

August 31, 2023 (UPDATED)

# HOW MANY TANKS LEFT FOR RUSSIA NOW ?

## STUDY OF RUSSIAN ARMY'S TANKS STOCKPILE SINCE THE BEGINNING OF UKRAINE'S INVASION



# SUMMARY

- 01** Introduction
- 02** Storage and repair bases
- 03** A study of tank storage bases
- 04** Tank repair factories
- 05** Putting current losses into perspective
- 06** Conclusions
- 07** Methodology et annexes





# DISCLAIMER

The Action Resilience Institute aims to help understand the phenomena of political violence and wars in an interconnected and globalized world.

The Institute's analysis notes therefore include an observation and a perspective of complex phenomena, which may concern the security or resilience of France and Europe.

The sole objective of this note is to deliver qualitative analyzes in order to help understand the phenomena and to have the means to fight against informational actions seeking to influence perceptions.

Finally, the conclusions of this note must be understood as trends and hypotheses and not as scientifically proven findings.

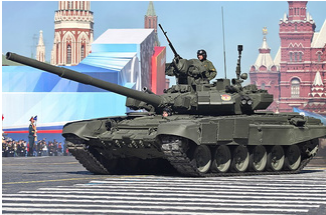
This note follows on from the previous Analytical notes which can be downloaded free of charge from the site <http://institutactionresilience.fr>



# 1 - INTRODUCTION

## Russia claims to have huge stockpiles of tanks

As of February 24, 2022, Russia's tank stocks were at immense quantities. According to the IISS (official figures from 2017-2022), there would be around 17,500 tanks in reserve. Very early on, these figures were questioned in that these tanks were often stored in the open and could be in poor condition. The Russian army can however count on this stock of gear that can serve as "spare parts reservoirs" to keep the gear in unit in working order.



T-90, T-90A & T-90M

200

**Figures based on the entire USSR's stockpile rather than the reality of the Russian army.**

These figures are mainly taken from counts made during the Soviet period. Thus, a large part of these evaluations are based on a theoretical total of tanks produced by the USSR. The break-up led to some of these tanks ending up under a flag other than Russian.



T-80B, T-80BV & T-80U

3 000

The Kazakh, Belarusian and Ukrainian armies have inherited a significant number of Soviet tanks,



T-72B3, T-72B & T-72A

7 000

More recent evaluations still give a stock of nearly 6,000 tanks. this figure remains theoretical since among these thousands of machines, not all are equal in terms of availability.



T-64

2 000

The objective of this report is to seek to assess the real and mobilisable stocks of Russia, beyond theoretical or propaganda figures, from an in-depth study of available open sources, in order to



T-62

2 500

**Does Russia have stocks of tanks as big as it claims?**



T-54, T-55

2 800



# A HUGE LEGACY TO KEEP



## *USSR's fall*

With the dissolution of the USSR, a large number of units were converted into storage bases, mainly in the military districts beyond the Urals. At the time, there were 3 in number: Siberian district, Transbaikalian district and Far East district, the latter hosted several so-called "deep" reserve divisions, intended to be engaged as reinforcements or in the second phase of maneuvers (counter-attack in the defensive or exploitation in the offensive).

Successive base reforms and closures led to operational units becoming themselves storage and repair bases for the Soviet Armed Forces.

## *The rationalization of land units*

With a military budget in free fall compared to that of the USSR (on average 10 billion dollars over the 90s compared to nearly 300 billion dollars before the fall of the USSR), many units were disbanded to reduce the number of military equipment to be permanently maintained in operational condition.

# MAP OF RUSSIAN GROUND FORCES RESERVE BASES



## *A concentration of bases east of the Urals*

To meet its international commitments, Russia has placed 'the majority of its storage and repair sites in the two new military districts in the East, the Central District and the Eastern District. It identifies 24 of these sites out of the 28 existing ones.

## *Bases with various roles*

While some bases provide direct support to operational units and regenerate units for their benefit, other bases are places for the disposal of obsolete equipment.

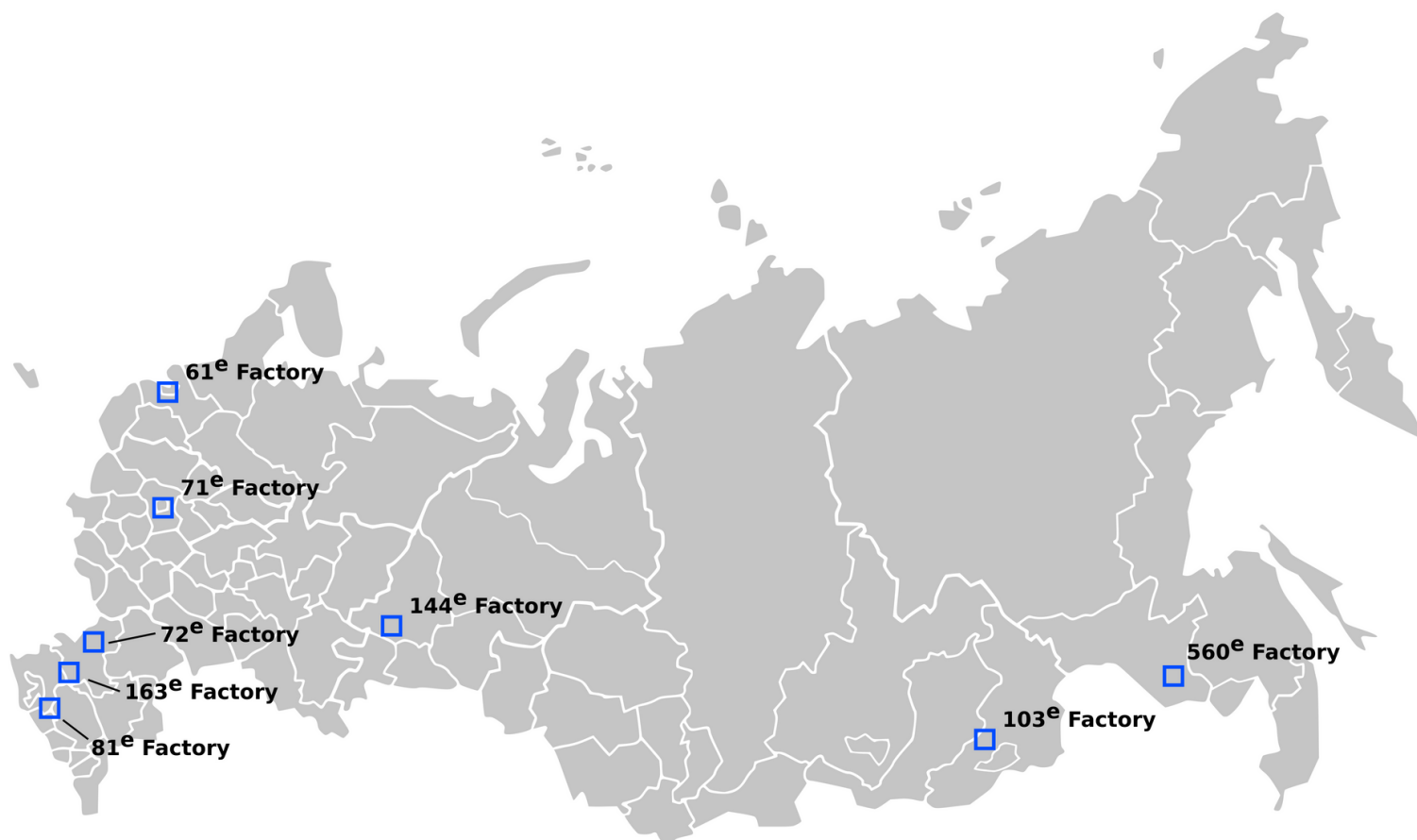
## *Large reserve bases and repair centers*

While 9 bases are dedicated to the storage of tanks and armored vehicles, other smaller bases are centers for the repair and regeneration of military equipment. Bases are also used to store military equipment (communications systems, engineering vehicles) and melee vehicles.

***In order to respect the Treaty on Conventional Forces in Europe, the Soviet Union and then Russia set up reserve bases beyond the Urals.***



# MAP OF ARMORED REPAIR FACTORIES



## *Facilities created from the 1930s*

In order to support the newly created Soviet armored force, the Directorate of Armor and Automobile gradually set up armor repair factories.

These factories make it possible to carry out complete repair operations on armored vehicles in very poor condition. Major components are removed for revitalization, spare parts are replaced and engines reconditioned.

## *Basic but existing modernization capabilities*

If the modernizations proposed are not on par with what manufacturers can do. These factories are able to bring a decent level of modernization to equipment in standard version and for example improve their level of armor by adding reactive bricks. They can also offer new, more efficient shooting optics compared to the original models.

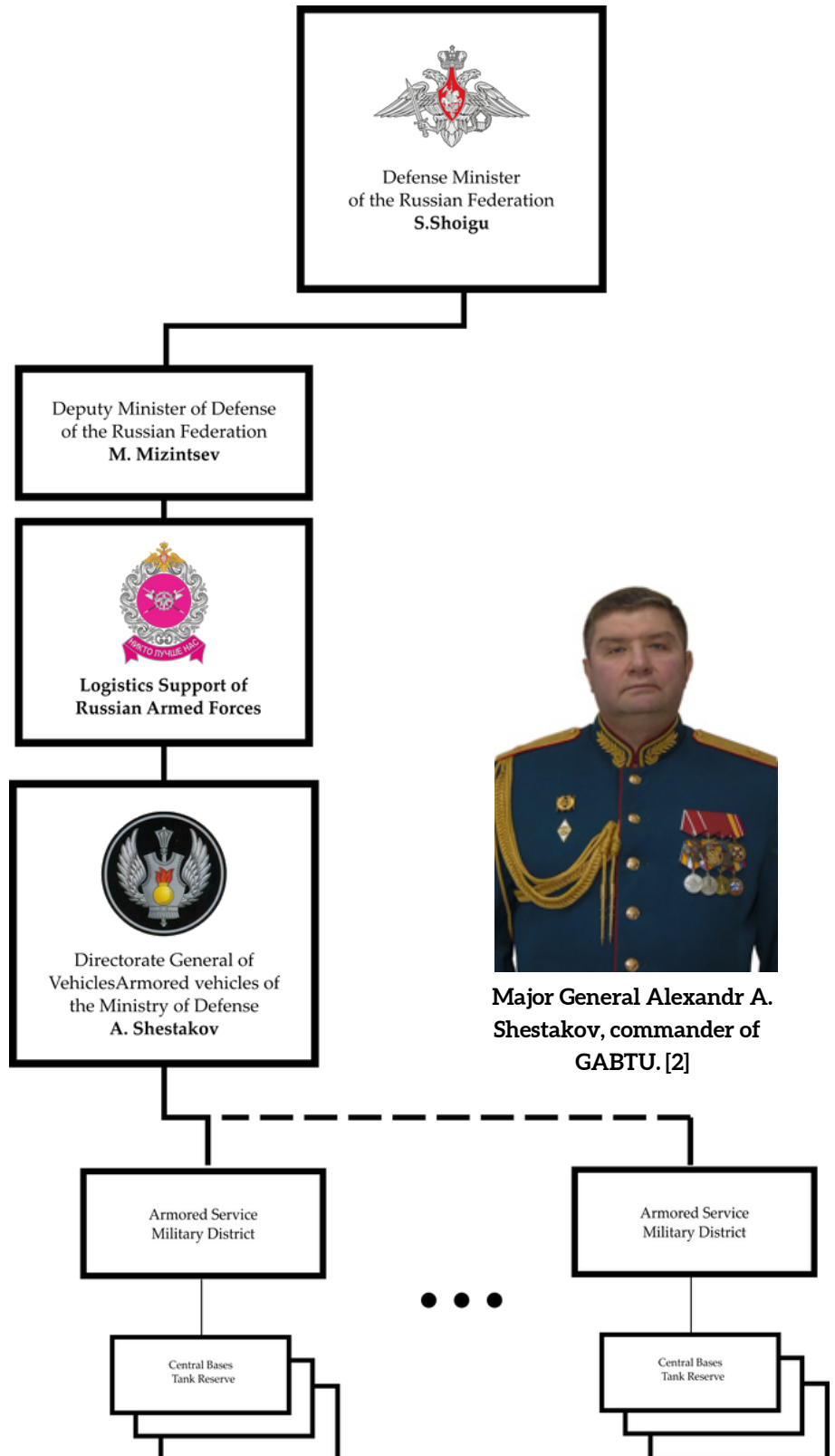


# 2 - STORAGE AND REPAIR BASES

## Central Tank Reserve Bases (Центральная База Резерва Танков)

The "Tsentral'naya Baza Rezerva Tankov" are units consisting of storing, maintaining, and if necessary, reforming the combat tanks of the Russian army. These bases have existed since the end of the Second World War and have hosted different models of tanks from the Soviet army and now from the Belarusian, Russian and Ukrainian armies. In the case of Russia, these bases are directly attached to the General Directorate of Armored Vehicles of the Ministry of Defense known by the acronym "GABTU".[1]

These bases are generally equipped with a maintenance battalion responsible for managing the tank stock and carrying out maintenance operations on the said tank fleet. These maintenance operations are conditioned by the needs of the Russian General Staff, the latter giving priority to certain tank models over others. Various storage techniques, particularly in dry air[3], have been developed in order to best preserve the armored vehicles stored on these sites.



[1] [http://old.redstar.ru/2004/09/17\\_09/2\\_02.html](http://old.redstar.ru/2004/09/17_09/2_02.html)

[2] [https://structure.mil.ru/structure/ministry\\_of\\_defence/details.htm?id=9742%40egOrganization](https://structure.mil.ru/structure/ministry_of_defence/details.htm?id=9742%40egOrganization)

[3] <https://knigogid.com/books/spravochnaya-literatura/spravochniki/page-120-251979-vitalii-feskov-vooruzhennye-sily-sssr-posle-vtoroi.html>



Each tank reserve base is attached to the Armored Service of the Military District hosting the base[4] [5], the district armored service depends on the GABTU. Base security is managed by a civilian paramilitary structure reporting directly to the base commander[6].

### List of Tank Reserve Bases

There are 9 Tank Reserve Bases[1] spread over Russian territory, and mainly in the Central and Eastern Military Districts:

- Western Military District:
  - 22nd Base in Bouy.
- Central Military District:
  - 349th Base at Topchikha.
  - 1311th Base at Verkhnyaya Pyshma.
  - 2456th Base in Yarokovo.
  - 2544th Base in Kozulka.
  - 6018th Base at Kamyshlov.
- Eastern Military District:
  - 111th Base in Komsomolsk on Amur.
  - 769th Base in Ulan-Ude.
  - 1295th Base at Arsenyev.

[4] <http://eparhia-amur.ru/news/text/113554.html>

[5] <https://moyaokruga.ru/severokaspijskayapravda/Articles.aspx?articleid=155816>

[6] <https://sudact.ru/regular/doc/emBuae6n3pdj/>

Example of a Central Tank Reserve Base



***There are 9 Reserve Bases of Tanks distributed on Russian territory, and mainly in the Central and Eastern Military Districts***

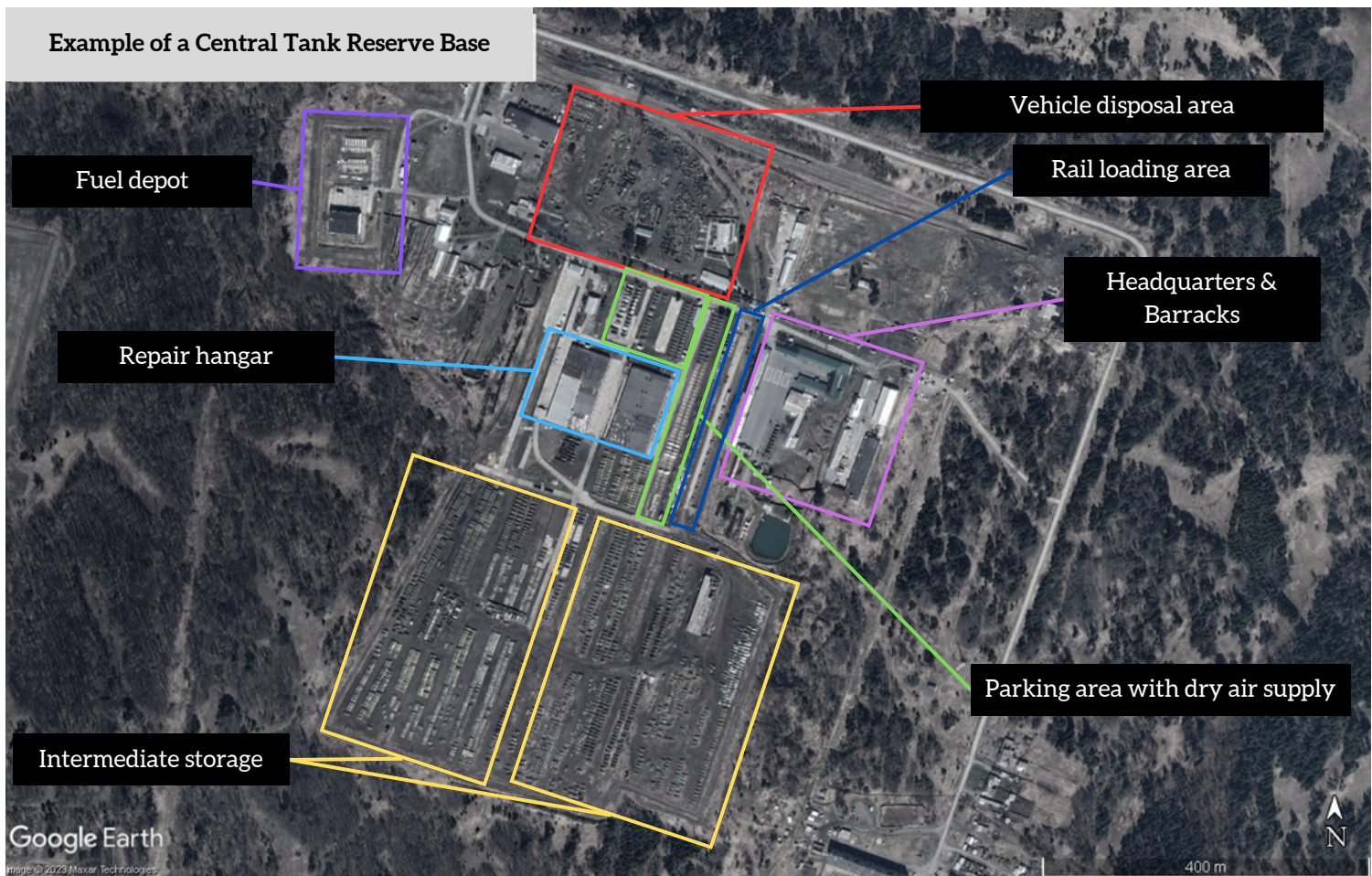


## Structure of a Central Tank Reserve Base

Most bases follow the following organizational scheme:

- An administrative building housing the base command.
- Buildings housing troops and technical specialists.
- A number of hangars where maintenance and/or storage operations are carried out.
- Concrete locations with or without inclusion of a tank dehumidification system by the gun.
- A storage space segmented according to the functional and/or administrative state of the vehicles.
- One or more disposal areas for scrapped vehicles.
- Possibly a fuel depot.

