

T-64 and T-80

by Steven J. Zaloga



GONGORD
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SOLOMON
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Front Cover

T-64Bs on winter exercise, camouflage painted with an uncommon pattern of light grey over the usual dark olive green. (Sovfoto)

Back Cover

T-80U of the 4th Guards Katemirovets Tank Division on its way to Moscow during the 1991 coup. They have the standardized three color paint scheme which consists of the basic dark green, oversprayed with sand and small black "crow's feet". (Dr. Udo Bauer via Thomas Anderson)

Acknowledgements

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Introduction

This book presents a photographic description of the two most sophisticated and secret of the post-war Soviet main battle tank designs, the T-64 and the T-80. Neither of these tanks have been exported until recently, making them far less well known than their stablemate, the T-72. An earlier book in this series (1004 T-72: Soviet Main Battle Tank) covered the T-72 tank. Since this earlier book was released, a great deal of new information about the T-72 has been released, including accurate information about Soviet tank designators, as well as information on more recent variants. This book provides this information as an update to the earlier book.

T-64

The T-64 tank was the most radical advance in world tank technology in the 1960s, as much a breakthrough as the T-34 tank had been in 1940. The T-64 was the first series-manufactured main battle tank to employ non-metallic armor, and the first to use an autoloader. In spite of its modest weight of 38 metric tons, it was armed with a very potent 125mm gun, at a time when 55-ton NATO tanks were still armed with 105mm guns. Its armor was quite thick for the time, and its road speed was very impressive. Indeed, all Soviet main battle tank design until the early 1990s has been only an evolutionary outgrowth of the T-64 design. The T-64 stemmed from two distinct sources, the desire of the Morozov design bureau to explore new tank technologies with a series of test-bed vehicles, and the decision to end heavy tank production by the Khrushchev administration in 1960. By the time of Khrushchev's ouster in 1964, the T-64 design was approaching maturity, and the Soviet Ground Forces desired a new tank with the long range firepower and thicker armor formerly found in the cancelled heavy tanks.

The T-64 tank was an effort of the Morozov design bureau, relocated to Kharkov from Nizhni Tagil in the late 1950s, which had been responsible for the earlier T-34, T-54/55 and T-62 designs. Morozov began work on the new design in the late 1950s, examining two new approaches to the tank question: a conventional tank design, the Obiekt 430 series that would later emerge as the T-64, and the more radical Obiekt 775 missile tank. The new Obiekt 430 tank design was based around the D-68 115mm smooth-bore gun. This did not offer a radical change in performance from the 115mm gun on the new T-62 tank, about to enter service with the Soviet tank force. But there were two other significant changes in the T-64 armament system compared to the T-62. The T-64 used an autoloader, giving it a theoretical rate of fire of 10 rounds per minute, versus 4 rounds per minute for the T-62. Secondly, the T-64 was fitted with a TPD-43B coincidence rangefinder, giving it superior accuracy at longer ranges. Compared to the T-62, the effective range of the gun firing APFSDS kinetic energy projectiles was 1.1km vs 0.9km, while for HEAT shaped charge projectiles it was 900 meters vs. 600 meters.

The T-64 was designed to accompany the new BMP infantry vehicle into the field, meaning that its top speed had to be increased. A new two-stroke opposing cylinder, multi-fuel engine, the 5TDF, was designed, similar in conception to the Fairbanks-Morse locomotive engines that the USSR had received via Lend-Lease from the United States during World War 2. The 5TDF was a very compact engine, with five pairs of horizontally opposed cylinders. This engine was more compact than the similar engine employed on the British Chieftain at this time; the Chieftain employed a vertical engine layout. The engine was fitted with a governor to limit excessive wear, which restricted the vehicle's top speed to 60km/h (37mph).

In order to carry the maximum amount of armor, every effort was made to keep down vehicle size and weight. A light-weight suspension system was used, employing internal shock absorbers instead of the traditional rubber rim, a type of wheel first used on the KV-1 tank of 1939. The suspension used shortened torsion bars, with the 1st, 2nd and 6th roadwheels having an additional telescopic hydraulic shock absorber. This suspension saved several tons of weight compared to more conventional suspensions.

The armor of the T-64, called "Combination-K" was a mixture of conventional steel and ceramic inserts. The ceramic inserts added superior protection against HEAT shaped charge projectiles, which at the time were the preferred type of ammunition used by NATO tanks. Another unusual innovation in the design was the incorporation of "gill" armor panels over the suspension, which were sprung outward during combat to reduce the effectiveness of HEAT projectiles when fired against the suspension area. The T-62's angled steel armor offered the equivalent of 200mm of steel against APFSDS and HEAT; the T-64 armor was equivalent to 410mm of steel against APFSDS and 450mm of steel against HEAT warheads.

The Obiekt 775 design was even more radical. The Soviet premier, Nikita Khrushchev, had an infatuation with missiles, preferring them to more conventional weapons. There was some fear that he might cancel main battle tanks as he had cancelled heavy tanks. A missile armed tank was insurance by the designers that this would not happen. The Obiekt 775 only had a two man crew, both in the turret. The gun was a short tubed rocket launcher. It could fire either a radio-guided anti-tank projectile with a HEAT warhead, or a rocket propelled general purpose projectile with a high-explosive-fragmentation warhead. The gun system was fully automated and the commander also served as the gunner. The driver was located in the right side of the turret, and his station automatically rotated so that he would always face forward. A similar system was later attempted in the American/German MBT-70 design. By placing the driver in the turret, the hull could be made considerably lower and more ammunition carried. The basic ammunition load was 24 guided missiles and 48 general purpose rounds, fed in by a semi-automatic loader.

The Obiekt 775 prototype was ready for trials in 1962. The prototype suffered from serious reliability problems which doomed its further development. The Soviet Ground Forces ordered the Obiekt 430 design to be accelerated. Several different design alternatives were studied with various types of suspensions, engine layouts and other changes. Following Morozov's retirement, the design team was headed by Nikolai Shomin. However, the design bureau decided to proceed with another missile carrier which was intended to complement the T-64 tank. The new Obiekt 287 missile carrier, also on the T-64 chassis, would offer long range firepower. This design was also quite novel. The vehicle had a pop-up launcher in the rear of the hull which was armed with 15 radio-command guided missiles. To the front sides of the launcher were two small unmanned containers armed with 73mm 2A28 Grom low-pressure guns (the same as on the BMP-1) to provide short-range self-defense, each with 32 rounds of 73mm ammunition. The crew of the Obiekt 287 was two men, a driver and a commander/gunner with the engine in front. The project was eventually judged a failure. The missiles proved to be susceptible to jamming, and the loading system was difficult to operate and not reliable. Further work was undertaken on another missile carrier based on the T-62 tank, called the IT-1, but it too never entered quantity production.

Production of the T-64 tank was authorized to begin on a limited scale in 1965-66, based on the Obiekt 432 design with its 115mm gun. Full scale production was delayed by problems with the vehicle's reliability and the new transmission. Among the more serious reliability problems was the gun autoloader. Nicknamed the "Korzina" (Basket) system, the 30 rounds of split ammunition were stowed in "L" shaped containers with the projectile horizontally at the bottom and the casing vertically around the rim of the turret basket. The gunner traversed the autoloader to the desired ammunition type, and the projectile was fed in. After firing, the casing was slipped back into the empty carousel slot. The autoloader operated in very cramped spaces, and besides having reliability problems, sometimes snagged on the crew's loose-fitting overalls, slamming the crewman into the breech as well. The transmission had a pair of single-stage planetary clutches, and oversteering led to significant power loss.

About 600 of the initial version of the T-64 were produced. In subsequent years, they were redesignated T-64R to distinguish them from the later production versions of the series with the standard 125mm gun. In the late 1960s, Shomin proposed a substantial modernization program for the T-64, substituting the new D-81 125mm gun for the D-68 115mm gun used on the early versions of the tank. This vehicle, codenamed Obiekt 434, entered trials in 1967 and was accepted for service in 1969. The new gun reduced the ammunition load to 38 rounds, compared to 40 in the T-64R. The original production batches of the T-64 were otherwise similar to the original T-64R. The T-64 went through a series of evolutionary improvements as is recounted below.

T-64R - This is the pre-series production type with the D-68 115mm gun. Ammunition was 40 rounds, of which 30 were in the Korzina autoloader. Total production was about 600 tanks.

T-64 - This was the initial production version with the 125mm D-81T gun. This version had the ZIP tool stowage bin on the right front side and no rear turret stowage bin. Most of these were later modernized as T-64A(rebuild).

T-64A - The T-64A was the first major production series of the T-64 family. It incorporated a number of changes from the initial T-64R and T-64. The ZIP tool stowage box on the right front fender was replaced by an additional fuel cell. A substitute ZIP tool stowage box was added behind the turret. The T-64 had a variety of other internal improvements added. Total production was over 1400.

T-64A(rebuilt) - The T-64A(rebuilt) is a rebuilt T-64 or T-64A, incorporating the new improvements found on later T-64 models. This includes substitution of a rubber side skirt for the gill armor, addition of glacis plate hull armor applique, stowage improvements and other small changes.

T-64B - The T-64B was a redesign of the T-64 to incorporate a new generation of hull and turret armor which was not as bulky as the 1st generation Combination K armor on the T-64A, while offering the same or better protection. The T-64B also introduced the new 9M112 Kobra radio-command guided anti-tank missile (AT-8 Songster). This missile requires a radio-command antenna box, which is fitted immediately forward of the commander's right turret station. A new gunner's sight was fitted which included a laser rangefinder, making the right hand portion of the coincidence rangefinder unnecessary. The T-64B carries 36 rounds of conventional ammunition and 6 Kobra missiles, compared to 37 rounds of 125mm ammunition on the T-64A. This version was called SMT M1980/2 by NATO. When fitted with smoke mortars, it was dubbed SMT M1981/1.

T-64B1 - The T-64B1 is an upgrade to the T-64B, although details of specific improvements are lacking. It may distinguish between new-build T-64Bs, and tanks rebuilt to T-64B standard on the basis of older T-64As during periodic rebuilding. The T-64B1 is an uncommon type with only about 400 built compared to over 1200 T-64B.

T-64BV/T-64B1V - The -V designator identifies tanks retrofitted with explosive reactive armor (ERA). This type of armor was developed under the direction of V.N.Bryzgov at the NII Research Institute of the Main Armor Directorate at Kubinka in the Moscow suburbs.

T-64 Command Tanks - There are three command tank versions of the T-64 series. These types are identified by a "K" suffix after the usual designation. The command types have an additional command radio compared to the usual radio fit, and usually have a land navigation device, less ammunition and an additional external radio antenna storage tube. The three main command types of the T-64 family are the T-64AK, T-64B1K and T-64BV1K. The T-64AK was not fitted with the usual 12.7mm NSVT machine gun over the commander's station. Additional

types on other variants may also have existed in the past, but have been consolidated into these types by 1990.

T-72 Update

The T-72 tank was developed by a team at Nizhni Tagil headed by Valeriy Venediktov. Because of its roots at the Ural plant at Nizhni Tagil, the T-72 is sometimes nicknamed the "Ural" tank. The main aim of the program, codenamed Obiekt 172, was to develop a less expensive alternative to the highly complicated and expensive T-64. While the T-64 tank was intended to supplement the more numerous medium tanks such as the T-55 and T-62 which were still in parallel production, the T-72 was intended to entirely replace the T-55 and T-62 in the Soviet Ground Forces. The smaller numbers of the more sophisticated T-64 (and later T-80) tanks were deployed with high readiness units such as those in Germany. The T-72 was also intended for export while the T-64 and T-80 were not.

Since the original Concord book on the T-72 has appeared, additional information of T-72 designations has appeared. The designations given in the original Concord book were mainly "exported" designators, given to variants of the tanks exports abroad. The designators used within the Soviet Ground Forces have now been declassified and are listed below.

Export	Soviet	Polish/ Czechoslovak	STANAG(NATO)
T-72A	T-72	T-72	T-72
T-72B	T-72	T-72	T-72
T-72G	T-72A	T-72M	SMT M1980, SMT M1980/1
T-72M1	T-72A	T-72M1	SMT M1981/3, SMT M1984
T-72M1M	T-72B	-	SMT M1988(Super Dolly Parton)
T-72S,T-72S1	T-72B1	-	FST-1, SMT M1986
-	?	-	SMT M1990

The export designation T-72M2 (T-72 with NDZ armor/super Dolly Parton turret) is now known to be T-72M1M for export, and T-72B in the Soviet Army. The T-72S is a new export tank with the 1K13 sight associated with the 9K120 Svir tube-fired anti-tank guided missile, and the improved V84 engine and corresponds to the Soviet T-72B1. Another new variant of the T-72, called SMT M1990 by NATO, has been seen fitted with the 2nd generation reactive armor of the T-80U, but the designation of this vehicle is not yet certain. These variants are all shown in new photos in this book.

T-80

The T-80 tank was developed by Nikolai Shomin's design team at the Morozov Design Bureau in Kharkov under the codename Obiekt 219. The T-80 tank was intended to offer superior automotive performance to the T-72 family. It did so by the introduction of the new SM-1000 gas-turbine engine, developed by the V.Ya.Klimov NPO, and manufactured by the Kirovskiy Plant in St. Petersburg. The T-80 uses an improved version of the D-81TM gun seen on the late-model T-72 variants.

T-80 - This is the basic production version of the tank. It is sometimes nicknamed the "Kobra", due to its use of the 9M112 Kobra radio-command guided missile. This is a relatively uncommon type, and only a few hundred were built.

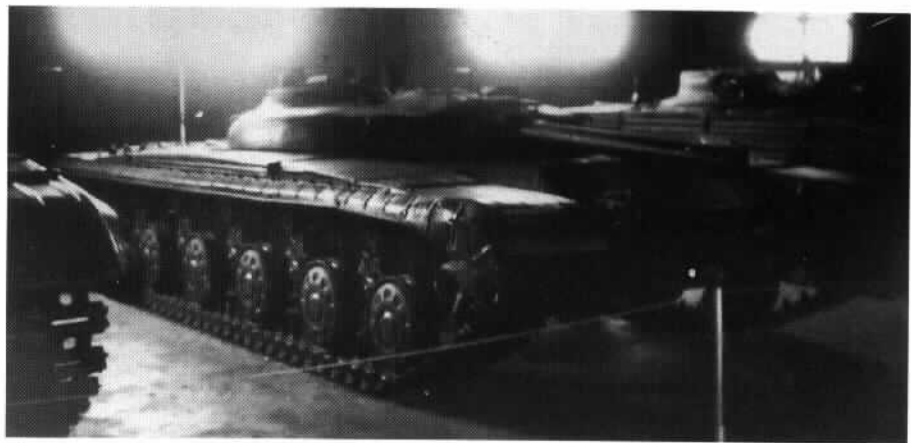
T-80B - Sometimes nicknamed Beryoza (birch Tree), this is the first major redesign of the T-80 family with a modified turret. The turret incorporates a new generation of Composite K ceramic armor which offers better protection against APFSDS kinetic energy penetrators. The turret has an equivalent protective level of 500mm steel compare to 410mm in the earlier models and the T-64. This is the most common variant of the T-80, with over 3,500 in service with Soviet tank units west of the Urals as of 1990. The T-80BK is the command tank variant.

T-80BV - The T-80BV is the T-80B fitted with 1st generation explosive reactive armor. The T-80BVK is the command tank version. There is also a late production type with a new turret similar to the SMT M1989, but fitted with the turbine engine and 1st generation ERA. This is probably the T-80U.

T-80D - Soviet documents refer to a T-80D. Nothing definite is known of this variant though it may refer either to an initial diesel powered version of the T-80, or a T-80 equivalent of the T-55AD Drozh anti-missile air defense vehicle.

T-80U/T-80UD - This is the latest version of the T-80 family, sometimes called the SMT M1989. This version has two significant changes from the earlier T-80 family, including a new turret with an improved frontal armor package with 2nd generation reactive armor. This variant is equipped with the 9K120 Svir laser guided antitank missile in place of the older Kobra. The standard version is fitted with the 6TD diesel engine, a 6-cylinder derivative of the 5TDF engine found in the T-64 family. There have been reports that a version of this tank exists with the older gas-turbine engine, but equipped with the modified turret and 2nd generation reactive armor. In the photos here, this version is referred to as the T-80UD.

T-64



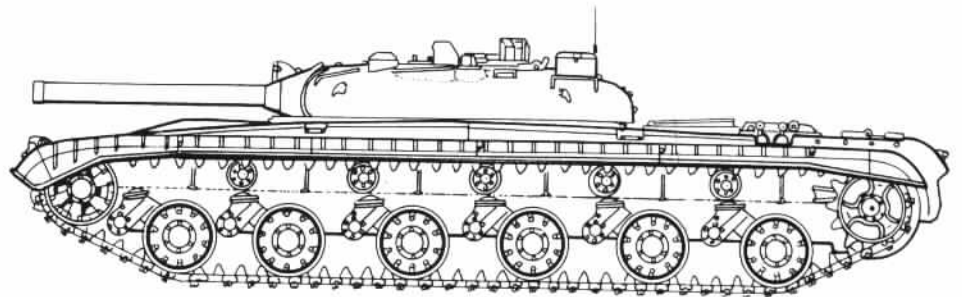
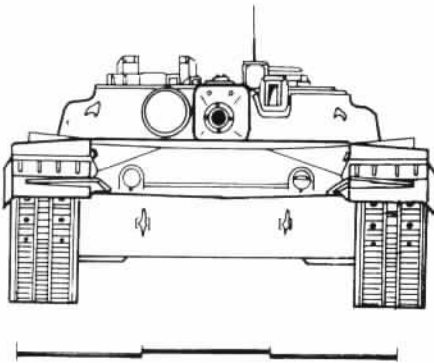
Parallel to the T-64 program was the Obiekt 755 missile tank. The two-man crew configuration permitted a particularly low hull, and low overall profile. In the background is the Obiekt 287 prototype.



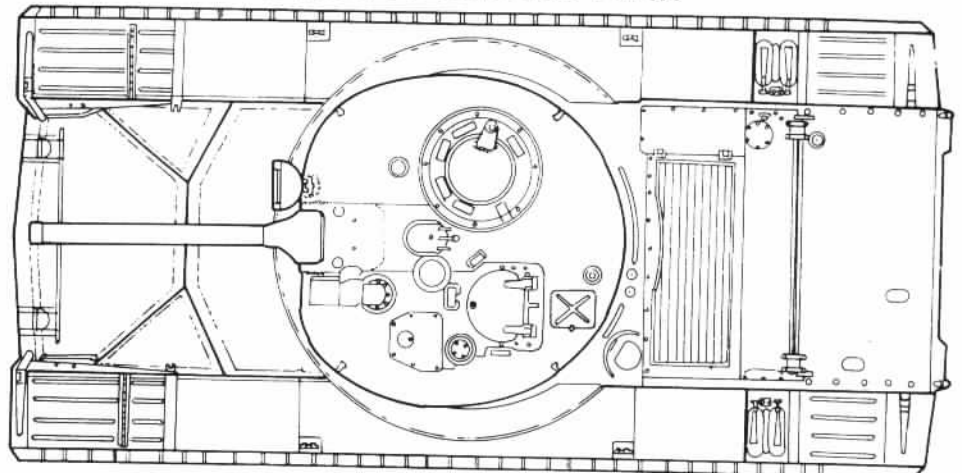
The initial testbeds for the T-64 differed in many details from the production vehicle. Notice the suspension, which is completely different, and the coincidence rangefinder, which on this test-bed is imbedded in the forward portion of the turret roof.



The prototype for the T-64 is fairly close to the production vehicles except for the glacis plate which lack some of the production features such as the V-shaped splash shield. The "gill" armor is particularly evident on this vehicle.



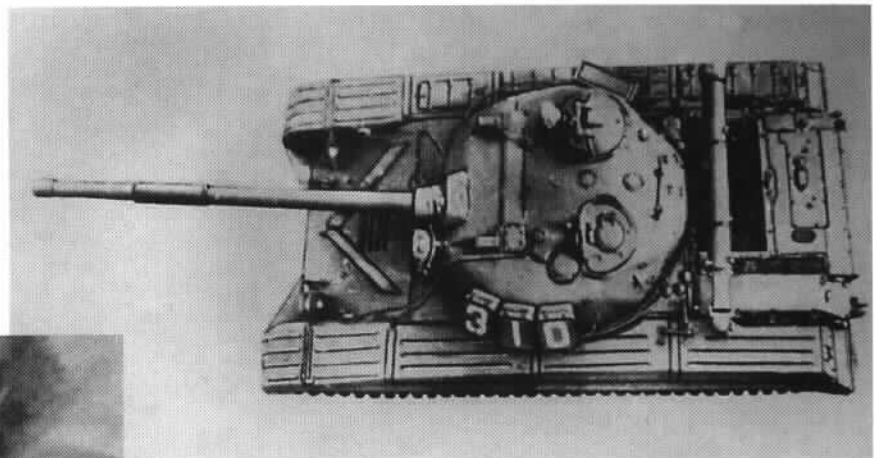
Obiekt 775 Missile Tank





A T-64R still in service in the 1980s. The only distinguishing feature of this variant is the shorter gun tube.

