1. DEVELOPING THE CONCEPT OF MILITARY RAILWAY USE

A proper description of the complex circumstances of developing the railway network in Poland requires an indispensable reference to the early use of the railways by the military.

For the first time in history, troops were carried by rail during the Palatine Uprising of 1849[4], and – that same year – during the German expedition to Schleswig. Ten years later, in 1859, the French and English were already making use of rail transport. During the American Civil War, Americans carried troops by rail on a major scale. In 1866, Austrians were the first to make strategic use of this mode of transport, moving 100,000 people from Custozza to the German Front, and thus covering 700 km in 12 days.[5]

In 1851 Russian military authorities developed their first guidelines for the movement of troops by rail: *Przepisy o przewozie kawalerii po Petersbursko-Moskiewskiej Kolei Żelaznej* [Regulations of Moving Cavalry by the Petersburg-Moscow Railway], while on November 24th 1851, the Russian Ministry of War issued its first directive on the use of railways for the purposes of transferring troops.[6]

The progressive development of railways is connected with the 19th-century industrialisation, making it a crucial mode of transport, which was of utmost importance to the success of both individual operations and entire campaigns. In the wake of the Franco-Prussian War of 1870–71, the importance of rail transport was duly noted by the General Staff of almost all major European nations. Prussia owed its military success in the 1870 war to the efficient mobilisation and shipment of its armed forces, most certainly assisted by the strategic railway network which had at the time been under expansion in Prussia for quite a time already: Field Marshal Helmut von Moltke's Prussian war doctrine provided for the expansion of a dense rail network, including technical infrastructure to serve the purposes of mass mobilisation and operational transfer. The efficiency of Prussia's transport system enabled swift completion of all mobilisation exercises, as well as full combat readiness three weeks ahead of the Russians.

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4 Owsińska (1965), 79.

5 *Koleje żelazne* (1919), 4.

6 Strózik, *Wojska kolejowe 1944–1946*, M.A. thesis, Military Office of Historical Research Archive, Ref. No. 1036, 4.

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Geopolitical conditions determined the main directions of military movement to the west and east, across the territories lost by Poland as a result of partitioning upon the loss of its independence. Moreover, the highest concentration of fortifications in Europe clearly points to the operational importance of the Polish territory. In the 19th century, strategic crossings were fortified on major rivers at the following locations: Warszawa, Dęblin, Modlin, Toruń, Grudziądz, and Poznań. Furthermore, Russian and Prussian systems of centralised fortifications and ring fortresses (brought about by extensions to the artillery range and the invention of smokeless gunpowder after 1870) were developed on Polish territory in the late 19th century, serving identical operational purposes.

Within the Kingdom, the network of fortress roads connecting specific fortifications and points of resistance was also expanded in the 19th century.

Different concepts for the operational use of railway transport laid out by the partitioning powers became a lead factor in determining the development of the railway network on the Polish land.

In Poland under partitions, road and rail networks were constructed and operated in conformity to the operational plans drafted by the General Staffs of Prussia, Russia and Austria-Hungary. Consequently, due to the growing importance of railways to the military, from the mid-19th century onwards, the development of the railway network was largely determined by military goals. Nonetheless, the partitioning powers followed separate railway-related policies, appropriately adapted to the binding war doctrines of the time.

Railway construction in Imperial Russia was largely determined by strategic considerations. New railway routes, particularly those stretching across the River Vistula and into the pre-frontier area of the Vistula Country, were perceived as a significant strategic threat – ample proof that an extensive rail network would allow the enemy to attack swiftly and dislocate troops.

Construction of new railway lines (particularly in the western part of the Empire) was strictly controlled by the state and dependent on approval by the Department of Military Transport of the Russian General Staff, upon which the Ministry of Railways could issue a licence for the construction and operation of every single narrow-gauge or industrial line, even if tertiary in importance.

The Russo-Turkish War of 1877–1878 exposed the shortcomings of the Russian railway system, the direct cause of the Sevastopol defeat. The mobilisation capacity of the Prussian army was far greater than that of the Russian army already in the 1880s, due to the expansion of the Prussian railway network. In view of such a state of affairs, Minister of War General Dimitri Milutin decided to abandon the "wilderness strategy" in favour of railway network development, the move to a certain degree changing the Russian military doctrine. Nonetheless,

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a significant number of conservative Russian generals continued to favour the already outdated strategic concepts of Kutuzov and Suvorov. The new military doctrine became the main reason behind the changes to the Russian railway-related policies. A decision was made to restore the concept of construction of railway lines by the state, leading to a rush of railway line purchases from private owners at significant loss to the state treasury. In the early 20th century, two-thirds of the railway network in European Russia were state-owned, strict state controls having been extended on the operation of lines in joint-stock control.