Also to facilitate transport operations, a loading area on the railway is present within a radius of 3 km around the base, or exceptionally, directly in the base.





## **Military equipment storage and repair bases**

These bases can be used to repair tanks, armored vehicles, and other categories of military vehicles employed by Russian ground forces. They directly support the sector's operational units.

These facilities are not dedicated solely to tank maintenance but can handle basic repairs for a large number of different vehicles. However, there are specialized bases for telecommunications and command equipment as well as engineering equipment.

The study here will focus more on the central tank reserve bases concentrating almost all combat tanks.



## 3 - STUDY OF CENTRAL TANK BASES AS OF 02/24/2022

The satellite imagery used to perform our count covers the period from April 2021 to September 2021, i.e. between 10 and 5 months before the February 2022 invasion.

Of the 22 reserve bases, the 10 central tank bases concentrate nearly 95% of the reserve tank manpower of the Russian ground forces. On these 10 bases, more than 5538 Russian tanks are present in different functional states. The study here did not take into account the tanks being dismantled, that is to say the tanks whose turrets are removed and only the chassis remains in the open air.

On these 5538 tanks, 4347 could be directly **identified** (that is to say that a model, even a variant could be associated). On the **1191 unidentified** tanks, hypotheses can be formulated on the associated potential model.

In addition to these tanks stored outdoors, these bases collectively have an indoor storage space of nearly **1,950 indoor storage spaces**. On these interior storage spaces, a part is actually allocated to maintenance operations on the tanks. A portion of the storage space is also used to store the fleet of vehicles used by the maintenance units present on the bases. And finally, these hangars can also be used to store other armored vehicles such as the very many BMPs or BTRs present on these bases. Some hangars are also simply no longer used and the deterioration of these hangars can easily be seen by satellite imagery.

In fact, the theoretical maximum of tanks in reserve is around **7000**, with a more likely count closer to **6000** if a hangar occupancy factor is **40%** tanks.

Type	Count
unidentified	1191
T-80	750
T-72	1945
T-62	1239
T-54/T-55	413
<b>Total</b>	<b>5538</b>

*As of February 24, 2022, the actual stock of tanks in Russia amounted to a theoretical total estimated at between 6 and 7000 units (all types and all states)*



# A SOVIET BEQUEST

Thanks to the identification of tank models, the cross-checking of information on the tank models hosted by the various reserve bases, it is possible to project trends when it comes to the level of modernity of the tank models present on these bases. Also, the information collected on Russian social media and posted by the military themselves, mostly conscripts (see our methodology ) makes it easier to assess the variants and the general condition of the vehicles stored in these bases.

It was found that the central reserve bases in the Far East (Komsomolsk-on-Amur, Arseniev) stored almost exclusively T-54/T-55 tanks and T-62 tanks, and in the past T-tanks -80. The only reserve base of the Western Military District in Bouï stores when it has much more recent models of tanks like the T-90.

In the Central Military District, a large number of T-72s are stored, of which a majority (at least 1100) are variants dating from the 70s (T-72 "Urals" and T-72A) and in a dubious operational state and probably doomed to destruction. Other T-72 variants noted are T-72B (at least 330), and T-72B Obr. 1989. A remainder of T-64 (unusable because of the Ukrainian origin of the engines) is also present on certain bases (Kozoulka and Topchikha).

Of the T-80s noted and identified, T-80BV (at least 580) and T-80UD (170 in number and unusable because of the Ukrainian origin of the engines) could be identified, it is probable that T-80U/UE-1 are present in small quantities on the Bouï base to support the 4th Guards Tank Division.

Type	Count
T-72 Oural/T-72A	1100
T-72B	330
unknown T-72	515
<b>Total</b>	<b>2055</b>

Type	Count
T-80BV	580
T-80UD	170
<b>Total</b>	<b>750</b>

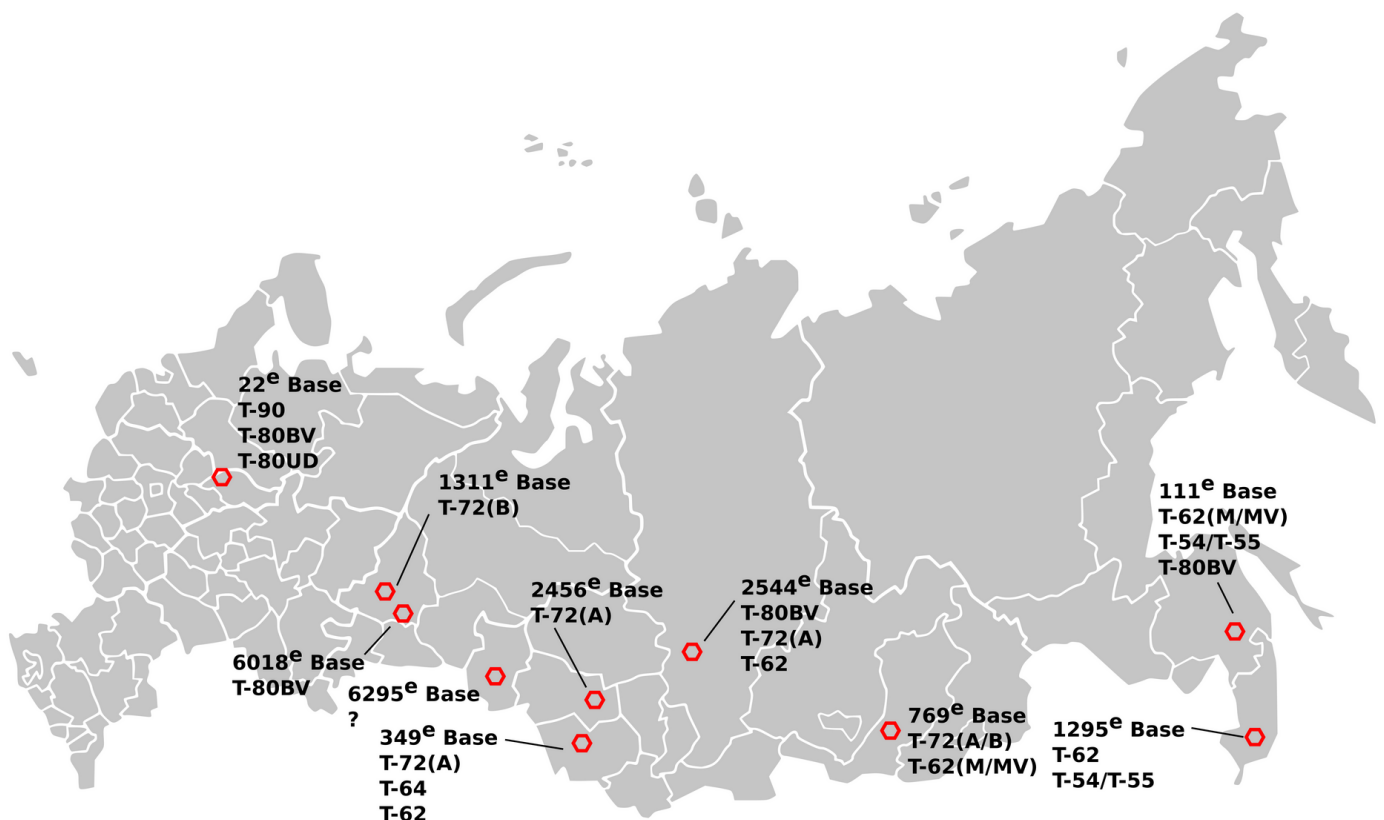
***As of February 24, 2022, the vast majority of tanks stored by the Russian army date from before 1980***

# A COHERENT BASE GROUPING

Following the order of priorities of the Russian Ground Forces, each base hosts specific tank models. Thus, the only reserve base of the Western Military District includes T-90s, mainly arming the units of this District directly facing NATO in terms of strategic positioning, it also hosts the T-80U/BV tanks previously used in the units. of the former Military Districts of Moscow and Leningrad. A large number of T-90As are also employed by the Southern Military District, as it does not have a Central Reserve Tank Base, it is likely that the base also supports this Military District.

The storage bases of the Central Military District supply the units of the Central Military District, mostly armed with T-72 (A and AV variants) they also have modernized variants (T-72B3 and B3 Obr. 2016). The Central Military District remains the military region least equipped with operational tanks (nearly 460 tanks) but the most equipped in terms of reserve tanks (more than 2155 tanks in reserve in the bases of the District).

The Eastern District bases have a large number of T-62 tanks and a significant number of T-55 tanks, they also hosted T-80BV tanks (and up to this day for the 111st) for a while before they joined local units. A large number of T-62 tanks are maintained in operational condition to provide mounted reserve units in the event of a major conflict. The appearance of the T-62s in the Ukrainian theater coincides with the partial mobilization ordered by Putin.



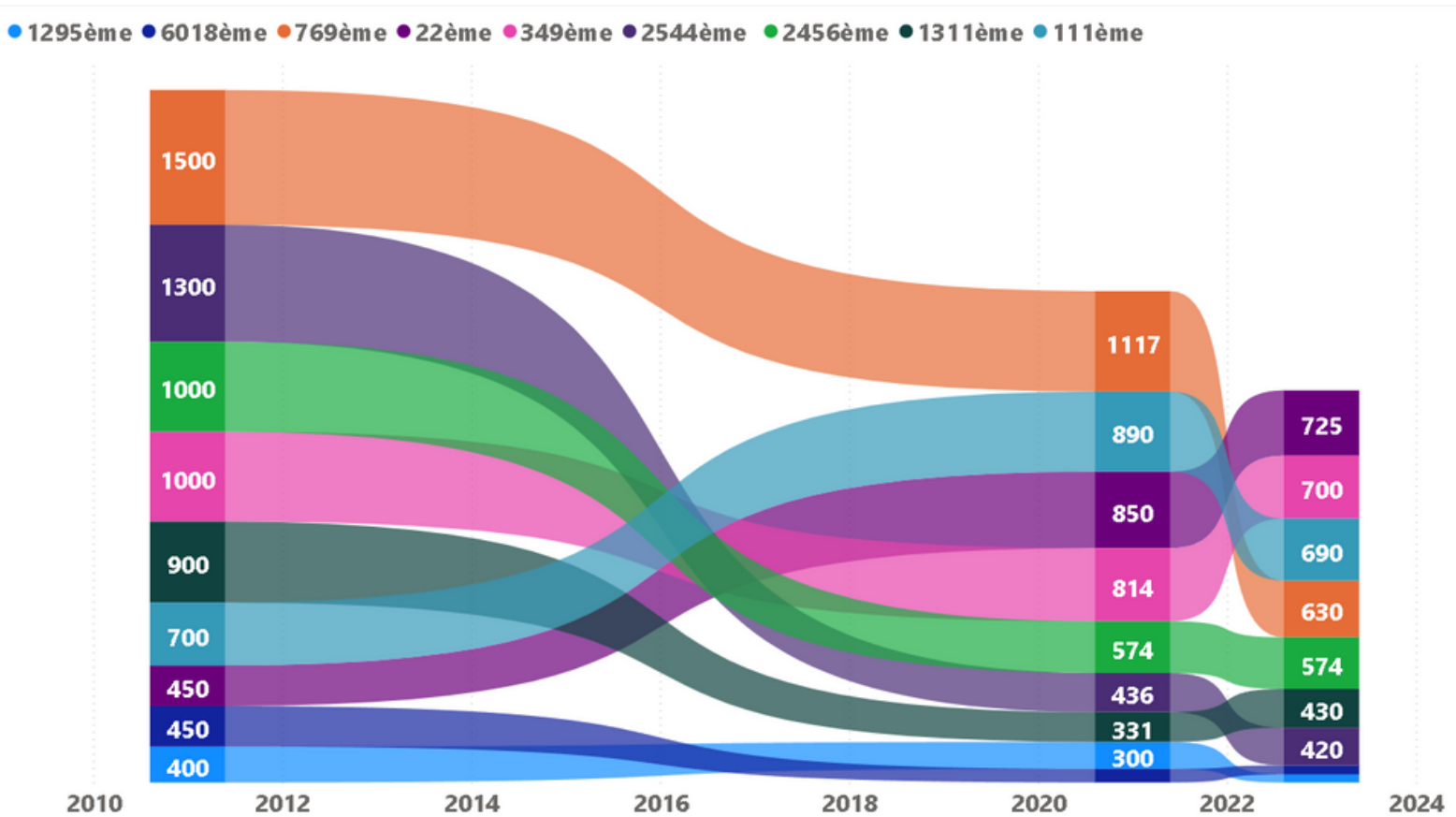


# CENTRAL BASE STATISTICS

Since the beginning of the 2000s, there has been a growing discrepancy between current reserve figures in central bases and theoretical reserves. In 2012, the Russian Ministry of Defense decided to proceed with the elimination of a large number of equipment considered obsolete[7], essentially T-55, T-62 and T-64 tanks, which were supposed to vanish from reserve bases.

Elimination therefore took place gradually, with a fairly slow pace. While the T-64 have practically disappeared, a large number of T-62's remain, this is partly explained by the recent policy of conservation of the T-62, initially intended for export while maintaining a small fleet (150 copies ) for the Russian army [8].

At the same time, the personnel of the 22nd Base grew significantly during the current decade while the latter recovered older tank models in service in the Western Military District units (particularly the T-80s fleet).

