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Russia's Railway Troops: The Backbone Sustaining Russian Military Force Posture

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Abstract

This paper uses current and historical Russian and English-language sources to examine the military importance of Russia's railway network and the specialised unit of military engineers that service them. The Railway Troops (zheleznodorozhniye voiska - ZhV) have played a supporting role in most of Russia's major conflicts over the past century and have grown in size and importance since Russia's annexation of Crimea in 2014. The ZhV's prominent roles in Russia's wars in Chechnya, and ability to lay the groundwork for Russia's invasion of Ukraine indicate the enduring importance of rail in for Russia's ability to mobilize troops and sustain war theatre operations. The ZhV are illustrative of the way in which Russian modes of warfare adjust and attempt to improve, as changes to their structure and operations have significant impact on the Russian army's ability to move troops and hardware across the country at pace.

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Introduction

More so than any other military, Russia's ground forces rely on its expansive railway network to move troops and materiel across the country, for training exercises in peacetime, and to mobilize and sustain troops in war theatres. Russia's vast territory and varied geographic terrain make other forms of transport such as road or sea less efficient and more expensive; its railway network is one of the world's largest, spanning more than 85,000 kilometers from its western exclave of Kaliningrad to Vladivostok in the East, on the Sea of Japan.[1]

In addition to facilitating the movement of passenger and freight traffic, the rail network has an important military role in its war and peacetime strategies. Russia's railways are intrinsic to its foreign policy goals, particularly the practicalities of reorientating its trade toward Asia amid Western sanctions, although a deeper discussion of the railways' civilian use is beyond the scope of this paper.

This paper aims to discuss how and why railways and the military engineers who service them are such a fundamental part of the Russian armed forces. It examines the role and scope of specialized engineering units known as the Railway Troops (*zheleznodorozhniye voiska* (ZhV)) and assesses how these units have been deployed by Russia in previous and current conflicts. The ZhV play an integral role in many of Russia's major conflicts as part of the rear (in Russian, *tyl*) of the armed forces, but they are an under-researched unit, mostly given passing reference as part of broader maneuvers. The ZhV's contributions to furthering Russia's strategic security and political goals, and the expertise that they have evolved from previous conflicts, merit closer attention.

This paper first offers an introduction to the importance of Russia's railway network for military use before providing a more detailed explanation of how the ZhV's visibility has changed through successive ministries of defense, their role in military exercises, and their

[1] Railway Technology, "Russian Railways: Connecting a Growing Economy," Apr. 30, 2013, https://www.railway-technology.com/features/featurerussia-railways-connecting-growing-economy/, accessed Dec. 14, 2022.

evolving use in different conflicts. In particular, the paper examines the ZhV's role in supporting the Russian armed forces in Chechnya and the North Caucasus and in Russia's current war against Ukraine.

Russia's Rail Network

Railways are a key part of Russia's ability to transport military hardware, personnel, and freight traffic across Russia and into countries that continue to use the same Soviet-era 1520-millimeter gauge system. Neighbouring Ukraine, Moldova, and Belarus all still use the Soviet gauge system. Part of the ease with which Russian ground forces entered Belarus and amassed troops on the Ukraine border during the February 2022 Allied Resolve exercises was due to this shared gauge system, which we now know also acted as a springboard for the invasion of Ukraine. Russia's strategic mobility depends on its railway network—relying on its aviation and maritime capabilities alone has never been sufficient.[2] Railways increase Russia's speed of troop mobilization to access war theaters and training grounds, and securing reliable links between the frontline and the rear (*tyl*) allows Russian ground forces to remain in war theaters for a sustained period.

Under Russian law, transport, including its railways, is considered a "strategic sector." These sectors are considered the cornerstone of Russia's political economy and an important facet of its national security. A 2008 law limited foreign investment in areas such as defense, natural resources, and the media and increased state scrutiny and financing of these assets. Amendments in 2014 extended the law to infrastructure and transport, highlighting the security importance of the railway system and its supportive infrastructure and restricting external investment and financing.[3]

The most famous of Russia's rail networks is the Trans-Siberian Railway (TSR), the backbone of Russia's military and civilian transportation for over a century. Russia's rail network is geographically positioned to allow Russia to project its armed forces to exert influence over neighboring states, but Russia's geography and demographic unevenness have created a significantly higher network density in the west to service the population there, and a comparative dearth in the east. This has strategic implications for Russia's desire to reorient its trade toward China and other Asia-Pacific regions against the backdrop of international

[2] Roger McDermott, "Russia's Strategic Mobility: Supporting 'Hard Power' to 2020?" FOI Sweden, 2013, https://www.foi.se/rest-api/report/FOI-R--3587--SE, accessed Dec. 15, 2022.
[3] Clifford Chance, "A Legal Overview of Foreign Investment in Russia's Strategic Sectors," May 2014, https://www.cliffordchance.com/content/dam/cliffordchance/briefings/2014/05/a-legal-overview-of-foreign-investment-in-russias-strategic-sectors.pdf, accessed Jan. 2, 2023.

sanctions. However, it also has military implications, as it limits Russia's ability to significantly load the rail network with greater numbers of troops during war or peacetime.[4]

The Railway Troops Explained

Unlike most other armed forces, Russia has a dedicated railway brigade known as the ZhV, founded in 1851 by Tsar Nicolas I to secure and protect the Moscow–St. Petersburg railway. This specialized unit is part of the Russian Armed Forces logistical corps and participates in all of Russia's large-scale military exercises. The highly specialized ZhV construct complex structures such as floating rail bridges through waterways, but they also have a civilian use, assisting the public during natural disasters by clearing rubble or repairing residential buildings.