The weakness of the Russian rail transport, the Trans-Siberian railway in particular (efforts to increase the capacity of the line went as far as to setting up a special-purpose railway ferry across the Lake Baikal), was one of the main reasons for Imperial Russia's defeat in the Russo-Japanese War.

Prior to the outbreak of the Great War, Russia developed a system of seven front-bound railway lines heading for the German border, their total capacity reaching 223 train pairs per day. The solution secured a mere 0.25 of train passage per day per frontline kilometre. Nine lines heading for the Austro-Hungarian border were routed (five double-track and four single-track lines). Their total capacity reached no more than 260 train pairs per day, securing the passage of a mere 0.4 of train per day per frontline kilometre.[7] In the late 19th century, a system of low-density parallel lines was also developed in the European part of Russia and across Polish territory.

Efforts to expand the capacity of Russian railways immediately prior to the Great War took a wrong turn. No railway network to support the military was built (having been restricted to the network developed in late 19th century with no attention paid to the improvement of the organisation of railway traffic): Prior to the Great War, the Russian Staff failed to predict that warfare against Germany would be a largely railway-based war, dozens of corps being moved from one area to another for strategic purposes, sometimes across hundreds of kilometres. According to the view of the General Staff, the strategic network was mainly to consist of high-capacity mainlines designed to move troops in the shortest possible time from inland governorates to the venues of concentration.[8]

As the new mode of transport – the railway – developed and expanded, General Staffs of partitioning powers drafted railway policies according to their specific operational plans.

7 Nowak (1994), 35.

8 Gawroński (1930), 7.

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According to Russian military doctrine, the main theatre of war would extend along the western border of the Empire, from the Baltic Sea to the Carpathian Mountains. Such strategists assumed a specific division of the theatre of war into the following regions: the centre (near the River Vistula), the north (the Baltic Sea and Polesie region), and the south (between the Polesie region and the Carpathian Mountains). Polesie was to serve as a divide between the regions; given the Polesie marshlands, it was assumed that the area would form a natural barrier. The Vistula region incorporated the area of the Kingdom forming a major outcrop, its flanks occupied by Prussia and Austria. It was bordered by Rivers Narew and Biebrza to the north, by the River Vistula to the west, and by the San River basin to the south.

The Russian military doctrine assumed that the *Vistula Country* would serve as the defence boundary to the west, safeguarding the mobilisation and concentration of troops, and become a foundation, as it were, for the Russian armed forces' development on the future Western Front (with a planned strike by the Russians towards Vienna and Berlin). The area of the Kingdom (40 % of the entire future front) was to become a major mobilisation and logistical centre for the Russian army. Last but not least, the first line of Class One fortresses intended to defend the western borders of the Empire had been expanded in the early 19th century. Consequently, the area featured considerable saturation of military infrastructure: well-developed systems of Russian fortifications warranted the protection for Russian troops' concentration in the Kingdom, the concept was followed consistently.[9] As early as in the post-1915 period, the Russian General Staff decided to fortify the river crossings – in order to expand the Modlin Fortress and construct new fortifications in Warszawa and Dęblin.

Planning to carry out defence operations in such a way as to avoid providing the enemy with a favourable technical and logistics base, the Russian General Staff restricted railway construction projects on the territory of the Kingdom from the 1880s.

On the other hand, the Prussian military powers advocated an offensive railway strategy, supporting the intensive expansion of the railway network to establish a dense transport system. The goal was even supported by a special-purpose law allowing the construction of private and self-operated local government railways: the Prussian General Staff planned for offensive railway use on enemy territory, including swift construction of temporary trench railway lines

9 *Militaria polskich formacji*. . . (1989).

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(standard- and narrow-gauge) aligned with the planned offensive directions, all works to be performed by specialist railway engineering battalions.