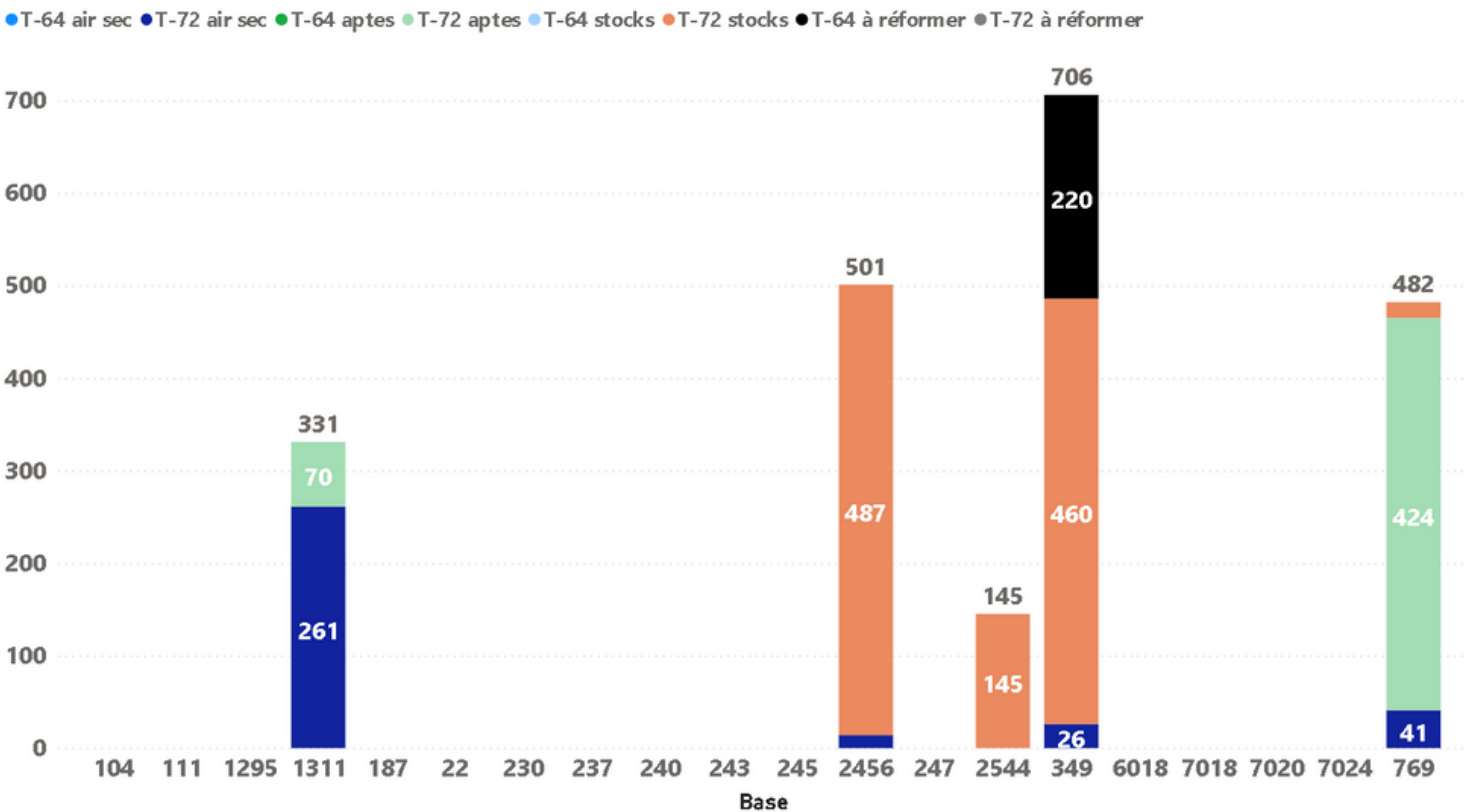
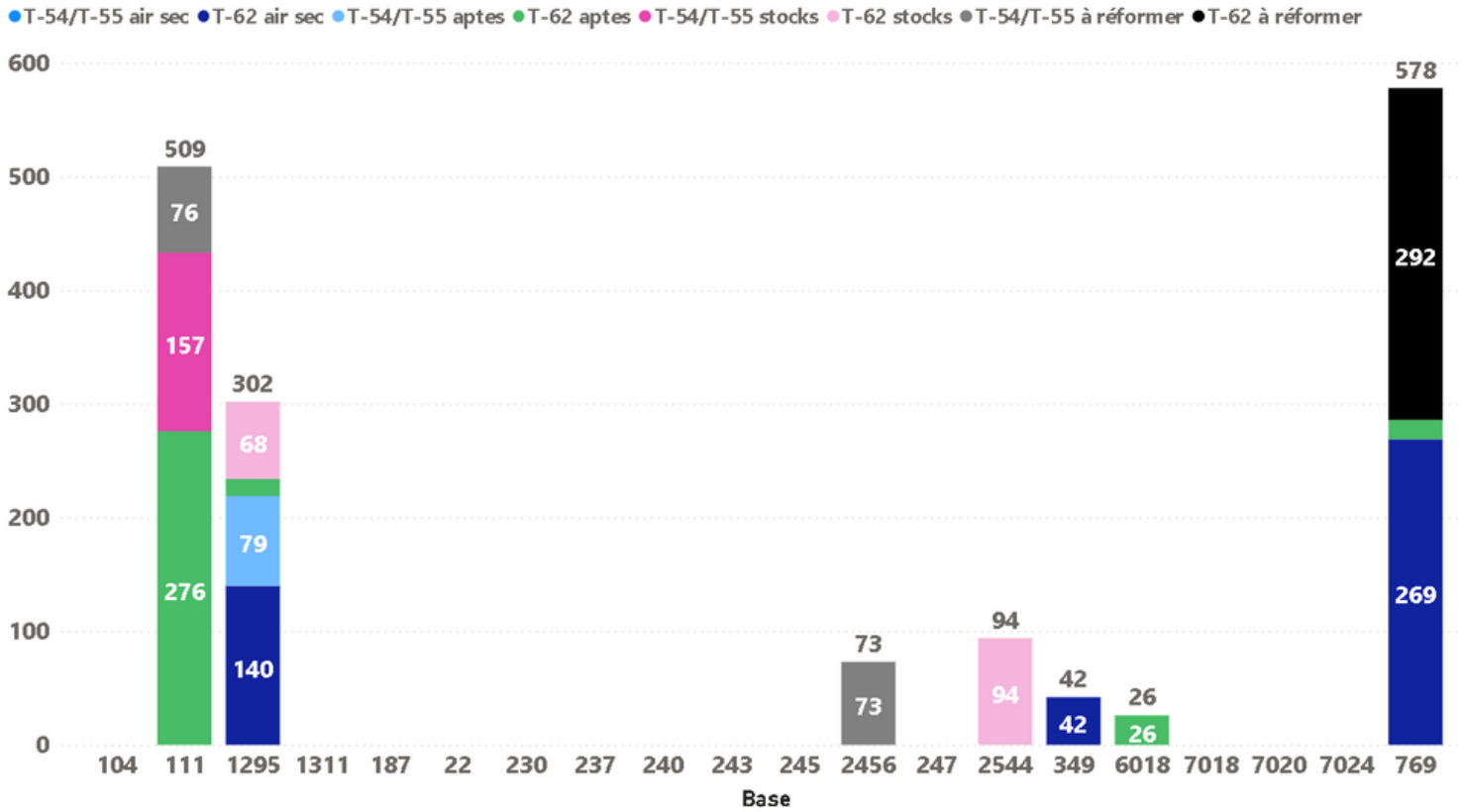


General count of tank reserve bases observed in 2011, 2021 and April 2023

[7] <https://lenta.ru/news/2012/03/23/getridoi/>

[8] <https://defence-blog.com/russias-cold-war-era-t-62-tank-still-in-service/>

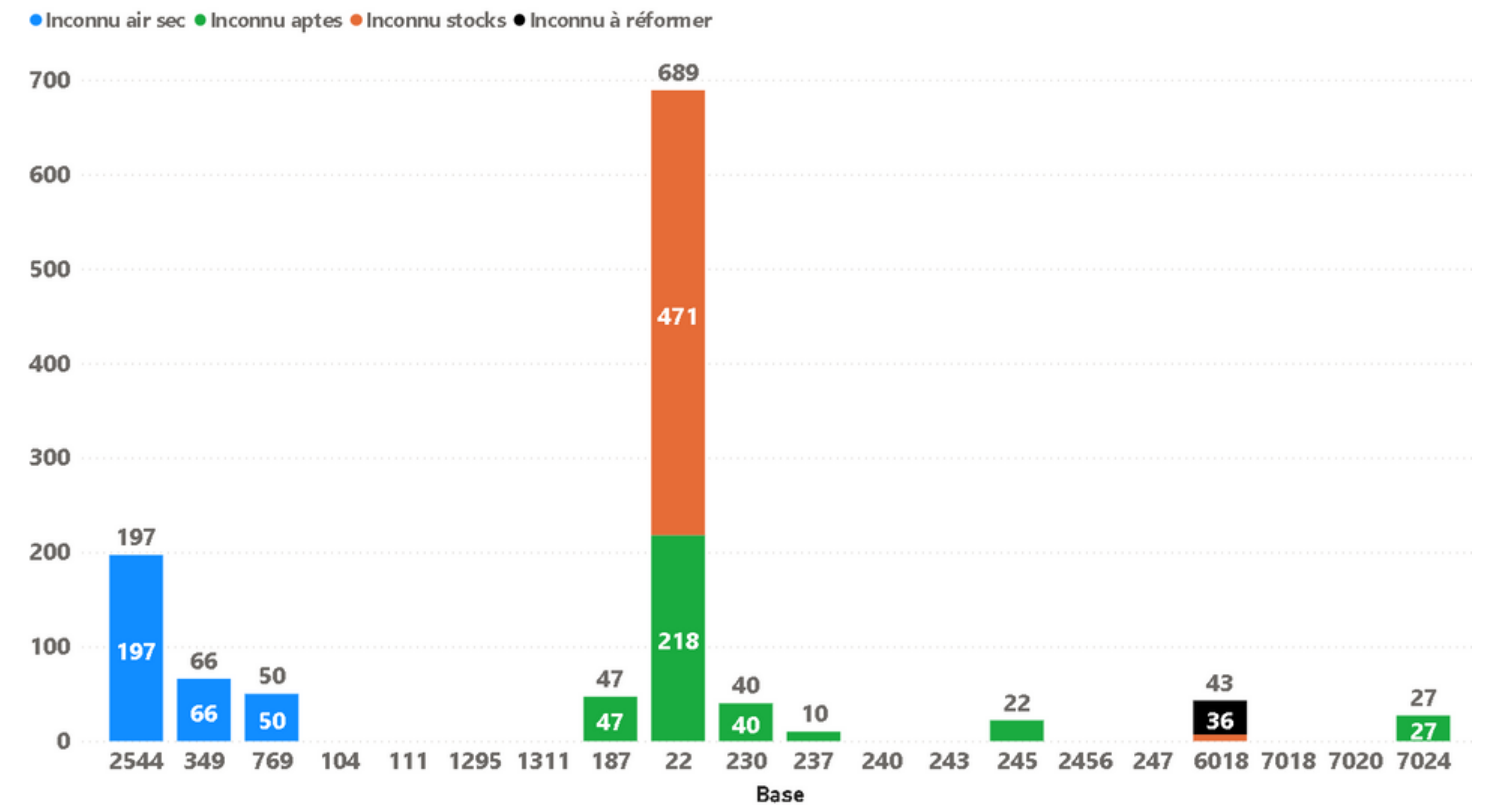
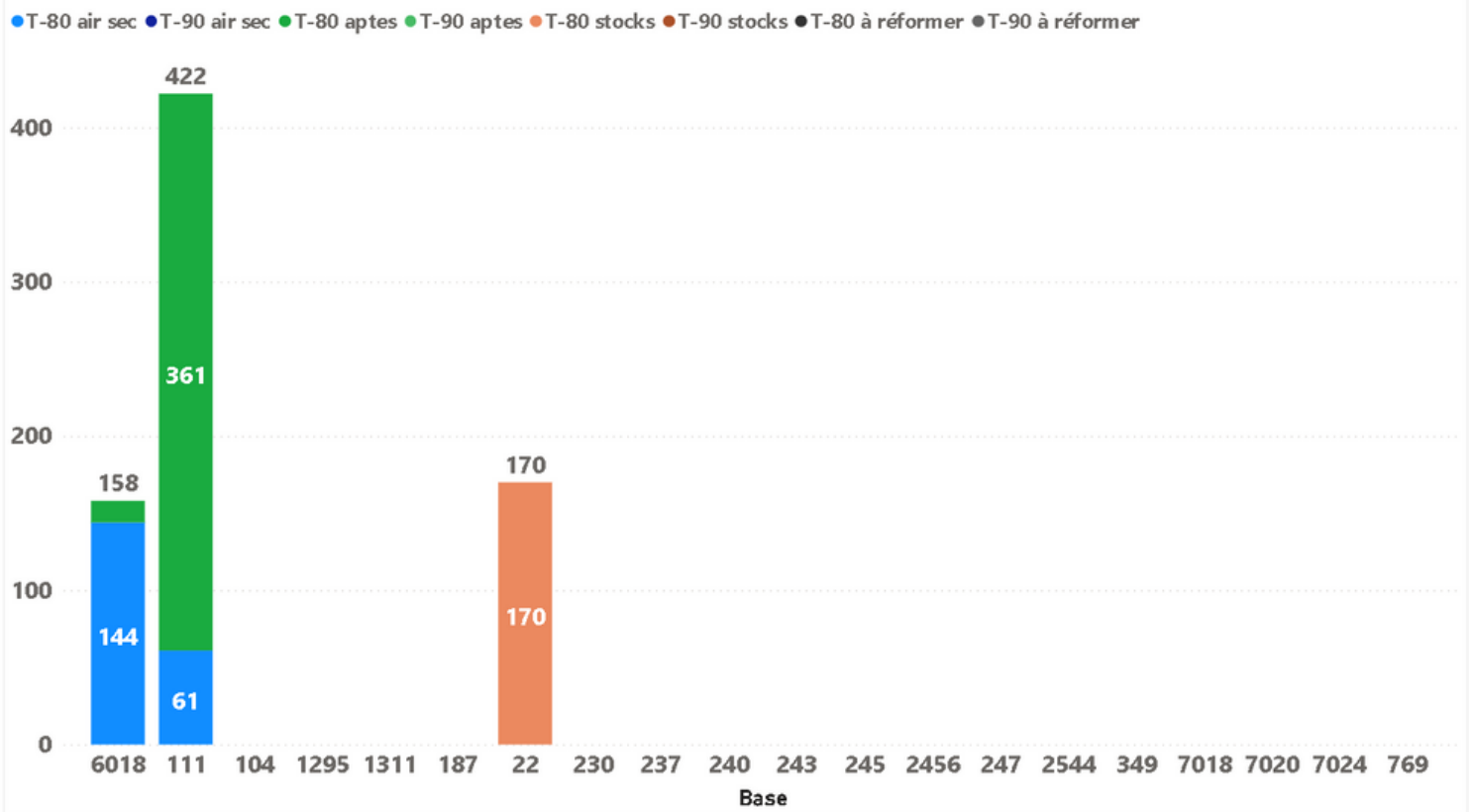
# CENTRAL BASE STATISTICS (2)



Count of old generation tanks found on reserve bases in 2021



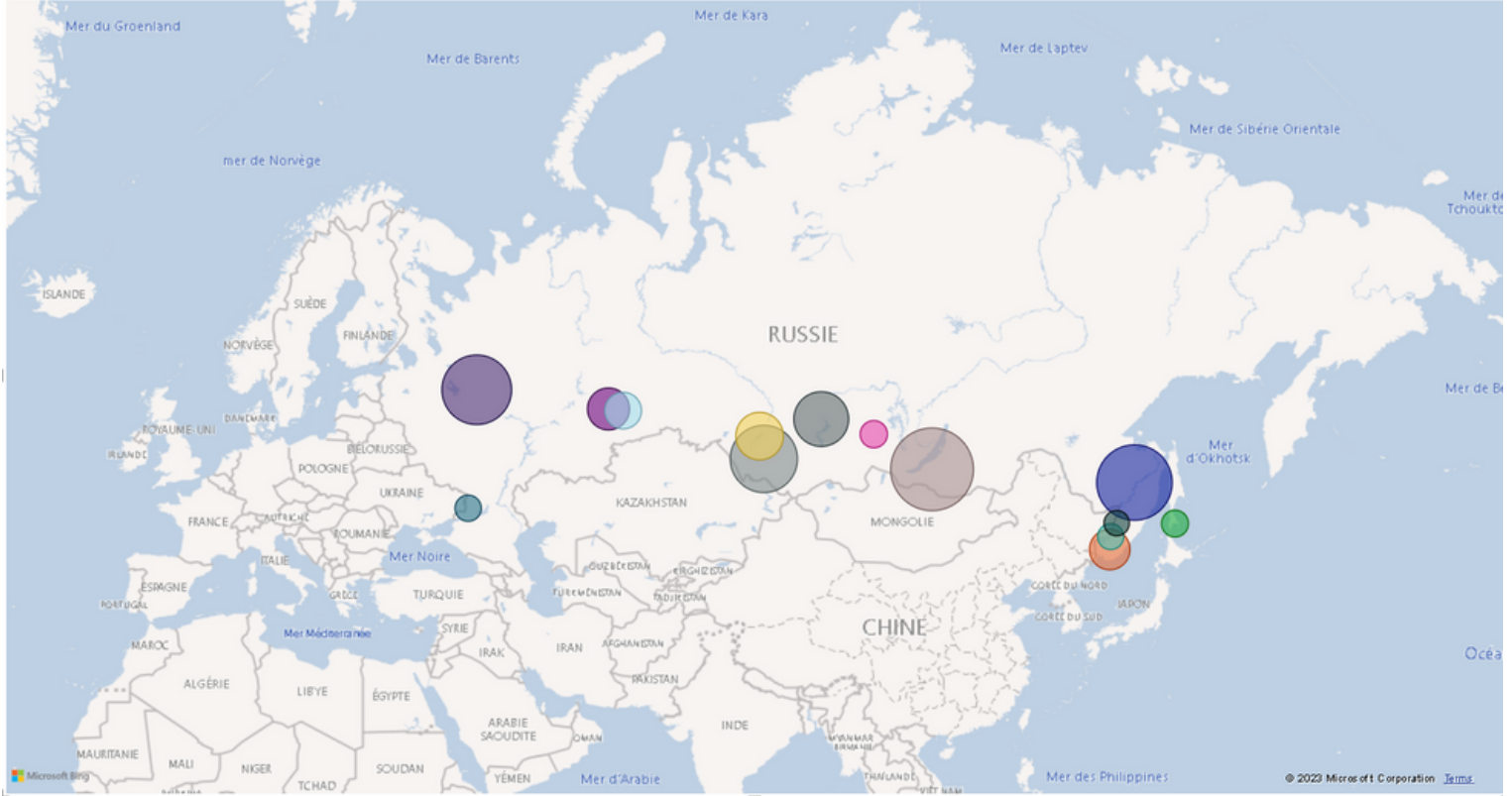
# CENTRAL BASE STATISTICS (3)