The first production variants of the T-64 series were armed with the D-68 115mm smooth-bore gun, later called T-64R. One of the distinctive features of the T-64R and the later T-64 (125mm) was the provision for a tool storage bin on the front left fender. This small detail will be noticed in this view. As a result, these early variants lacked the typical rear storage bin of later T-64 models.



Although retouched by Soviet censors, this view shows a very early production T-64R on maneuvers.



The initial production of the T-64 with D-81T gun lacked a thermal sleeve over the gun tube. This vehicle can also be distinguished by the right fender ZIP tool storage bin on the fender.

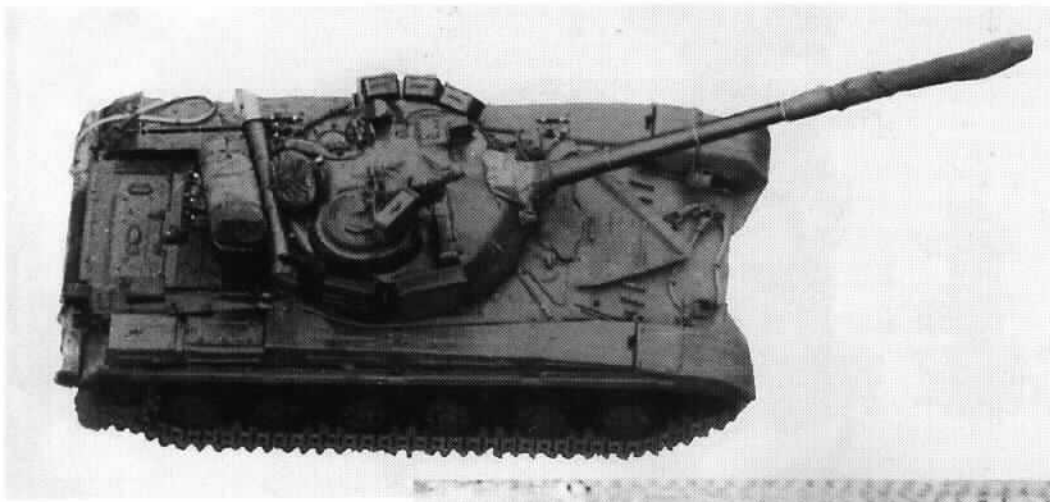


The T-64 remained in service until the 1980s, though most were upgraded to the T-64A (rebuild). This vehicle shows the characteristic features- the 125mm gun without the thermal sleeve and the right fender ZIP container.

When the T-64A was first spotted by NATO intelligence in Germany in the early 1970s, it was misidentified as the T-72. This overhead view shows the characteristic features of the standard production T-64A-the thermal sleeve over the gun tube, the deletion of the right fender ZIP, and the addition of a new ZIP tool stowage container on the turret rear.

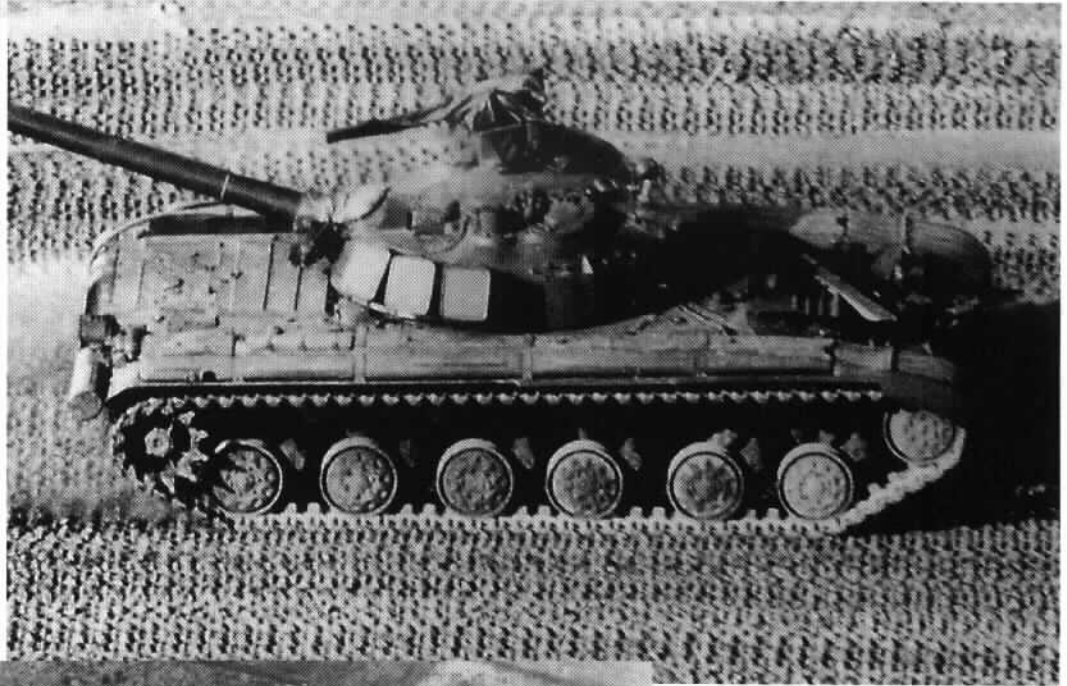


A frontal view of a T-64A. This vehicle has complete stowage, although the "gill" armor panels are not fitted.



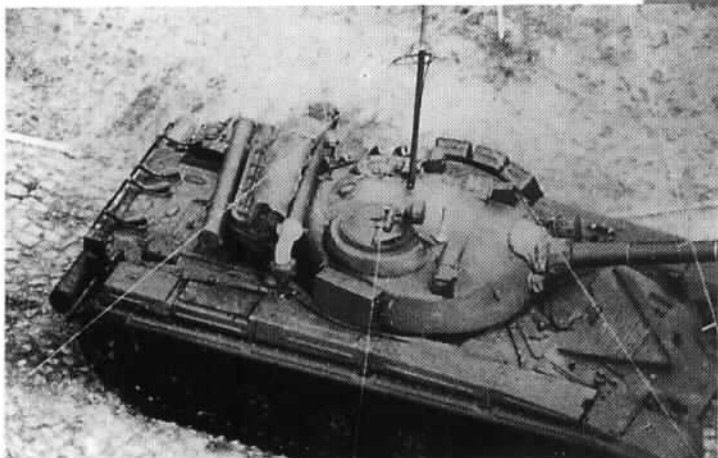
The large tube fitted behind the turret is part of the PVT deep wading system. One tube is fitted over the rear engine port, while another fits into an opening in the gunner's hatch.

A T-64A moving at speed. In this view, the turret is traversed to the rear. The steel-rimmed road-wheels are very evident in this view.

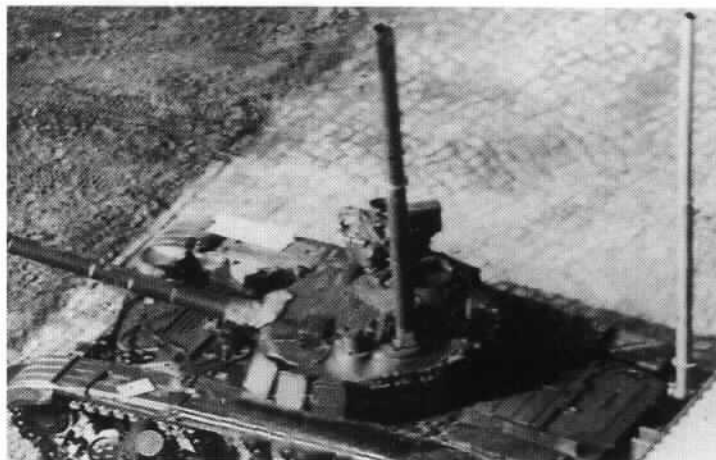


Another overhead view of the T-64A. This shows two details often obscured by stowage- the pattern of the rear turret ZIP box's hatch and the provision for stowing spare track links on the rear left turret side.

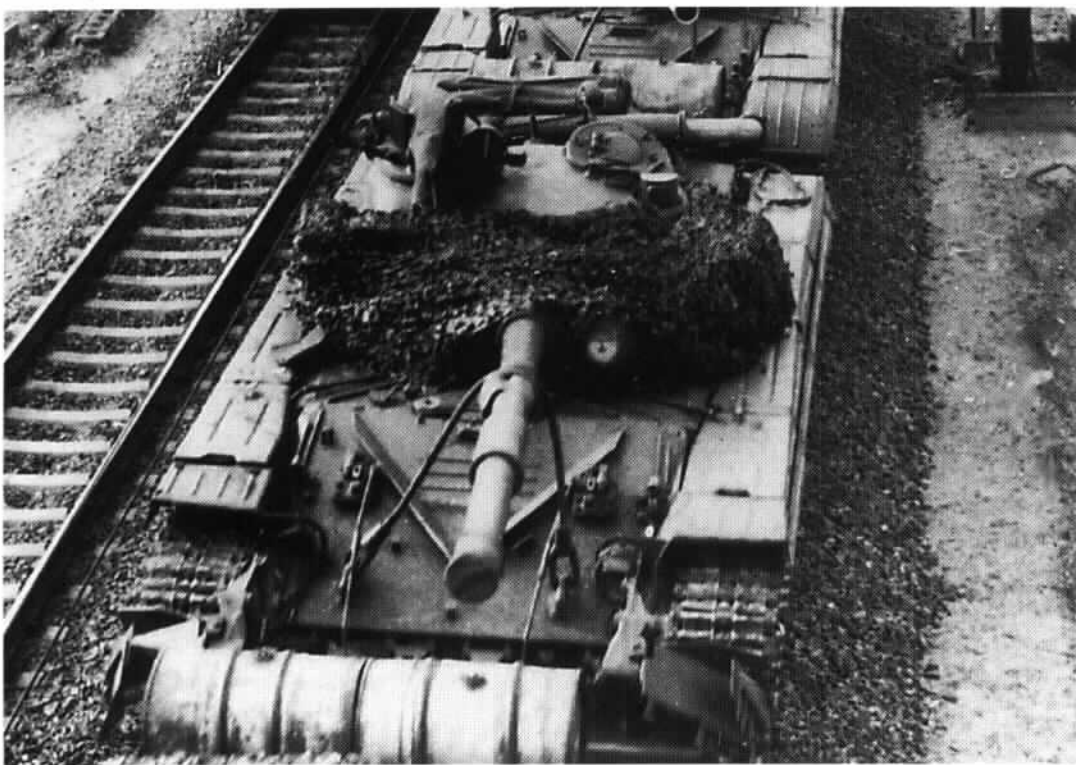
This overhead view shows a T-64A fitted with the KMT-6 mine rakes. These mine rakes were an elaboration of earlier types used on the T-55 series, but adapted for the T-64. This particular tank has portions of its gun thermal sleeve removed.



The T-64AK is the command version of the T-64A. In this view, the additional antenna is seen fully erected with the guide wires holding it down. Other detail differences are the absence of the commander's NSVT 12.7mm machine gun, and the additional small radio antenna added just beyond the left front corner of the commander's cupola. Notice that this vehicle has both sets of OPVT wading tubes stowed- the engine tube behind the turret, and the turret tube to the rear of the turret ZIP stowage container.



An interesting view showing the OPVT snorkels fitted to a T-64A.



A T-64A fitted with KMT-6 mine rakes. When using mine rakes, the front dust guards are sometimes removed to prevent damage.



An interesting overhead view of a T-64A tank park. The nearest vehicle has KMT-6 mine rakes. Also interesting is the fact that the tank has the "gill" armor panels fitted, not all that common a practice after the early 1970s.



A T-64A in the field in Czechoslovakia in the mid-1980s. This tank has white stripes painted over it, forming a cross when viewed from above with the arms joining on the center of the turret roof. This particular marking is a very common one during Soviet exercises, often being used to distinguish "aggressor" forces. This vehicle is camouflage painted, and has an interesting marking painted on the searchlight cover- a red star with white or yellow wreath. Barely evident are the fold-out "gill" armor panels on the sides of the suspension.

A heavily stowed T-64A with the Central Group of Forces in Czechoslovakia in the 1980s. It lacks the full OPVT tube stowage.



A T-64A stowed for transport. The barrel is held down by tow cable to prevent the turret from swinging during transport.



A T-64A during rail-transport in the 1980s. The unit insignia on the turret side is not that common during peacetime. The vehicle bort number is carried on the left turret stowage bin, but is covered in this view by a canvas panel.



An early production T-64. Sometime of these vehicles there is so much stowage present on this vehicle that it is visible from a distance.



This view of a T-64A in transit gives an unusually clear view of the complicated suspension of the T-64 tank family.



A T-64A on parade in Hungary in the 1980s. The Guards Tank Army is the only unit that uses the T-64A, except for parades or other demonstrations.



A pair of T-64A in transit with a regimental unit insignia evident on the turret front-two concentric circles with the inner circle having a hollow triangle. The lead vehicle is an early production T-64 with the fender mounted ZIP stowage bin. Another feature of this variant is evident here- the long grab-bar at the base of the front turret sides. This feature was dropped on the standard T-64A.



A clear side view of a T-64A showing the method of attaching blocks to the suspension. The blocks are attached to the left, while the racks for two more blocks are attached to the right. Most vehicles have only two racks, located horizontally rather than vertically.



r had rear turret stowage bins added, though
hard to tell.



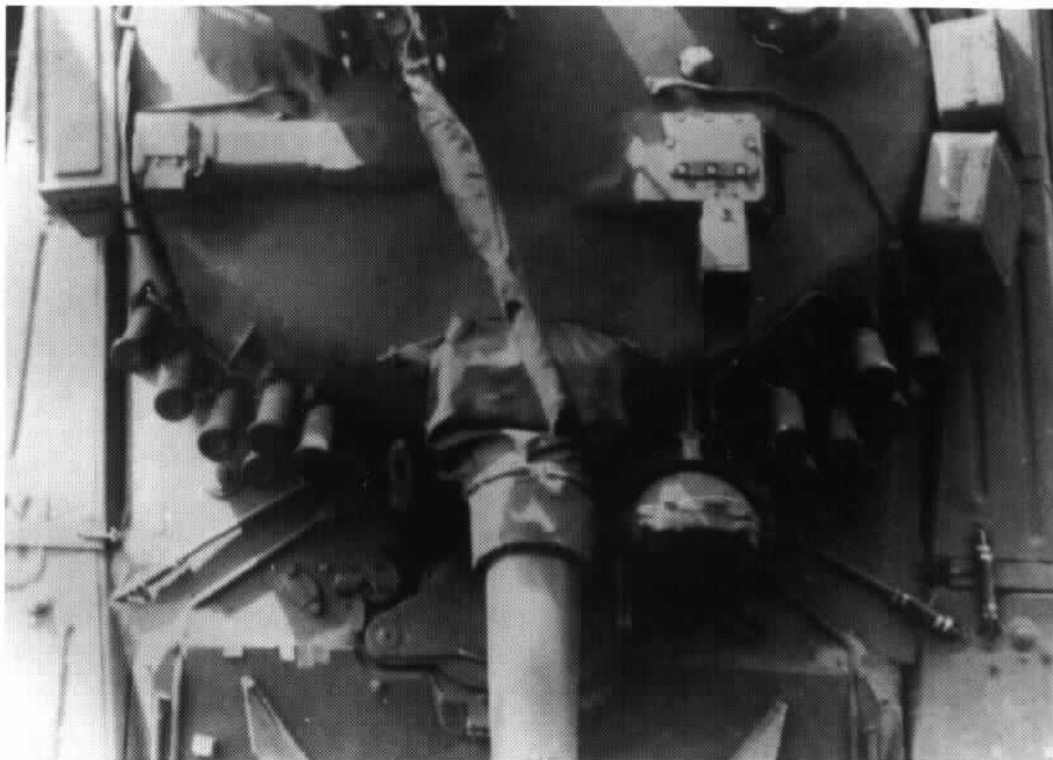
insignia is not particular common in peacetime



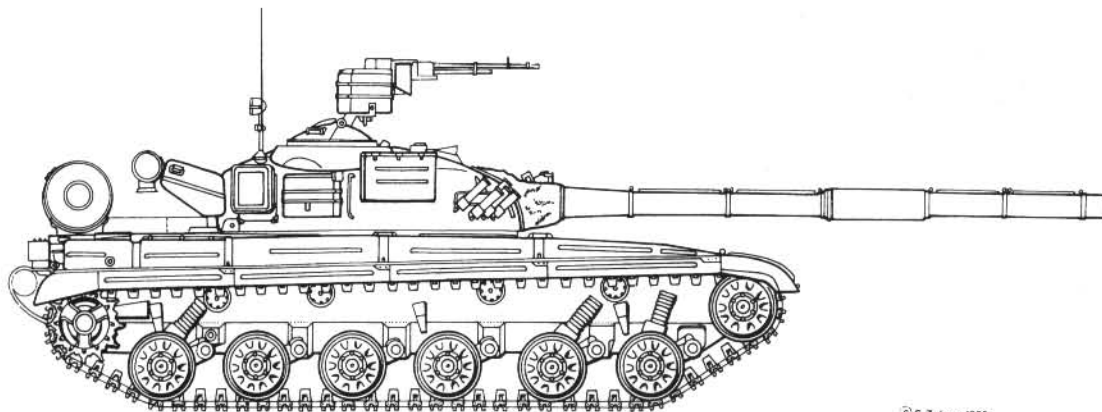
ink stowage on the left turret rear. Two track
are empty. This is not entirely typical stowage;
n vertically as seen here.



A T-64A having its bore cleaned. This particular tank is fitted with KMT-6 mine rakes.