Railway troops were introduced in many European countries, such as Bulgaria, Belgium, and the Netherlands, at the turn of the 20th century amid the industrial revolution, but Russia's historic reliance on rail meant it was one of the first countries to establish such a unit. Railway troops in different nations had similar roles—to construct important sections of track, develop new training methods, test out industrial equipment, and construct bridges more cheaply than a civilian workforce.[5]

Today, Russia's ZhV could be characterized as a wing of the Russian armed forces but also as a non-combat engineering agency, given their important civilian role in peacetime.[6] There are thought to be between 25,000 and 30,000 ZhV officers serving in the armed forces in Russia today.[7] The Ministry of Defense's Transport Department identifies where ZhV troops will be distributed with the assistance of Russian Railways (RZhD, a state-controlled entity), which is currently under international sanctions for its role in facilitating the Ukraine war. Russia's regional railways are coordinated jointly by the Ministry of Communications and RZhD, which coordinate military exercises and mobilization when civilian railways need to be commandeered by the armed forces. The ZhV have one of the most stable leadership

[4] Emily Ferris, *Problems of Geography: Military and Economic Transport Logistics in Russia's Far East*, Royal United Services Institute (RUSI), Oct. 12, 2020, https://rusi.org/explore-our-research/publications/occasional-papers/problems-geography-military-and-economic-transport-logistics-russias-far-east, accessed Jan. 5, 2023.
[5] Wilfried Kopenhagen, *Armored trains of the Soviet Union, 1917–1945* (Atglen, PA: Schiffer Military History), https://michaelharrison.org.uk/wp-content/uploads/2022/03/Armoured-Trains-of-the-Soviet-Union-1917-19451.pdf.
[6] Michael Peck, *Meet Russia's Railroad Troops (and Here is Their New Mission),* Feb. 10, 2019, The National Interest, https://nationalinterest.org/blog/buzz/meet-russias-railroad-troops-and-here-their-new-mission-43967, accessed Dec. 5, 2022.
[7] Sergei Mingazov, *Kommersant: Putin podderzhal rezirovaniye sredstv dlya zheldorvoisk na BAMe,* [Kommersant: Putin supported the reservation of funds for the railway troops on the BAM line], Forbes Russia, Oct. 12, 2021, https://www.forbes.ru/finansy/442633-kommersant-putin-podderzal-rezervirovanie-sredstv-dla-zeldorvojsk-na-bame, accessed Jan. 28, 2023.

positions—since 2010, it has been headed by Lieutenant General Oleg Kosenkov, who has served in command positions within the ZhV for over 40 years.[8]

The ZhV and the *Tyl*

The ZhV ensure the flow of ammunition and communications during Russian military campaigns, but also help to fulfill many of Russia's strategic political and military ambitions.

During the 1904–1905 Russo-Japanese war, the TSR—then in its early days of functioning—supplied troops in the Far East with food and ammunition from Central Russia. Although Russia ultimately lost the campaign, the TSR's single-track line was the sole line of communication between forces and required a significant boost in capacity and throughput at a critical time; at the start of the war, only four trains were operational to carry troops across the still incomplete TSR. This increased to six by the end of 1904, but by 1906, this operational capacity increased to 18 trains in each direction on the Trans-Baikal Railroad. That year, engineering upgrades and the TSR's increased capacity for throughput meant that time for concentrating battalions from one side of Russia to the other was significantly shortened, from 30 days to just 7 or 8.[9] At the time, the ZhV and civilian engineers were commended for meeting significant demand in a short space of time, amid persistent geographical constraints to construction such as marsh and permafrost.

During the Soviet era, the ZhV were considered a prestigious agency, involved in national economic (and therefore political) tasks, such as building railway tracks to important oil rigs, upon whose output the Russian economy still depends. Although—as will be discussed below—the ZhV were involved in many of Russia's military campaigns, such as the Chechen Wars, their importance began to wane. In 2010, then-Minister of Defence Anatoly Serdyukov introduced a swath of military reforms, one frequently criticised as corrupt and arbitrary, that saw the logistical corps, particularly the ZhV, downsized, and there was talk of its disbandment. Then-President Dmitry Medvedev merged the Logistics and Armaments Directorate into one structure, and Serdyukov reorganised the ZhV's command restructure, rendering them subordinate to each of the newly formed military districts (MDs).[10] By 2010, the ZhV were reduced to a small grouping, declining from around 42,000 personnel in 2009 to just 27,000,

[8] Russian Ministry of Defence, "*Oleg Ivanovich Kosenkov*," https://structure.mil.ru/management/details.htm?id=10330350@SD_Employee, accessed Dec. 15, 2022.
[9] Toepfer, "Technics in the Russo-Japanese War," *Professional Memoirs, Corps of Engineers, United States Army and Engineer Dept at Large*, 2, no. 6 (Apr.–June 1910), Society of American Military Engineers, https://www.jstor.org/stable/44709410, accessed Dec. 5, 2022.
[10] Vladimir Mukhin, "*Reformu armii proveryat manevrami*," [Army reform will be tested by maneuvers], *Nezavisimaya Gazeta*, June 28, 2010, https://www.ng.ru/regions/2010-06-28/6_army.html, accessed Dec. 14, 2022.

with only 2,370 officers.[11] The ZhV would become subordinate to regional command structures and were mostly involved in combat training exercises.[12]

But the ZhV experienced a dramatic return to the agenda in 2014 and 2015, when they proved instrumental in furthering Russia's strategic security interests toward Ukraine. Russia's annexation of Crimea in 2014 and the subsequent civil unrest in Ukraine, fuelled by Russia's financial and military support of separatist groups in the East, meant that constructing railway lines in the south of Russia was integral to the *tyl,* bringing weapons, ammunition, and supplies to eastern Ukraine across the Russian border.