Prior to the outbreak of the Great War a system of thirteen double-track main lines was constructed in Germany, leading from the country's western borders towards the borders with Russia. The main line's general capacity reached 660 train pairs per day (an average of 1.8 trains per day per frontline kilometre). Ten lines were developed along the main direction of the German army attack, stretching over a distance of 160km.[10] The frontline routes: Strasbourg – Stuttgart – Nuremberg – Prague – Częstochowa (including the parallel Nuremberg – Wrocław section), and Ulm – Munich – Vienna – Kraków crossed into Prussia and Austria-Hungary, the development arising from close co-operation between the two countries in the field of wartime operational use of the railway system. A system of high-density parallel lines was also developed in the first zone of future frontline railways, right on the Prussian – Russian border. Intense efforts to develop the railway infrastructure were also made in East Prussia, with intent to regroup and assemble troops prior to the planned flanking strike into the Russian territory.

Several years prior to the outbreak of the First World War Jan Bloch, the author of *Przyszła wojna* [The Future War], had emphasised the importance of Field Marshal Helmut von Moltke's operational plan, which assumed a large-scale use of rail transport: "The Germans will initially decide to hurl all their might upon one of their opponents, and, once that opponent's resistance is crushed, to transfer their main forces onto the second theatre of war by rail."[11] These predictions were confirmed in the course of the war in the western theatre. Bloch had also predicted the future positional nature of the war, a bold theory at the time, vastly differing from the beliefs of the majority of contemporaneous military theorists.[12] "The future war – shall mostly involve a series of battles fought around defensive positions [...] practice will show that the party with the more resilient army and population, and greater means to wage the war, will come out victorious, in this respect – favourable defence conditions shall prove more important than those for attacking."[13]

During the First World War, the majority of operational and supply transports were performed by rail, its technical condition and carriage capacity were of key

10 Nowak (1994), 33–34.
11 Bloch (1900), vol. I, 73.
12 Wyszczelski (2001), 133.
13 Bloch (1900), vol. II, 543–546.

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importance to success at any given frontline section. Bearing in mind the nature of military transport, the First World War would ultimately be dubbed "the railway war."[14] During this large-scale conflict railway military units developed wartime railway lines (standard- and narrow-gauge alike) for the purposes of operational transfers and supplies delivery to the troops in combat.

During this conflict, the development of military road transport began as well. Road transport served the purpose of moving troops, weapons and supplies directly to the frontline. In 1916 French troops managed to hold Verdun only thanks to the well-developed road network and a large number of heavy vehicles. When the German army broke through the railway lines from Verdun to Paris and Toul, the French army replaced rail transport with road transport.

At the end of the First World War an unprecedented number of troops was being moved by rail over a short period of time.

During the German offensive of March 21st 1918, when the British front was broken through near St. Quentin, it took ten days to move French reserve divisions to an under-fire section with the use of 1,376 operational transports (plus the transports used to forward supplies).[15]

The dubious Austrian railway policy adversely affected the construction and operation of railways in Galicia. Several shifts from private to public ownership had a negative impact on the development of the railway network. The density of the inconsistently developed Galician railways was only increased in the late 19th century once the development of the two strategically important lines began, both heading for the Russian border: the Karl Ludwig line connecting Cracow to Lviv via Przemyśl and further on to the Austrian-Russian and Austrian-Romanian borders, and a parallel line running at the foot of the Carpathian Mountains: the so-called Transversal Railway.[16]

A system of seven frontal railway lines (two double-track and five single-track lines) was extended on the Austro-Hungarian territory all heading for the border with Russia as the Empire's main adversary. The overall capacity of these lines reached a mere 153 pairs of trains per day, which enabled the passage of 0.22 trains per day per frontline kilometre.[17]

14 Bloch (1900), vol.II, 7.
15 Sikorski (1984).
16 Wielopolski (1969), 62.
17 Nowak (1994), 35.

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Austria also followed an offensive railway strategy, although – given its economic and technical restraints – it was unable to develop a railway network matching the Prussian one in expansiveness.

Once Poland regained its independence significant efforts were made during the inter-war period to integrate the three railway networks taken over from the former invaders, and establish a single uniform transport system (as the country held a combination of terminal sections of the rail networks set up by the three occupants[18]). Due to financial and technical limitations, a minimum programme of adjusting the railway system to military requirements was approved. Connecting the Warsaw-Berlin mainline with a newly built Kutno – Strzałkowo railway line, and the contemporaneous development of the Herby-Gdynia coal mainline built by the French-Polish Railway Society were of key importance to the Polish *raison d'etat,* for economic as well as military reasons. During the inter-war period, action was taken to prepare the railway network for the times of war – yet a bare minimum of investments was carried out due to financial constraints. The course of the September campaign served to prove that in its initial stages, both the railway troops and the militarised Polish State Railways fulfilled their roles correctly. The railway lines were destroyed in border regions; wherever the enemy had destroyed stations or junctions, rail traffic was maintained thanks to the provisional reconstruction of the surface infrastructure and installation of signalling devices in order to maintain railway traffic. Yet ever-more intense bombing and organisational chaos resulted in a quick paralysis of the mainline railway traffic.[19]