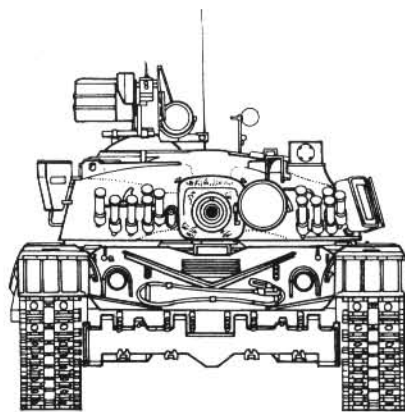
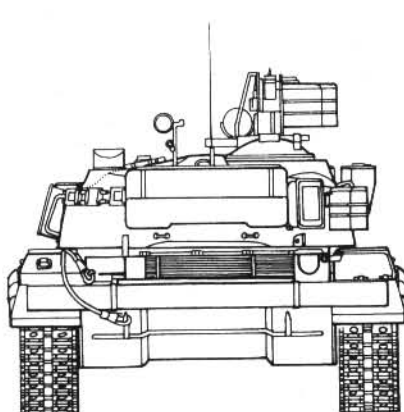
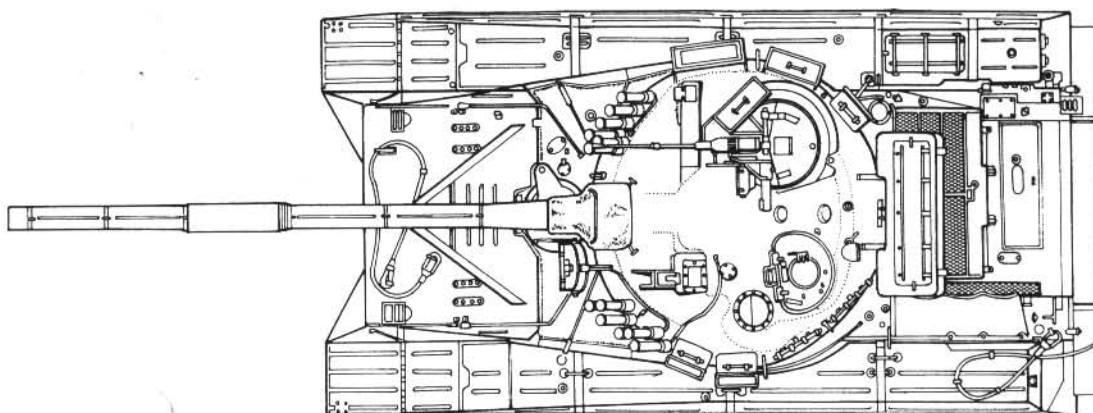
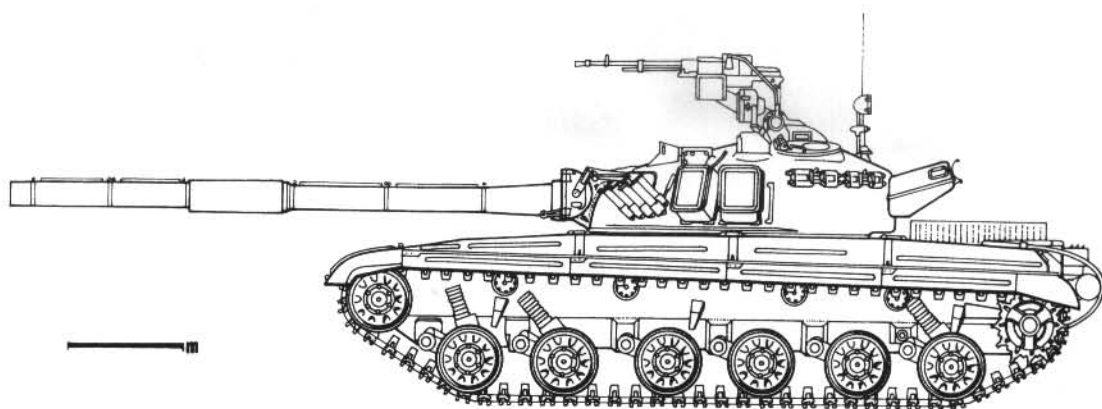


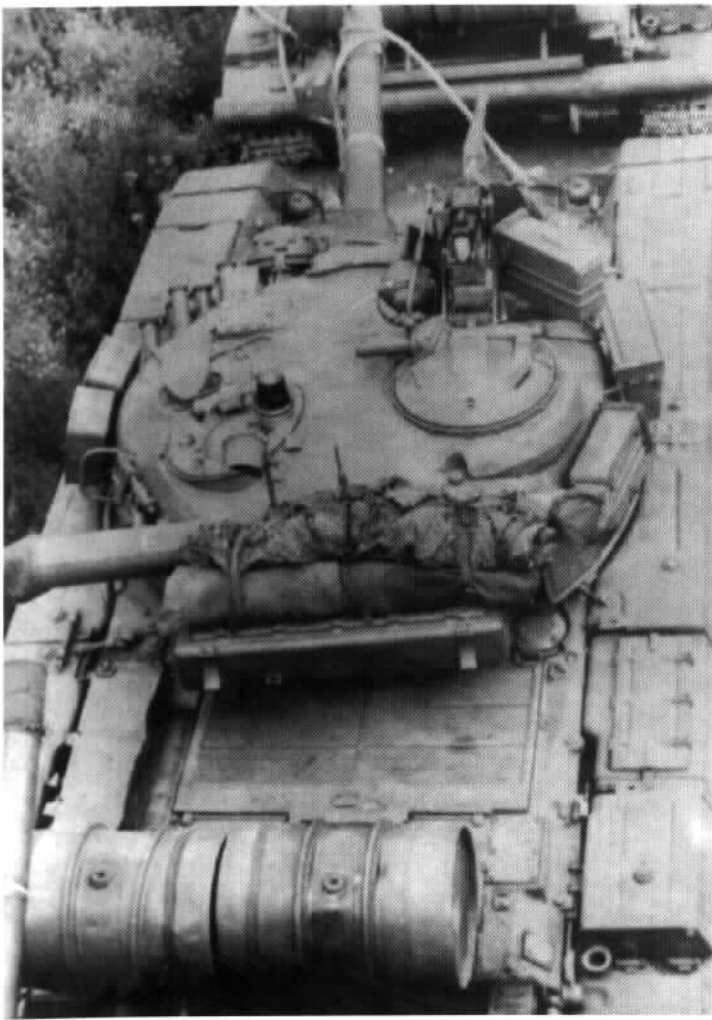
In 1979, T-64A began to be fitted with 12 smoke mortars on the turret front as is seen in this overhead view.



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T-64A Tank





An interesting rear overhead view of the rear deck of a T-64A. This shows the typical twin 200 liter fuel drums carried on these tanks.



The T-64A (rebuild) is an upgraded T-64 or T-64A. The hull glacis plate has an added layer of about 30mm of steel armor applique added. This can be most easily determined by the reduction of splash strips in front of the driver. Normally there are four, after the upgrade there are only two. Other internal improvements probably took place at the same time on the vehicle's transmission.



An interesting view contrasting the new with the old- a T-10M to the left and a T-64A (rebuild) to the right at the Central Soviet Army Museum in Moscow. When Khrushchev ordered heavy tank production ended in 1960, the Soviet Army circumvented the directive by acquiring the new high technology T-64 tanks alongside cheaper T-55s and T-62s, all in production at the same time. Notice how much lower the T-64 is to the T-10M.

A close-up of a T-64A rebuild. This vehicle is classified as a T-64A even though it was obviously based on an older T-64 as is evident from the right fender ZIP box cover evident in the foreground of this photo, and the grab-iron around the base of the turret. The thickness of the added glacis plate applique can be seen by noting the edge of the cut-out in front of the driver's viewport.



A close-up of the mounting for the NVST 12.7mm machine gun. The machine gun is absent in this view. This mounting is remotely controlled from inside the turret.

Another characteristic of the T-64A rebuilds- the added black rubber skirting panel. This panel was intended to keep down dust as well as act as a stand-off panel to detonate small caliber anti-tank rocket and missile warheads.



A front view of the T-64A rebuild at the Moscow museum. This view shows the pattern of the added glacis plate armor panel on the bow of the vehicle.



The Moscow museum vehicle has some of the stowage container covers removed showing the plain insides.

A T-64A rebuild during wargames in Hungary in 1989. This vehicle not only has the basic rebuild features such as the added glacis armor, but also the 12 smoke mortars. In front of the tank is a Soviet officer (to the left, and a Hungarian officer (in camouflage coveralls) to the right.



A T-64A rebuild tank crew talking to NATO observers during 1989 wargames in Hungary. Notice how the added glacis armor has cut-out for the KMT mine roller attachments on the hull front outside the V-splash shield.

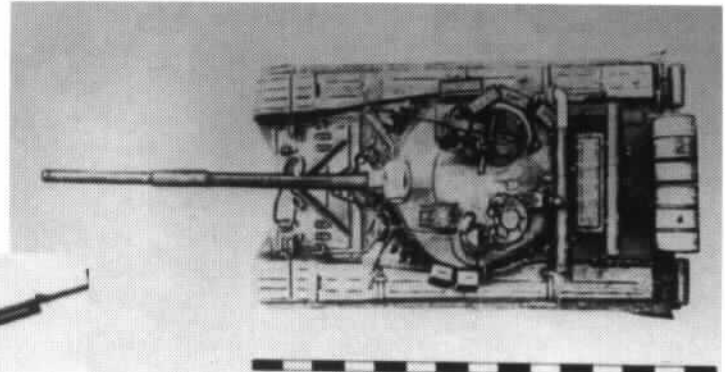


A T-64A rebuild moving off a railroad car during 1989 wargames. This tank is from a Guards unit simulating an aggressor force judging from the white identification band.



Another T-64A rebuild during summer exercises. This vehicle is an older T-64 with the initial gun-tube minus the thermal sleeve, turret grab-iron and fender ZIP boxes.

An overhead view of a T-64B tank. This variant had a new turret of slightly different shape on the front. In addition, the turret had a layer of plastic anti-radiation liner added over the top of the roof and the rear of the turret. The main feature of this variant was the addition of a guidance control box for the Kobra missile in front of the commander's station, obscured by the commander's NVST machine gun in this view.



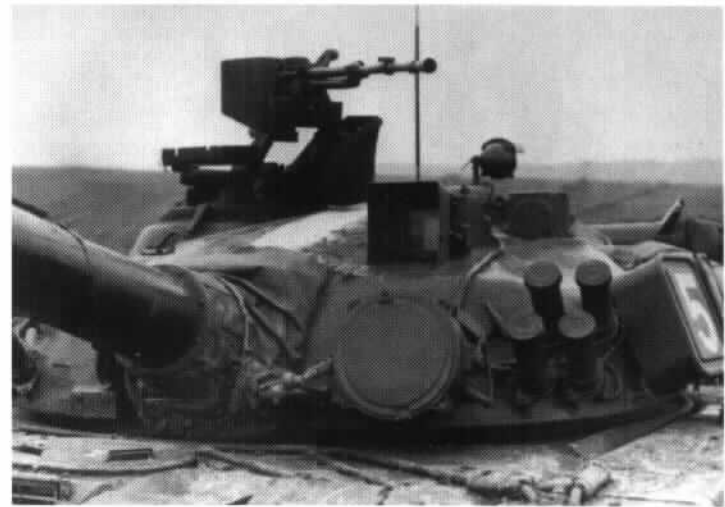
A T-64B tank during maneuvers in the late 1980s. This can be identified by the small platform located in front of the commander's cupola, although the guidance box itself is absent. Several other details are worth noting. The side panniers are labeled, from left to right: MASLO (Oil); ZIP (Tools); TOPLIVO (Fuel). The vehicle tactical number is 445, while on the rear stowage box is a unit tactical insignia 180/2 in a triangle. Inverted triangles are usually the sign of company sized formations. This tank has the white bands of a wargame aggressor force.



A close-up of the turret of a T-64B. The later production T-64B (possibly the T-64B1 series), had additional plastic anti-radiation liner added to the turret roof and the turret rear sides. This can be seen by carefully studying the photo-the small circular plugs characteristic of this material are evident.



A rear view of a T-64B engine deck. The vehicle is heavily stowed, and is fitted with four racks for spare track links on the left rear turret side.



A detailed front view of a T-64B turret. The most distinctive feature of this variant is the enlarged gunner's sight which contains a laser rangefinder. Also evident in front of the commander's cupola is wiring leading down to where the Kobra control box is fitted-the box is not present in this view. The other characteristic of the T-64B-the new turret, is a more subtle change, noticeable by the slight plateau effect of the front edge of the turret roof. The T-64B also carry fewer smoke grenade launchers than the rebuilt T-64A.

Another T-64B turret shot. In this view, the added glacis plate applique is evident, as well as the other characteristics-the enlarged gunner's sight and the electrical conduit for the Kobra guidance box. Canvas covers are placed over the side turret numbers. The Kobra box is attached to the two vertical posts behind the right turret stowage box, and the small flat plate located in front of the commander's cupola.





A fine character study of a T-64B on wargame maneuvers in 1989. This vehicle has the Kobra control box fitted in front of the commander's station. The other typical T-64B features are present as well including the increased glacis armor, enlarged gunner's sight, and smoke mortar configuration. Note also the use of a T-55/T-62 fuel pannier instead of the more usual 200 liter drums.



The T-64B was first seen at the May 1985 Victory Parade in Moscow. This was the first time that the T-64 of any variant had been displayed at Moscow, and a reminder of how secret this tank had been for many years. Photos of the T-64 did not begin appearing in the Soviet press until this time. These vehicles have the characteristic T-64B features except that their turret stowage is different. This turret stowage pattern appears to be the style found on the T-64BV with reactive armor, these vehicle may have been from the Kubinka NIIBT in the Moscow suburbs where ERA experiments were going on at the time.



A T-64B on exercise in Hungary in 1989. The small attachment point for the Kobra guided missile control box is evident in front of the commander's cupola.



A rear detail view of a T-64B showing the rear engine grill and the rear of the turret stowage box. The two semi-circular attachments on the turret box are for the turret OPVT wading tube.



A T-64BV, minus the explosive bricks on summer maneuvers. The many small attachment bolts are very evident in this view. Notice also that the stowage bins and smoke mortar layout has been changed to accommodate the ERA.



A T-64BV on exercise in Hungary in 1989. This shot is particularly interesting as it shows the attachment racks for the frontal ERA bricks fitted, even though the bricks themselves are not attached. This view also shows the elusive Kobra command box.



A T-64B fitted with the Kobra radio-command guidance sight. When the missile is launched, it is tracked by the gunner's enlarged sight via an IR beacon on the missile fuselage. The gunner's sight automatically tracks the missile relative to the target, and transmits flight alterations to the missile via the radio control box in front of the commander's station, probably in the 30-35 GHz range. This missile has a range of 4km, and can penetrate up to 800mm of steel armor, sufficient to defeat any tank armor of the early 1980s.



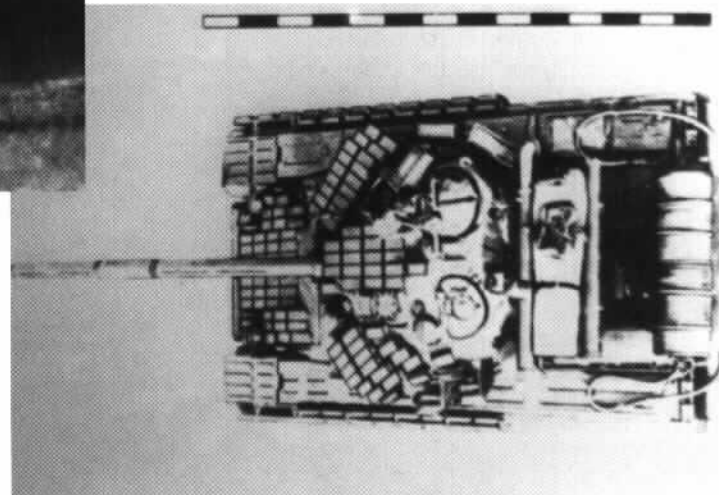
A T-64B moving at speed and kicking up mud. This vehicle also has the Kobra command box fitted.



The same tank, bort number "326" with the turret traversed to the rear. This shows some details of the rear stowage bin.



A T-64B on the move. This vehicle has the engine OPVT snorkel on the rear of the stowage bin rather than the normal location on top.



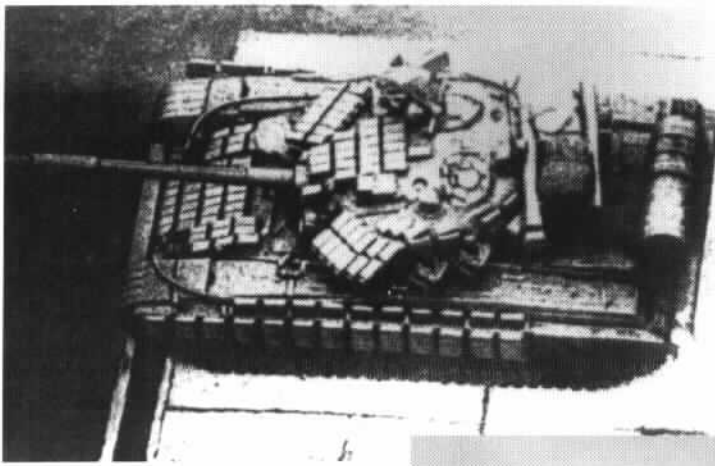
In the late 1980s, the T-64 began to appear with Kubinka explosive reactive armor (ERA). This variant is designated T-64BV, the V standing for *vzryvnoi* or "explosive". This overhead view shows the pattern.



A T-64BV in transit showing the attachment points for the ERA bricks.



A close-up view of the T-64BV turret minus the bricks themselves. Another detail evident here is the modified attachment arrangement for the Kobra control box, consisted of sheet metal supports under the box. Also evident by careful inspection of this view is the plastic anti-radiation armor on the roof, and around the base of the commander's cupola.



Another overhead view of a T-64BV showing the armor layout. This one is unusual in that the hull side bricks are also shown. These are not commonly fitted in peacetime as it is nuisance to service the suspension when they are present, and they tend to get knocked off if traveling in rough terrain.

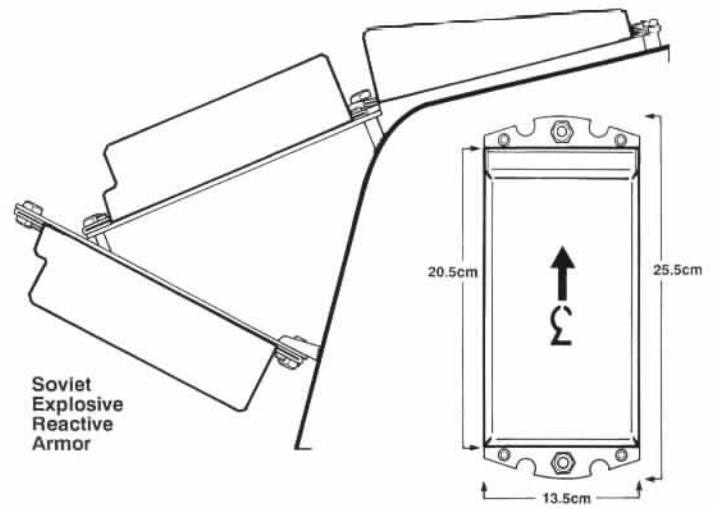
A good detail view of the left turret side of a T-64BV. This shows the modified smoke launcher array, as well as the layout of ERA bricks. The stenciling on the fuel tanks reads *ТОПЛИВО* ("fuel" in Russian). The small semi-circular device behind the gunner's hatch seems to be a standard fitting on the T-64B and T-80, but its role is not certain.



On some of the later T-64BV tanks, the smoke mortars were deleted, and a slightly different pattern of ERA bricks was used as seen here.



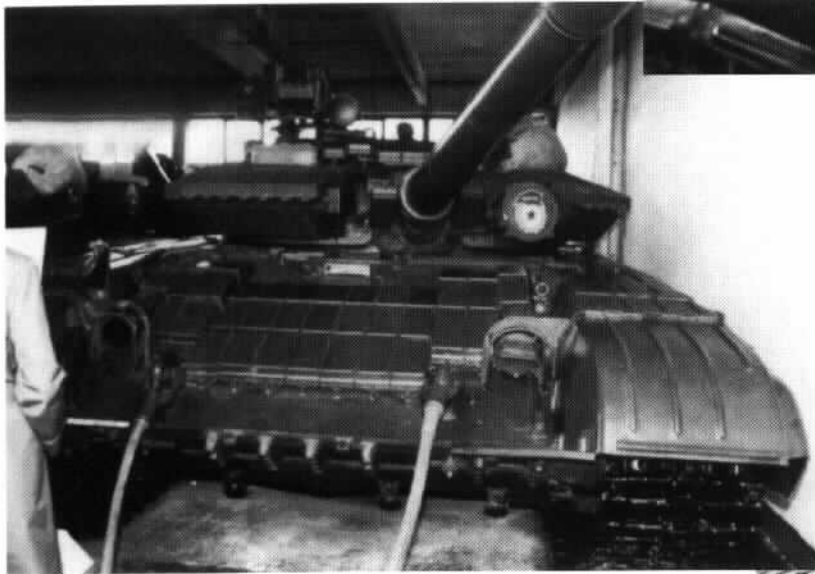
A T-64BV showing the ERA brick arrangement. Notice how far the roof bricks are spaced from the turret roof. Also note that the final row of bricks in the array are of a different cross-sectional shape.



A frontal view of a T-64BV showing the arrangement of the ERA bricks. This view is also interesting in that it shows the Kobra control box.



A detail view of a T-64BV showing the arrangement of the ERA bricks on the hull front.



Another frontal view of the T-64BV. This angled view accents the fact that the outer bricks are not fitted flush to the glacis plate. Notice also that the upper row of bricks use the wedge shape rather than the more common brick shape.



A T-64BV in rail transit. On this vehicle, the usual rubber side skirts are absent, giving a clearer view of the suspension.



A detail view of a T-64BV showing the frontal ERA brick arrangement.



A close-up of the brick arrangement on the right turret side. The attachment bracket projecting out from the turret side is used to hold an additional 12.7mm ammunition box for the commander's NSVT machine gun.

Another close-up of a T-64BV turret. This provides a good look at the Kobra control box. Notice also that a regimental insignia has been painted on the forward row of turret ERA bricks.



A close-up of a T-64BV turret, also showing the Kobra control box.



A T-64BV showing the enlarged gunner's sight characteristic of this variant.



Summer wargames in the late 1980s, with a T-64A fitted with KMT-6 mine rakes.