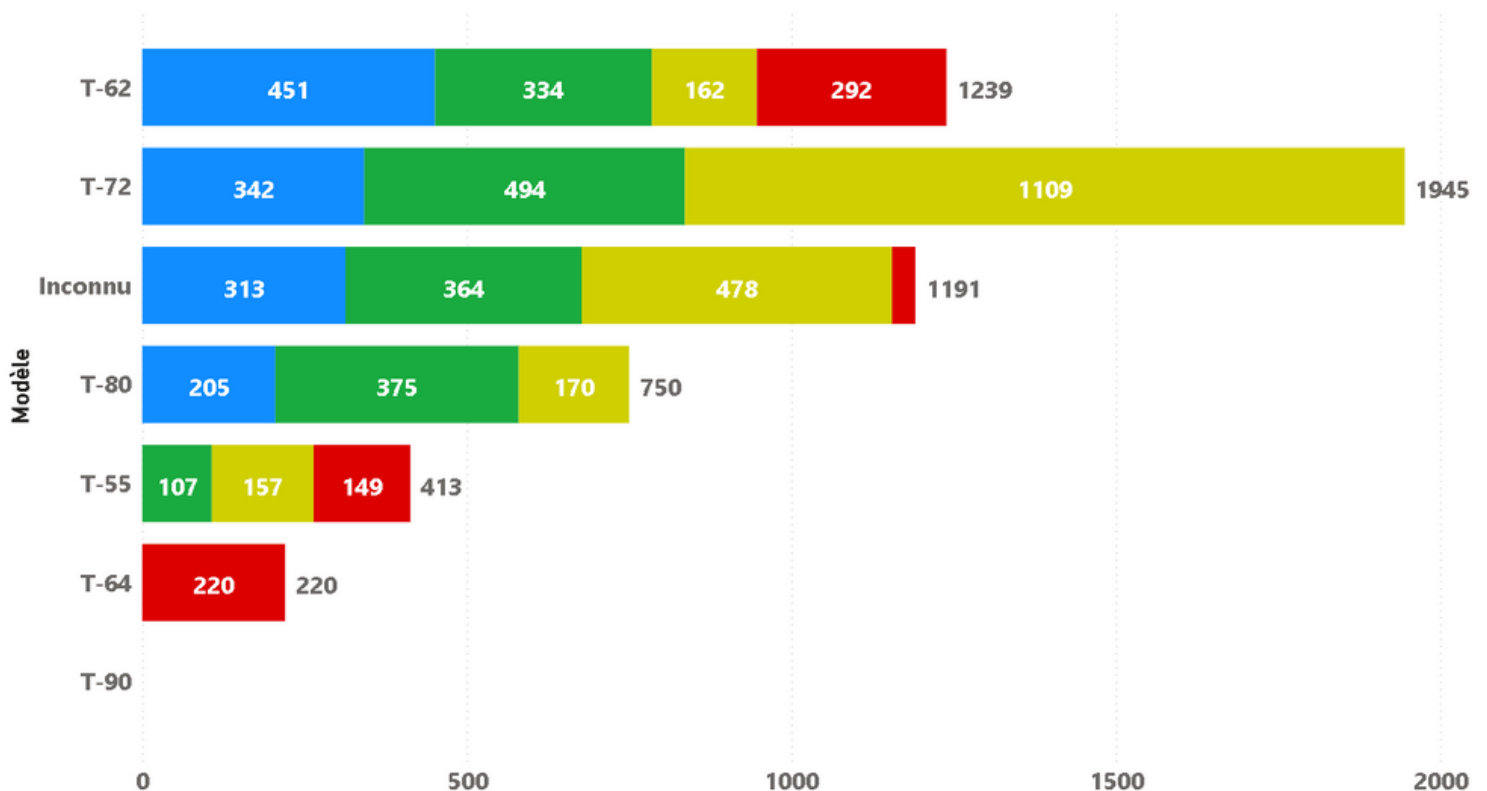
Count of new generation and unknown tanks found on reserve bases in 2021

# CENTRAL BASE STATISTICS (4)

Base ● 104 ● 111 ● 1295 ● 1311 ● 187 ● 22 ● 230 ● 237 ● 240 ● 243 ● 245 ● 2456 ● 247 ● 2544 ● 349 ● 6018 ● 7018 ● 7020 ▶



● Air sec ● Apte ● Stock ● A réformer



Global count by availability status and by identified model estimated in 2021



# 4 - STUDY OF ARMORED REPAIR FACTORIES

## List of Armor Repair Plants

There are 8 armored vehicle repair factories, 2 of which were recently created from Russian army repair bases[9], spread all over Russian territory, and more particularly in the west of the country:

- 61st Factory in Strelna, district of Saint-Petersburg: factory repairing mainly combat tanks and specializing in the T-80B/BV/U and T-72B.
- 71st Factory in Ramenskoye: recently created from a technical center for armored vehicles.
- 72nd Plant at Kamensk-Shakhtinsky created from the 7024th storage and repair base.
- 81st Factory in Armavir: factory specializing in the repair of BTR and BRDM.
- 103rd Factory in Atamanovka: factory that can repair a large range of armored vehicles and specializes in the T-62 & T-54/T-55.
- 144th Factory in Yekaterinburg: a factory specializing in the repair of VDV vehicles.[10]
- 163rd Factory in Kushchevskaya: a factory specializing in the repair of T-72 tanks and BMPs.
- 560th Plant in Voevkaevka, mainly repairing BMPs.

## Current situation

On February 24, Russia had 3 factories dedicated to the repair of tanks, in addition to the Omsktransmash factory with a capacity for repair and deep modernization of tanks (this factory carries out the modernization of T-80B/BV to the BVM standard). Each of the 3 factories is optimized to repair specific tank models. This common thread makes it possible to have a better acuity concerning the potential of repair/renovation of combat tanks of Russia.

In October 2022, the 103rd Factory was notified of a contract for the modernization of 800 T-62 tanks, thus officially dedicating this factory to the repair of T-62 tanks. The 61st Factory in Saint Petersburg, already having a fairly large queue of T-80BV tanks (244 T-80s in August 2022) seems willing to continue to modernize / revitalize these specific models. The 163rd Factory is entangled in multiple legal proceedings, and close to bankruptcy[11].

These factories also participate in the repair of other armored vehicles such as BMP-1/2, BTR-70/80, BMD-2 or BRDM-2[12]. This therefore reduces the workload dedicated solely to combat tanks while Russian forces have to restore a large number of armored vehicles and the Kurgan Factory is the only one that produces BMPs.



[9] <https://checko.ru/company/voyskovaya-chast-42713-1034417360636>

[10] <http://163btrz.ru/%d0%b8%d1%81%d1%82%d0%be%d1%80%d0%b8%d1%8f/>

[11] <https://www.kommersant.ru/doc/5445730>

[12] <https://www.chita.ru/text/society/2023/03/12/72126134/>

# LONG WAITING LINE AND HIGH DEMAND

## A large number of tanks to repair

Long before the conflict, tanks from tank reserve bases, including ones stored in hangars. Had to systematically go through the repair factory box in order to be able to resume service. Indeed, the machines had to be revitalized to have a functional engine, the electrical wiring completely redone, undercarriage completely replaced and the main gun renovated or replaced in order to have a functional tank. This was particularly the case for the T-80BV which reintegrated several armored formations, in particular the 200th Motorized Rifle Brigade located in the Kola Peninsula. [13]

It takes between 30 and 60 days to repair a tank coming out of reserve bases that has not undergone regular maintenance and storage under dry air.[14]

## Delivery rates not necessarily realistic

Taking what has actually been produced by the 103rd Factory since October, actual production figures appear to be lower than the rates announced by the Russian government. It was announced at the beginning of March 2023 that around forty vehicles had been sent "to the special operation zone" the likely hypothesis being the T-62s sent to the front so far were coming from storage bases[15]. This gives a figure of 8 tanks per month instead of the 22 to 23 initially planned by the order of the Ministry of Defense[16]. In the past, the factory refurbished 92 T-72B1s over 3 years on before being sent to Venezuela [24].

The 163rd Factory was able to refurbish 100 BMP-2s per year between 2014 & 2016 while subcontracting almost half of the vehicles to 4 other different factories[18]. Also in 2016, 24 T-72s were delivered by the Factory to the Russian armed forces[19]. Cases of embezzlement did not spare the factory in the early 2010s [20].

Regarding the 61st Factory, the rate of repair seems to be between 30 and 60 tanks per year[17]. It reconditioned nearly 120 T-80BV tanks from 2016 to 2019[21].

For example, the overhaul of a T-72 tank is of the order of 30 million rubles[22] (383,000 US dollars). The cost of upgrading a T-90 to the T-90M standard is \$2.8M, converting a T-72B to T-72B3 \$1.2M and a T-80BV to a T-80BVM \$1.2M[23]



[13] <https://www.rbth.com/science-and-tech/327915-how-russias-t-80-tanks-are-assembled-for-arctic>

[14] <https://arsenal-otechestva.ru/article/442-61-brz>

[15] <https://overclockers.ru/blog/Zelikman/show/88356/general-gurulev-pokazal-kak-prohodit-modernizaciya-sovetskih-t-62-na-103-btrz>

[16] <https://www.kommersant.ru/doc/5607913>

[17] <https://vk.com/@585874971-61st-armored-repair-plant>

[18] <https://mil.today/2016/Weapons11/>

[19] <https://dzen.ru/media/armsblog/stoimost-modernizacii-tankov-t90m-t72b3-t80bvm-5c82199fd8c8100b947695b>

[20] <https://ria.ru/20190718/1556607156.html>

[21] <https://bmpd.livejournal.com/2081356.html>

[22] <https://newdaynews.ru/society/396216.html>

[23] <https://arbatcredit.ru/163-bronetankovyj-remontnyj-zavod/>

[24] <https://armstrade.org/includes/periodics/mainnews/2012/0411/101412424/detail.shtml>

# CORRUPTION ISSUES

## A widespread phenomenon of corruption in the Russian army

Corruption has always been a very present phenomenon in the Russian army, the 2005 FFI report is quite eloquent on the volume of corruption within the Russian Ministry of Defense.[25]

## Equipment looted from units

Many cases of misappropriation of military equipment taken directly from vehicles were noted from the start of the conflict.[26] One can also note the recent case directly implicating the armored service of the Southern Military District, implicated in the smuggling of T-90 tank engines.[27] This is not the first time that such events have occurred, including another case of smuggling T-72 and T-90 tank spare parts brought to light in 2010 to Ukraine[28] and 2012 [29], a case of spare parts smuggling to Armenia[30], or a recent case of trafficking in T-90 engines and spare parts to Kazakhstan.[31] And a case concerning another T-72 and T-90 dating from February 2022 to an undisclosed country.[32] All these factors lead to additional costs and additional work during the long maintenance phase of armored vehicles.

## Smuggling and corruption among defence contractors

Defence contractors are not to be outdone with a case that has hit the headlines. In 2010, the governor of Chelyabinsk, linked to the equipment manufacturer Electromashina, was linked to a case of smuggling of military equipment to Iran, involving equipment for tanks disguised as agricultural machinery and illegally exported to Iran.[33] The case also brought to light the diversion of industrial documents to the United Arab Emirates.

Corruption is such that a large number of people in industry and public procurement have been prosecuted for acts of corruption, 60 defence contractors and nearly 250 civil servants have gone to court, 27 have been sentenced for violation of the rules of the public procurement[34].



[25] <https://ffi-publikasjoner.archive.knowledgearc.net/bitstream/handle/20.500.12242/1801/05-03484.pdf>

[26] <https://www.severreal.org/a/voruyut-dazhe-u-sosuzhivtsev-rossiyskaya-armiya-i-maroderstvo/31839023.html>

[27] [https://www.kommersant.ru/doc/5954243?utm\\_source=yxnews&utm\\_medium=desktop](https://www.kommersant.ru/doc/5954243?utm_source=yxnews&utm_medium=desktop)

[28] <https://newizv.ru/news/2010-04-26/zapchasti-k-tankam-t-90-vyvozili-na-ukrainu-pod-vidom-igrushek-i-pryanikov-119954>

[29] <https://lenta.ru/news/2012/08/16/tanchiki/>

[30] [https://ekb.tsargrad.tv/news/uralec-popalsja-na-kontrabande-zapchastej-dlja-tankov-t-72-v-armeniju\\_341248](https://ekb.tsargrad.tv/news/uralec-popalsja-na-kontrabande-zapchastej-dlja-tankov-t-72-v-armeniju_341248)

[31] <https://dailystorm.ru/news/na-zhitelya-urala-zaveli-delo-o-kontrabande-dvigateley-dlya-bmp-i-t-90-v-kazakhstan>

[32] <https://www.samara.kp.ru/online/news/4630084/>

[33] [https://cheltoday.ru/articles/rassledovaniya/skandal\\_v\\_chelyabinskoy\\_oblasti\\_obnaruzhena\\_tankovaya\\_kontrabanda\\_dlya\\_otpravki\\_za\\_granitsu/](https://cheltoday.ru/articles/rassledovaniya/skandal_v_chelyabinskoy_oblasti_obnaruzhena_tankovaya_kontrabanda_dlya_otpravki_za_granitsu/)

[34] <https://topwar.ru/206410-predsedatel-sk-nazval-chislo-osuzhdennyh-za-korrupciju-chinovnikov-nachinaja-s-2011-goda.html>



# MAJOR INDUSTRIAL GROUPS TO THE RESCUE

## Takeovers by Uralvagonzavod

In order to support these factories relatively weakened by the fall of the USSR, plans have been put in place jointly with the Russian government to rationalize the tank repair factories. Thus, the vast majority of these factories came under the effective control of the Uralvagonzavod group (the only combat tank manufacturer existing in Russia) from the mid-2010s.

## The serial bankruptcies and liquidations of a large number of repair centers

Even as Uralvagonzavod acquired the 61st, 81st and 560th Plants, the liquidation of almost 12 plants took place during the decade of 2010 and until 2021[39]. This considerably reduces the number of workshops specializing in the repair of Russian ground forces vehicles, driving a non-negligible quantity of minor vehicles to armored repair factories.

## Uralvagonzavod, primarily a tank modernizer

While the Armata program is falling further and further behind and the T-14 does not always seem to be ready, Uralvagonzavod continued to deliver modernized tanks like the T-72B3 and T-72B3 Obr.2016 to the Russian ground forces and to VDV, with nearly 1240 over the period 2011-2021[36], with a marked slowdown in 2021 to give way to the T-90[37]. This tank model and its updated variant was, and still remains, the basis of the Russian armored force. At the same time, the T-90M entered production very recently, but the models delivered to the ground forces are mostly modernized T-90As[39]. The Omsk[35] subdivision, Omsktransmash, meanwhile, upgraded more than 93 T-80s to the T-80BVM standard before the start of the invasion. Prior to the invasion, Russia planned to acquire 400 T-90Ms and 500 T-14s by 2027[39], these T-90Ms were to come mostly from existing T-90 stock while a new line of assembly had to come out of the ground to make the T-14.

## A production of the next generation tanks coming to a standstill

The Armata program, supposed to bring a new generation of armored vehicles is originally planned to enter the forces in 2015, has been constantly postponed until then. The 2014 sanctions did not help the situation with the scarcity of advanced equipment intended in particular for the T-14 model. The new sanction batch of 2022 further accentuated the problem and ended up reaching modernized tank models like the T-72B3 Obr.2016 or the T-80BVM. This is how old-generation optics and the absence of certain sensors for fire control were observed on the latest models of modernized tanks.

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[35] <https://russiandefpolicy.com/tag/t-72b3/>

[36] <https://bmpd.livejournal.com/4402499.html>

[37] <https://tass.ru/armiya-i-opk/13478539>

[38] <https://bmpd.livejournal.com/3935520.html>

[39] <https://topwar.ru/202777-goskorporacija-rosteh-odnoj-rukoj-stroit-zavody-pjatju-ubivaet.html>

# MAINTAINING PRODUCTION AT ALL COSTS

## Cutting-edge components struggling

While the T-72B3 Obr. 2016 and T-80BVM are initially fitted with Sosna-U visible and thermal multi-channel sights, models from November 2022 are now fitted with the old generation 1PN96MT-02 sight[40] and half the range[41].