After Russia annexed Crimea in 2014, the ZhV began construction work on the Zhuravka-Millerovo section of railway, which links two cities by a Soviet-era railroad running through Ukrainian territory, to which Kyiv had blocked Russian access when the conflict began. The project was personally ordered by Putin and included new bridges and railroad stations—a significant task. Unusually for an infrastructure project of this scale, it was completed ahead of time in 2017, without the usual allegations of corruption or missing funds, raising suspicions at the time that the work was of utmost security significance. It became apparent that while Russian Railways (RZhD) was initially responsible for the work, the ZhV made up a significant chuck of the workforce—more than 1,000 engineers—alongside civilian workers, pulling officers from the Southern, Western, and Central MDs.[13] At the project's conclusion, Deputy Defence Minister Gen. Dmitry Bulgakov personally awarded 23 members of the ZhV with medals. There had been suggestions that the ZhV might be involved, but the commendations clearly demonstrated the task's military importance. [14]

The Zhuravka-Millerovo line links up Russia's military bases from Voronezh to Rostov, and so infrastructure-related projects of this kind grew in importance.[15] At the time, it was also a means of developing connections in Ukraine to prevent those territories from returning to Ukrainian sovereignty as well as a way to facilitate the movement of Russian troops into eastern Ukraine to assist the separatist groups. There were concerns that Russia was laying the groundwork for a future conflict with Ukraine, for which it would be well prepared.[16] By 2022, as Russia prepared for the invasion of Ukraine, military units from across Russia were able to amass on the border using these routes.

[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] Sergei Sukhankin, "Zhuravka-Millierovo Rail bypass: A Threat to Ukraine's National Security?" Eurasia Daily Monitor, 14, no. 90 (July 25, 2017), Jamestown Foundation, https://jamestown.org/program/zhuravka-millerovo-rail-bypass-a-threat-to-ukraines-national-security/, accessed Jan. 6, 2023.
[15] Vladislav Bombela, "*Putin gotovitsa k voine s Ukrainoi*" [Putin is preparing for war with Ukraine], Fakti, Mar. 2, 2017, https://fakty.com.ua/ru/ukraine/20170302-putin-gotuyetsya-do-vijny-z-ukrayinoyu/, accessed Jan. 10, 2023.
[16] Elena Rykovtseva, "*Genshtab gotov k voine*" [The General Staff is ready for war], Radio Svoboda, Feb. 8, 2022, https://www.svoboda.org/a/genshtab-gotov-k-voyne/31693145.html, accessed Jan. 11, 2023.

Against this backdrop and recognising their strategic importance, Minister of Defence Sergei Shoigu reorganised the ZhV's units in 2015, establishing separate railway brigades, with 10 formations featuring 58 separate military units that are in a state of constant readiness. There are between two and five battalions in each formation.[17] The ZhV are supplied by the 41st Central Factory for Railway Equipment, a company that manufactures and maintains equipment especially for the ZhV and the Ministry of Defence as well as training specialists in engineering to be able to support the ZhV.[18] This plant has its own separate railway line for the delivery of products and is based in the outskirts of eastern Moscow. As of 2023, this factory is not specifically named on any Western sanctions lists, but it has been identified as one of several struggling under the sanctions that target Russia's defense industry overall.

The ZhV's Evolving Use in Military Exercises

The ZhV operate at all strategic command and staff exercises, as well as their own logistical exercises, and over the past decade, they have had to work through geographic and staffing challenges. Often, the issue is not speed of mobilization, but Russia's ability to sustain troops in a war theater for a long period of time, and Russia's military exercises have often revealed key weaknesses in its railway network.

Russia's Zapad 2009 joint military exercises with Belarus showed that even with the Soviet-era common gauge system, it took five days for Russia's 4th tank brigade to move 400 kilometers from Moscow to Belarus, and motorized rifle brigades took even longer.[19] At the time, Russian commentators compared Zapad unfavourably with an exercise that the Chinese military had held, where ground forces were moved up to 2,400 kilometers in just five days, confirming that Russia's reliance on rail was hampering swift mobility. There were also suggestions that Russia's brigades were too large and unwieldly, slowing down their deployments. Russia's military reforms did not immediately take this into account amid the