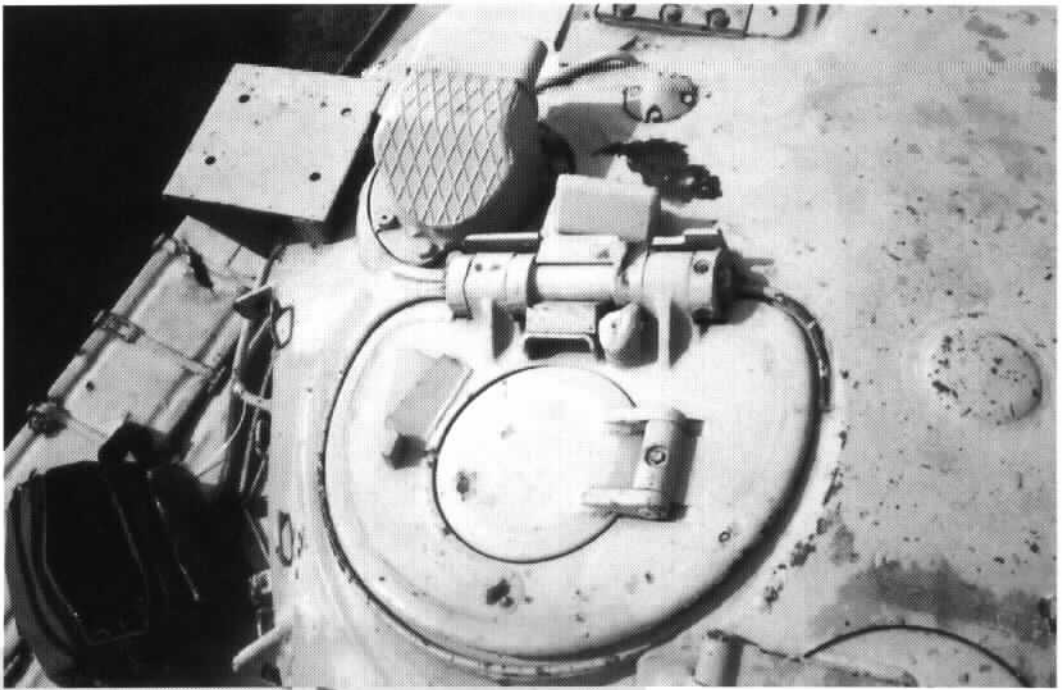


A view of the KMT-6M2 mine rake in the folded (travel) position.

A detail side view of the KMT-6 mine rake on a T-64. This is probably the improved KMT-6M2 version.

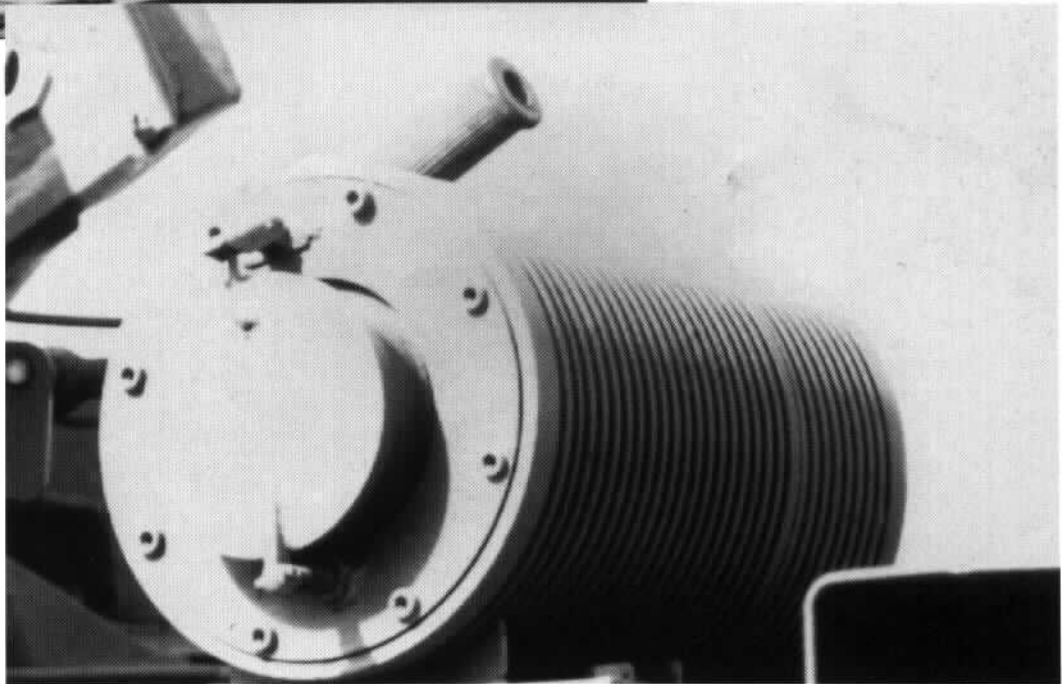
T-72 UPDATE

Iraqi T-74M tanks during the Gulf War were fitted with a Chinese manufactured "dazzler". The dazzler was usually mounted on the small panel seen to the left of the gunner's sight.

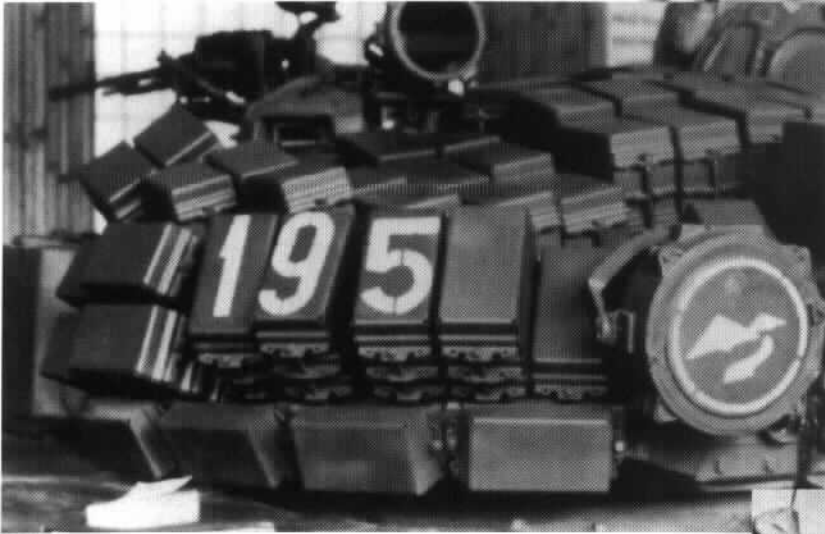


This T-72M1 displayed in Baghdad before the 1991 Gulf War shows the dazzler located on the turret roof between the commander and the gunner's hatches.

The PRC manufactured dazzler as mounted on Iraqi tanks. The dazzler is a miniature strobe beacon which emits a bright light on a similar frequency to that used by the tracking beacon on wire guided missiles such as the Milan, HOT, and TOW. This is intended to confuse the missile guidance tracker as to where the missile is located relative to the target. The system did not work well in the Gulf War as the coalition forces were already aware of this trick before the war broke out.

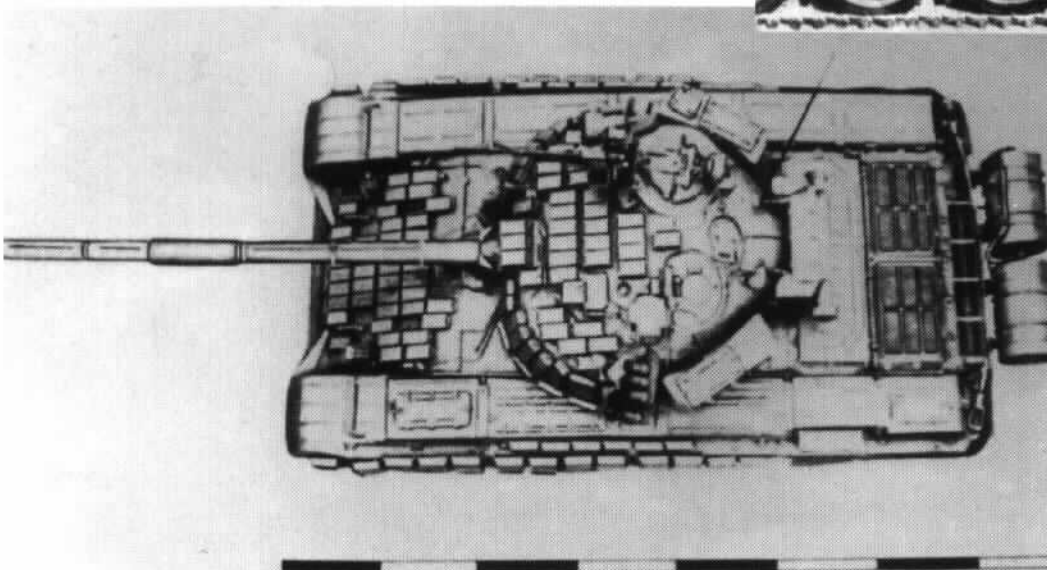


A major fuss ensued when a visiting US Congressional delegation was shown this T-72B at the 24th Motor Rifle Division garrison in Lvov. Instead of the usual single layer of ERA bricks, two or three layers were fitted. This caused considerable alarm since it was presumed that if one layer of ERA is good, two or three layers must be much better. In fact, it is doubtful that the subsequent layers of ERA would function in such an arrangement, and this appears to have been a case of Soviet "disinformatsiya" rather than a real armor fit.



Another view of the triple layer ERA on the T-72B.

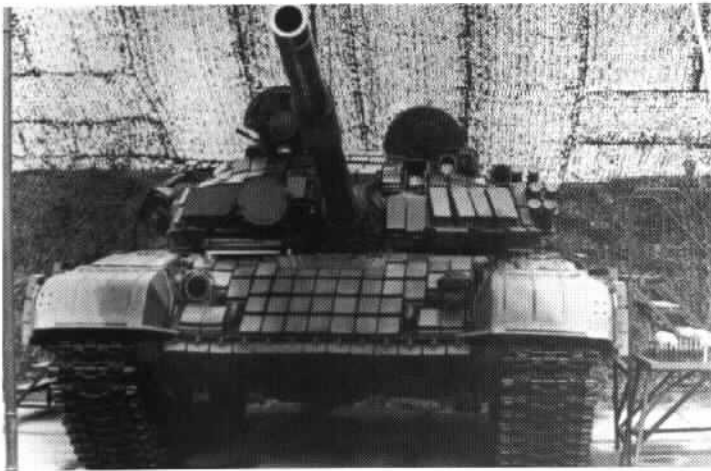
A view showing a T-72B with the ERA bricks attached to the side. The T-64BV, T-72B and T-80BV can all have side bricks attached, but they are often left off in peacetime for convenience.



An overhead view of a T-72B showing the layout of the ERA package. The T-72B already has the most thickly armored turret of any Soviet tank, even minus the ERA.



In 1986, the T-72B began showing up with a new gunner's sight immediately in front of the gunner's hatch designated T-72B1. This is a modified version of the 1K13 laser guidance sight and is used with the new 9K120 Svir tube-launched guided missile.



A frontal view of the T-72B1 fitted with the 1K13 sight. This variant was first called FST-1 by US Army intelligence, and later as SMT M1988.



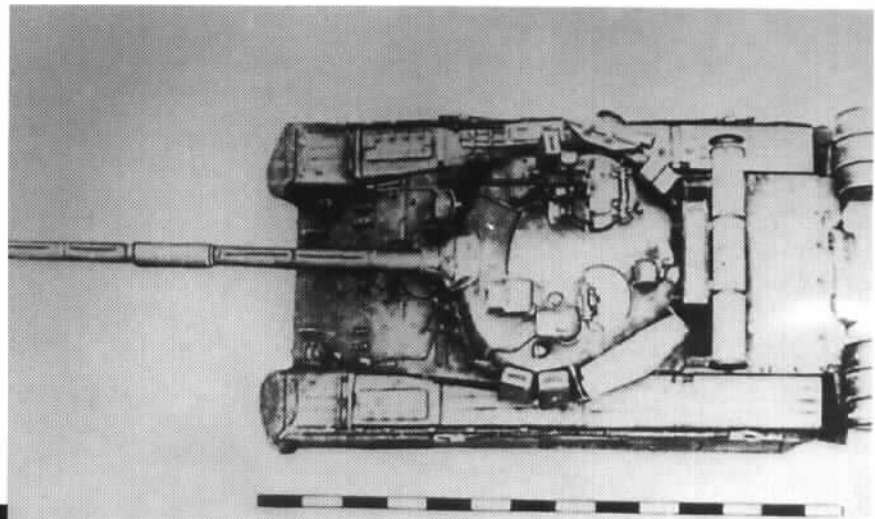
In 1990, some T-72B1s began to be fitted with the 2nd generation reactive armor first seen on the T-80U. This version also has the 1K13 laser sight, evident above and behind the smoke mortars. This version is called SMT M1990 by NATO, but its Soviet designation is not yet certain.



An overhead view of the engine deck of the SMT M1990 which suggests that it is powered by the same V-84 diesel as the T-72B1. In the background are two more of this new tank type.

T-80

An overhead view of the T-80 tank. Note that the turret of this version of the tank is very similar to that of the T-72 or T-64.



A rear view of a T-80. This vehicle lacks the usual rear stowage bin. These stowage bins were often left back in garrison since they had to be removed to gain access to the engine.



A T-80 tank on winter maneuvers. US intelligence observers frequently nicknamed the T-80 "Mickey Mouse" because the two rear fuel tanks look like big mouse ears when viewed from the front. In Soviet service, the T-80 is sometimes nicknamed the "T-80 Kobra" since it is still armed with the Kobra missile rather than the newer Svir.



A T-64A on parade in Budapest, Hungary in the 1980s, marked with the insignia of Guards division.



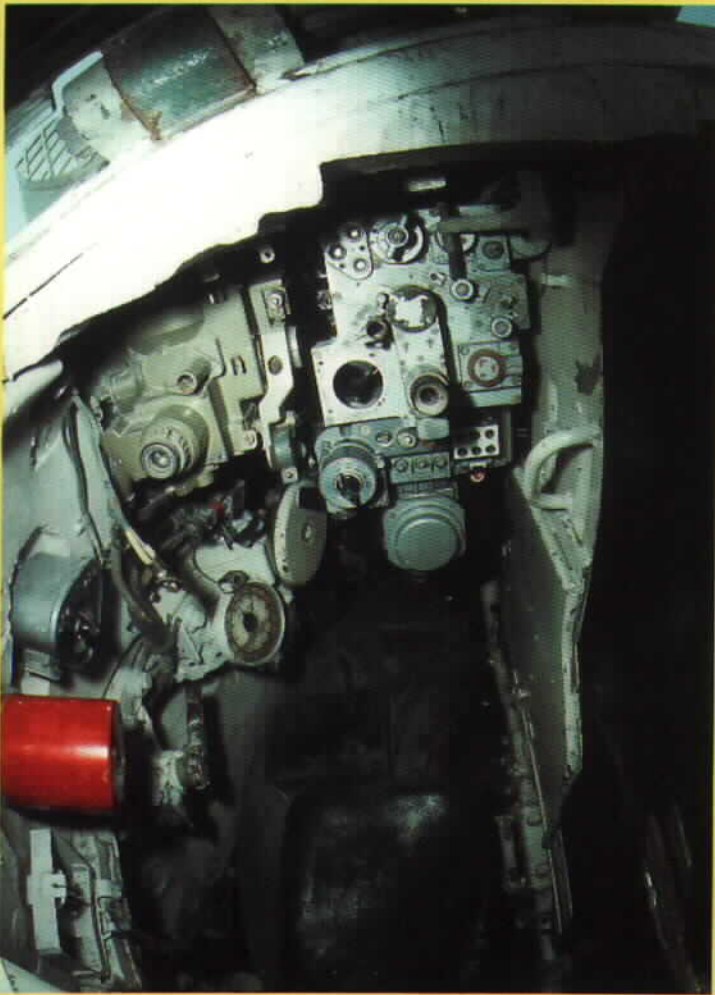
A T-64B on exercise in Hungary in 1989. The small attachment point for the Kobra guided missile control box is evident in front of the commander's cupola.



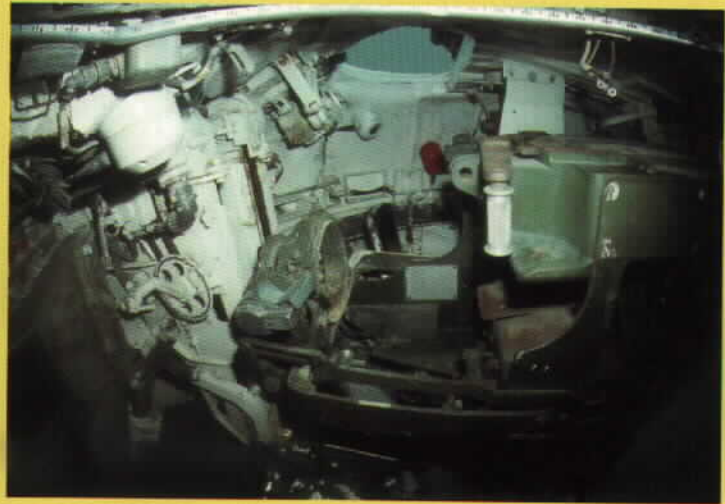
A T-72 tank of the Iraqi Army captured during the Gulf War and currently preserved at the US Marine Corps museum at Quantico, Virginia. The black turret marking is a later American addition. The vehicle unit insignia consists of the colored bands on the fume extractor and a regimental insignia faintly visible on the turret side.



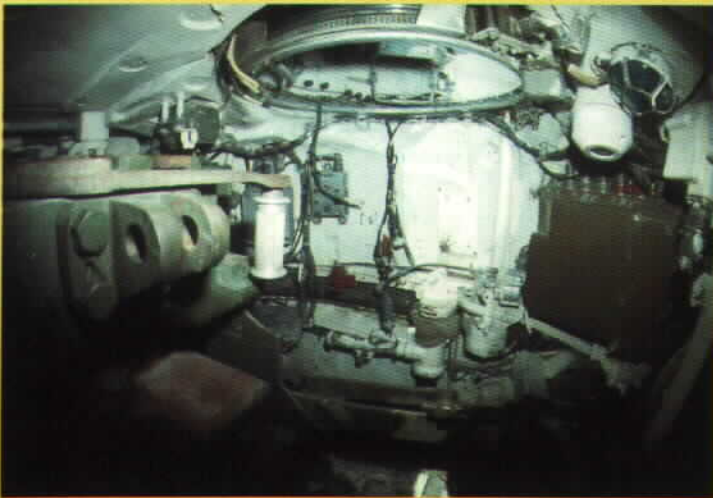
A T-64A tank unit on parade in Budapest, Hungary in the 1980s, marked with ceremonial style Guards division insignia.



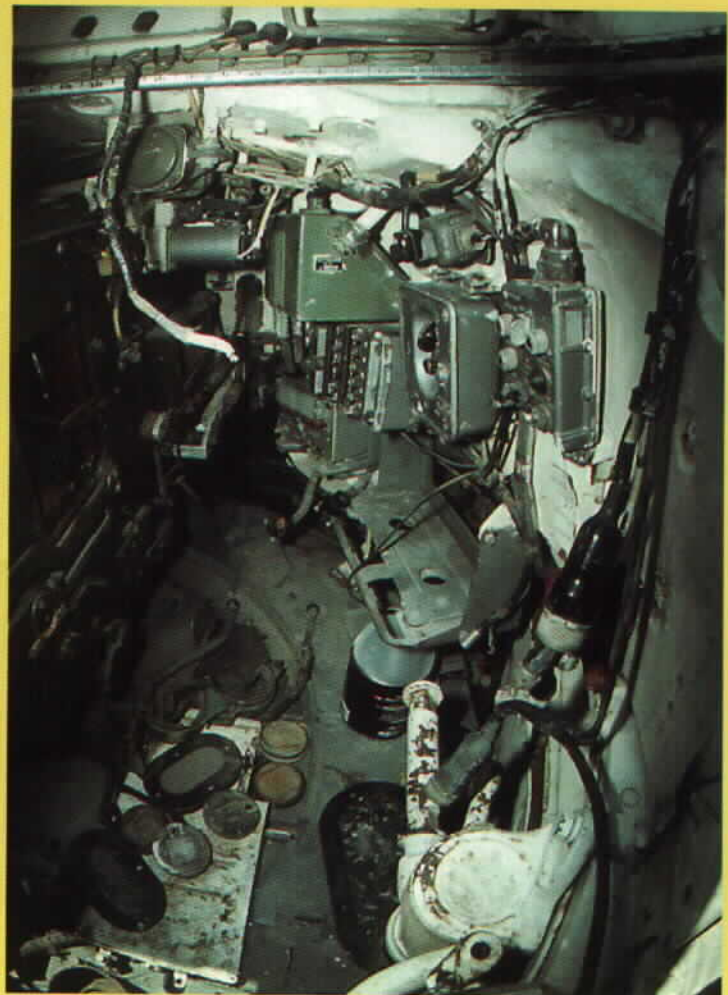
An interior view of a T-72 (export designation: T-72B). This is a view looking down into the gunner's station on the left hand side of the turret. The gunner's sights are immediately forward, and to the right is the gun breech of the D-81T gun.