Factory	Tank models covered
Uralvagonzavod	T-72/B/B3/B3M, T-90/A/M
Omsktransmash	T-62/M/MV, T-80B/BV/BVM
61ème Usine	T-72/A/B, T-80B/BV
103ème Usine	T-54/T-55, T-62/M/MV, T-72/A/B, T-80B/BV
163ème Usine	T-72/A/B

Factory	New built	Modernization	Overhaul
Uralvagonzavod	10	174	0
Omsktransmash	0	31	0
61ème Usine	0	0	30-60
103ème Usine	0	0	30-60
163ème Usine	0	0	30-60
<b>Total</b>	<b>10</b>	<b>205</b>	<b>90-180</b>

[40]<https://topwar.ru/211474-novye-tanki-t-80bvm-dlja-specoperacii-na-primeneni-pohozhe-prishlos-jekonomit.html>

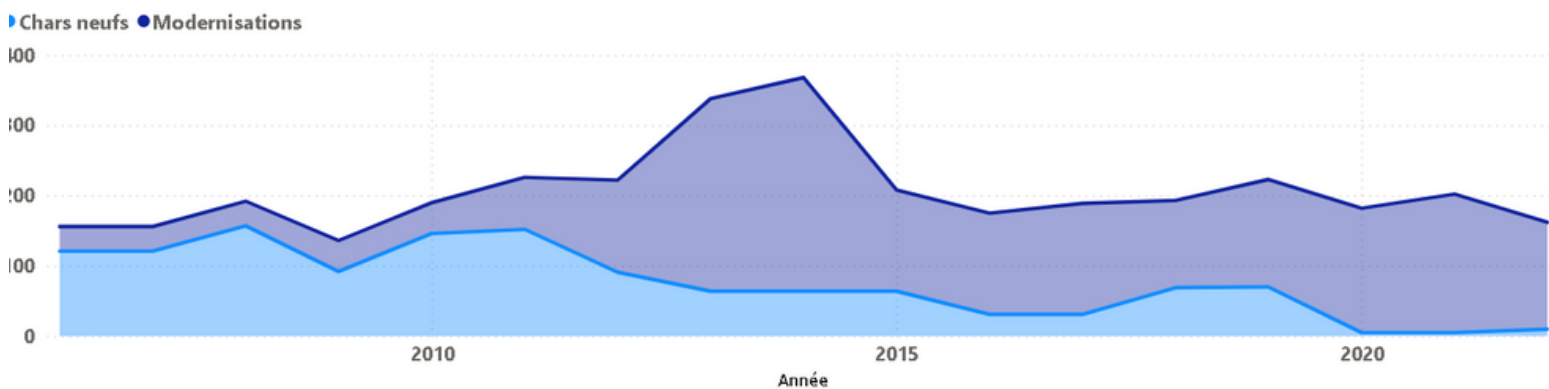
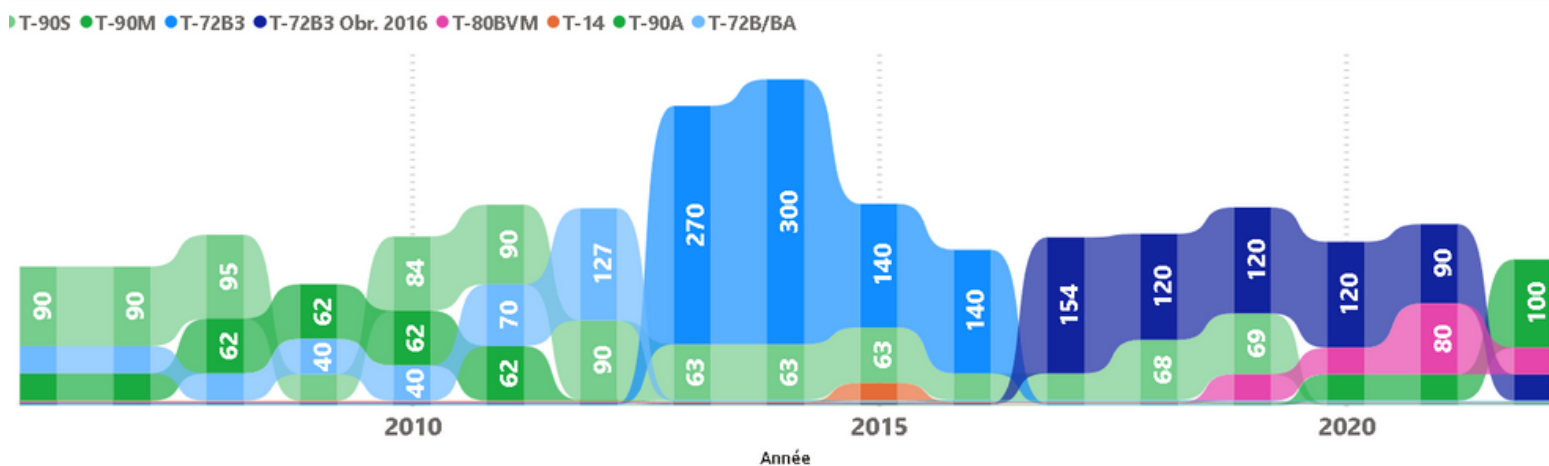
[41]<https://topwar.ru/16618-mnogokanalnoe-teplovizionnoe-primeneni-prisposoblenie-navodchika-sosna-u.html>

# PROBLEMS FROM PREVIOUS SANCTIONS

## A history of declining tank production

While Uralvagonzavod produced a fairly substantial number of T-90s for export between 2005 and 2016, it was also able to produce a substantial modernization program for T-72 tanks. Thus, from 2013, UVZ was able to supply nearly 300 modernized vehicles per year while ensuring the production of new chassis for export.

This drop can be partly explained by the first wave of sanctions that hit Russia in 2014 following the annexation of Crimea and its involvement in the Donbass war[42]. A detailed observation of production below sheds light on the first impact of the international sanctions decided from 2014 onwards. Taking into account the increase in modernization of T-72 tanks and the decrease in production of T-90 tanks, Uralvagonzavod finds itself in an increasingly difficult position to produce new tank chassis in numbers. Thus, the first T-90M contract produced only 10 new tanks and modernized 50 existing ones.



[42] [https://ecfr.eu/article/commentary\\_the\\_sanctions\\_straitjacket\\_on\\_russias\\_defence\\_sector/](https://ecfr.eu/article/commentary_the_sanctions_straitjacket_on_russias_defence_sector/)



# LABOR ISSUES

## Staff under strain and difficult to replace

In June 2022, the human resources deficit for the entire defense industry was estimated at 400,000 positions for a total workforce of 2 million positions [43]. Following the COVID crisis the company Uralvagonzavod was forced to reduce wages by almost 20% in 2020 [44]. In an attempt to keep up with the pace imposed by state orders, UVZ employees are working 6 days a week, the holiday season has been suspended and nearly 500 positions are actively sought by the company [45]. Salaries not being sufficiently attractive, UVZ turned to prisoners to meet its needs [46].

## Painful restructuring

The policy of the Kremlin since the second half of the 2000s has been to concentrate the arms industries within large consortia like Rostec. The group grew by acquiring nearly 700 companies, mostly state-owned, and by further streamlining[47]. Establishments have been closed, hundreds of thousands of jobs cut[47][48]. We can cite, for example, the case of 12 factories dedicated to the repair of military equipment in a situation of bankruptcy and liquidated by the group.

The factory that partly manufactures tank armor (The Volgograd Metallurgy Plant) went bankrupt in 2019[49].

Year	Revenue (million RUB)	EBIT (million RUB)	Net Income (million RUB)	Employees
2013	74 632	-1 028	-7 036	/
2014	127 516	9 688	-5 293	30 594
2015	92 896	1 114	-16 441	28 200
2016	132 339	5 441	-5 306	26 627
2017	129 000	615	/	27 100
2018	147 300	7 212	2 000	27 900
2019	126 280	/	/	29 780
2020	138 900	19 446	389	29 748

[43] [https://vpk.name/news/613140\\_borisov\\_deficit\\_kadrov\\_na\\_predpriyatiyah\\_opk\\_v\\_rf\\_budet\\_sostavlyat\\_okolo\\_400\\_tys\\_chelovek.html](https://vpk.name/news/613140_borisov_deficit_kadrov_na_predpriyatiyah_opk_v_rf_budet_sostavlyat_okolo_400_tys_chelovek.html)

[44] <https://www.rbc.ru/business/28/05/2021/60ae5dc99a7947ef4d363f14>

[45] <https://v-tagile.ru/novosti-nizhnego-tagila/ekonomika/uralvagonzavod-raskryl-skolko-gotov-platit-novym-rabochim-i-pri-kakom-grafike>

[46] <https://utyug.info/new/25602/>

[47] <https://www.wilsoncenter.org/blog-post/the-inner-workings-rostec-russias-military-industrial-behemoth>

[48] <https://topwar.ru/202777-goskorporacija-rosteh-odnoj-rukoj-stroit-zavody-pjatju-ubivaet.html>

[49] <https://v1.ru/text/business/2019/03/30/66036730/>

# SOVIET MAIN BATTLE TANKS, A COMPLEX MAINTENANCE

## Complex machines to maintain

The evolution and complexity of main battle tanks have led to further strengthening the maintenance cycles of these machines. Engine power grew, dynamic performance improved and mechanical, optical, hydraulic, and above all, electronic equipment gradually equipped the tanks.

The 3 maintenance operations in the Russian army, are defined by a series of regulations grouped in the maintenance of armored weapons and equipment (BTVT), these 3 maintenance operations are:

- Routine repair: an operation aimed at ensuring or restoring the operability of the machine and consisting of the replacement or restoration of individual parts.
- Medium repair: (1st and 2nd medium repairs) repair carried out with the aim of restoring availability and bringing about a partial restoration of the life of the machine by replacing a limited range of components and carrying out the technical inspection of the components according to regulatory recommendations and technical documentation.
- Total repair: repair carried out with the aim of restoring totally or almost totally the life of the machine by restoring or replacing any component, including basic components.

Model	State	Maintenance TO-1	Maintenance TO-2	Medium Repair (Unit)	Total Repair (Factory)
T-55,T-62 [50][52][n]	new	1000-1100 km	2000-2200 km	7000 km	11000 km
	overhaul	1000-1100 km	2000-2200 km	6000 km	10000 km
T-72(A/B)[51] [52]	new	1600-1800 km	3300-3500 km	8000 km	14000 km
	overhaul	1600-1800 km	3300-3500 km	7000 km	12000 km
T-80(B/BV/U) [54][55]	new	2500 km/120h	5000 km/240h	11000-12000 km / 500h	1000 h
T-90/T-72B3[53][n2]	new	2500-2700 km	5000-5200 km	11000 km	?

[50] <https://topwar.ru/192109-z-j-otdelnyj-tankovyj-batalon-remontnye-budni.html>

[51] [https://en.defence-ua.com/weapon\\_and\\_tech/how\\_often\\_tank\\_maintenance\\_is\\_required\\_to\\_perform\\_and\\_why\\_it\\_should\\_be\\_taken\\_into\\_account-5507.html](https://en.defence-ua.com/weapon_and_tech/how_often_tank_maintenance_is_required_to_perform_and_why_it_should_be_taken_into_account-5507.html)

[52] [https://rep.bntu.by/bitstream/handle/data/29354/EHkspluataciya\\_bronetankovogo\\_vooruzheniya\\_i\\_tekhniki.pdf?sequence=6&isAllowed=y](https://rep.bntu.by/bitstream/handle/data/29354/EHkspluataciya_bronetankovogo_vooruzheniya_i_tekhniki.pdf?sequence=6&isAllowed=y)

[53] [https://web.archive.org/web/20121120100132/http://vadimsvwar.narod.ru/ALL\\_OUT/TiVOut0507/T90\\_2/T90\\_2024.htm](https://web.archive.org/web/20121120100132/http://vadimsvwar.narod.ru/ALL_OUT/TiVOut0507/T90_2/T90_2024.htm)

[54] Танк Т-80Б. Техническое описание и инструкция по эксплуатации (1984)

[55] <http://fofanov.armor.kiev.ua/Tanks/EQP/gtd-1250.html>

[n] les 2S3 utilisent les mêmes moteurs que les T-55 et T-62, les jalons de maintenance sont donc similaires.

[n2] les moteurs employés sur T-72B3 sont de la même série que le T-90.

# MAIN BATTLE TANKS, A DEMANDING MAINTENANCE

## Hardware Immobilization

For routine maintenance: between 1 (TO-1) and 2 (TO-2) days of immobilization required per vehicle in a space equipped for repair work (concrete surface under hangar).

For major repairs: between 30 and 60 days depending on the tank models and the complexity of the model, and a very important detail, the total repair can only be done in certain certified factories on the specific tank model.

Routine maintenance can therefore be carried out in spaces set up behind the front line, while major operations will require much longer immobilization with the problem of transporting the armored vehicle. For example, if T-62 or T-55 tanks need to be reconditioned, then it will take a 13,000 km round trip to support these models. The probability is all the more strong that these vehicles will make a one-way trip to Ukraine.



## The key figures of Russian army's vehicles maintenance

In 2020, the official Russian Ministry of Defense repair figures for all land combat vehicles (including armored vehicles and trucks and excluding artillery) are as follows [56]:

- 1,123 total repairs carried out by defense contractors.
- 2,355 average repairs by Russian Armed Forces facilities.
- 19,711 service maintenance operations carried out by defense contractors.
- 69,018 technical maintenance operations carried out by the Russian armed forces.

In these figures, it is estimated that the share of tanks represents 20% of the total repaired personnel for the year 2020. This represents between 200 and 250 total tank repairs carried out for the year 2020. These figures are consistent with the factory capacities as well as the reconditioning of tanks leaving the reserve bases observed in 2020 (nearly 120 tanks were released that year) [57]. The other half is dedicated to the revitalization of tanks already present in operational units.

[56] [https://mil.ru/files/mort/2020-12-10\\_army\\_in\\_numbers\\_2020.pdf](https://mil.ru/files/mort/2020-12-10_army_in_numbers_2020.pdf)  
[57] <https://bmpd.livejournal.com/4211202.html>



# 5 - PUTTING INTO PERSPECTIVE WITH REGARD TO CURRENT LOSSES

The counting of losses carried out by the Oryx blog provides a minimum estimate of Russian losses in Ukraine. At least 2,268 tanks have been destroyed, captured or damaged by Ukrainian forces as of August 27, 2023. These figures, supported by a detailed analysis made of cross-checks, make it possible to avoid double counting as much as possible. A count based on the counts of tank models by military units has been carried out, it makes it possible to establish a remaining active tank fleet in 2021.

Type	Losses	Losses (30%)	Active duty (2021)	Percentage
T-54/55/55A	2	3	0	/
T-62/M/MV	78	100	0	/
T-62 Obr 2022	3	4	0	/
T-64A	2	2	0	/
T-64BV	62	81	0	/
T-72A/AV	54	70	377	18%
T-72B/B Obr.1989	393	510	668	76%
T-72B Obr.2022	4	5	0	/
T-72BA	29	36	71	50%
T-72B3	331	430	599	71%
T-72B3 Obr. 2014	3	4	18	22%
T-72B3 Obr.2016	234	304	496	61%
T-72 inconnus	118	153	872 (1)	17%
T-80BV/BVK	398	517	185	279%
T-80U/UK/UE-1/UM2	103	133	186	71%
T-80BVM	95	123	93	132%
T-80BVM Obr. 2022	4	5	0	/
T-80 inconnus	8	10	0	/
T-90A/AK	34	45	227	19%
T-90S	6	7	0	/
T-90M	34	45	67	67%
Inconnues	265	344	/	/
<b>Total</b>	<b>2270</b>	<b>2932</b>	<b>2987</b>	<b>98%</b>

(1) Remnant of remaining T-72 strength (all types)

# A SLIGHT ACCELERATION OF RUSSIAN TANK LOSSES THIS SUMMER

Since the beginning of June, there has been an acceleration of tank losses.

Whether it is the Oryx site (losses confirmed by a photo/video not always dated so to be taken with caution), the evaluation of the War Spotting site or the claims of the Ukrainian Ministry of Defense, we see an increase in tank losses at from June 2023:

source	June	July	August	daily average	daily average (2023)
ORYX (08/31)	98	118	88	3,305	2,61
WAR SPOTTING (08/26)	78	100	52	2,64	2,18
MoD UKR (08/31)	239	175	224	6,93	5,11

However, we are not in the same proportions as during the Ukrainian offensive from August to November 2022. This makes it possible to launch our three evolution scenarios, depending on the observations on the stocks actually available for the Russian army and possibilities for the development of the conflict.



*slight acceleration of Russian tank losses since the beginning of the summer and evolution towards older models (first T-54/55 lost)*

# ASSESSMENT OF RUSSIAN TANK LOSSES COMPARED TO STOCKS

Since the start of the conflict, the losses suffered by the Russian armored force have been described as “heavy”. However, no order of magnitude has been established in relation to the assessment of available stocks.

The institute therefore carried out this assessment on the basis of the preceding elements.

Certain losses (sources Oryx site or War Spotting on 08/27). It should be remembered that these figures must be assigned by a factor of 1.3 to 2 (to take into account machines destroyed or damaged but not recorded because no images).

They are compared to the volumes of the machines of the active units and to those stored (affected by a factor of 0.5 to 0.3 to take into account the degraded state), with the exception of the T-80 stocks (more recent and better preserved).

Tank type	losses (Oryx)	losses (War Spotting)	est. losses (IAR)	act duty tank 02/24	est. stocks (IAR)	available stocks (estimate)	situation (IAR)	remaining stock (IAR)
T-54/55	2	1	3	0	413	206	98,5%	203
T-62	81	69	105	0	1239	619	83,0%	514
T-64	64	54	83	0	100	100	18%	17
T-72	1166	1025	1512	2229	1945	972(1)	52,8%	1689
T-80	608	536	788	464	750	750(1)(2)	31,5%	426
T-90	74	60	97	294	0	0(1)	67,7%	197
unknown type	265	0	344	0	1191	397(3)	n.a.	n.a.
<b>total</b>	<b>2260</b>	<b>1901</b>	<b>2932</b>	<b>2987</b>	<b>5639</b>	<b>3044</b>	<b>55,3%</b>	<b>3046(4)</b>

(1) figure not taking into account monthly productions which can be estimated at approximately 390 per year, i.e. 585 tanks which have been reintegrated into the total.

(2) the stock of T-80s has been kept identical without a discount to take into account greater care for these newer machines in storage units and bases.

(3) Only a third of the oldest and unknown gear is considered available (high rating).

(4) production figure for new machines (estimated at 390 units per year, including a certain number of overhauls (see next page)

The result of this assessment on August 27 is that the Russian army now has only a slightly higher number of tanks (3100 for 2900) than it had in units on 02/24, but with a proportion of machines of very old models or recovered from stocks in more important problematic conditions. In particular, there is a significant drop in the proportion of T-72 and T-80.

**The tank losses mean that the Russian army today has a number of tanks (including stocks) barely higher than that present in units on 02/24**

To this problem of a drastic reduction in the number of tanks in units and a modification of the models available, is added that of the losses of qualified personnel in tank units.

This can only reflect on the tactics employed, since poorly trained tankers on older or less maintained vehicles will no longer be capable of complex offensive maneuvers.