[17] Roman Kretsul and Alexei Ramm, *"Robotizirovannie sistemi skoro naidut primeneniye v zheleznodorozhnikh voiskakh*," [Robotic systems will soon be used in the railway troops], Izvestiya, Feb. 11, 2022, https://iz.ru/1289710/roman-kretcul-aleksei-ramm/robotizirovannye-sistemy-skoro-naidut-primenenie-v-zheleznodorozhnykh-voiskakh, accessed Dec. 10, 2022; Alexei Ramm and Bogdan Stepovoy, "*Dron s bolshoi dorogi: zheleznodorozhniye voiska usilyat becpilotnikami*," [Drones from the main road; the railway troops will be strengthened by UAVs], Izvestiya, Apr. 19, 2020, https://iz.ru/1000317/aleksei-ramm-bogdan-stepovoi/dron-s-bolshoi-dorogi-zheleznodorozhnye-voiska-usiliat-bespilotnikami, accessed Dec. 3, 2022.
[18] 41st Tstentralniy Zavod, http://41zavod.ru/o-predpriyatii, accessed Dec. 14, 2022.
[19] Johan Norberg, "*Training for War: Russia's Strategic-Level Military Exercises 2009–2017*," FOI Sweden, Oct. 2018, https://www.foi.se/rest-api/report/FOI-R--4627--SE, accessed Dec. 10, 2022.

hurried efforts to form new brigade structures, but within the next five years, the military took steps to "lighten" brigades with smaller and more flexible units.[20]

This issue of brigade mobility persisted in the Vostok 2010 exercises, which took place in Russia's Far East and Siberian MDs. To save time and avoid overloading the rail track, the 28th Motorized Rifle Brigade was transferred from Yekaterinburg to the training ground in the Far East without its heavy equipment; the brigade was instead equipped from a local store. The exercise also highlighted the (ongoing) weaknesses of Russia's railway system in the East, whose lines are long—sometimes only single-track rails—and vulnerable, but also essential for any large-scale military operations in the Far East. Protected by air defense units, the ZhV were deployed there during Vostok-10 practicing scenarios to repair railways and bridges.[21]

Russia attempted to overcome the brigade mobility issue, with reforms first downsizing brigades, an unpopular move that rendered the army too small to counter regional or large-scale wars, then moving in 2013 to a mixed-force structure with divisions and brigades.[22] Quadrennial strategic exercises are held in each MD, which has allowed troops and their command and control structures to learn from Russia's varied geographical terrain and account for the different densities in rail networks across the country.[23] Zapad 2013 involved joint Russian-Belarusian strategic coordination in both countries and was notable for the significant participation of the ZhV and the importance of railways in transporting forces from the Moscow and Nizhny Novgorod regions to the training grounds in Belarus. Here, units were moved from central Russia to the west, using rail, river, and road transport, but there were several incidents, including tanks being accidentally ditched by the side of the road. [24]

Some of these measures, alongside significant state investment in railways to increase capacity and throughput, meant that by the time Russia held its Vostok (East) military exercises in 2018, its ground forces were able to swiftly move troops into eastern regional areas, where transport infrastructure is relatively undeveloped.[25] By the January-February 2022 Union Resolve joint exercises that Russia held with Belarus—which we now know to be the staging ground for the invasion of Ukraine—more than 200 trains arrived from Russia into Belarus, with around 50

[20] Roger McDermott, "The Brain of the Russian Army: Futuristic Visions Tethered by the Past," *The Journal of Slavic Military Studies*, 27, no. 1, https://www.tandfonline.com/doi/abs/10.1080/13518046.2014.874840, accessed Dec. 12, 2022.
[21] Ibid.
[22] Michael Kofman et al., "Not Built for Purpose: The Russian Military's Ill-Fated Force Design," War on the Rocks, June 2, 2022, https://warontherocks.com/2022/06/not-built-for-purpose-the-russian-militarys-ill-fated-force-design/, accessed Jan. 6, 2023.
[23] Ibid.
[24]Liudas Zdanavicius et al., "Russia's Zapad 2013 Military Exercise: Lessons for Baltic Regional Security," Jamestown Foundation, Dec. 2015, https://jamestown.org/wp-content/uploads/2015/12/Zapad-2013-Full-online-final.pdf, accessed Dec. 17, 2022.
[25] Johan Norberg, "Vostok 2018: About the Russian Military's Brain, Not its Muscles," MEMO 6470, Swedish Defence Research Agency (FOI), https://www.foi.se/report-summary?reportNo=FOI%20MEMO%206470, accessed Dec. 12, 2022.

cars.[26] But although the slow massing of forces on the border was smooth, as the Ukraine war has shown, Russia's ability to sustain warfare far from railheads is restricted.

The ZhV in Conflict

Historically, the ZhV have been present in almost all of Russia's major conflicts. During the Russo-Japanese war (1904–1905), Russia's armored trains covered the ZhV who were repairing the track and protected them against Japanese units, preventing greater losses. All the main participating states in the First World War used armored trains to support the *tyl*, as railway lines at the front sustained heavy damage during the early stages of the war. By 1918, the Red Army had 23 armored trains, rising to 59 at the end of 1919, and 103 by the 1920s, manned by the ZhV. Their role was to engage the enemy, cover the deployment of advancing infantry, and support troops during the attack, carrying significant ammunition with them and able to fire even during maneuvers.