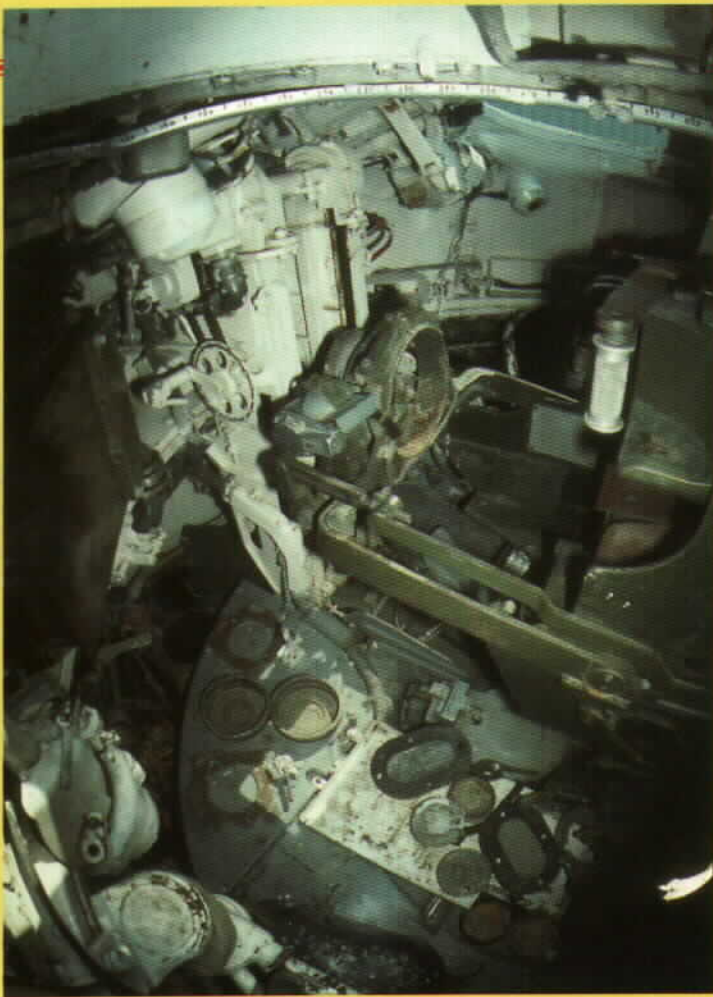
This is a view from the tank commander's station looking over towards the gunner's station. This shows the breech of the D-81T gun.



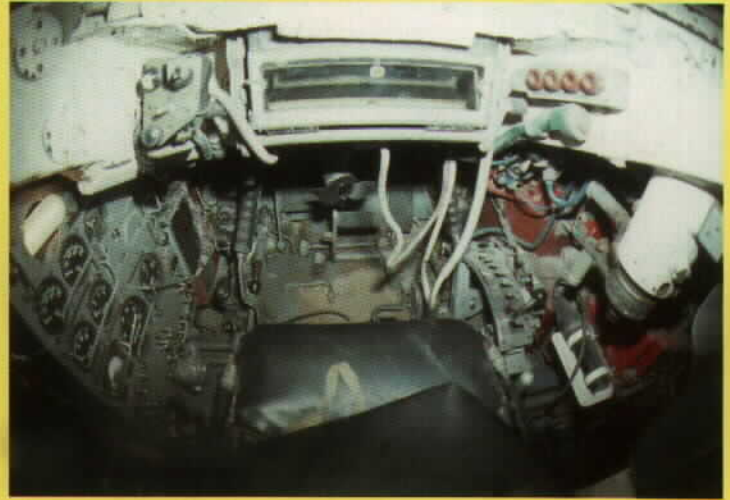
This is a view from the gunner's station looking over towards the commander's station. This large olive drab box to the right is the main turret electrical junction box.



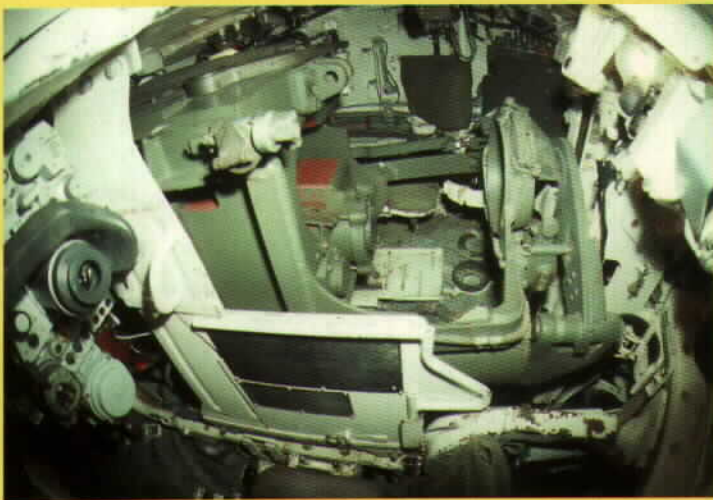
This is an interior view of the tank commander's station looking forward with the gun breech to the left. The empty aluminum rack is where the radio would usually be located.



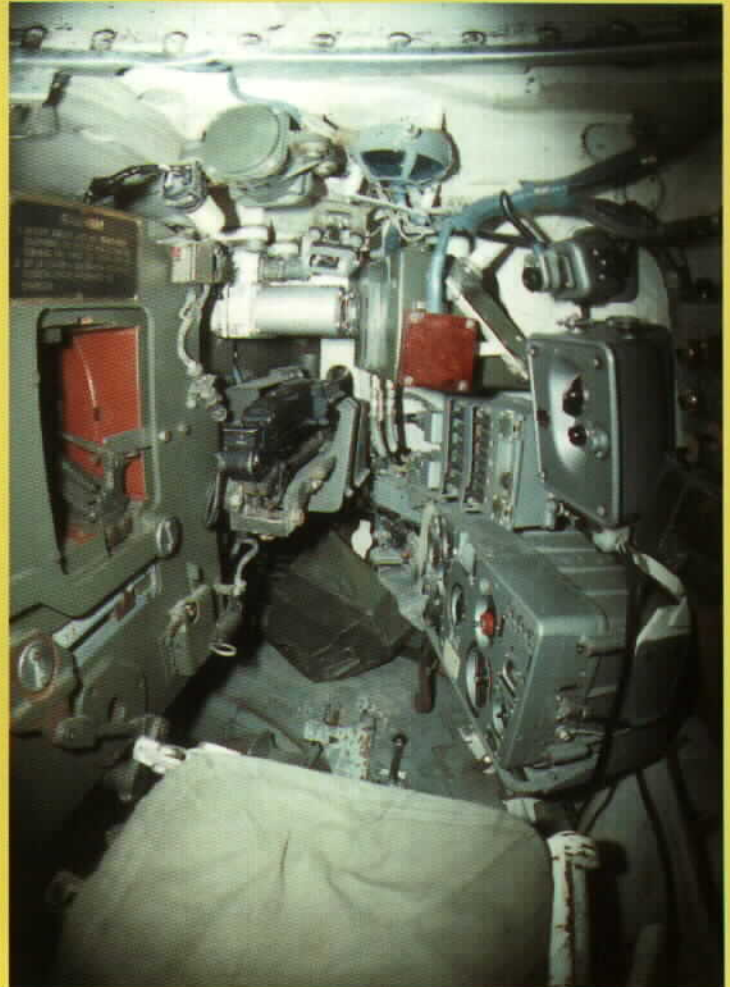
This is a view from the commander's hatch looking down towards the turret rear. The gun breech is to the right, and behind it is the actuating arms of the tank's automatic loader.



A view of the driver's station in the Iraqi T-72M1 in the 24th Infantry Division Museum.



A view from the gunner's hatch looking into a Polish-built Iraqi T-72M1 currently preserved at the 24th Infantry Division Museum at Ft. Stewart, GA. This vehicle is more complete than the other T-72 interior shown here, having already undergone restoration since the end of the Gulf War.



A view of the commander's station in the Iraqi T-72M1 in the 24th Infantry Division Museum.



A T-80BV unit on summer maneuvers in the late 1980s. The vehicles are marked with a Guards divisional insignia over a white disc on the active infrared searchlight.



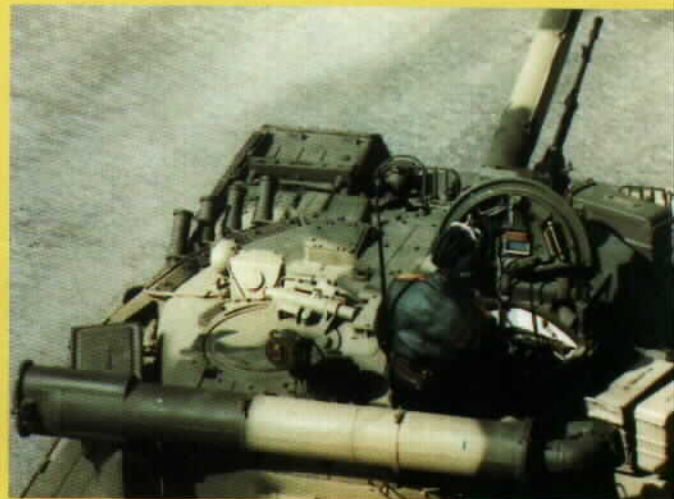
A T-72B of a Guards division moving at speed. Note the new variant. The snorkel has been moved to the rear of the turret. (Thomas)



A T-80U of the 4th Guards Kantemirovets Tank Division on winter maneuvers outside Moscow, passing through an orange cloud from a smoke grenade. (Sovfoto)



Troops of the "4th Guards Kantemirovets Tank Division imeni Yuri Andropov" on exercise in 1990 at Naro-Fominsk with their T-80U and a BMP-2 in the background. (Sovfoto)



An overhead view of the T-80U showing turret details. This tank belongs to a show division, the 4th Guards Kantemirovets Tank Division at Naro-Fominsk in the Moscow area, so its crew has non-standard dress uniform, including this black leather coat.

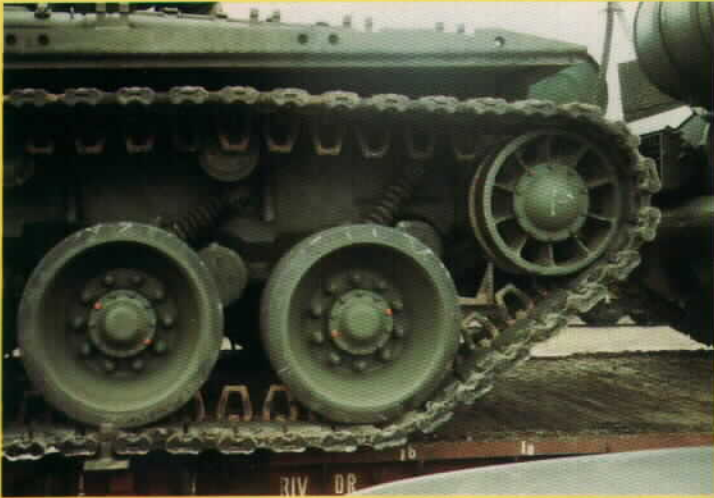


ement of the smoke mortars to permit reactive armor to be fitted to this
derson)

This side view shows that the front turret applique is in fact
shaped like a forward pointing chevron. This detail is hidden by
the rubber flaps hanging over it.



A close-up detail shot of the T-80U. The T-80U fires the laser guided Svir missile rather than the radio-guided Kobra, so
it uses the new laser sight over the gunner's station.



A detail view of the idler and front two right road wheels of a T-80BV of the 79th Guards Tank Division, 8th Guards Combined Arms Army during their withdrawal from Jena, Germany in 1992. (Michael Jerchel)



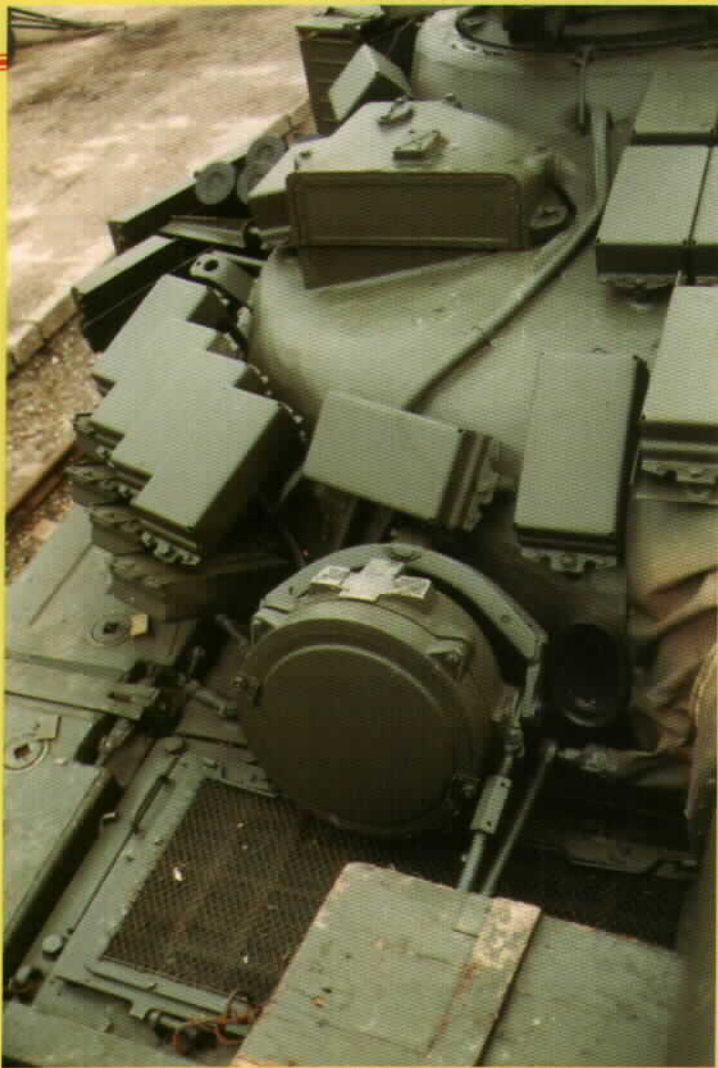
An overhead shot of a T-80BV showing the tank gunner's hatch and the detail in front of it. (Michael Jerchel)



A detail view of the tank commander's cupola, showing the NSVT machine gun mounting minus its weapon. (Michael Jerchel)



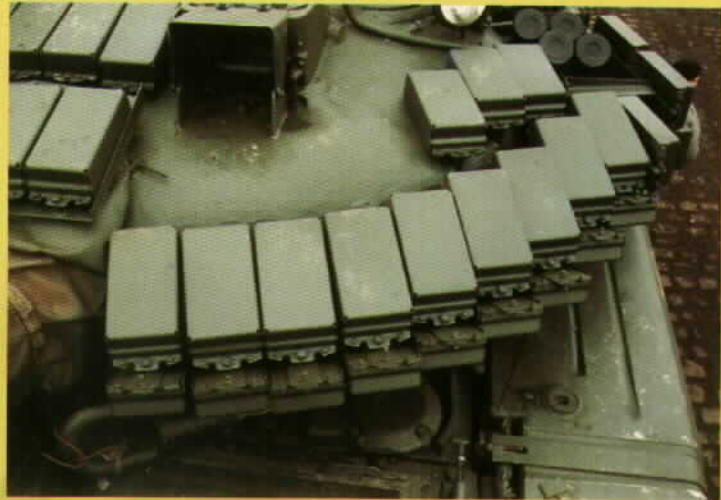
A detail view of the rear turret stowage of a T-80BV. The basic item is the snorkel tube for deep wading. Between the snorkel tube and the turret rear is a combing for the attachment of the snorkeling equipment. (Michael Jerchel)



A detail view of the reactive armor layout on a T-80BV on the right side of the turret. In this view, the turret is traversed to the rear, so some of the engine deck detail can be seen immediately below. (Michael Jerchel)



An overall view of the right turret side of a T-80BV showing the layout of the reactive armor bricks. In this view, the turret is pointed rearward, so details of the engine deck are also evident. The large screened area immediately under the searchlight is one of two air intakes for the turbine engine. (Michael Jerchel)



Another view of the left turret side from the front showing the pattern of the reactive armor as well as the gunner's sight above. (Michael Jerchel)



An interesting view from the rear side of the turret showing the layout of the reactive armor bricks and other detail. (Michael Jerchel)



During the August 1991 coup attempt against Gorbachev, T-72 tanks from the 2nd Guards Tamanskaya Motor Rifle Division based in Kalininets, and T-80U tanks from the 4th Guards Kantemirovets Tank Division based in Naro-Fominsk, were sent into the streets of Moscow. Here, a T-80U of the 4th Guards Kantemirovets Tank Division. (Alexander Petrochenko)



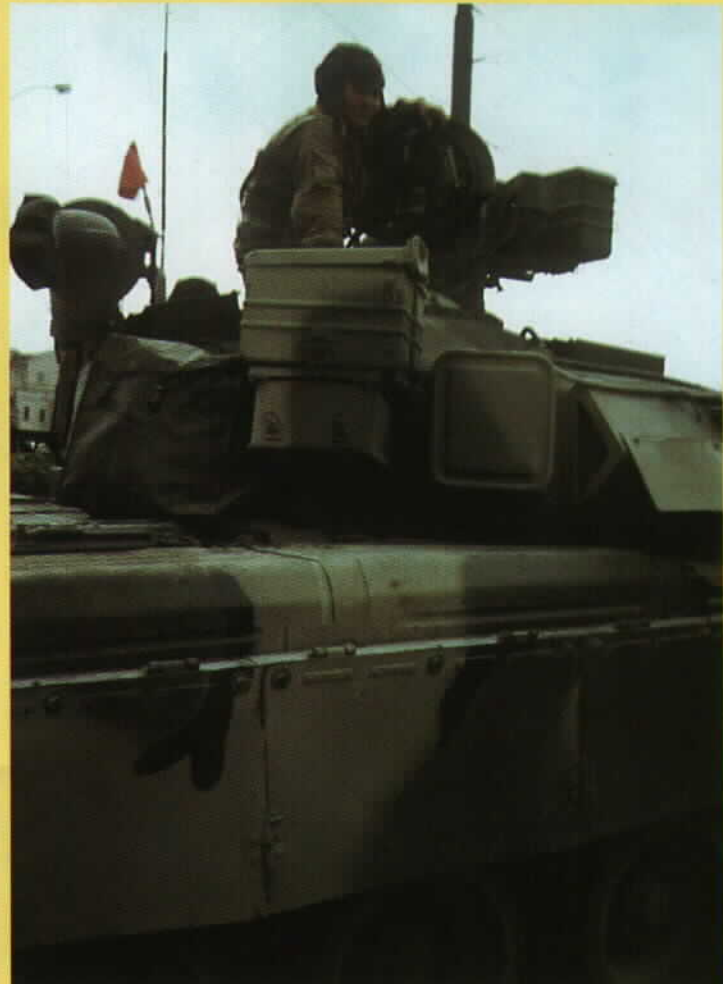
A T-80U of the 4th Guards Kantemirovets Tank Division rests on a street in Moscow during the coup. Ironically, the T-80U tank will probably be best remembered for its role in this historic event, much as the armored car at Finland Station in 1917 or the T-34 tanks which took part in the November 7 parade in Moscow in 1941. (Alexander Petrochenko)



A head-on view of a T-80U tank. Like most T-80Us, it wears the new three color camouflage scheme introduced in the late 1980s. (Alexander Petrochenko)



A pair of T-80Us at a street intersection in Moscow during the 1991 coup. The T-72 battalion of Major Ilyin went over to Yeltsin's side during the coup, the T-80Us remained largely neutral, neither acting against Yeltsin, nor actively supporting the anti-coup forces. (Alexander Petrochenko)



A close-up of a tank commander from the 4th Guards Kantemirovets Tank Division during the coup. The division is a show unit, used in the annual parade and many of its conscript troops come from the Moscow area, making them unenthusiastic participants in the coup. (Alexander Petrochenko)



A rear view of the T-80. The T-80 turbine engine requires a large exhaust port at the rear. The engine air intake is immediately behind the turret.

A clear view of why the T-80 is sometimes called "Mickey Mouse", the wide space of the two rear fuel drums. This vehicle has an unusual large mast mounted over the rear of the turret. It would appear to be either a wind sensor or laser detector, but such a device is not commonly seen on the T-80.



A T-80 on the move, heavily stowed. The characteristic feature of the T-80 is the new roadwheel- larger than a T-64's, smaller than a T-72's. The commander's machine gun cradle is a simple manual type, not the remote control type found on the T-64.