# PROJECTIONS OVER THE NEXT 2 YEARS

Type	Delivries	Leaving storage (2022)	Incoming balance
T-62/M/MV/ Obr 2022	0	200	200
T-72B/B Obr.1989/Obr. 2022	0	200	200
T-72B3	0	0	0
T-72B3 Obr.2016/Obr. 2022	60	0	60
T-80BV/BVK	0	300	300
T-80BVM/ Obr. 2022	31	0	31
T-90M	100	0	100
<b>Total</b>	<b>191</b>	<b>700</b>	<b>891</b>

## The 3 scenarios considered

In our study, we considered 3 most probable scenarios to project the possible losses and the state of the reserves over the next 2 years (until January 2025):

- Continuation of losses at the annual rate observed since the start of the conflict.
- Successful Ukrainian offensive against Russian forces with significant liberation of territories.
- Stagnation of the front and success of the Russian conservation strategy until Jan 2025.

The estimated volume of tanks delivered for renovated, modernized or new tanks is 390 per year with delivery rates spread over 3 months.

The constant casualty scenario assumes a casualty rate of 2.5 tanks per day distributed evenly across each tank fleet without relying on the particular casualty rate of each associated tank model.

The successful Ukrainian offensive scenario sees an increase over 2 consecutive months in tank losses to 15 tanks per day then a return to the normalized rate of 2.5 tanks per day from July. This scenario is based on the losses observed during the previous Ukrainian counter offensives and is increased by a factor of 2 to take into account the potential scale of the future offensive if successful.

The stagnation scenario takes into account a reduction in the number of tanks lost by 2 in relation to the annual rate and corresponds to the rates of operational pause observed during the transition periods.

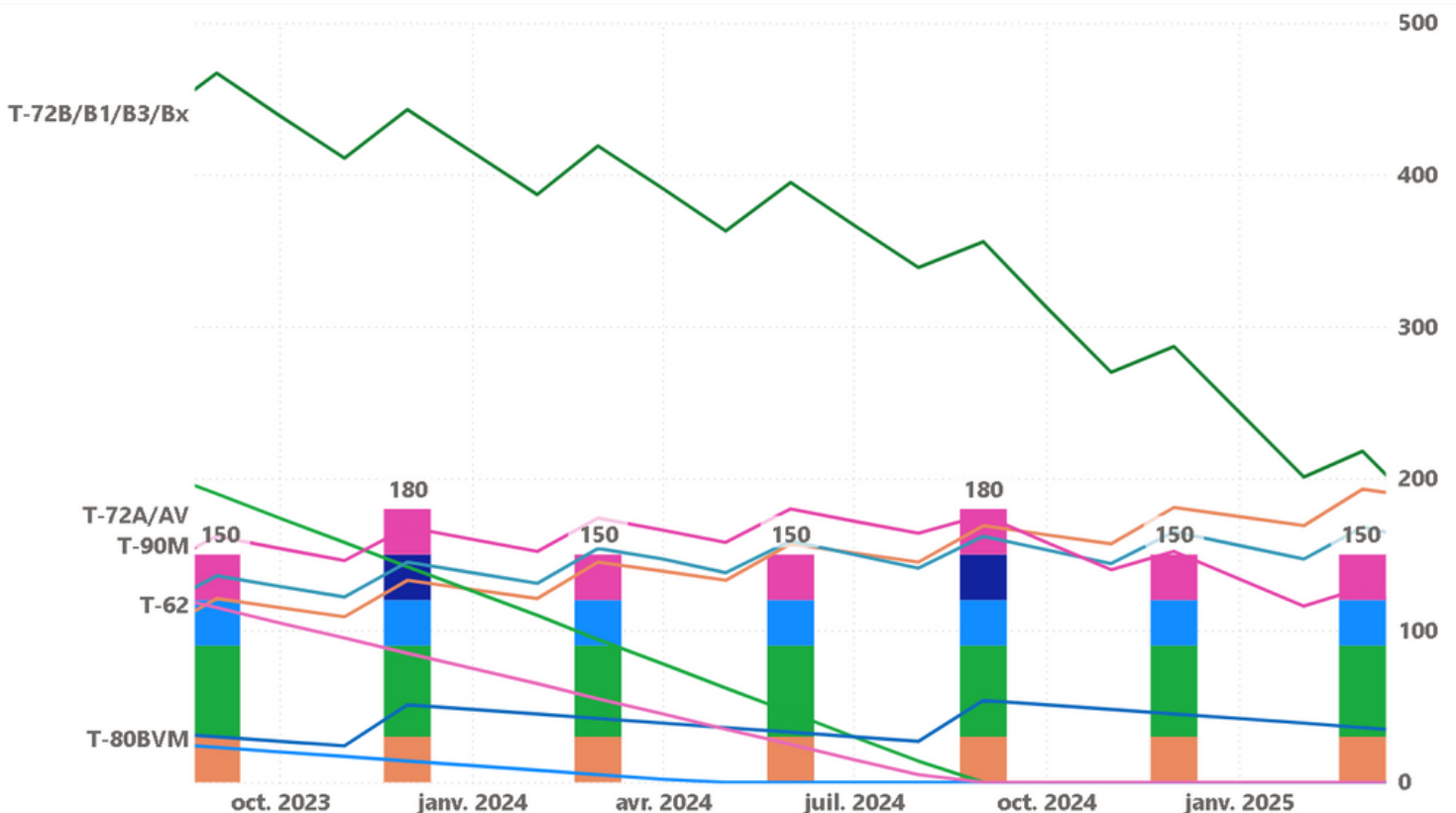
# SCENARIO 1: CONTINUATION OF THE CURRENT PACE

## Scenario #1: Continued Losses

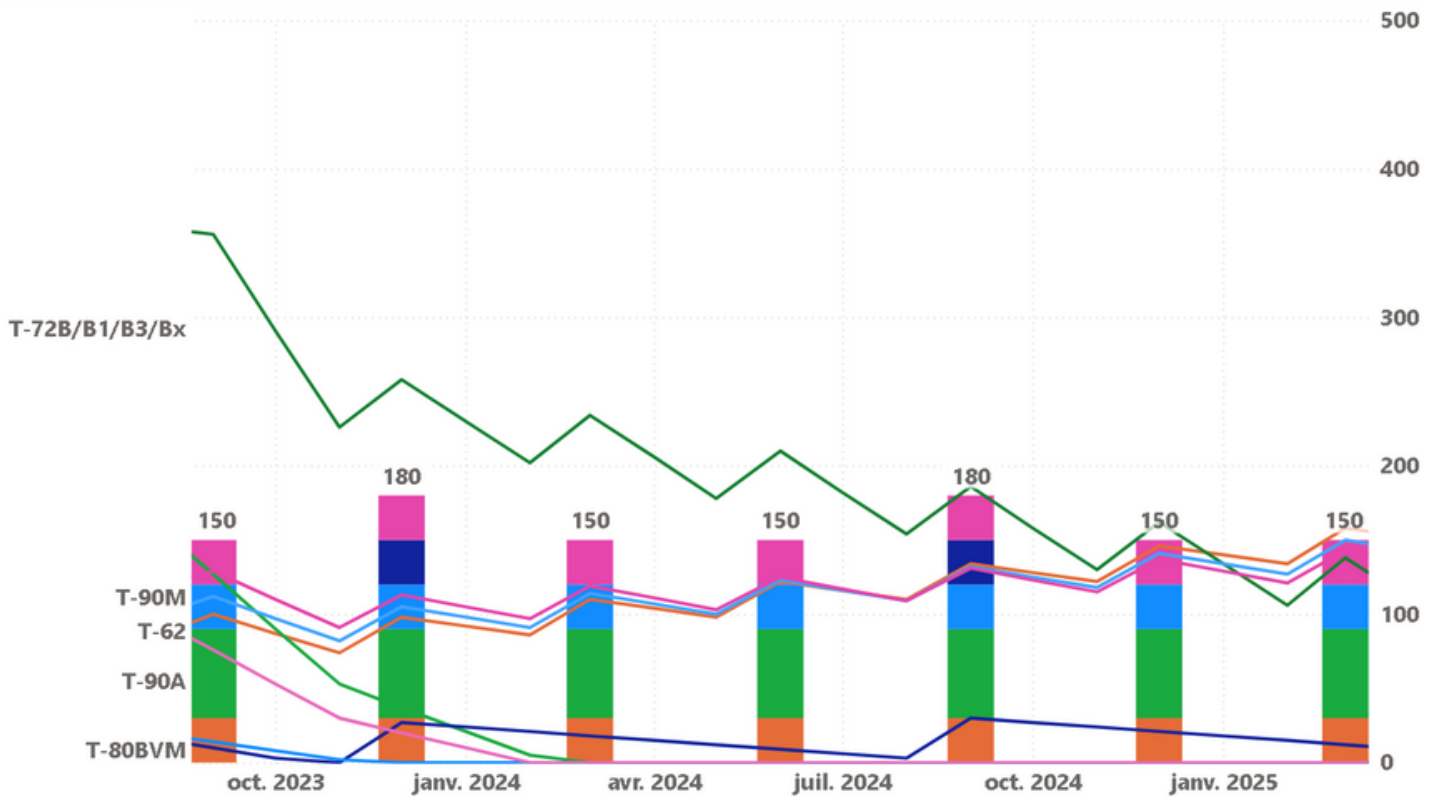
This scenario would see the continuous depletion of the T-72 tank fleet and the gradual decline of the T-80 tank fleet, fueled by modernizations and repairs carried out by manufacturers. T-62 tanks would overtake the T-72s from next year due to the revitalization of existing stock removed from reserve bases.

Subject to the preservation of the committed units and the maintenance of the industrial capacity to provide around a hundred units per year, the T-90 tank fleet will continue its transition towards the T-90M modernization and constitute the elite segment of the force. Russian armour.

In the overall trend of the fleet, and without taking into account the need to reserve a repair capacity for existing and surviving models, the fleet of Russian tanks at T+12 months would be at 500 units at +/- 20%, i.e. between 400 and 600 copies. This scenario would therefore lead Russia to an almost total inability to deploy more than one armored brigade in a border theater of operations. Knowing that Russia must keep the borders facing the Baltic countries, Finland, Kazakhstan and China.



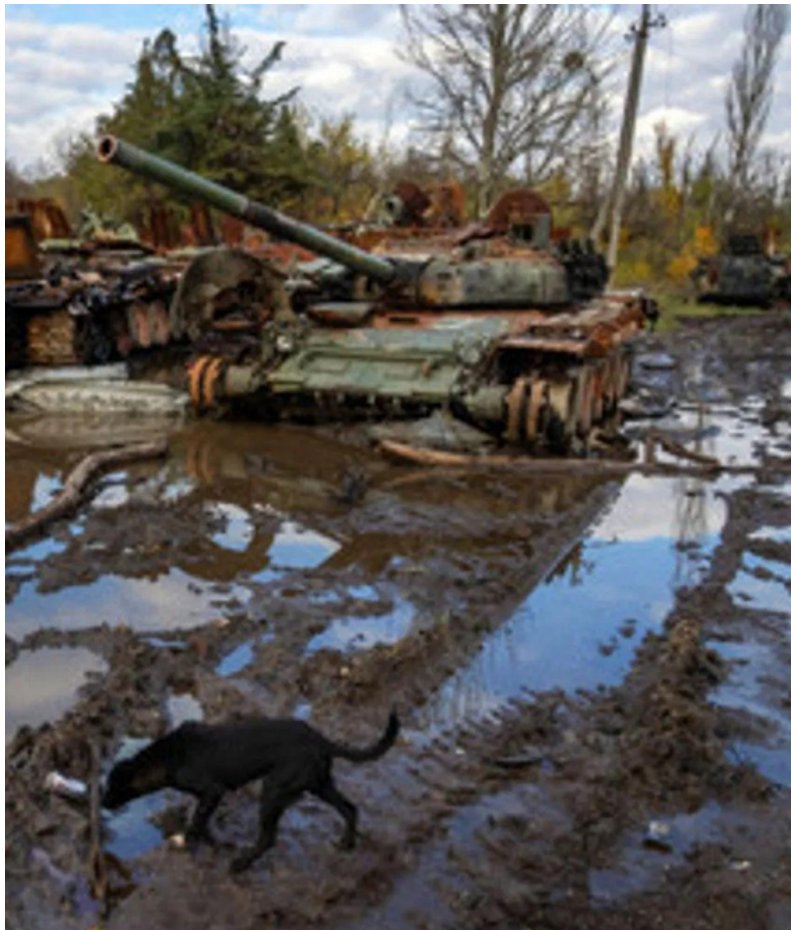
# SCENARIO 2: SUCCESSFUL UKRAINIAN OFFENSIVE



## Scenario #2: Successful Ukrainian Offensive

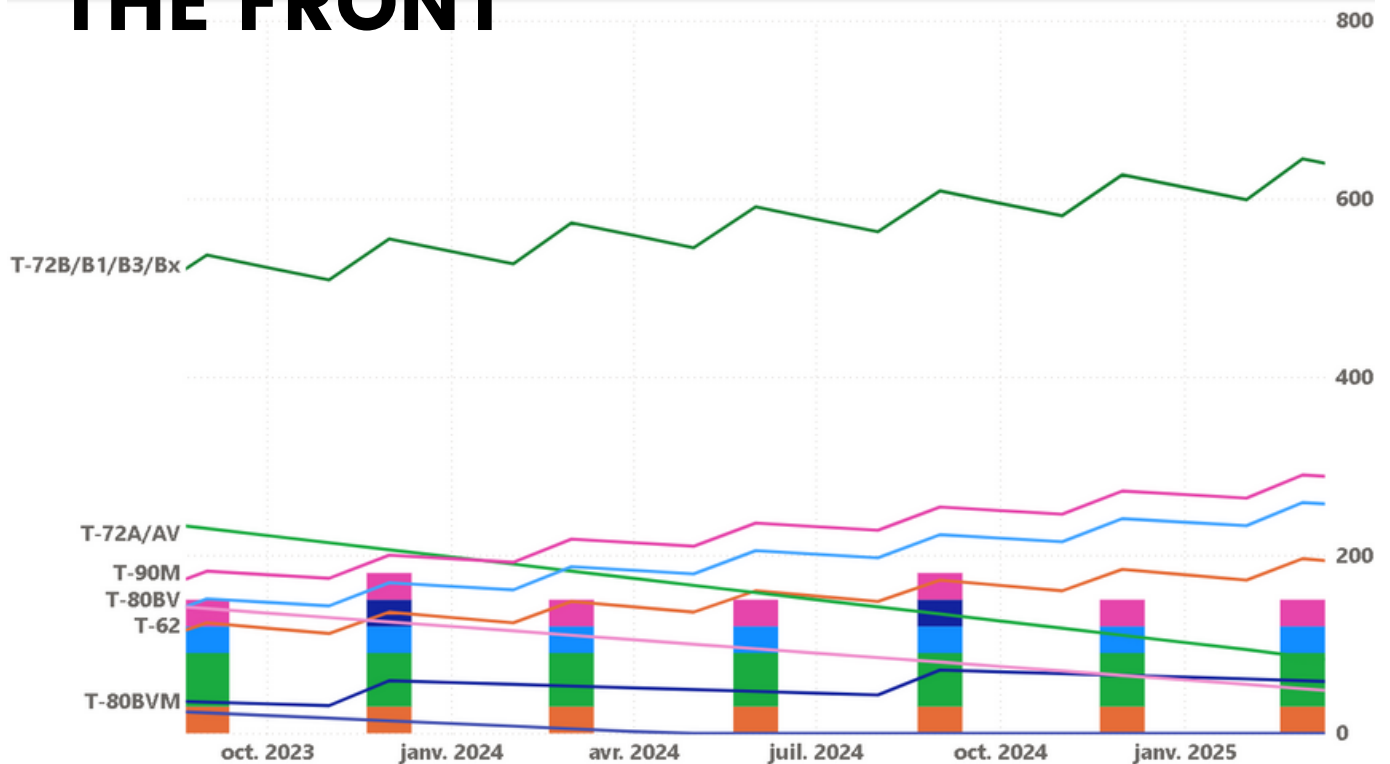
This scenario would see the destruction at an accelerated pace of the remaining and in-service tank fleet. All models would be impacted except for corporate preservation measures (strategic retreat). The entire active fleet, all models combined, would become symbolic at the end of 2023 with a total fleet of nearly 250 tanks, each model of tank would therefore be present in a sample quantity (about 1 or 2 battalions) in the Russian ground forces, which complicates the constitution or reconstitution of a large coherent unit such as an armored division.

The absence of an active heavy armored force would mechanically lead to a purely defensive configuration of Russian ground forces not only in Ukraine but also on the borders of the Federation.





# SCENARIO 3: STAGNATION OF THE FRONT



## Scenario N°3: Stagnation of the front

This scenario would see the survival of the tank fleet and the beginning of a revitalization of the armored personnel, allowing the Russian armed forces to regenerate their fleet with standard delivery rates. Nevertheless, this regeneration would be extremely gradual and would not allow the recovery of levels equivalent to those before the invasion.