Russia's experience during the civil war in 1917 informed the military view of armored trains as vital for engagement close to rail lines and junctions. At the time, Russia's railways were the only means of transporting troops to the front lines. Armored trains also became an important weapon to protect crews against gunfire; the trains were equipped with artillery and could be moved quickly into position.[27] But as Russia's experiences in the Second World War demonstrated, while the armored trains could move quickly, covering hundreds of kilometres a day and defending against small arms fire, they were confined to the tracks, and even minor track damage rendered the trains unable to move.[28] Even so, armored trains and the ZhV were instrumental in protecting rail junctions from German invasion, particularly around Minsk, Moscow, and Leningrad, as well as in battles in the Far East, such as Khalkin-Gol in 1939 against Japanese militants, which allowed the Red Army to secure its eastern border.[29]

Although later development of Russian tanks demonstrated superiority over armored trains in terms of armor protection and higher caliber of weaponry, the USSR never entirely removed armored trains from service, relegating them to protecting ground troops at specific

[26] BelSat, "Source: 200 Trains with Russian Military Personnel and Equipment to Arrive in Belarus," Jan. 22, 2022, https://belsat.eu/en/news/22-01-2022-source-200-trains-with-russian-military-personnel-and-equipment-to-arrive-in-belarus, accessed Dec. 12, 2022.
[27] Martin Hosek, "The Hailar Incident; the Nadir of Troubled Relations between the Czechoslovak Legionnaires and the Japanese army, April 1920," *Acta Slavica Iaponica* 29 (2011): 103-122, https://src-h.slav.hokudai.ac.jp/publictn/acta/29/06Hosek.pdf, accessed Dec. 10, 2022.
[28] Ibid.
[29] Alexey Zaksavin, "*Chasti postoyannoi gotovnosti; kak razviviayutsa Zheleznodorozhnie voiska Rossii*" [Parts of constant readiness: how Russia's Railway Troops are developing], Aug. 6, 2022, https://russian.rt.com/russia/article/1034062-zheleznodorozhnye-voiska-istoriya, accessed Dec. 11, 2022.

locations.[30] These trains, manned by the ZhV, continued to play an important role in Russia's conflicts in the mid-1990s.

Chechnya and the North Caucasus

There is piecemeal information available about the precise transportation of Russian troops into the war theater during the two Chechen wars (1994–1996 and 1999–2000), but the ZhV were instrumental not only in transporting troops, but also in protecting the railroads as a strategic line of communications and logistical supply chain.

In the First Chechen War, assuming a swift victory was in the offing and with limited preparation time to launch an offensive on Grozny, Russia's armed forces required significant levels of coordination between aviation and the railways to bring together units from across the country.[31] Military trains from the Russian Far East deployed troops to Chechnya, travelling up to 1,200 kilometers a day. But mobilization was hampered by delays in disembarkation, as train station platforms in Russia were short, with few loading points, and military trains were long, sometimes with more than 100 carriages.[32]

Chechnya is landlocked and surrounded by Russian territory on three sides. Russian columns of around 23,000 troops advanced on Grozny from all three sides slowly and in an uncoordinated manner, which allowed the Chechens time to shore up their defenses. This, alongside other issues such as poor intelligence and a lack of preparation for urban combat, meant that Russian forces' casualties were extremely high.[33]

Despite these high casualties, armored trains and the ZhV who operated them proved their worth in Chechnya, guarding trains that carried construction materials, military cargo, and troops and shielding them from explosive attacks.[34] Passenger rail traffic to Naurskaya station (north of the regional capital Grozny) across the Terek River had been introduced in 1994, a project that took 10 years. During the war, Chechen rebels attacked Russian tanks, partially destroying that rail bridge to disrupt Russian communication lines, but the ZhV captured the bridge and reconstructed it, restoring 77 kilometers of communication lines and 67 kilometers'

[30] Michael S. Gerson, *The Sino-Soviet Border Conflict: Deterrence, Escalation and the Threat of Nuclear War in 1969*, (Arlington, VA: CNA, Nov. 2010), https://www.cna.org/reports/2010/d0022974.a2.pdf, accessed Dec. 11, 2022.
[31] Maj. Norman L. Cooling, "Russia's 1994–1996 Campaign for Chechnya: A Failure in Shaping the Battlespace," *Marine Corps Gazette*, Oct. 2001, https://www.canada.ca/en/army/services/line-sight/articles/2022/02/russias-1994-96-campaign-for-chechnya-a-failure-in-shaping-the-battlespace.html, accessed Dec. 20, 2022.
[32] Global Security, "*Railway Troops/RailwayFforces" (Zheleznodorozhniki),* https://www.globalsecurity.org/military/world/russia/railroad-troops.htm, accessed Jan. 3, 2023.
[33] Jacob W. Kipp, "Russia's Wars in Chechnya," *The Brown Journal of World Affairs* 8, no. 1 (Winter/Spring 2001), https://www.jstor.org/stable/24590174, accessed Dec. 15, 2022.
[34] Ibid.

worth of power supply lines, clearing the tracks of rubble.[35] They also rebuilt bridges across several other key rivers, including the Aksai, Bolshoi Shaudon, and Sunzha.[36]

During the Second Chechen War, the ZhV were tasked with restoring the rail track following insurgency operations, clearing mines and repairing switches, and restoring power to electric rail lines. At the time, Russian cargo trains were targeted by Chechen rebels and the railways were often mined. At this point, the ZhV began to operate an armored train designed to protect commercial freight and military supply trains.[37] Armored trains also provided cover for the ZhV engaged in demining the tracks, who would undertake controlled detonations of mines and then replace damaged sections of the track with new ones. Each armored train included a repair team, who were able to replace the damaged sections within a few hours. The four armored trains and the attached ZhV unit became part of the southern MD. The then-director of the ZhV, Col. Gen. Grigory Kogatko, noted in 2001 that Chechnya had informed the ZhV's experience of working in hostile and extreme conditions, particularly their experience of neutralizing IEDs.[38]