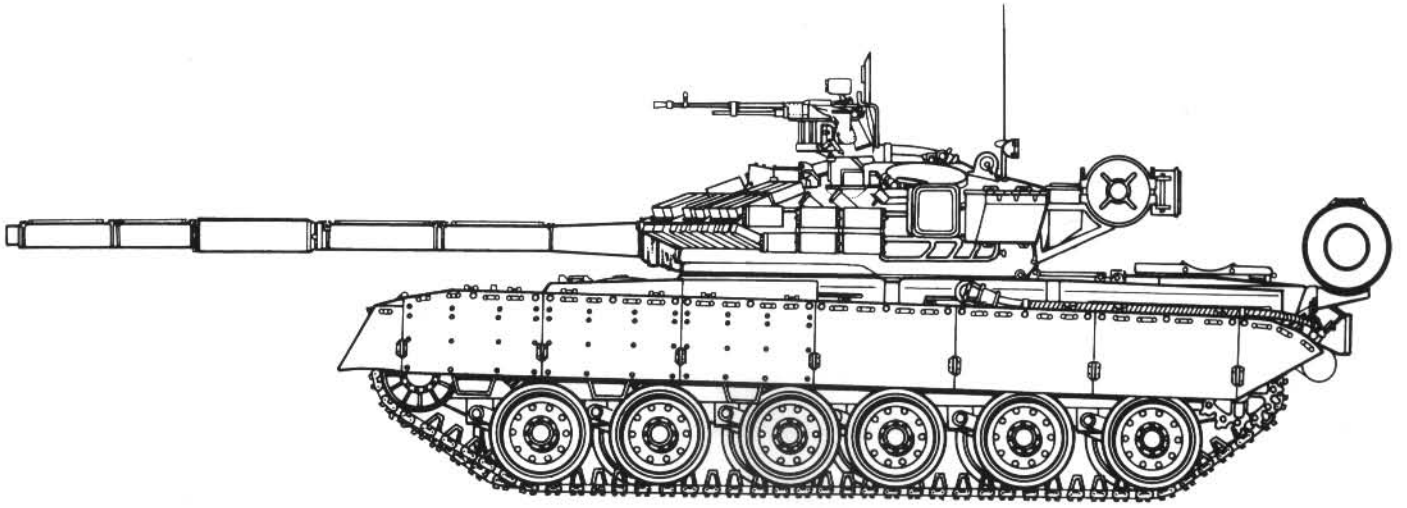
The T-80 was rebuilt with reactive armor, as the T-80BV. It is still unclear what features distinguish the T-80 and T-80B.



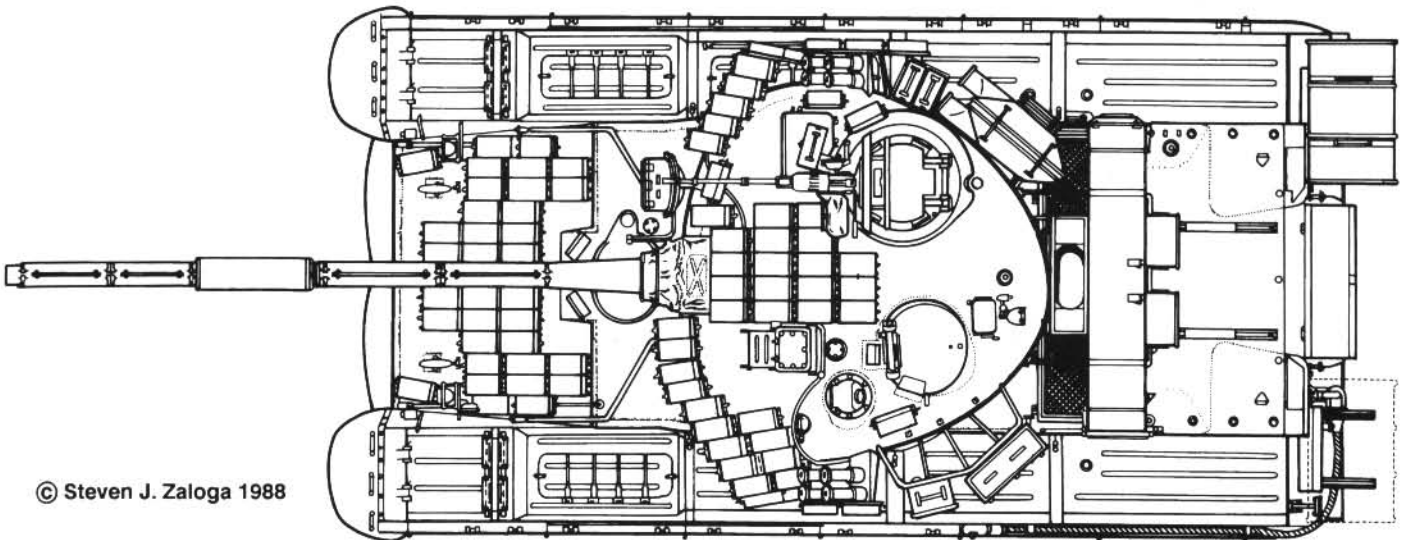
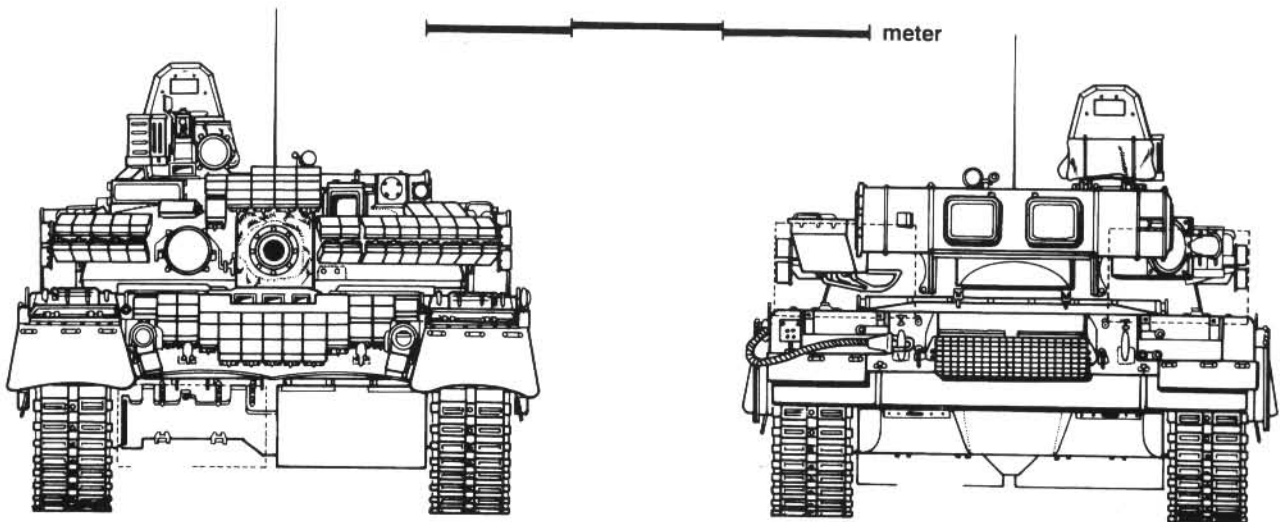
A turret close-up of a T-80BV showing the reactive armor layout. Careful inspection of the photo will locate the Kobra guidance box on the far right side of the turret, as well as the enlarged gunner's sight.



Another T-80BV on summer wargames with the Northern Group of Forces in Poland in the late 1980s.



T-80BV Tank





This T-80BV has the driver's weather shield up. It also clearly shows the Kobra control box in front of the commander's cupola.



A good close-up of the T-80BV side skirts. The many small bolts are used for the attachment of ERA bricks.

A T-80 moving at speed. The commander has a weather shield to provide some relief from the wind and dust.



An overhead view of the T-80BV. The large device immediately to the rear and below the commander's cupola is a pair of covers fitted over the engine air intake. These covers have tubes which are then attached to a pair of OPVT wading snorkels.

A close-up shot of the ERA bricks on the T-80BV. The marking painted on the brick covers has an arrow pointing forward and the Cyrillic letter "Z" (resembling the number 3) which means Zapad (forward).

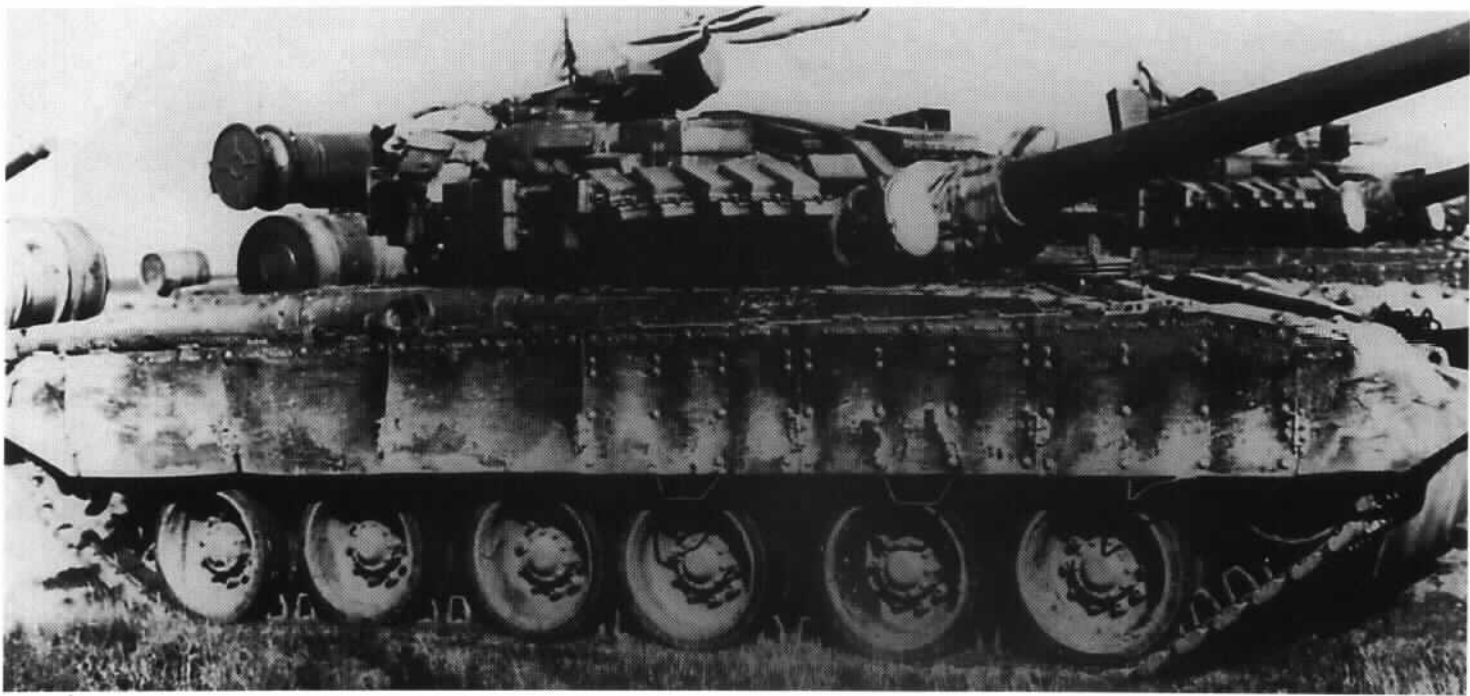




A close-up of a T-80BV. Note that the bricks on the glacis plate are not attached directly to the armor, but space off about an inch.



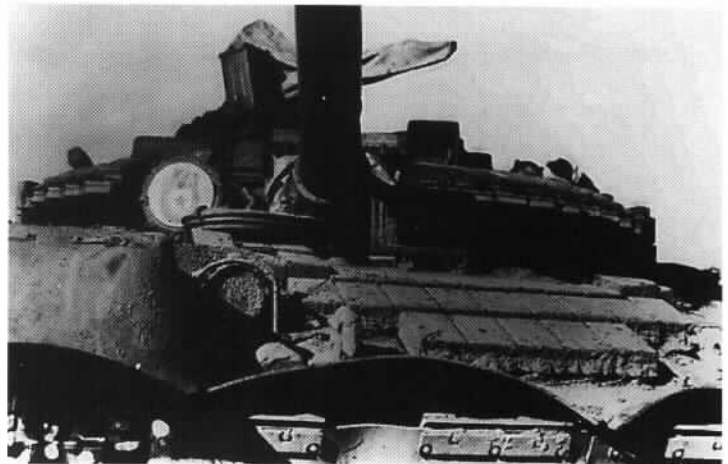
This T-80BV is finished in a new scheme adopted by the Soviet Ground Forces in 1988. It consists of a pattern of sand, over the normal dark green, broken up by black "crow's feet". The pattern resembles the old US Army MERDC patterns of the 1970s, but using 3 colors instead of 4.



Another good view of the T-80BV side skirts. These side skirts are made of the usual black rubberized material, but have steel reinforcement behind them to bear the weight of the ERA bricks.

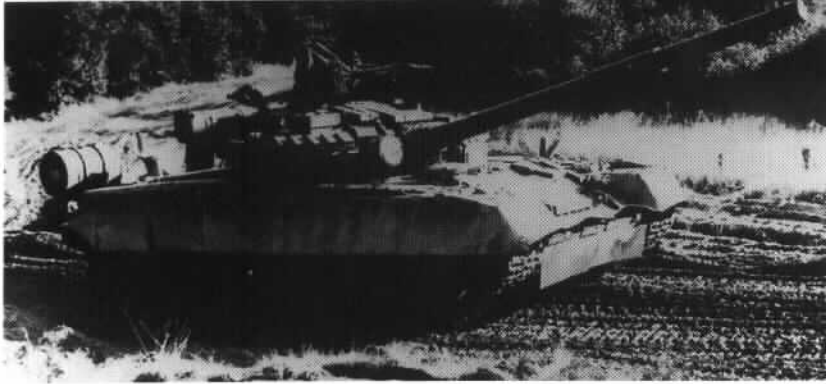


A T-80BV during summer wargames. It is camouflage painted, but the scheme may have been one of the unofficial local schemes used by Soviet units in the Western Group of Forces in Germany.



A detailed close-up view of the bow of a T-80BV encrusted with mud after summer wargames. The unusual skirts on the bow of the T-80BV may have been intended to keep down dust, but also may provide some additional stand-off protection from small caliber anti-tank rockets.

A platoon of T-80BV on maneuvers. The large tube on the turret rear is the ubiquitous OPVT snorkel so common on Soviet tanks.



This view of a T-80BV very clearly shows the unusual skirts hanging over the bow front. The rubberized panels immediately above those were intended to be rolled back to protect the ERA bricks when driving through heavy brush.



A T-80BV with Guards insignia painted against a white background on the Luna searchlight cover. In some Guards tank divisions, the tactical unit insignia is painted on the reverse side of the cover.



A company of T-80BV on the move. The lead vehicle has a partial array of ERA bricks on the side panels.



Although backlit and dark, this photo accents the fact that the rack for the OPVT snorkel is a thin frame assembly.



A T-80BV moving up to a river crossing operation during summer wargames in Germany. Note the BLG-60M bridgelayer in the background, probably from an NVA (East German Army) unit.



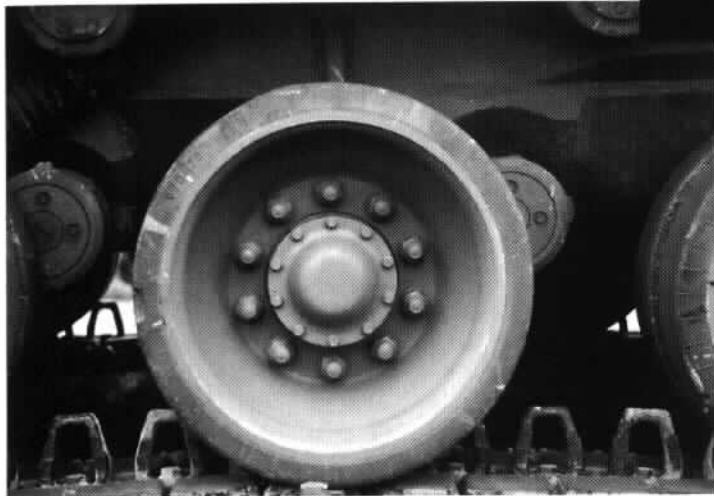
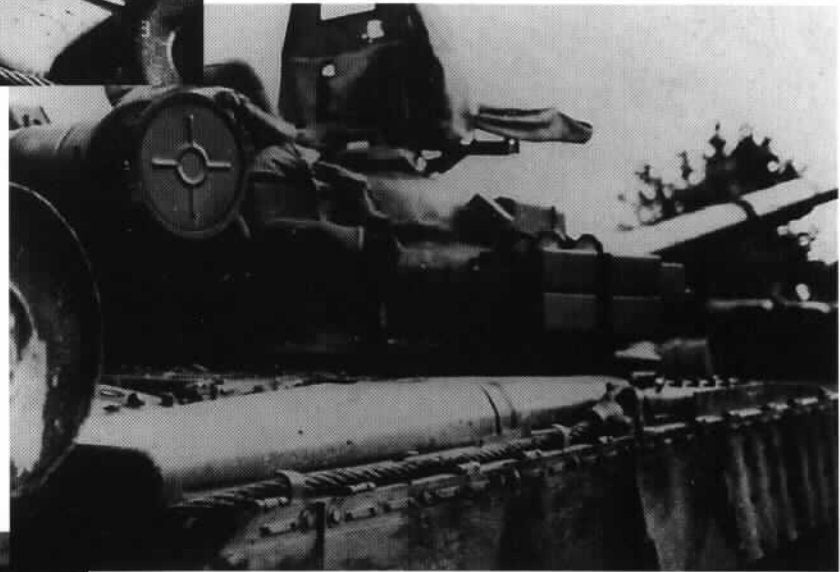
A close-up of a T-80BV with a part of the skirt removed. This shows the heavy spring shock absorber over the first and second roadwheels.

A rear view of a T-80BV with the metal straps for the 200 liter drums loose. On the engine deck is a cradle for a third 200 liter drum, a reflection of the heavy fuel consumption of the T-80's gas turbine engine. The stencilled numbers on the stowage boxes is not a typical Soviet practice.

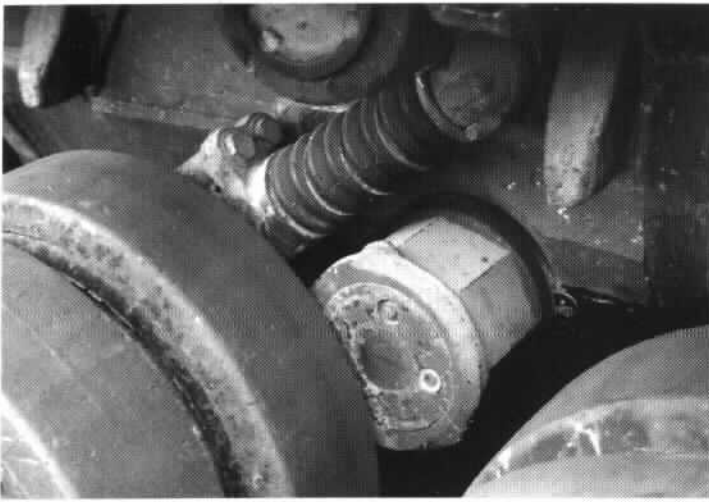


An useful overhead view of a camouflage painted T-80BV. This scheme is essentially the same as the one shown with the T-80U on parade in Moscow later in this book. Note that there is a canvas cover over the engine air intake.

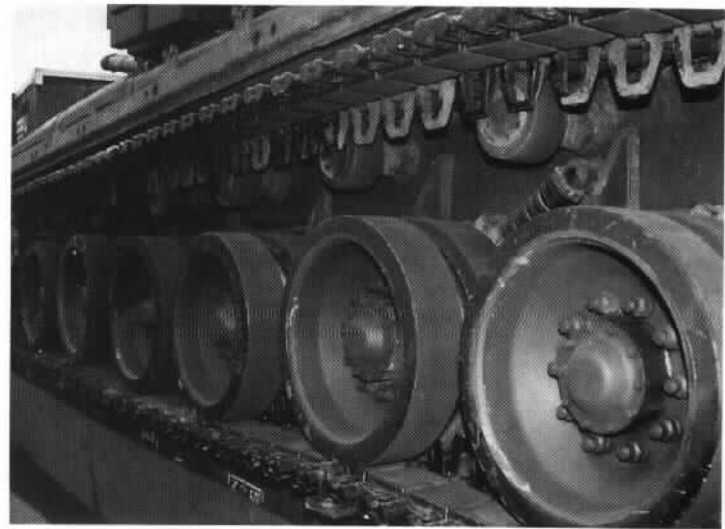
An extreme rear view of a T-80BV. The strange wrinkling of the side skirts is due to the steel reinforcement behind the rubber skirts for attaching the ERA bricks.