Leaders of the Soviet Russia also recognised the importance of railway transport. Russia's railway network was poorly developed, especially in the east. The catastrophic technical state of the railways, equipment and rolling stock in Russia as a result of the First World War and of the Revolution made operational movement of troops largely difficult. The extent of the pre-Revolution decline of the Russian railways is best proven by the following telegram: "A Telegram to the Head of the Board of the South-East Railway and the Director of the Ministry of Transport from the stationmaster of Samodurovka station. On train the No. 28 that arrived to cross with the train No. 3, there were 15 carriages with soldiers, when it came to an intersection with train No. 3. When the train stopped, the

18 Nowak (1994), 52.

19 An example of this was the Warsaw – Poznań line, following the destruction of the important Kutno station, military railway transport and evacuation trains were totally paralysed.

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soldiers surrounded me and demanded that I dispatch them immediately while apprehending the train No. 3 which was approaching me already. Upon arrival of the train No.3, they demanded that its steam engine be uncoupled from the mail train and coupled to their train. After I explained that I could not leave the mail train without an engine, they threatened me by saying that they would deal with me. I only managed to convince them by explaining that the engine uncoupled from the train No. 3 would be running backwards, reducing their speed of travel even further. Once they understood it, the soldiers grabbed me and led me to the steam engine of the train No. 28, threatening the driver that they would throw him into the firebox if he did not go faster. Most of the discharged [soldiers] were drunk. The work is impossible and life-threatening under such conditions; please take action to protect me from such wilfulness; trains with discharged troops should be escorted by reinforced patrols – signed, Dorokhov."[20]

The decapitalisation of Russian railways had also resulted from the implementation of the Leninist *grab nagrablonnoye* [steal the stolen!] slogan, leading to the destruction of rolling stock, railway equipment, and railway property to an extent never witnessed before. The technical and transport capacity of the Russian railways was also diminished due to the shortage of skilled staff, brought about by wartime and Revolution-related losses, and the demoralisation of Russian railwaymen. All these factors contributed to the Soviet railways being plunged into chaos and corruption. It was fully realised that victory in a world revolution depended upon a properly functioning rail transport and its carrying capacity. As part of the effort to rebuild an effective transport system, Felix Dzerzhinsky was appointed Chief of Railways. The head of the Cheka quickly intimidated railwaymen with executions and repression, introducing something of a proprietary order to the Soviet railways. His excellent organisational skills were soon proven, allowing a transformation of the Soviet railways into a well-run, totally militarised enterprise. The tsarist engineers and railway experts were put to work during the implementation of a long-term plan to modernise the Soviet railways.

The 1930s saw the implementation of the Soviet General Staff doctrine, pursuant to which the start of a war was tantamount to moving the economy onto war footing. One element of the Stalinist plan to industrialise (militarise) the entire country involved the total militarisation of railways (with military ranks introduced for railway staff). Modern rolling stock was developed in Russia at the time (a case in point involving the construction of FD and IS locomotives,

20 Gołowin (2006), 363–364.

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mainly to American designs), with electric and diesel traction brought in alongside efforts to modernise the infrastructure, signalling, permanent way and station track layouts.[21]

It should be noted that projects to modernise the railways involved numerous innovative technical solutions and designs for the construction of bridges and rolling stock adopted from the Americans. In the 1930s, such tendencies included the appropriation of guidelines of the American school of locomotive construction; consequently, American locomotives were in principle adapted for the purposes of Soviet railways with no major changes. Regardless of regular intelligence missions, "white intelligence" was also carried out in the field of most recent scientific and technical literature; in the 1930s all novelties in American literature on railway technology were translated into the Russian language, one example including the Moscow-based State Rail Transport Publishing House publishing in 1935 the Russian translation of a volume on the traction economy from the American railway encyclopaedia.[22] American sources had major impact on the design work by Russian railway engineers.