Hostilities in Russia's volatile North Caucasus region from 2002–2009 and the Ministry of Defence's counter-insurgency operations there prompted the creation of a group of armored trains in 2010, controlled by the ZhV, to be used to withstand attacks. A series of Islamist insurgent attacks on Russia's transport network and infrastructure, including a fatal terrorist attack in 2009 on the Moscow–St. Peterburg express line and at Moscow's Domodedovo airport in 2011, prompted the Kremlin to refocus on protecting Russia's transport network, usually with legislation.[39] Then-Prime Minister Dmitry Medvedev in 2011 ordered enhanced security measures at major transport hubs, including more police officers and metal detectors to prevent suicide attacks. But when Medvedev conducted spot inspections of the railways, he found that few hubs had complied with his orders, highlighting some of the ongoing practical problems in top-down issuances.[40]

After the Chechen wars and a reduction in attacks on Russia's internal network, the Ministry of Defence, as part of Serdyukov's wide-ranging reforms, decided to remove the rolling stock

[35] Ibid.
[36] Ibid.
[37] Andrew McGregor, "Armored Trains Return to the Russian North Caucasus," *Eurasia Daily Monitor* Vol. 7 (36), Feb. 23, 2010, https://jamestown.org/program/armored-trains-return-to-the-russian-north-caucasus-2/, accessed Dec. 19, 2022.
[38] Kavkazskiyu Uzel, *"Voenniy zheleznodorozhniki vosstanavlibayut Chechniyu*," [Military railway workers restore Chechnya], Dec. 29, 2001, https://www.kavkaz-uzel.eu/articles/14204/, accessed Dec. 15, 2022.
[39] Monica Duffy Toft, "Chapter 10: Russia's War on Terrorism," *The Policy World Meets Academia: Designing US Policy Toward Russia*, American Academy of Arts & Sciences, https://www.amacad.org/publication/policy-world-meets-academia-designing-us-policy-toward-russia/section/15, accessed Dec. 20, 2022.
[40] Alexandra Samarina, "*Stranu khvatil paralich upravleniya*," [The country was paralyzed], *Nezavisimaya Gazeta*, Nov. 2, 2011, https://www.ng.ru/politics/2011-02-11/1_vokzal.html, accessed Dec. 20, 2022.

from operation, removing anti-aircraft guns from the trains.[41] The armored trains were then permanently deployed in Stavropol in southern Russia, close to the borders with the North Caucasus. But when Sergei Shoigu replaced Serdyukov in 2012, he rescinded the order to scrap the trains and reintroduced the Baikal, Terek, Amur, and Don trains back into service in 2015.[42] Some of these armored trains are in use in the Ukraine war today (see below).

Ukraine War

The ZhV are playing a fundamental role in Russia's active war against Ukraine in two key ways.

First, Russia and Belarus's interlinked railway system facilitated the swift movement of troops and hardware between the two countries, allowing Belarus to act as the launchpad for the initial assault on Kyiv from the north in February 2022. As part of a multitude of preexisting bilateral security arrangements, Russia and Belarus in 2004 signed an agreement on logistical support as part of the Regional Group of Forces (RGF, their joint military training command), giving the Russian armed forces the right to use Belarus's infrastructure and resources during a threat or a war. The agreement is the basis upon which their bilateral joint exercises and Belarus's facilitation of the Ukraine war have been conducted.[43]

As part of their Union State—a loose political framework that Russia is pressing Belarus to formalize to more deeply integrate their legal, economic, and political systems—there are budgets assigned for military facilities and infrastructure, including financing railway stations. For the Russian military, investments in upgrading Belarus's railways and improving the network have been key in the smooth mobilization of its troops into Ukraine and, in 2020, 260 kilometers of track in Belarus was upgraded with Russian investment.[44] Recognition that the railways were fundamental to the Ukraine invasion prompted reports of saboteurs on the railway lines in Belarus who deactivated or destroyed train signalling systems, which caused the trains to run much more slowly, delaying supplies from the *tyl*.[45]

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[41] Alexander Raskin, "*Minoboroni vernulo bronepoezda na vakhtu*" [The Ministry of Defence returns armored trains to duty], Aug. 6, 2015, https://iz.ru/news/589522, accessed Dec. 11, 2022.
[42] Ibid.
[43] Belarusian Government, "*Soglasheniye mezhu Pravitelstom Respubliki Belarus i Pravitelstvo Rossiyskoi Federatsii o sovmestnom tilovom obespechenii regionalnoi gruppirovki voisk (sil) vooruzhenikh sil respubliki Belarus i vooruzhenikh cil Rossiyskoi Federatsii*" ['Agreement Between the Government of the Republic of Belarus and the Government of the Russian Federation on Joint Logistics Support for the Regional Grouping of Troops (Forces) of the Armed Forces of the Republic of Belarus and the Armed Forces of the Russian Federation'], Dec. 21, 2004, accessed Dec. 11, 2022.
[44] Belta, "BZhD v 2020 godu otremontirovala bolee 260km puti" ['Belarus Railways in 2020 Repaired More than 260 km of Track'], Jan. 6, 2021, https://www.belta.by/society/view/bzhd-v-2020-godu-otremontirovala-bolee-260-km-puti-423156-2021, accessed Dec. 5, 2022.
[45]Emily Ferris, "Russia's Military Has a Railroad Problem," *Foreign Policy*, Apr. 21, 2021, https://foreignpolicy.com/2022/04/21/russias-military-has-a-railroad-problem/, accessed 10 January 2023.

