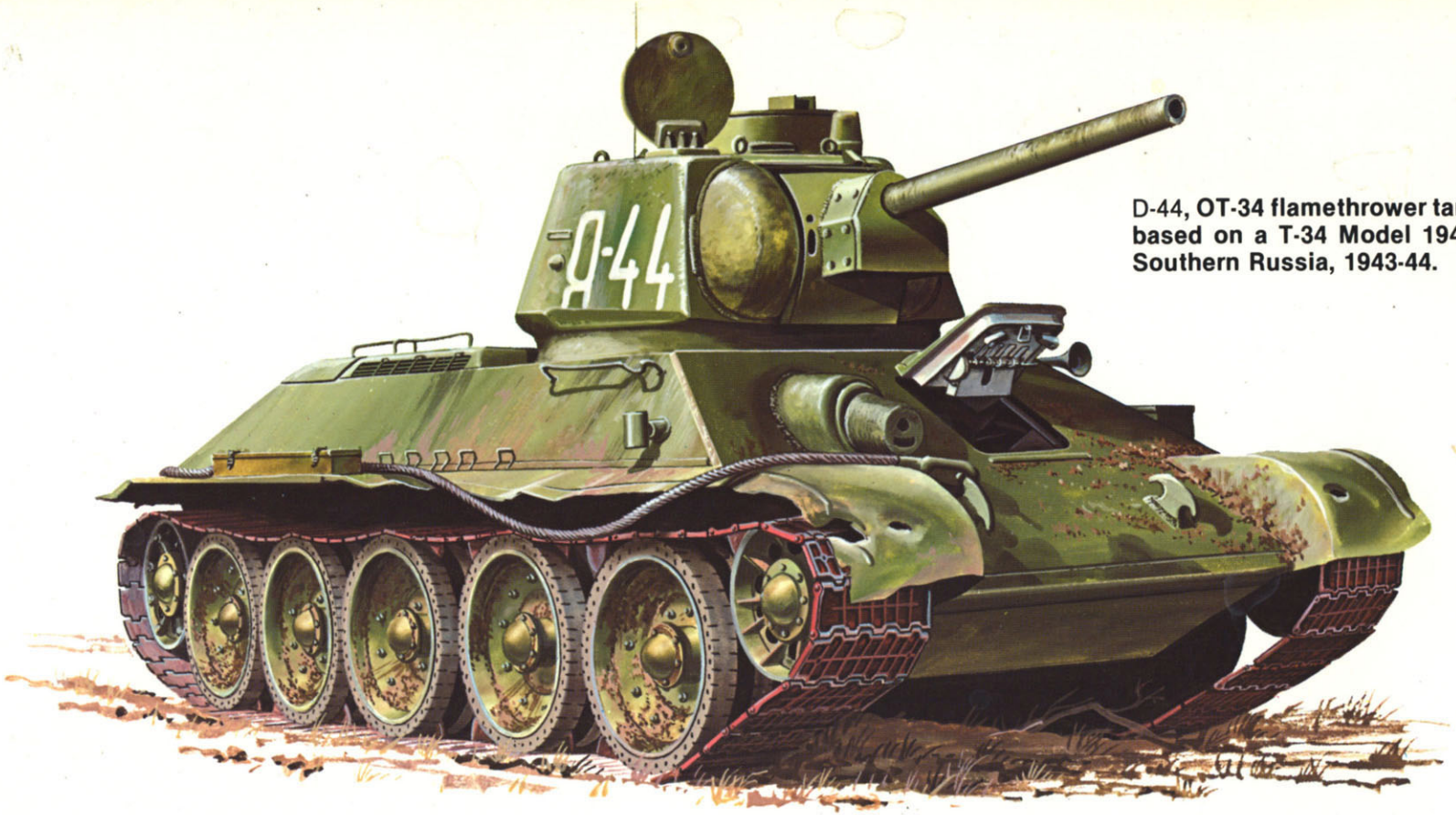




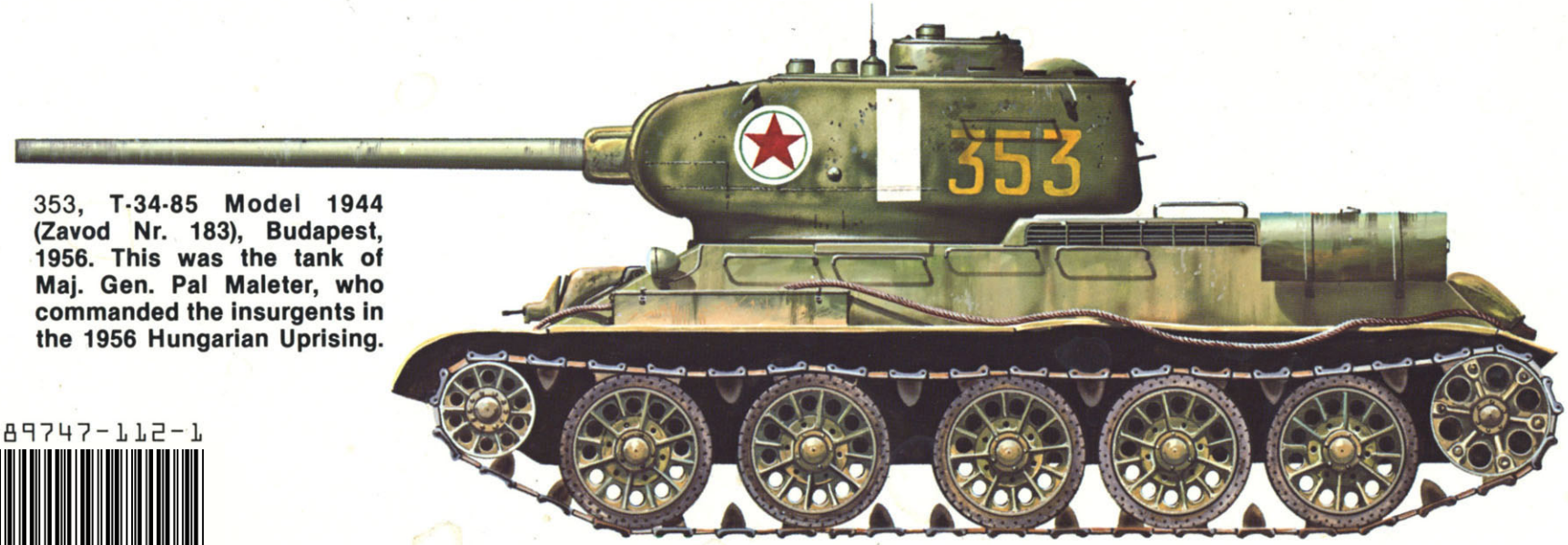








D-44, OT-34 flamethrower tank based on a T-34 Model 1943, Southern Russia, 1943-44.



353, T-34-85 Model 1944 (Zavod Nr. 183), Budapest, 1956. This was the tank of Maj. Gen. Pal Maleter, who commanded the insurgents in the 1956 Hungarian Uprising.

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