However, broad range of activities notwithstanding, the density of the rail network was not increased to any significant extent. The insufficiently developed Russian railway network – a legacy of the defensive military politics of the Tsarist General Staff – made it very difficult to deliver supplies to the advancing German army during the last war. Nonetheless, the dire condition of roads meant that railway transport played a dominant role on the domestic front during the 1944–45 offensive.

In the mid-1930s, once Hitler came to power, railway modernisation and full militarisation began in Germany as well. After the war broke out, special kinds of military locomotives and wagons were developed (*Kriegsdampflokomotive*). This was also when major cutbacks were introduced for the use of non-ferrous and deficient materials employed in the railway sector. Notably, the importance of railway transport can be proven by the fact that the production of the rolling stock remained a priority up until the end of the war, together with the production of armaments.

While preparing to invade the USSR as part of an operation codenamed Otto, road and railway networks were expanded in Germany and across its newly

21 It is worth noting that Soviet Russia was the first country in the world to introduce mass welding technology for steel boilers in place of rivets, which had previously been most popular.

22 *Tjagowoje chazjaistwo* (1935).

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acquired territories. The main lines in the Reich and Poland (the Ostbahn) were modernised and expanded. As part of the efforts to carry out Operation Otto, large railway junctions together with a new Poznań Franowo marshalling yard were developed on the former Polish territory (along with a bypass and a number of connecting lines: Poznań Górczyn – Poznań Starołęka – Poznań Franowo – Swarzędz, Poznań Starołęka – Luboń, Poznań Franowo – Poznań Krzesiny, Poznań Franowo – Kobylnica), as well as the Łódź Olechów marshalling yard (along with an avoiding line Łódź Chojny – Łódź Olechów – Bedoń together with connecting lines); the following junctions and locomotive depots were expanded as well: Poznań Główna Osobowa, Poznań Franowo Towarowa, Toruń Kluczyki (one of the biggest locomotive depots in Poland, designed and built as a rectangular hall with an undercover traverser), Sierpc, Skierniewice, Skarżysko Kamienna, Dęblin, Pilawa, Łuków, Tłuszcz, Sędziszów, Suwałki, Czeremcha, Małaszewicze (pre-war Polish hangars at the Małaszewicze military airfield adapted for the purpose), Łazy, Szczakowa, Zbąszynek, Głogów, Chabówka, Żurawica, Przeworsk, Rozwadów, Nasielsk, Iłowo, Iława, and Łódź Olechów; a new depot was also built at Tomaszów Mazowiecki.[23] As part of Operation Otto most railway stations were modernised and expanded along the east-west strategic lines and parallel lines.

Electromechanical (sliding) VES type signalling devices by Siemens & Halske and Siemens electrically driven switches were installed as part of the process to modernise railway signalling devices and increase capacity of all lines at major stations.

On the eve of the German attack on the USSR, the German railways introduced an innovative method of organising and performing railway traffic with intent to increase the capacity of railway lines that had reached their limits when transporting the military and supplies. The so-called report boxes were set up at block posts; report boxes served as provisional separation check points and were fitted with wired railway communication telephones.

Pursuant to the armoured and air warfare doctrine (Fuller, Liddel Hart, Guderian, Douhet) developed over the 1930s, the efficiency of direct operational transport to the frontline would drop significantly. The motorisation of infantry and artillery units, development of armoured weaponry, and the increased ability to manoeuvre new units all meant that rail transport would be facing the

23 Within the preparations to invade the USSR the German Eastern Railways (Ostbahn) prepared a modern design of a large rectangular steam locomotive depot together with locomotive handling facilities as well as a design of a modern water tower.

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key task of supplying large amounts of ammunition, propellants and lubricants to the rear support units. In addition, railway lines in close proximity to military activities were exposed to damage due to aerial attacks; consequently, they would be basically taken out of operational use. Furthermore, the threat of small groups of sabotage guerrillas gave rise to the need for employing significant efforts to protect the railway lines. From that time on, the main task of railway transport involved the transfer of troops, equipment and supplies from the interior of the country to rear bases at the frontline, which was later proved by the experience of the Second World War.