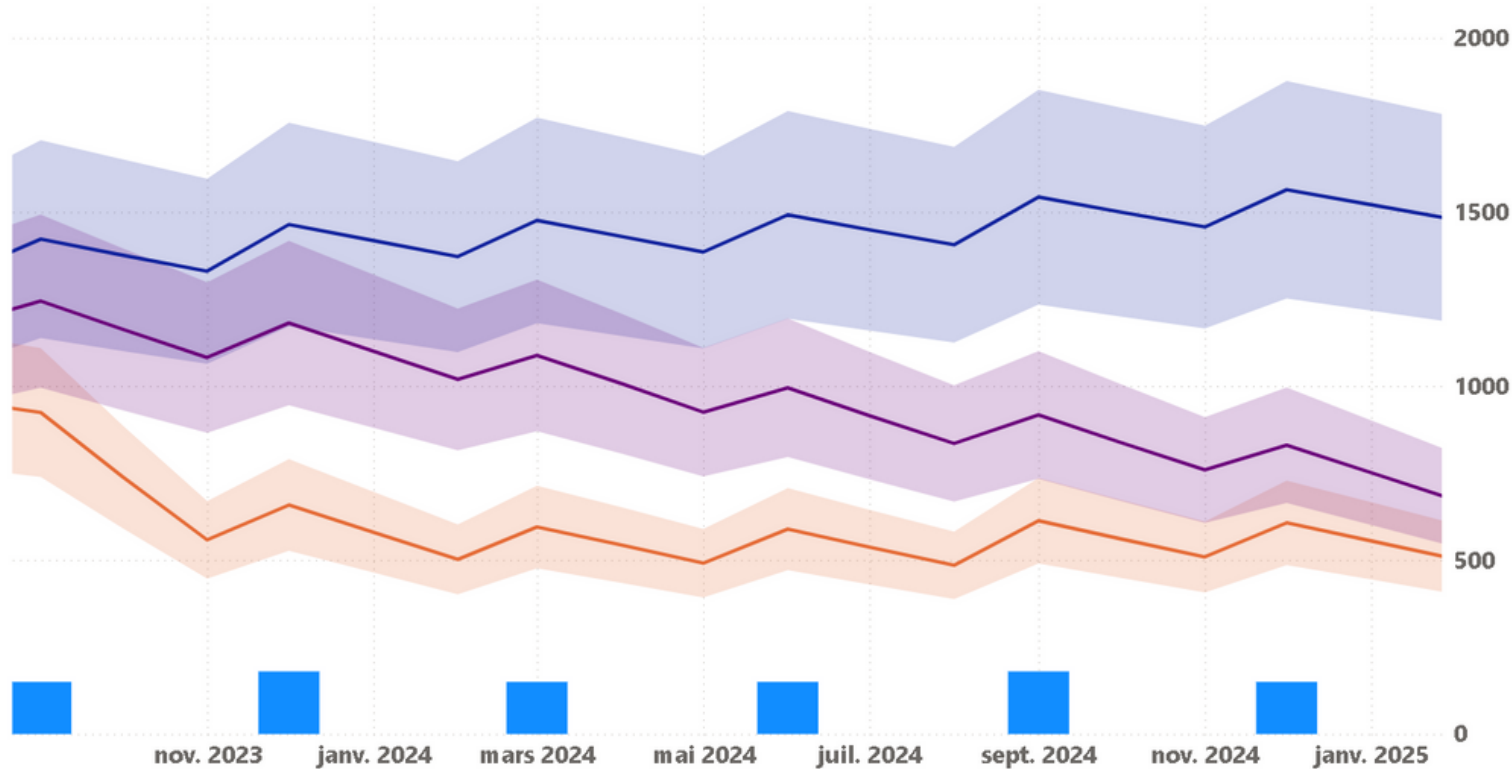
The T-72 tank fleet would be able to grow as the T-80s gradually ramped up, the gradual conversion of the T-90 fleet to the M standard would continue to build the elite armored force. Russia would be able to re-establish a large decision-making armored unit from the year 2024.



# SUMMARY OF THE THREE HYPOTHESES

Rythme des Projections de pertes en fonction des scénarii

● Livraisons ● Accalmie ● Offensive ● Standard



The various scenarios studied highlight the following characteristics:

- The Russian defense industry is still capable of producing tanks but at an insufficient rate to make up for the losses, a successful Ukrainian offensive would be catastrophic for the operational tank fleet.
- Russia still has a substantial reserve of tanks even if the latter will have to do the work of a major renovation and revitalization project.
- The quality aspect of the tanks put into service or returned to service is decreasing while the Russian defense industry is struggling to find substitute components of equivalent quality to the Western components used in Russian tanks.
- A major but determining unknown concerning the availability of vehicles, out of nearly 1300 tanks in theoretical strength, a large part requires repairs at mid-life due to the intensive use made during the 15 months of conflict and the damage suffered during the operations.



## 6 – CONCLUSIONS:

### On the Defense Industry

Regarding the Russian defense industry, if the Ministry of Industry has announced a quadrupling of production figures, these statistics most likely include modernizations and repairs of tanks in the factory. In fact, these projections are consistent with the total theoretical capacities for the production of new vehicles, the modernization of existing ones and the repair and refurbishment of the tanks present in the storage bases, i.e. a "produced" workforce of between 700 and 800 tanks.

This make-up of statistics to inflate production figures is not new and already during the Second World War, Albert Speer had already used this method of raking tanks in modernization/repair (for example Panzer III and IV): even repairs minor were included in the production statistics.

### On the remaining reserves

Although the stocks are still substantial, the probability for the tanks stored to be operational is diminishing while the tanks stored in dry air have already been massively removed to make up for the losses of the year 2022. The next tanks removed will have a lot more chance of having to go through a factory repair phase and therefore mechanically having to be immobilized for 3 to 4 months, taking into account the transport from the storage bases, the factory repair, and the shipment to an operational unit. This delay remains a minimum delay and does not take into account the existing queue at the entrance to the manufacturing or tank repair factories.

These queues were observed in November 2022 at the Omsktransmash plant where nearly 100 T-62 tanks are awaiting modernization. In May 2023, the line has grown further and nearly 200 tanks are present awaiting repair or modernization.





# CONCLUSIONS (2)

## On the qualitative aspect of the armaments produced or modernized

A decrease in the quality of the armaments was noted on the last specimens delivered, thus, the sights of tanks of last generation gave way to analogical thermal sights resulting from the Soviet era. The tanks rehabilitated are increasingly old: examples of T-62, T-55 and T-54 have been observed in the theater of operations, the first versions of the T-72 have also been seen in Ukraine.

As Russia uses up the stocks present in the repair bases, the level of performance and overall availability of the equipment will decrease. Already victims of an omnipresent cannibalism, the periods of reconditioning of the tanks will lengthen or will be incomplete in relation to the standard versions (absence of certain optics, absence of telemetry, absence or deficiency of the stabilizer of fire, breakdown of the automatic loader, engine or transmission underperformance and many other problems).

### Hardware Availability

Although the estimated volumes of the armored force are still substantial, the availability of equipment is reduced due to the conduct of a war. Difficult to assess exactly, this availability can be assessed with regard to the deployments of armored units on the front. Signs such as the consistency of formed armored units are good qualitative indicators of the general availability of the tank fleet. A very good example was the heterogeneous composition of the tank units engaged during the failed offensive on Vuhledar in January-February 2023. No less than 7 different variants of tanks, in minimal quantities each, were engaged in this critical operation for the restoration of an important axis of communication for the Russian forces in Ukraine. Comparatively more consistent sets were seen on the Svatove and Bakhmut front with company-sized units with only one or 2 models and logistical consistency (same motorization).

***Comparatively more consistent sets were seen on the Svatove and Bakhmut front with company sized units with only one or 2 models and logistical consistency.***

***Tanks restored to operational condition of increasingly older models, requiring increasingly long lead times, which will increase the load on the factories***



These weaknesses in the availability of a coherent mass for the whole of the Ukrainian theater underlines a low rate of availability of equipment, complicated by the diversity of models of combat tanks used on the front, and which has been further accentuated with the mobilization of older models. The proliferation of different models has the effect of expanding the existing base of maintainers and specialists needed to carry out vehicle maintenance and repair tasks. While the industrial defense apparatus is having difficulty finding personnel, this situation will degrade the general availability of the fleet as new tank personnel attempt to make up for the losses incurred during the previous year.

# CONCLUSIONS (3)

## Prospects for the Russian ground forces

Continued degradation under Ukrainian military pressure has the potential to bring Russian ground forces to breaking point. The current low availability of tanks prohibits any serious offensive against the Ukrainian army, thus explaining the largely defensive posture of the current Russian system.

Although the study focuses on the fleet of Russian ground forces main battle tanks, the same trends (old equipment transported to the front, mosaic of vehicle models, availability problems) were observed in the combat vehicle segment infantry and armored personnel carriers. These elements are so vital in order to accompany the combat tank force in a mechanized offensive.



***The continuous degradation of the Russian army is global: loss of human know-how and material capacities***

Without an exact knowledge of the vehicle readiness rate, it is difficult to reliably project the breaking point of Russian armor strength. Nevertheless, this force very likely entered a zone of tension, preventing any serious initiative on the part of this force, preventing any serious initiative with a reasonable success and without excess losses.

Its tactical capabilities are already diminished. Tank units reconstituted with vehicles taken from depots where they were stored in sometimes difficult conditions, and armed by crews hastily formed from conscripts, are no longer capable of complex offensive maneuvers.

This loss of know-how and military capacity in turn leads to a higher rate of attrition and losses. It is a real vicious circle that has begun for the Russian armored weapon, from which it is difficult to see today how it could escape if the conflict lasts (and without massive external deliveries of tanks).

What remains certain is that a continued effort of attrition, destruction of field logistics and artillery reduction by Ukrainian forces will bring Russian forces closer to breaking point.

This pressure must remain continuous in order to prevent any reconstitution of a park of tanks which could be able to carry out an offensive. While the level of technology will most likely not match that of the initial invading forces, the mace can pose a threat if it catches the Ukrainian Armed Forces off guard.

***The current low availability of tanks prohibits any serious offensive against the Ukrainian army***

# METHODOLOGICAL NOTE AND SOURCES:

Once the official list of tank stocks was consolidated by type as of February 24, we proceeded in several stages.

First establish the list of Russian army tank storage sites: storage and repair bases, repair factories, then the identification of the units and especially the numbers of the units in charge of these sites. These numbers are essential to then search for information on the various open sources: social networks (Vkontakte, Odnoklassniki OK and Tiktok), blogs and even websites.

This information makes it possible to cross-check and complete the data collected from satellite images, in particular on the density of tanks by zone, and their condition.

Thus, the density of the tanks stored in the buildings, the greater or lesser proportion of tanks without equipment (in particular without engines) can be deduced from the analysis of the photographs disseminated by the Russian soldiers and conscripts, which offers a valuable complement to the unit count from satellite images.

To supplement this data for private companies, we also conducted research on trade registers (and case law sites for disputes). The contracts signed with the Russian government are indeed all published, including in the military field. The total amount is public and it is possible to deduce the overall volume of tanks rehabilitated or modernized according to the type, as well as the delays (and therefore any delays that cause disputes). Similarly, old repair sites (closed factories) are also detectable.

These methods allow us to draw conclusions on an assessment of the stock of tanks available in reserve before the invasion, and to revise downwards the figures disseminated.

These attempts at qualitative analyzes are based on open sources, sometimes partial, which must be put into perspective. They can highlight trends but do not constitute a precise and sure count.





# APPENDICES - STUDIES BY RUSSIAN BASE

## The 22nd Central Tank Reserve Base.

The base is located in Bouï, Kostroma oblast, nearly 400 km northwest of Moscow. This base is the only major base in the Western Military District to maintain a significant reserve of tanks. The present models of tanks are those arming or having armed the units of the district such as the T-90 tanks, the T-80UD tanks and a certain number of T-72 tanks.

The Military unit (В/ч 42713) was founded in March 1946[1]. The current sources do not make it possible to know when the military unit acquired its current form. The "client" units of the center are mainly the 2nd Motorized Rifle Division, the 4th Guards Armored Division and the 47th Guards Armored Division.

An annex to the base closed in 2010 in Tver (В/ч 42713-2) [2], it was converted into a military school (Suvorov Military School).

The base also has 240 storage spaces in concrete hangars.



Tank numbers as of 06/19/2021

Type	dry air	operational	non operational
unidentified	0	218	471
T-80UD	0	0	170
<b>Total</b>	<b>0</b>	<b>218</b>	<b>641</b>



[1] <https://checko.ru/company/voyskovaya-chast-42713-1034417360636>  
 [2] [http://www.evasiljeva.ru/2015/11/blog-post\\_427.html](http://www.evasiljeva.ru/2015/11/blog-post_427.html)



## Recent activities

BMP-3s were taken from the base in November 2021 to participate in the invasion of Ukraine [1]. T-72B3s are taken from the base to be sent to Belarus in December 2022 [2]. According to the Ukrainian Ministry of Defense, the base will receive BMP-2s from Belarus in August 2022.



*Identifiable T-80UD and static since at least 2012, the 2 radio antennas on the background of the photos taken from the ground are easily recognizable on the right of the satellite image.*

[1] <https://avia.pro/news/ogromnyy-zheleznodorozhnyy-sostav-bronetechniki-rf-zamechen-v-27-kilometrah-ot-ukrainskoy>

[2] <https://reform.by/rossija-perebrosila-v-belarus-eshhe-13-tankov-t-72>

[3] <https://ua.news/ru/war-vs-rf/u-okkupantov-defitsit-bmp-2-rashisty-vynuzhdeny-odalzhivat-u-belorusov>



### The 111th Central Tank Reserve Base.

The base is located in Khabarovsk Krai, Far East. It is one of two tank bases in the Far East. The present tank models of T-62 (original variants and M and MV modernizations), T-80 (almost all of the T-80BV variant) and T-55 (original variants and A model). The vast majority of tanks are stored outdoors.

The Military unit (В/ч 44284) was founded in May 1969[1]. The unit seems from the beginning devoted to the repair and maintenance of tanks.

The base contains 360 storage spaces in concrete sheds.



**Tank numbers as of 06/19/2021**

Type	dry air	operational	non operational
T-80BV	61	361	0
T-62/M/MV	0	276	0
T-54/T-55	0	157	76
<b>Total</b>	<b>61</b>	<b>794</b>	<b>76</b>

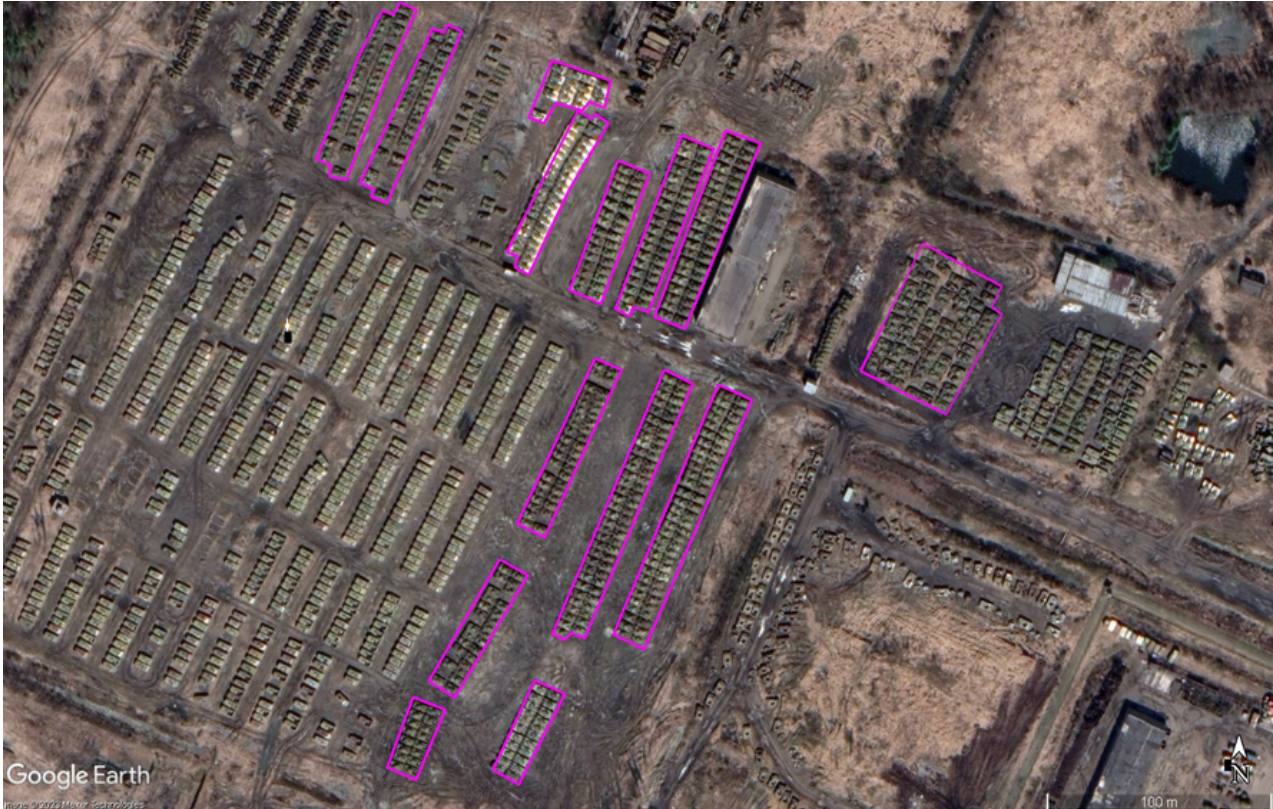


[1] <https://checko.ru/company/voyskovaya-chast-44284-1032700031891>



## Recent activities

T-62s are taken at the end of October 2022 (satellite images showing T-62s loaded on trains in the dedicated loading area for armored vehicles - a column on standby at the base itself - number of nearly 30 tanks) to be probably sent to the Omsktransmash Factory to be reconditioned or modernized (T-62s are located at the Omsktransmash Factory at the end of November 2022).