Second, the ZhV are providing important cover for Russia's infantry in Ukraine. They are chiefly involved with manning Russia's armored trains around parts of illegally annexed Donetsk and Luhansk, mine clearance, and restoring destroyed infrastructure on rail sections.[46] The Yenisei armored train is designed to carry personnel and equipment and absorb blows from explosive devices. Yenisei has a diesel locomotive positioned in the center of the train—if an explosive device or fire comes from the front, the engine remains intact and the train is still able to move, as each end of the train is heavily armored.[47] The Volga armored train was fitted by the ZhV from the Western MD; it is used for demining and restoring rail track.[48] Russia has also deployed the Amur armored train, dispatched to Melitopol in Zaporizhzhia—annexed illegally in September—to accompany cargo. These trains are equipped with ZU-23-2 anti-aircraft platforms and can operate without electricity or dispatchers, which is particularly vital if communications are down.[49]

Evidently, the ZhV's actions in Ukraine have increased their prominence, but whether the Russian defense community will judge their involvement as a success remains to be seen.

Conclusion

The ZhV's continued existence and prowess depends on its ability to prove its efficiency to the defense community. Russia's engagement over the past 15 years in different war theaters, both domestically and internationally, and in varied geographical terrain, means that the ZhV has had many opportunities to demonstrate its effectiveness, and its funding, command and control structure, and regard have been recalibrated accordingly within the Ministry of Defence.

The ZhV's involvement in the Ukraine war thus far indicates that they are considered a vital part of Russian troop mobilization and sustainment. If the ZhV can continue to perform

[46] Alisa Krauze, "*Nachalnik GU Zheleznodorozhnikh voisk rasskazal o rekonstruktsii BAM i uchastii voennikh v SVO*" [Head of the main directorate of the Railway Troops discussed the reconstrition of the BAM line and the participation of the military in the special military operation], Aug. 5, 2022, https://tvzvezda.ru/news/202285226-QGrHs.html, accessed Jan. 3, 2023.
[47] Marina Krizhanovskaya et al., *"MO RF pokazalo rabotu bronepoezda v zone spetsoperatii"* [The Russian Ministry of Defence demonstrated how an armored train in the special operation zone works], Dec. 7, 2022, TV Zvezda, https://tvzvezda.ru/news/2022127556-2IjfY.html, accessed Dec. 15, 2022.
[48] Alexander Karpov, "*Peredvizhnaya Sistema ataki i oboroni; kak rossiiskaya armyia vozrozhdaet primeneniye bronepoezdov na Ukraine*" [Mobile attack and defence system: how the Russian army revives the use of its armored trains in Ukraine], RT, June 24, 2022, https://russian.rt.com/russia/article/1017989-rossiya-armiya-bronepoezd, accessed Jan. 4, 2023.
[49] The Reporter, "*Na Ukraini pribil rossiskii bronepoezd*" [Russian armored train arrives in Ukraine], Mar. 7, 2022, https://topcor.ru/24379-na-ukrainu-pribyl-rossijskij-bronepoezd.html, accessed Dec. 10, 2022; Ashish Dangwal, "Fortress on Wheels: Russia Flaunts Its Heavy-Duty Armored Train Used for Critical Military Missions in Ukraine," Eurasian Times, Dec. 8, 2022, https://eurasiantimes.com/fortress-on-wheels-russia-flaunts-its-heavy-duty-armored-train-used-for-critical-military-missions-in-ukraine/, accessed Dec. 15, 2022.

engineering tasks of national security importance to a high standard, and still more cheaply than civilian organisations, then—barring significant changes of direction at the top of the Ministry of Defence—their position appears stable. But there may be other changes on the horizon. Uneven funding allocations, issues with professionalisation and training of staff, and international sanctions putting pressure on the railways as a sector all mean that the future of the ZhV may not be assured.

First, investment in the armed forces and national security overall is likely to remain significant for the coming three years; Putin has pledged that there will be no reduction in military spending, set to be 9.5 trillion rubles from 2023 to 2025.[50] But funding is likely to be applied unevenly. Although the ZhV are important, they have long complained that other parts of the military are prioritized with the latest models of equipment—this is partly because Russia's aerospace forces, navy, and strategic missile forces have more technical requirements and often receive more specialized contract soldiers than the ground forces.[51]

Second, several factors could limit the ZhV's professionalization and ability to train up new recruits. While in principle the ZhV are investing in newer technology such as drones and innovative engineering techniques, they frequently hold national competitions in engineering to identify new specialists, suggesting that they are having to seek external expertise to inform their practices.[52] The longer the war in Ukraine continues, the more disruption there is likely to be for recruitment and training of technical and specialized officers. The Ministry of Defence has plans to increase Russia's standing army by around 350,000 personnel over the next three years, raising the draft age to 21–30 (it currently stands at 18–27). These changes will require significant investment in training and developing junior staff.[53] Unless there is also a concomitant interest in increasing the ZhV, they may face a challenge supporting significantly larger brigades.