Under operational plans of the Warsaw Pact, the Polish railway network was to be used for purposes of handling military and supply delivery transports along the Western (high-level operational reserves) and Coastal (regrouping of troops to protect naval landing operations) Operational Directions. The quickest route to Berlin led across Poland: ever since the early 19th century, both Germany and Russia had been investing in order to develop fortified (defensive) and transport (offensive) infrastructure. Transport by rail along the Western and Coastal Operational Directions to the rear of the frontline was only intended to serve the purposes of country-rear frontline transport of troops. The goal was supported through significant investment engaged in by the Polish State Railways as of the early 1950s. The railway network was undergoing modernisation and development at the time, railway lines and junction stations constructed to bypass the transport infrastructure that was impact-sensitive to conventional and nuclear weapons. Until 1956, total militarisation of the railways proceeded according to the Soviet model (the Polish State Railways had even introduced ranks resembling the military, insignia sewn onto shoulder pads). Such tendencies were also expressed in the official 1950s slogan of the Polish State Railways: "Traffic, transport, defence." In the late 1950s, once a new doctrine regarding the rear support operations in the event of a nuclear war was introduced, L-30, L-36 and REM-500 folding bridges and the NZM-56 road-rail floating bridge were made part of equipment allocated to the railway military and Polish State Railways (reserve mobilisation units). Furthermore, preparations of the railway network for offensive front-end operations included the securing of appropriate technical infrastructure and rolling stock, all especially adapted for military transport purposes.

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2. RED ARMY MILITARY TRANSPORT IN THE FINAL STAGES OF THE SECOND WORLD WAR – TRANSPORT-BASED SECURITY OF THE RED ARMY OPERATIONS IN BELARUS AND THE VISTULA-AND-ODRA REGION

In July 1944, having crossed the River Bug, the Soviet Army entered the area between the Rivers Vistula, Bug, and Narew as a starting point for the offensive planned for 1945. At the operational level, the railway was the main mode of transport used by the Red Army to transfer troops and supplies to the front-line and army field bases. Direct supply deliveries from army bases to tactical frontline groups were handled by motor and horse-drawn vehicles.[24] During the Second World War, the share of railway transport serving the Red Army in all forms of military transport reached 70 %. Due to the overall cargo volume, the military railway lines were stretched to absolute limits of transport capacity.[25] The main railway directions and army base sections were outlined for attack zones of every frontline.

In order to secure the supplies for the Vistula-and-Odra and Berlin operations, one million tonnes of material resources had to be brought in over the course of each of the respective operations.

Throughout the war, the Red Army consumed 10 million tonnes of ammunition, 13.4 million tonnes of fuel, 40 million tonnes of food and around 12–15 million tonnes of other materials. All that was brought in from distant support facilities to an army in combat by rail, over a distance of many thousands of kilometres.[26] Since Polish railway lines were of European track gauge (1,435 mm), the Soviet military authorities intended to convert the entire railway network on the Polish territory to the Russian gauge of 1,524 mm. The project was abandoned in the course of planning and reconnaissance efforts to set up a new transport system for the future theatre of war. Such undertaking would have required a massive amount of technical and human resources; furthermore, the existing

24 Strózik, *Wojska kolejowe 1944*–1946, 21.
25 Antipenko (1970), 347.
26 Antipenko (1970), 348.

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standard-gauge rolling stock would have to be abandoned. The Polish railway network used a large variation of types of rails, many lines were built with metal sleepers, making it increasingly difficult to re-gauge the track. Furthermore, Polish railways followed different signalling systems and traffic regulations. Had the entire Polish railway network been converted to Russian gauge, the handover of large number of broad-gauge rolling stock to the Polish side would have had a negative impact on the efficiency and transport capacity of the Soviet railways. In case of proceeding with such a transformation of Polish railways, the Red Army operational units were to be charged with their operation, which would have left a sizeable number of Polish railwaymen without a job.

Consequently, representatives of the Lublin-based Department of Transport of the Polish Committee of National Liberation engaged in negotiations with the Soviet commanders and the Supreme Board of Military Transports with regard to the upholding of the standard gauge on the Polish railway network. The Polish party proceeded to convince the Soviet command that such a move would not be expedient. Jan Grubecki, M.Sc. Eng., Head of the Department of Transport and Postal and Telegraph Services of the Polish Committee of National Liberation handled all negotiations on behalf of the Department.[27] These negotiations had some effect on the Russian leadership's decisions – ultimately, only the lines required for the delivery of supplies to the troops in combat were to be converted to the 1,524 mm gauge. On July 29th 1944, the Polish Committee of National Liberation resolved to agree to the partial re-gauging of railway lines on the liberated Polish territory for warfare purposes; the resolution intended to legally sanction the decision of the Red Army command.[28]