*T-62/M/MV visible in the free storage area of the base.*





*T-80BV visible and stored between base hangars*



**The 349th Central Tank Reserve Base.**

The base is located in Topchikha, 70 km southwest of Barnaul, in the Topchikhinsky district of Altai Krai. The present tank models are overwhelmingly T-72s and T-64s (being dismantled), with several dozen T-62s as well. The tanks present are overwhelmingly first generation T-64 & T-72 (T-64A/T-64B, T-72 Ural, T-72A), and therefore obsolete.

The Military Unit (B/Ч 63753) was founded in October 1999[1], The unit seems to have been set up shortly before the fall of the USSR in 1989, probably based on the 68th Armored Division of Reserve [2][3]. The unit accommodated up to 1500 tanks in 1990. [2]



**Tank numbers as of 06/10/2021**

Type	dry air	operational	non operational
T-64/T-72	26	0	460
T-64	0	0	220
T-62/M/MV	42	0	0
non identifié	66	0	0
<b>Total</b>	<b>136</b>	<b>0</b>	<b>680</b>



[1] <https://checko.ru/company/v-ch-63753-1022202769533>  
 [2] <https://moyaokruga.ru/nashslovo/Articles.aspx?articleId=119865>  
 [3] <http://museum.top-culture.ru/istoriya-voennogo-garnizona-topchiha-i/>



### Recent activities

Several T-72s outside base (at least 8) on July 14, 2022 in the vicinity of the base for military training in the area.[1]



[1] <https://tolknews.ru/obststvo/126530-v-topchihe-po-ulitsam-na-bolshoy-skorosti-proneslas-kolonna-tankov>







**The 769th Central Tank Reserve Base.**

The base is located in Ulan-Ude, in the Republic of Buryatia. The present tank models are overwhelmingly T-72 and T-62. The variants found on the base are classic T-62M and T-62, T-72A, T-72B and T-72B Obr. 1989.

The Military unit (B/Ч 44286) was created in 1969[1] and appears to have been a reserve base since its inception, it was formerly called the 227th Storage and Repair Base.



**Tank numbers as of 08/21/2021**

Type	dry air	operational	non operational
T-72/A/B	41	424	17
T-62/M/MV	269	17	292
unidentified	57	0	0
<b>Total</b>	<b>367</b>	<b>808</b>	<b>309</b>



[1] <https://ok.ru/knagrade/topic/155102146591723>



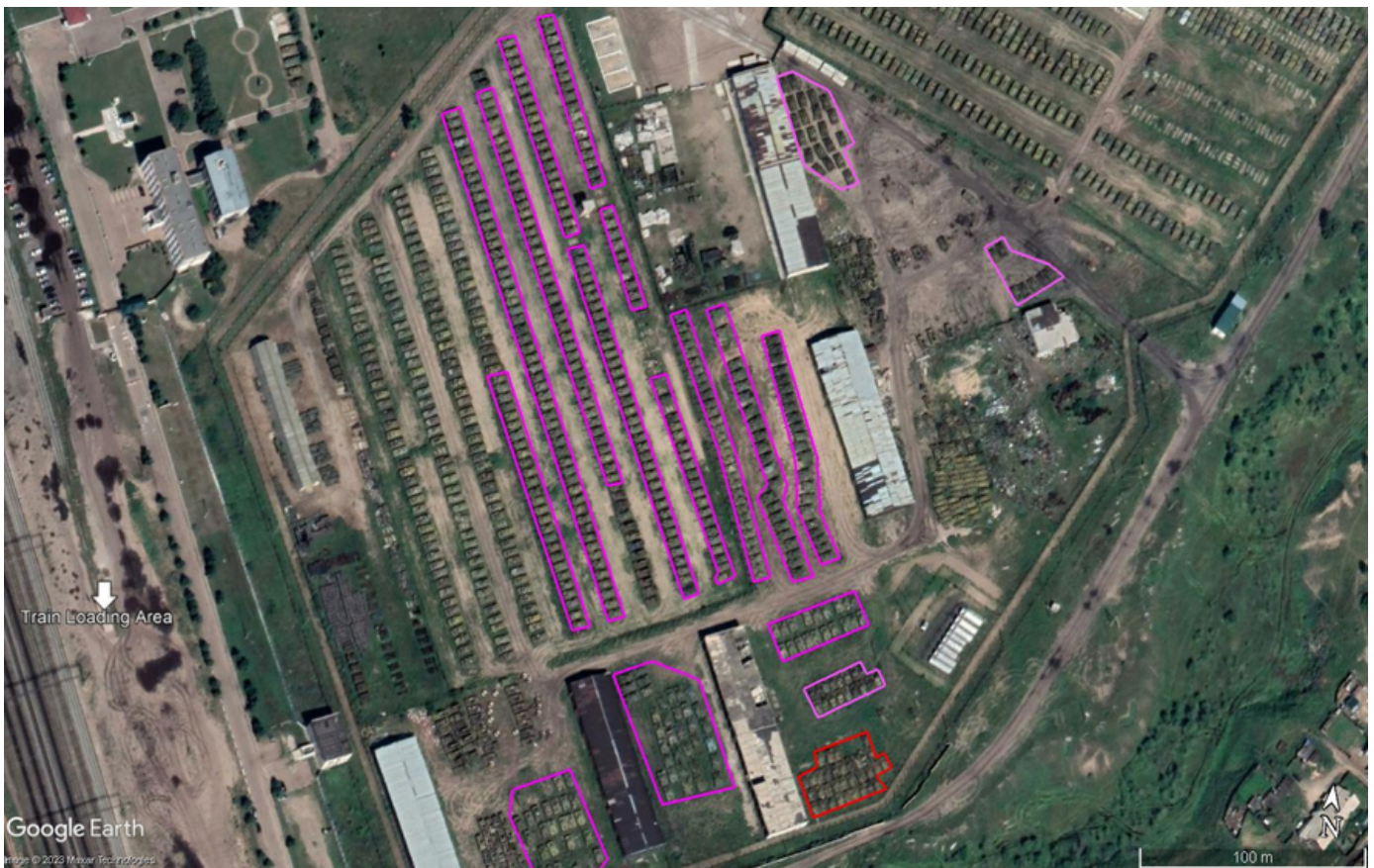
## Recent activities

Release of a large number of T-62 (about a hundred) and T-72 (about fifty) from September 2022 visible on the Google Earth history.



[1] <https://tolknews.ru/obsestvo/126530-v-topchihe-po-ulitsam-na-bolshoy-skorosti-proneslas-kolonna-tankov>





[1] <https://tolknews.ru/obststvo/126530-v-topchihe-po-ulitsam-na-bolshoy-skorosti-proneslas-kolonna-tankov>





[1] <https://tolknews.ru/obsestvo/126530-v-topchihe-po-ulitsam-na-bolshoy-skorosti-proneslas-kolonna-tankov>





[1] <https://tolknews.ru/obsestvo/126530-v-topchihe-po-ulitsam-na-bolshoy-skorosti-proneslas-kolonna-tankov>



**The 1295th Central Tank Reserve Base.**

The base is located in Arseniev, Primorsky Krai. The present tank models are overwhelmingly T-62 and T-54/T-55. The variants found on the base are classic T-62M and T-62, T-55, and T-54.

The Military unit (В/ч 42718) is the oldest currently known tank reserve base, established on April 12, 1946 in Sormovo in the Gorky region from a tank brigade[1]. This unit was then moved to the Far East in 1949[1]. Mainly composed of T-62 and T-54 / T-55, the base hosted for a certain period of T-80 (BV) before they joined the units of the Eastern District in the late 2010s.



**Tank numbers as of 09/15/2021**

Type	dry air	operational	non operatinal
T-62/M/MV	140	15	39
T-54/T-55	0	107	0
<b>Total</b>	<b>140</b>	<b>262</b>	<b>39</b>



[1] <https://arsenev.bezformata.com/listnews/rezerva-tankov-voyskovaya-chast/92764282/>



## Recent activities

Release of a large part of the T-62 in October 2022. In March 2023, T-54 and T-55 from the base are spotted on Russian railways. [1]



[1] <https://dzen.ru/a/ZB2ver460TyJ9Nrg>



### The 1311th Central Tank Reserve Base.

The base is located in Verkhnyaya Pichma, north of Yekaterinburg. The present tank models are overwhelmingly T-72s. The variants observed on the base are T-72Bs and a few T-72As.

The Military Unit (B/Ч 42716) is one of the oldest currently known tank reserve bases, established on February 5, 1959. Mainly composed of T-72 of the B variant. The base accommodated up to 900 tanks (visible) in 2011 to come down to a level of 300 visible tanks.



### Tank numbers as of 09/15/2021

Type	dry air	operational	non operational
T-72/A/B	261	70	0
<b>Total</b>	<b>261</b>	<b>70</b>	<b>0</b>



[1] <https://checko.ru/company/voyskovaya-chast-42716-1046600292793>



### Recent activities

No recent activity noted on the base.



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[1] <https://dzen.ru/a/ZB2ver460TyJ9NrG>

**The 2456th Central Tank Reserve Base.**

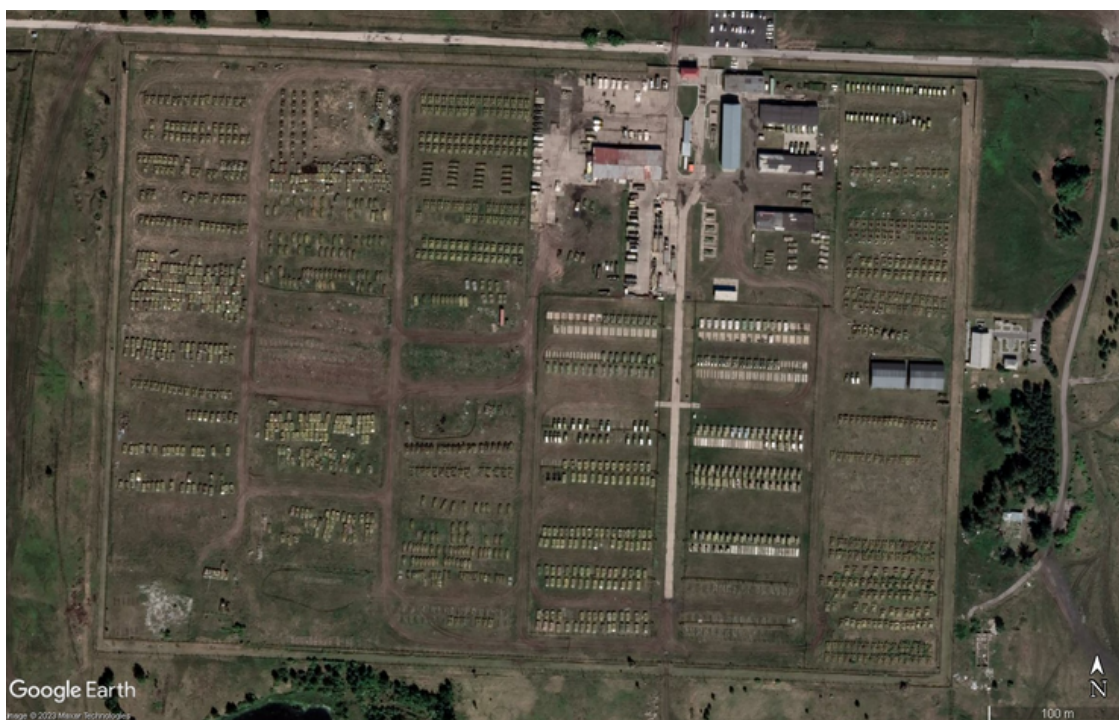
The base is located in Yarokov, 35km southwest of Novosibirsk. The present tank models are overwhelmingly T-72s, with a remainder of T-54/T-55. The variants found on the base are T-72A, T-72 Ural.

The Military unit (В/ч 32456) was created in 1989[1]. Mainly composed of old variant T-72 (Urals & A) and T-54/T-55.



**Tank numbers as of 09/15/2021**

Type	dry air	operational	non operational
T-72/A/B	14	487	0
T-54/T-55	0	0	73
<b>Total</b>	<b>14</b>	<b>487</b>	<b>73</b>



[1] [https://chelznak.ru/shop/armed\\_forces/nagradi\\_medali\\_ministerstva\\_oboroni/item\\_18577/](https://chelznak.ru/shop/armed_forces/nagradi_medali_ministerstva_oboroni/item_18577/)



## Recent activities

No recent activity noted on the base.



[1] <https://dzen.ru/a/ZB2ver460TyJ9NrG>



**The 2544th Central Tank Reserve Base.**

The base is located in Kozulka, Krasnoyarsk Krai. The present tank models are overwhelmingly T-72s and T-62s, with potentially a remnant of T-64s. The variants observed on the base are T-72A, T-72 Ural, T-62, T-62M and T-64A. An arrival of T-80BV was noted in 2016 [1].



The Military unit (В/ч 54630) exists since February 27, 2003[2], but it is likely that the previous unit had the same role as a base or reserve division. The base is mainly composed of old variant T-72 (Urals & A) and T-62 with the arrival of the T-80BV tank in 2016.

**Tank numbers as of 05/12/2021**

Type	dry air	operational	non operational
T-72/A/B	0	145	0
T-62/M	0	94	0
MBT	197	0	0
<b>Total</b>	<b>197</b>	<b>239</b>	<b>0</b>



[1] <https://www.krsk.kp.ru/daily/26534.4/3550535/>  
 [2] <https://site.birweb.1prime.ru/company-brief/12652098>



## Recent activities

No recent activity on this base.



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[1] <https://dzen.ru/a/ZB2ver460TyJ9NrG>

### The 6018th Central Tank Reserve Base.

The base is located in Kamyshlov, Sverdlovsk Oblast. The present tank models are overwhelmingly T-80s.

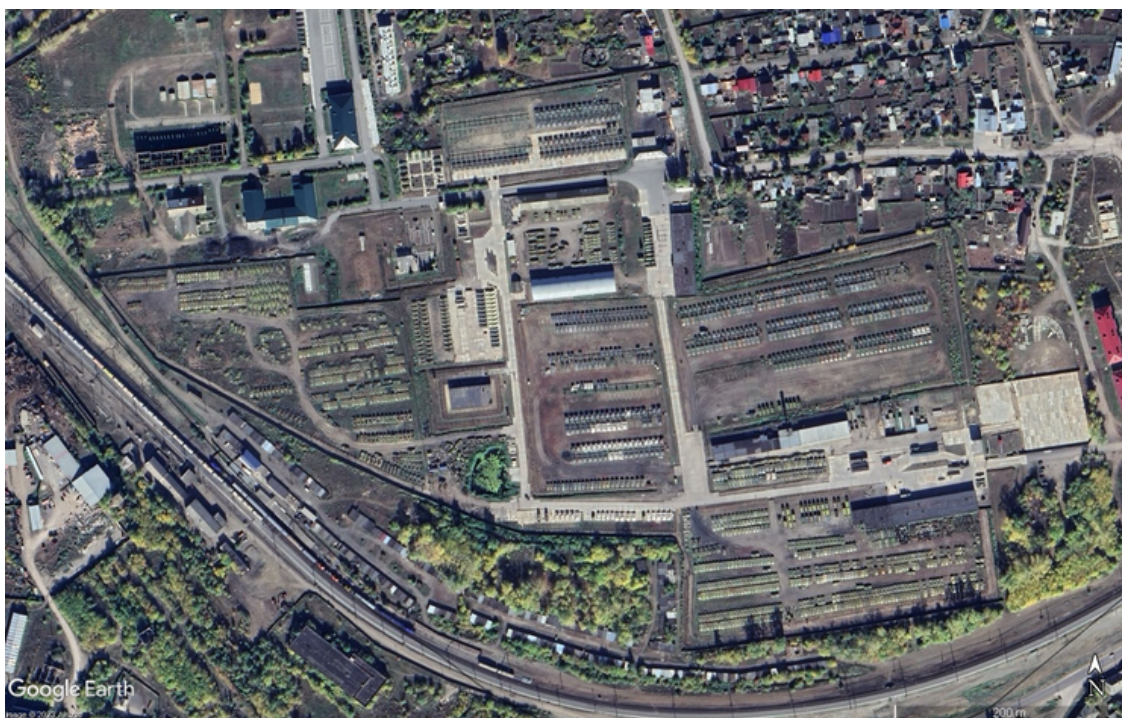
The Military unit (В/ч 75485) was founded in February 1990[1]. Mainly composed of T-80 in BV variant. It also accommodates a few T-62s and a large part of troop transport or infantry combat vehicles.

The number of tanks there is relatively low (200) compared to the other bases.



**Tank numbers as of 09/15/2021**

Type	dry air	operational	non operational
T-80	144	7	0
T-62	0	26	0
<b>Total</b>	<b>144</b>	<b>33</b>	<b>0</b>



### Recent activities

None recorded.

[1] <https://milcult.ru/news/muzey-voennoy-tehniki-otkrylysa-v-kamyshlove>



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It is based on the works and documents of the following persons:

Stijn Miezer @oryxspioenkop

Nathan Ruser @Nrg8000

@war\_mapper

@TankDiary

@VDV\_textbooks

@Fiesling2050

@RALee85

@CovertCabal

*This analysis note was established on the basis of the elements as of August 27, 2023 at 7 p.m. It is therefore likely to be updated or modified according to future developments.*



## Contact details

Institut Action Resilience

65, Cours Pierre Puget

13006 MARSEILLE

<https://institutactionresilience.fr>