Third, the international sanctions have had human and practical effects on the railways, and thus have affected the ZhV's ability to fulfil military and civilian tasks. Fearing the military draft, at least 100,000 qualified technology specialists and people with science, technology, engineering, and mathematics skills departed Russia at the start of the war, which will likely

[50] The Bell, "Putin Won't Run Out of Money for His War Any Time Soon," Jan. 27, 2023, https://thebell.io/en/putin-won-t-run-out-of-money-for-his-war-any-time-soon/, accessed Jan. 27, 2023.
[51] Ibid.
[52] Irina Dronina, "*Zhelezodorozhniye voiska poluchat noviy naplavnoi most*" [Railway troops will receive a new floating bridge], *Nezavisimaya Gazeta*, July 8, 2020, https://nvo.ng.ru/realty/2020-08-07/1_1103_bridge.html, accessed Jan. 4, 2023.
[53] Paul Goble, "Upcoming Spring Draft Set to Be Most Difficult in Russia's Recent History," *Eurasia Daily Monitor*, Vol 20 (12), Jan. 20, 2023, https://jamestown.org/program/upcoming-spring-draft-set-to-be-most-difficult-in-russias-recent-history/, accessed Jan. 21, 2023.

affect the ZhV's ability to draw on outside expertise, particularly if there are plans to expand capacity.[54]

But perhaps most pressingly, the only three producers of cassette bearings—which Russian cargo trains use for their innovative wagons with increased loading capacity (around 15 percent of all Russian railcars)—were joint ventures with foreign companies, who shuttered their operations when Russia invaded Ukraine.[55] By October 2022, around 10,000 units of these railcars were idling without bearings, and railcar manufacturers were forced to produce standard models with less loading capacity. China and Uzbekistan have offered to step in to meet Russia's demand, but Russian operators have complained the prices are up to 50 percent higher once import duties have been applied.[56]

This will likely have an effect on Russia's ability to upgrade its transport network in the Far East for troop mobilization and develop its transport links with China and other Asia-Pacific countries—plans that are especially important amid the sanctions that have cut Russia off from international supply chains. In principle, the money is there; funds from the federal budget are reserved specifically for the ZhV to assist construction work in the East, and the Ministry of Transport has allocated 1.254 billion rubles as part of its strategy until 2030 (more than any other type of infrastructure) to developing railways, including purchasing additional locomotives.[57] To this end, in 2022, the Ministry of Defence noted that the ZhV had prepared more than 2.5 million cubic meters of earthworks to assist with Russia's expansion of its trade network toward China.[58] But while the ZhV are working on upgrading the Baikal–Amur Mainline (BAM) in the Far East, they represent only 5 percent of the workers involved. The BAM is in serious need of labor resources because of the scale of the project and the dearth of migrant workers, many of whom left during the pandemic.[59]

RZhD is also struggling as a direct result of the sanctions, and almost all of its network upgrade projects with companies such as Siemens have been cancelled. In late 2022, the government announced a planned investment in RZhD of more than 1.7 trillion rubles for 2023. On direct

[54] Todd Prince, "A Nail in the Coffin: Tech Workers Are Fleeing Russia and the Impact Will Last for Years," Apr. 6, 2022, RFERL, https://www.rferl.org/a/russia-it-workers-brain-drain/31783558.html, accessed Jan. 22, 2023.
[55] Nick Augusteijn, "Siemens Announces Withdrawal from Russia, Mobility Division Takes Hit," Rail Tech, May 13, 2022, https://www.railtech.com/all/2022/05/13/siemens-announces-withdrawal-from-russia-mobility-division-takes-hit/?gdpr=accept, accessed Jan. 14, 2023.
[56] Railway Supply, "Bearings for Russian Railcars from China and Uzbekistan," Railway Supply, Dec. 6, 2022, https://www.railway.supply/en/bearings-for-russian-railcars-from-china-and-uzbekistan/, accessed Jan. 14, 2023.
[57] Ministry of Transport, "*Kompleksniy plan modernizatsiy i rashireniye magistralnoy infrastrukturi na period 2018-2024*" [Complex modernization plan and expansion of rail infrastructure from 2018-2024], http://government.ru/docs/34297/, accessed Dec. 15, 2022.
[58] Ibid.
[59]Sergei Mingazov, "*Kommersant: Putin podderzhal rezirovaniye sredstv dlya zheldorvoisk na BAMe*" [Kommersant: Putin supported the reservation of funds for the railway troops on the BAM line], Forbes Russia, Oct. 12, 2021, https://www.forbes.ru/finansy/442633-kommersant-putin-podderzal-rezervirovanie-sredstv-dla-zeldorvojsk-na-bame, accessed Jan. 28, 2023.

orders from Putin, the government is also set to bail RZhD out of its debt burden by more than 200 billion rubles, with an additional 250 billion rubles from the National Wealth Fund (Russia's rainy-day fund) allocated to finance the investment program.[60]

Thus far, this suggests the ZhV will remain on the Ministry of Defence's agenda as an auxiliary and often background means of furthering Russia's strategic political and security goals. But potential future growth of the ground forces without a concomitant increase in staff training standards for the ZhV who will need to support them could create a shortage of expertise. The broader issues that affect Russia's railway network will have a knock-on effect on the ZhV's ability to reliably construct new track and significantly boost throughput along the rail lines, all of which may set the units up to fail in their efforts to increase capacity. As is often the case in Russia, the link between the Kremlin's stated goals and practical reality may still be quite far apart.

[60] Russian Government, "Government Meeting," Nov. 10, 2022, http://government.ru/en/news/47009/, accessed Jan. 2, 2023.

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