A close-up view of a T-80BV road-wheel showing the torsion bar arm and attachment details. (Michael Jerchel)



A close-up showing the shock absorber and torsion bar extension on a T-80BV. (Michael Jerchel)

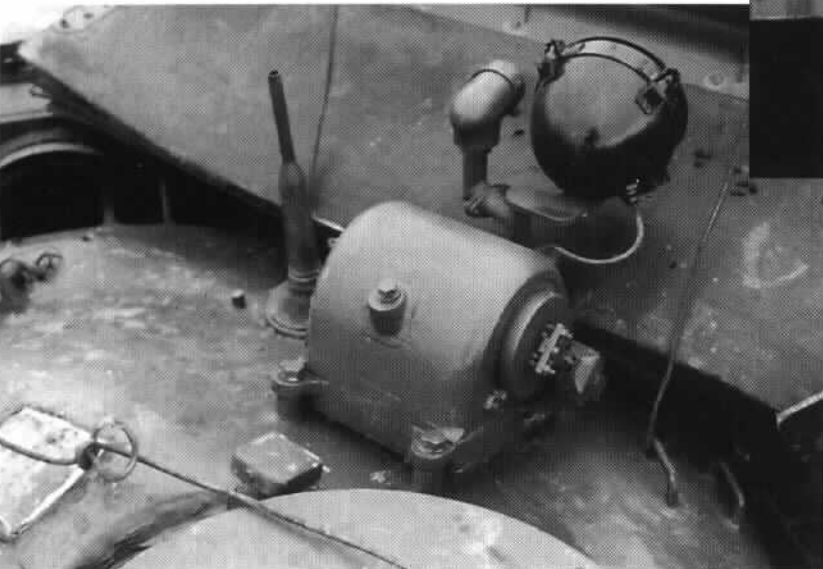
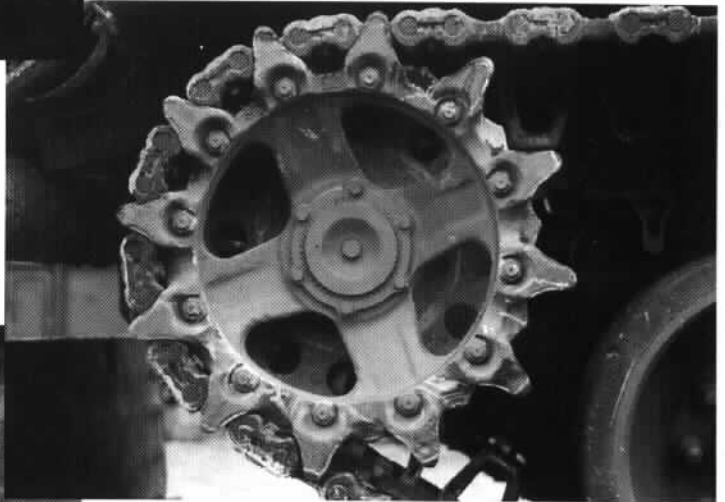


A detail view of the suspension of a T-80BV. (Michael Jerchel)

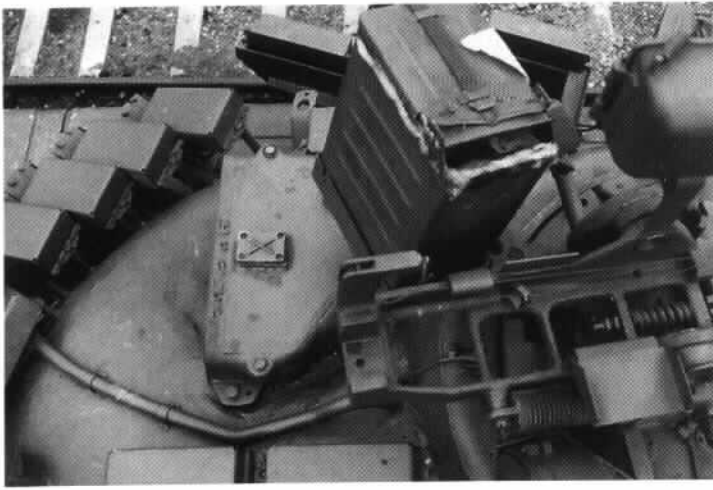


A detail view of the stowage of a T-80BV's right turret side. Starting from the right, there are two 12.7mm ammunition boxes, followed by two engine deck snorkel combings. These two combings are joined together. They are attached over the two rectangular engine air intakes immediately behind the turret when deep wading to prevent water from rushing into the engine compartment. Behind these are the snorkel tube and stowage boxes. On top of the snorkel are the side skirts which have been removed for travel. (Michael Jerchel)

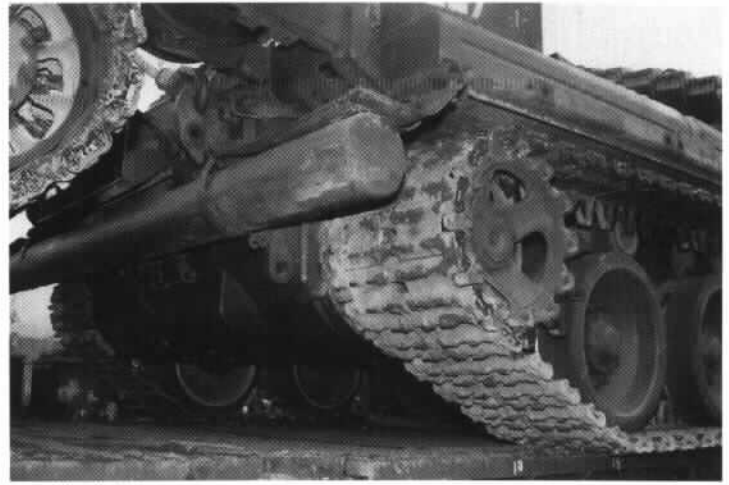
A close-up view of the drive sprocket of a T-80BV. (Michael Jerchel)



A close-up shot of the wind sensor and position light on the top rear of the turret. During firing, the small doors on the wind sensor open up, measuring any cross-wind. (Michael Jerchel)

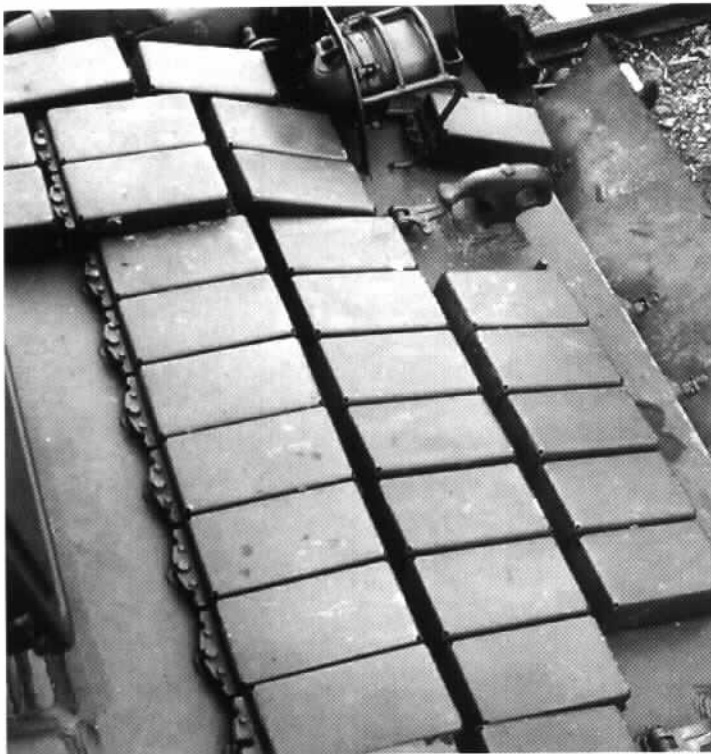
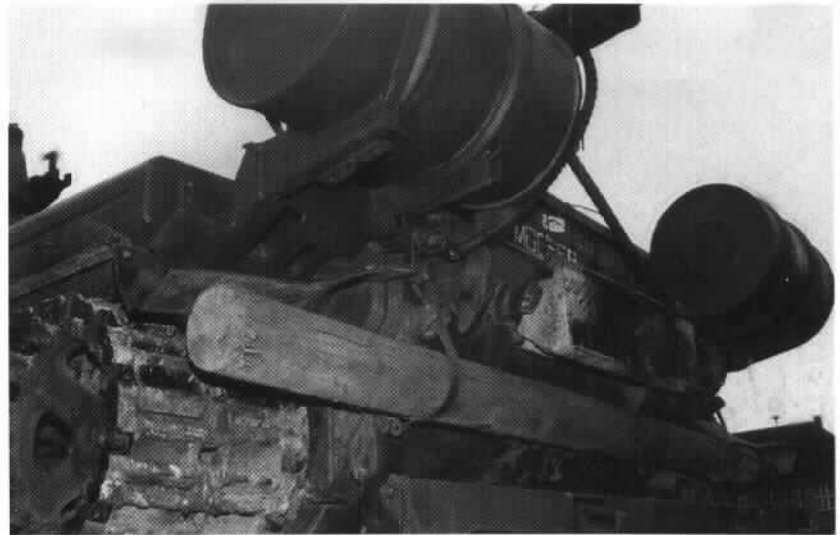


A detail view immediately above the front of the machine gun mount on the tank commander's cupola, showing the Kobra command antenna box below it. (Michael Jerchel)

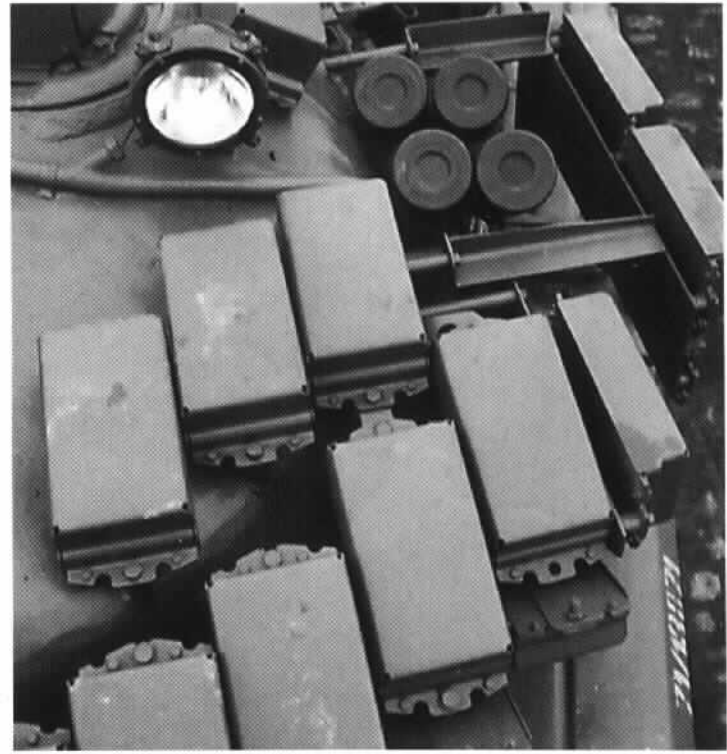


An interesting rear detail shot showing the lower rear hull detail, including the unusually complex attachment racks for the rear fuel drums. (Michael Jerchel)

Another rear view from the left side showing the unditching beam and the engine exhaust port. (Michael Jerchel)



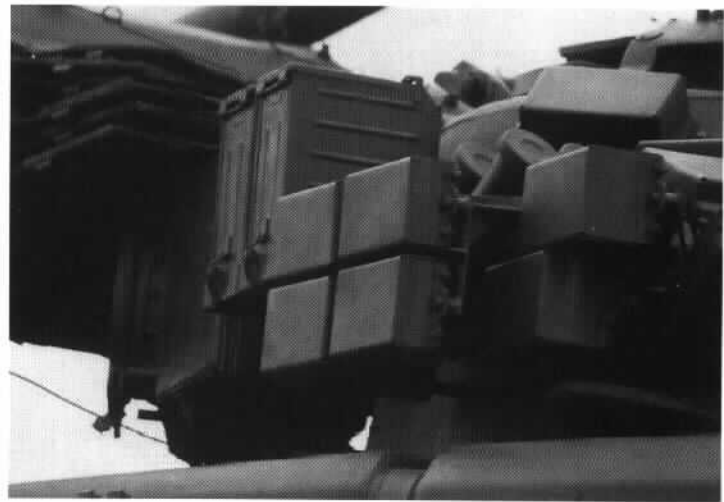
A detail view of the ERA layout on the glacis plate of a T-80BV. (Michael Jerchel)



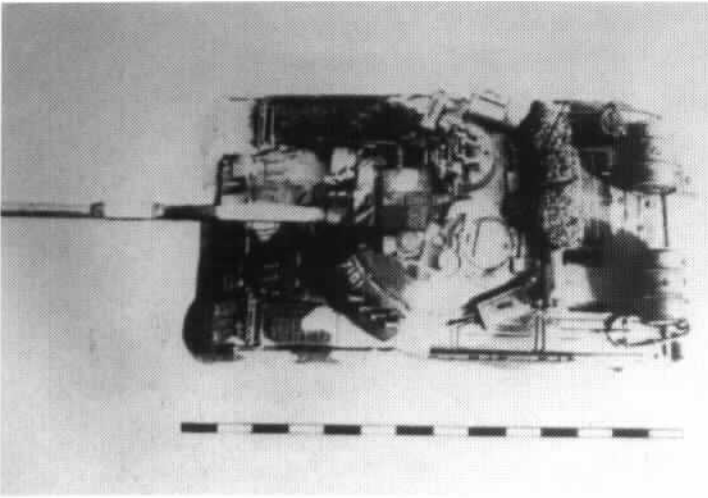
A view of the left turret side from the front showing the layout of the reactive armor bricks. (Michael Jerchel)



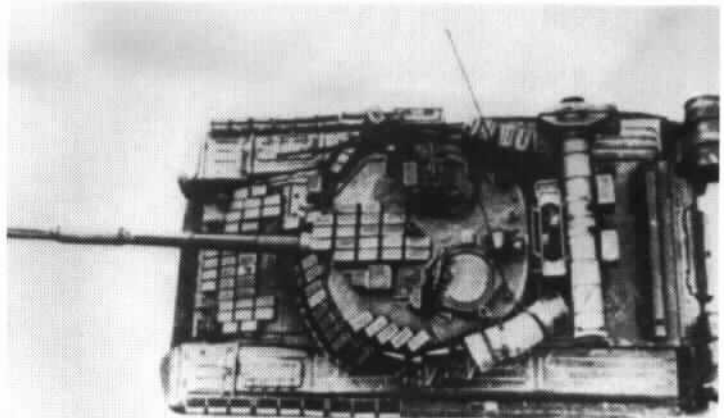
A detail view of the reactive armor array on the roof of the T-80BV as well as the Kobra missile guidance box in front of the commander's station. Note that the bricks on the gun mantlet are contained in a sheet-metal tray. (Michael Jerchel)



A detail shot showing how the reactive armor bricks are attached to the extension brackets on the right turret side. (Michael Jerchel)



An overhead view of the new T-80, also known as the SMT M1989. This vehicle uses a new gunner's hatch similar to the type seen in the final production T-80BV. The main distinguishing features of this variant are the new engine deck and the new, 2nd generation ERA/applique armor.



This overhead view of an intermediate type between the T-80B and T-80U shows the final turret configuration before the definitive T-80U. It is noticeably wider at the rear than the normal T-80BV, and has a different gunner's hatch and different smoke mortar arrangement. It also reverts back to a narrow gunner's sight and does not have the Kobra control box present. It also uses the modified commander's cupola with remote control NSVT machine gun found on the later T-80U.



A pair of T-80Us on maneuver in 1989. The T-80U was introduced due to the high fuel consumption and other problems associated with the SM-1000 gas turbine engine in the T-80B family.



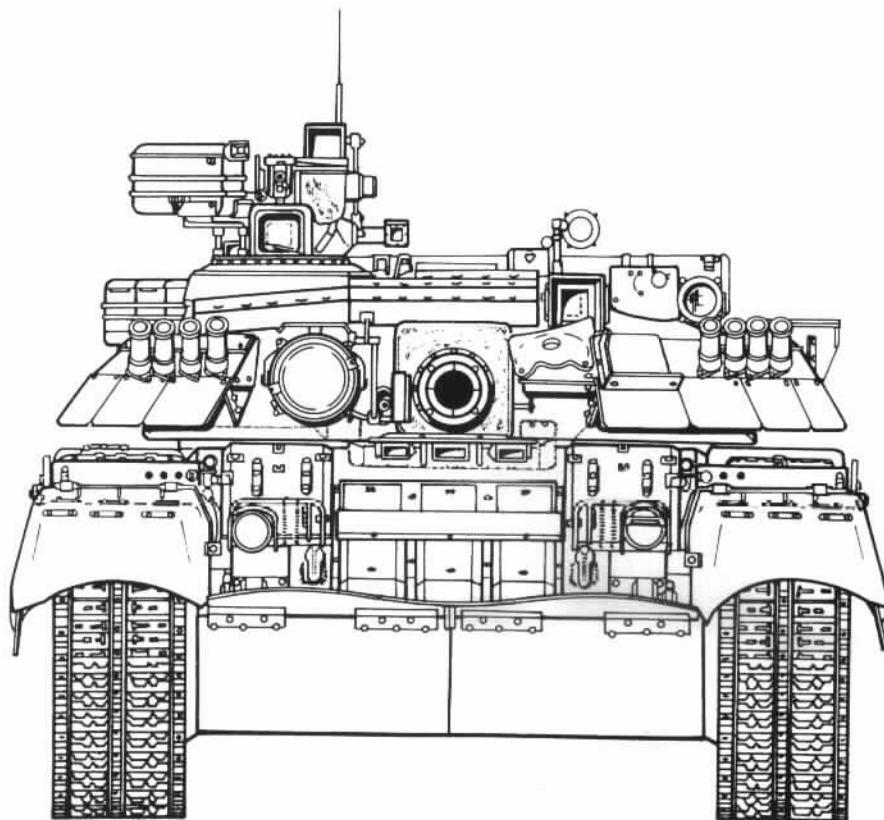
Careful examination of the commander's cupola reveals that the T-80U has gone back to the remote control machine gun station found on the T-64 as opposed to the manually operated type found on the T-72 and T-80B. The major difference between the T-80U commander's cupola is that it has a new, enlarged sighting optic under the machine gun.



This overhead view of a T-80U of the 4th Guards Kantemirovets Tank Division "Imeni Yuri Andropov" shows the new applique/ERA layer characteristic of this version. It is believed that this applique is a new generation of ERA, but details so far are lacking.



A view of the T-80Us of the 4th Guards Tank Division on parade in Moscow in 1990 when they first appeared. They are finished in the new three tone camouflage scheme first adopted in the late 1980s as the first standardized Soviet vehicle camouflage.



A T-80U of the 4th Guards Kantemirovets Tank Division in Moscow. The new applique armor extends down over the side skirts.



Another distinguishing feature of the T-80U is the rubberized flaps hanging off the turret ERA to give additional stand-off protection.

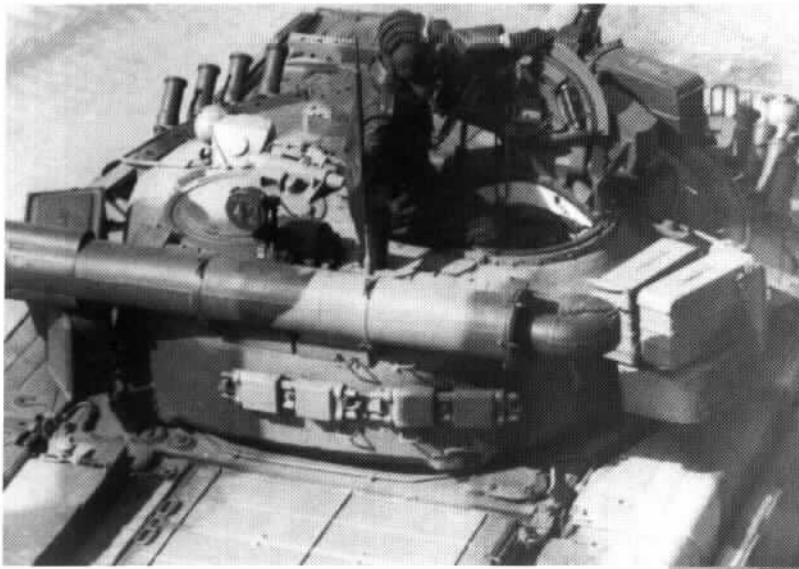
A T-80U on Red Square during its 1990 public debut.



Another side view of the T-80U moving into position in Moscow for a Kremlin parade. The T-80U is not fitted with the usual rear stowage bracket for the OPVT snorkel seen on the earlier T-80B.