Tracks running in the direction of the River Vistula (in conformity to the overall direction of the offensive) were the first to be subject to conversion: Grodno – Białystok – Warsaw, Vawkavysk – Czeremcha – Siedlce – Warszawa,[29] Brest – Łuków – Dęblin, Lubitovo –Kovel – Dorohusk – Chełm – Lublin – Dęblin,[30] Pilawa – Otwock – Warszawa Praga,[31] Lublin – Łuków – Siedlce, Rava

27 Zamkowska (1982), 65–75.

28 Zamkowska (1982), 41.

29 According to a report of Mr. Bogdan Pokropiński, a retired Warszawa Praga locomotive depot driver, on the Warszawa – Mińsk Maz. – Siedlce only one track was re-gauged, the standard gauge track remained disused.

30 On the Chełm – Dęblin stretch one track was regauged to 1524 mm, traffic was retained on the second, standard-gauge track, Antipenko (1970), 227.

31 The Warsaw – Dęblin line was re-gauged together with the opening of the southern railway route.

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Ruska – Munina – Przeworsk – Rzeszów, and Munina – Przemyśl Gł. According to S. Zamkowska, as the frontline and support unit preparations proceeded, the Lublin – Klementowice[32] and Lublin – Łuków[33] lines were also converted to broad-gauge.

The railway military developed a bypass of a destroyed railway tunnel, rather curious from the engineering perspective, on the 4th Ukrainian Front territory, with intent to allow the delivery of supplies for the troops entering Czechoslovakia. The circumstances of the project were the following: the Zagórz – Łupków – Medzilaborce line crossing the Łupków Pass and connecting the Carpathian Mountains to Czechoslovakia was of great operational importance for 4th Ukrainian Front troops entering Czechoslovakia. An extension of the Lviv – Sambor – Khyriv – Zagórz main line, it enabled the direct delivery of supplies and military equipment from the Russian interior. Meanwhile, the German troops blew up the railway tunnel in Łupków; they also destroyed in no small extent the 64 km-long Zagórz – Łupków – Medzilaborce line.

The railway troops of the War Directorate for Railway Reconstruction No. 3 quickly rebuilt and reopened the line. Yet the tunnel in Łupków, forming a part of the line, was blown up along its central section (175 m long), its rapid reconstruction was not possible given the extent of damage and related technical difficulties. Therefore, it was decided to construct a 3.5 km detour across the so-called Carpathian Crest. The section – and the accompanying Pobyeda mid-station – were designed and planned by I. Ogoyev, M.Sc. Eng. The construction of a railway bypass for the destroyed tunnel required 70,200 m^3 of earthworks and the development of 12 civil engineering structures,[34] the incline of the detour route reached 38 %.[35]

Due to the extremely difficult nature of the detour, it became known as the "Devil's Loop." The detour was constructed by units of women and prisoners of war over a mere 20 days, and completed on December 4th 1944; railway traffic along the entire Zagórz – Medzilaborce line commenced on December 15th 1944. This is how a frontline railway connection opened up across the Carpathian Mountains, allowing supplies to be delivered to the 4th Ukrainian Front troops.[36]

32 It is most likely that the author obtained these documents (which were misinterpreted), describing a certain part of the works, because a conversion of the line only as far as Klementowice would not be based on rational reasoning. It is most probable that the entire Lublin-Dęblin section was re-gauged to broad-gauge.

33 Zamkowska (1982), 46.

34 *Zheleznodorozhniki* (1987), 303–304.

35 Kuczera (2007), 16.

36 *Zheleznodorozhniki* (1987), 303–304.

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Due to the technical and operational conditions of the detour line – the incline required trains to be re-assembled at the Pobyeda mid-station – the capacity of the Zagórz – Medzilaborce line was reduced to 8 train pairs (12 wagons per train). In the years 1945–1946, the tunnel was de-mined, all post-collapse earth and debris removed – on the Polish side, the tunnel length was reduced by approximately 50m. On November 7th 1946 rail traffic commenced through the reconstructed tunnel on the Zagórz – Medzilaborce line, which had previously been converted to standard gauge.[37]

At the same time – in the course of struggles for the Brest 1 railway junction – a Guards Brigade of railway troops of the 1st Belarussian Front rebuilt the bridge over the River Bug in Brest. In the course of the related works, the work site had to be defended against the threat of an encircled assembly of German troops. The traffic across the reconstructed bridge recommenced on August 10th 1944.[38]