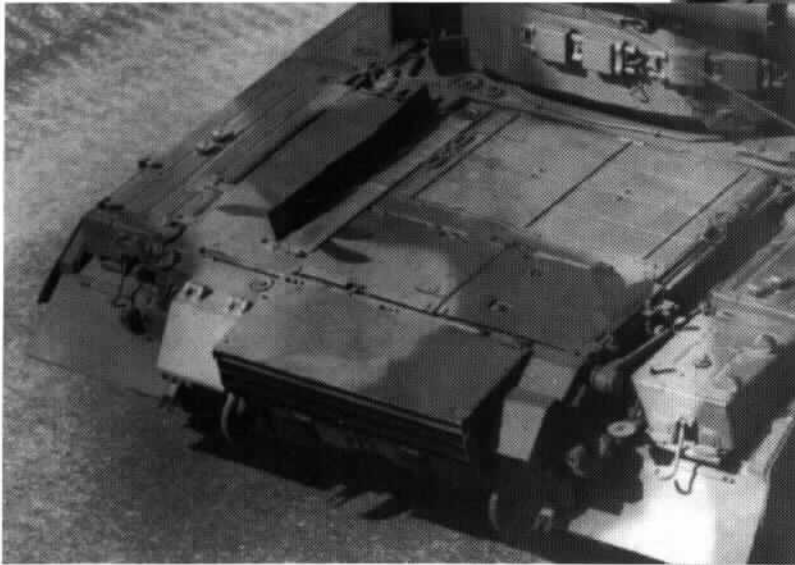
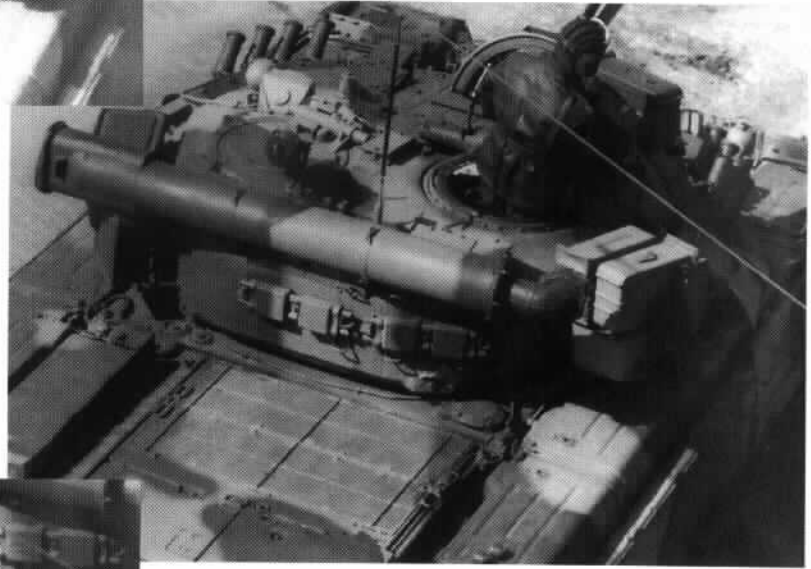


A side of the T-80U showing the wheel spacing on this variant.



A close-up of the engine deck area of the T-80U showing the grill work over the new 6TD engine. The turret uses a different gunner's hatch than that found on the normal T-80B.

Another overhead view of the rear engine deck, showing additional detail of the panels further to the rear. This deck has a similar layout to that on the T-64, though the details are different.



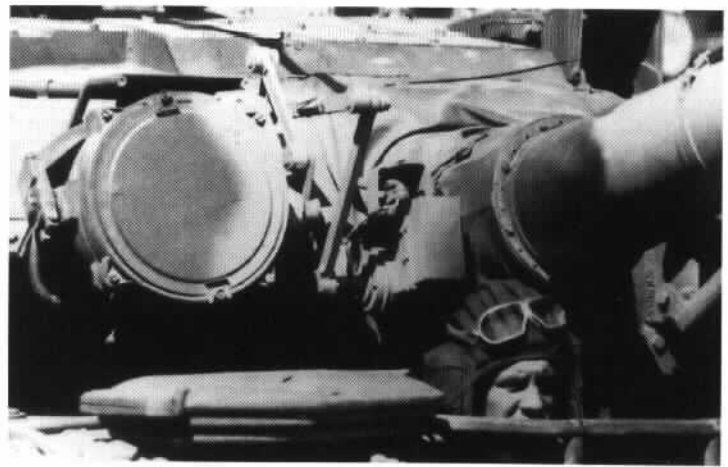
A rear view of the T-80U engine deck showing the much larger grill assembly found on this variant.

An overhead view of the T-80U. On first glance the engine deck looks very similar to that of the T-64, but this impression fades on close comparison.





A rear view of the T-80U. Under the grill is additional track stowage.



A close-up of the active infrared searchlight on the T-80U. Surprisingly, Soviet tanks still are not fitted with thermal imaging night sights comparable to those used on NATO tanks like M1 Abrams or Leopard II.

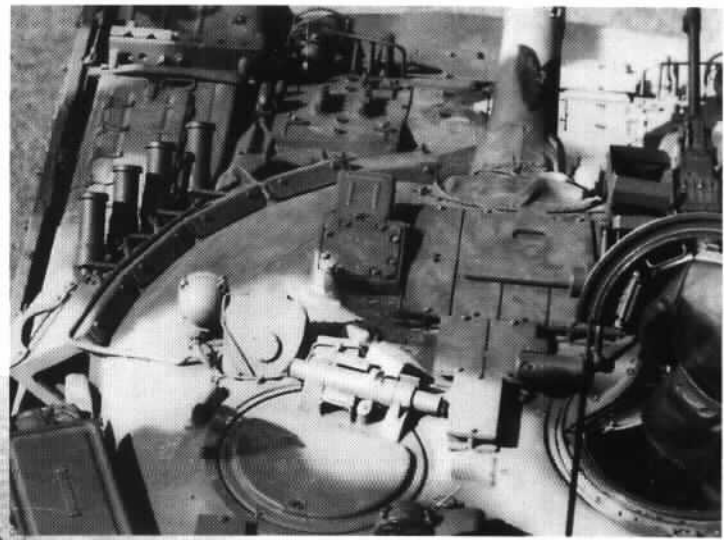


A rear side shot of the T-80U. This view accents the flat back of the T-80U turret.



A T-80U parked in the Moscow outskirts. The T-80U became famous during the August 1991 coup attempt as companies from the 4th Guards Kantemirovets Tank Division, normally reserved for the annual parades, were sent into the city.

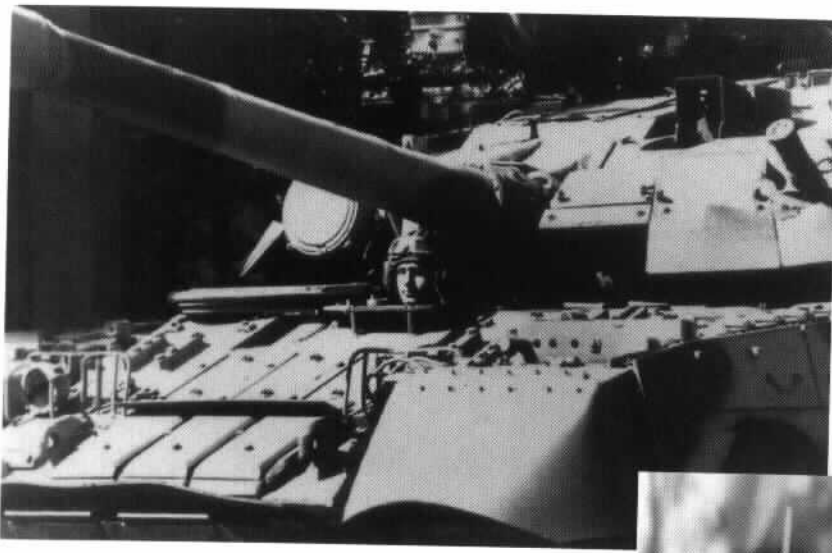
An interesting overhead view of the turret showing the new gunner's hatch and other details of the new T-80U turret.



A good view of the applique armor layout on the T-80U. Notice also the sharper edge of the turret behind the new 2nd generation ERA.



A T-80U in the Moscow suburbs. The applique panels on the hull side have small metal steps to make it easier for the crew to clamber aboard the tank.



A frontal view of the T-80U showing the new armor array.

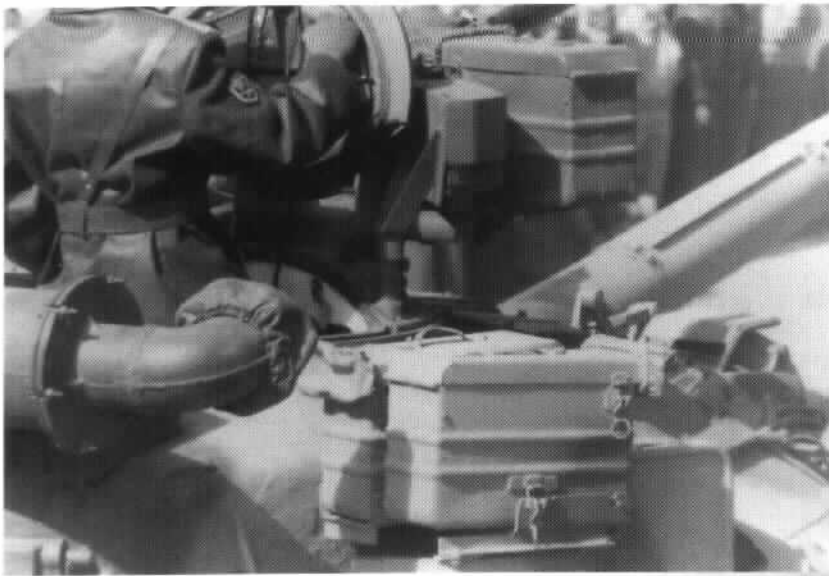
A detail shot of the complicated protective covers over the searchlights on the T-80U.



A detailed side view of the right turret front and the applique armor panels on the right hull front.

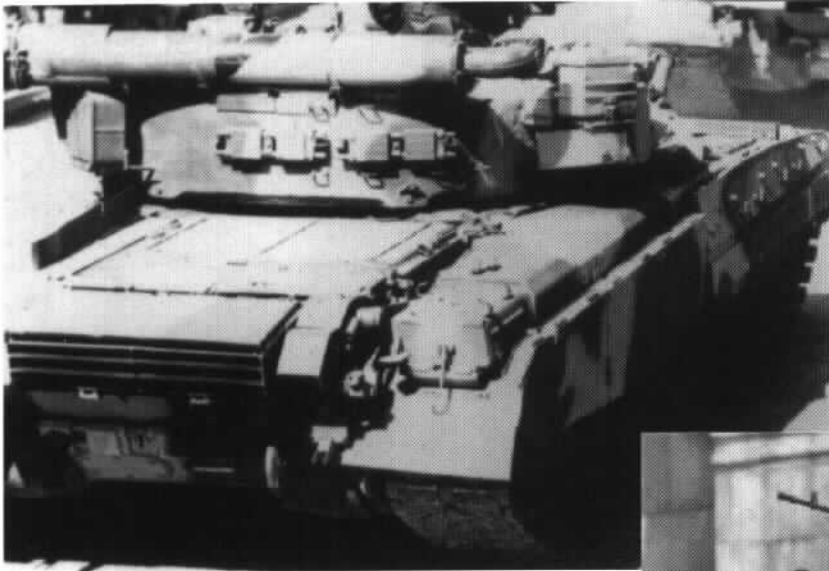
This view clearly shows the similarity between the T-80U's machine-gun mounting and that of the older T-64, right down to the larger ammunition box. Two spare ammunition boxes are carried further to the rear on the turret side.





A close-up of the ammunition box stowage on the T-80U.

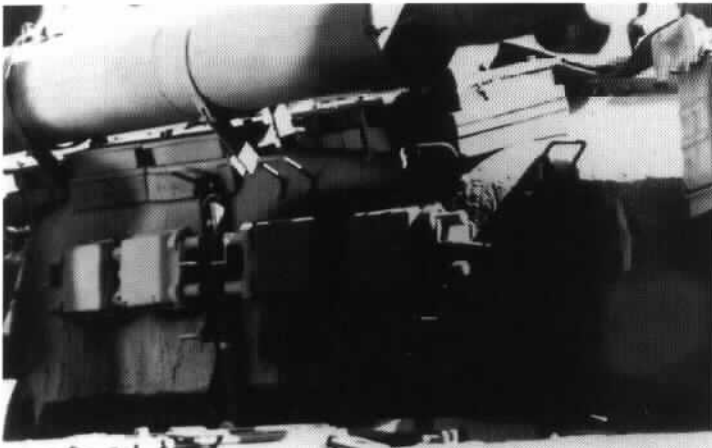
Another rear-view of the T-80U operating in the Moscow area.



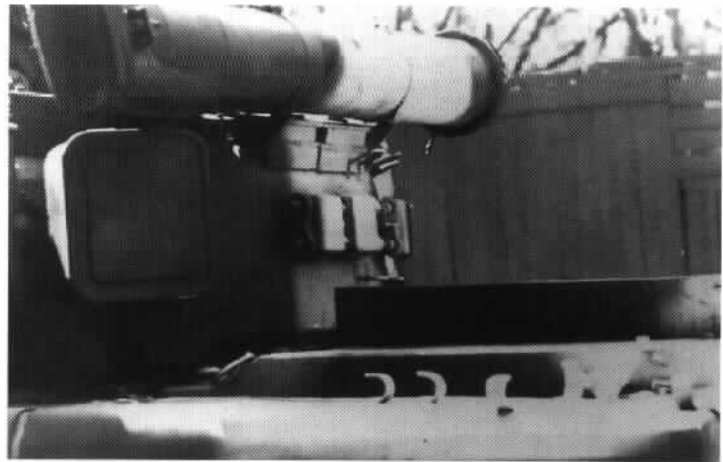
This rear shot shows the rear engine grill to good effect as well as some of the panel detail on the hull rear.

Although a bit murky, this shot shows the attachment brackets for the unditching beam underneath the engine exhaust grill. The beam is not present in this view.



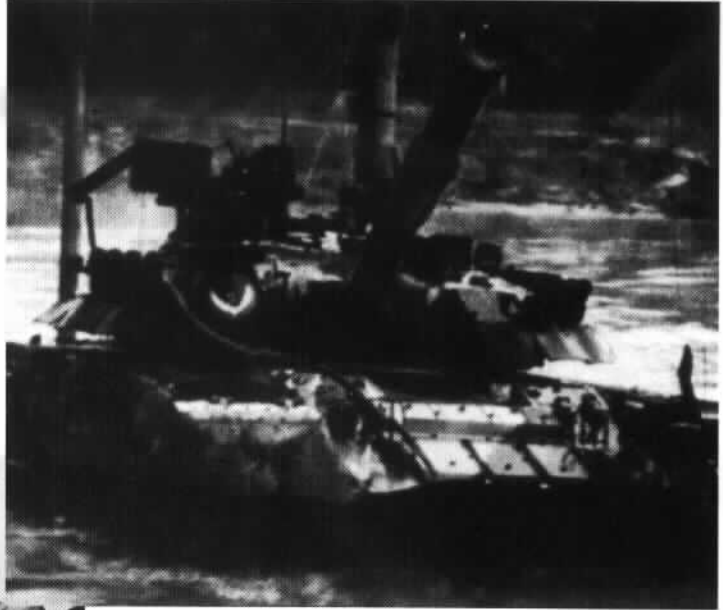


A view under the OPVT snorkel showing the extra track link stowage on the turret back as well as rectangular containers which are probably additional panels of 2nd generation reactive armor.



A view from the left side showing the track stowage and details under the OPVT snorkel.

A rare view showing the OPVT snorkels in operation on the T-80U. The snorkel configuration on the T-80U is more similar to that on the T-64 than the T-80B.



T-80U tanks of the 4th Guards Kantemirovets Tank Division on their way to Moscow during the 1991 August coup attempt against the Gorbachev government. (Dr. Udo Bauer via Thomas Anderson)



A close-up of a T-80U during the 1991 coup. (Dr. Udo Bauer via Thomas Anderson)



T-80Us on their way to Moscow during the coup. The vehicles have the fuel tanks stowed up on the rear engine deck instead of over the rear fenders as is more commonly the case with turbine powered T-80Bs. (Dr. Udo Bauer Via Thomas Anderson)



3507 T-72M2 W/ERA



3501 T-72M2



3502 T-72G/M



3505 T-80 w/ERA



3506 T-80MBT



3512 T-80U "SMT-1989"



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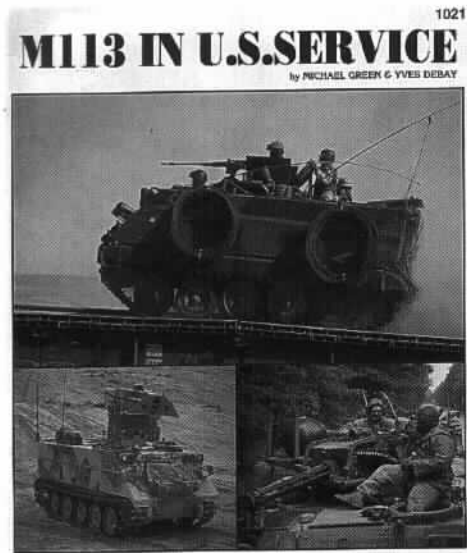
1004 T-72 Soviet Main Battle Tank
by Steven J. Zaloga



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1013 Soviet Wheeled Armored Vehicles
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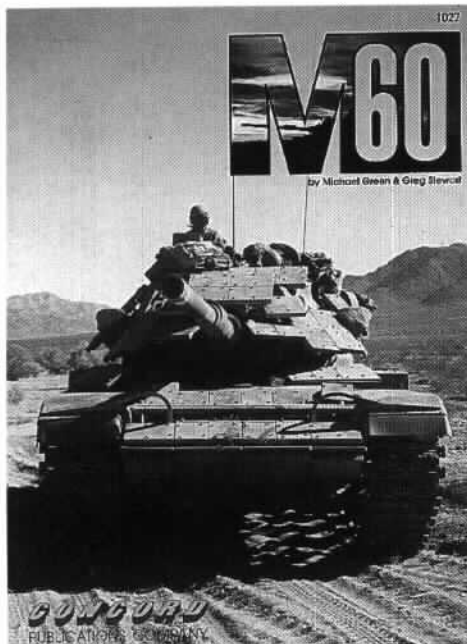
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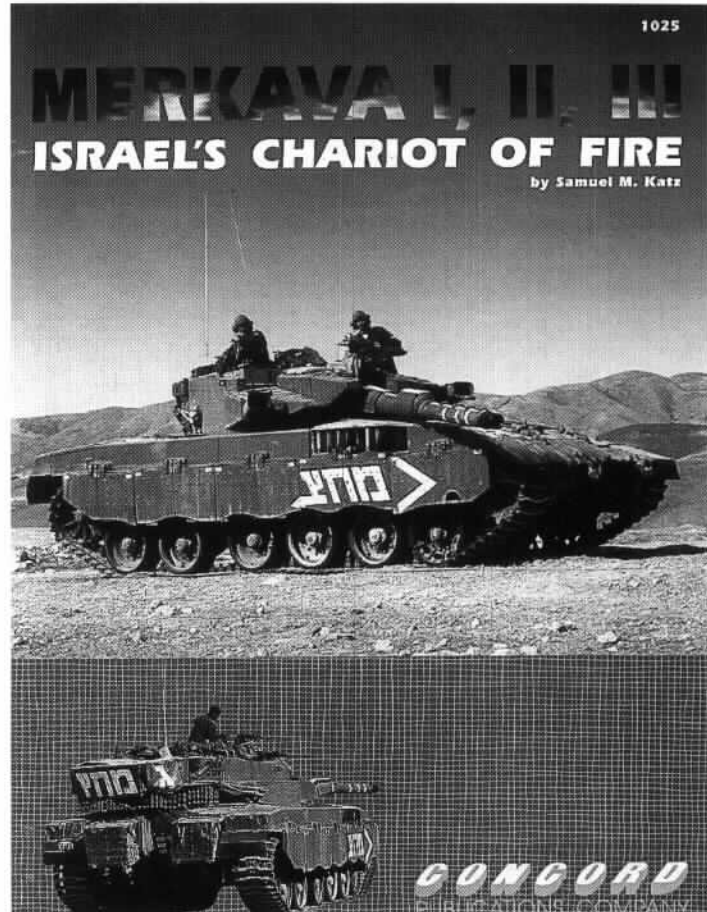
1007 Leopard 1 and 2: The Spearheads of the West German Armored Forces
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