The 1st Belarussian Front troops comprised War Directorates for Railway Reconstruction Nos. 1 and 20, which were charged with ensuring the safety of frontline railways reconstruction in the vicinity of the frontline operating along the Berlin direction.[39]

In order to secure military transports, the railway troops of the 1st Belarussian Front constructed railway bypasses of Lublin[40], Dęblin[41], and Małkinia:[42] "The bypass lines played a vital role. While railway junctions at Praga and Dęblin were under constant artillery fire, trains had to be continually available to carry out manoeuvres from one end of the front to another. With this in mind, troops at the front constructed a new 35km-long line, connecting Mińsk Mazowiecki and Pilawa railway stations, thus enabling an improved transfer in both directions between Warsaw and Lublin. I recall Marshall Zhukov's great satisfaction upon receiving these messages. He immediately handed over a full set of guidelines to

37 Kuczera (2007), 16.

38 *Zheleznodorozhniki* (1987), 297.

39 *Zheleznodorozhniki* (1987), 390.

40 This was probably a line bypassing the Lublin junction, connecting the Lublin – Łuków line to the Lublin – Rejowiec one.

41 This was probably the Życzyn – Stawy line, bypassing the Dęblin junction and connecting Dęblin – Pilawa to the Dęblin – Łuków line.

42 This was probably the Treblinka – Prostyń Bug rail link, which made it possible to travel to Małkinia or Tłuszcz, bypassing the destroyed bridge on the Małkinia – Treblinka section. Nonetheless, it cannot be ruled out that a rail link was installed to allow direct transfer from Białystok towards Ostrołęka, bypassing Małkinia.

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the Chief of Staff at the front, specifying additional manoeuvres and operational camouflage."[43]

Railway troops on the First Belarussian Front included the following: the 1st Guardian Railway Brigade, the 29th Railway Brigade and the War Directorate for Railway Reconstruction No. 20 under the command of Major General N. Borisov.[44]

While one track on the Warszawa – Mińsk line was converted to broad gauge, the pre-war high-platform modernist stations were blown up, as they would not match the loading gauge of the broad-gauge rolling stock. This section was located at a distance of 12–20 km from the frontline head of enemy defences, whereas some rear units remained 4–6 km away; consequently, the organisation of train movements at the rear of the front had to be altered.[45]

Due to the close proximity of the enemy, the Rembertów junction – used as a bypass of the Warszawa Praga junction – gained considerable importance. The Russian railway troops constructed a strategic bypass for the Warszawa Praga junction in the vicinity of the junction in Rembertów. The works included the rebuilding of the Pilawa – Mińsk section,[46] opened for traffic on December 15th 1944;[47] the Wawer – Rembertów line was built (approximately 4 km in length), and commissioned on December 5th 1944.[48]

Pursuant to the December 21st 1944 directive of the Head of the Headquarters of Military Transport of the 1st Belarussian Front, the 1st Polish Army was positioned on the Mińsk Mazowiecki – Warszawa Praga line, between the stations Dębe Wielkie and Rembertów. The area entrusted to the 1st Polish

43 Antipenko (1970), 238–239.

44 *Zheleznodorozhniki* (1987), 296–297.

45 Strózik, *Wojska kolejowe 1944–1946*, 58.

46 The Mińsk Mazowiecki – Pilawa line was built in 1897, it handled also scheduled passenger traffic. In the 1930s official Polish State Railways documents it was described as closed; at that time the line was controlled by the Polish Armed Forces (the first paratrooper landings, destruction and rebuilding of engineering structures exercises were held there). This line was probably dismantled during the German occupation. Most probably, the construction of the strategic avoiding line of the Warszawa Praga junction described by General Antipenko only involved the laying of tracks on existing embankments. This line was most likely dismantled in the post-war period, and reconstructed again in 1970.

47 Strózik, *Wojska kolejowe 1944–1946*, 62.

48 Strózik, *Wojska kolejowe 1944–1946*, 62. The junction line was not in use after the war, but it was maintained until the 1980s as a strategic bypass of the Warsaw junction in the event of war. It was dismantled in the mid-nineties.

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Army comprised the following stations: Miłosna, Rembertów, and passenger halts: Sulejówek, Wola Grzybowska and Wesoła, as well as a siding post No. 14 in Rembertów (a branch of the military siding on the Rembertów – Wesoła line). The siding was accessible via a triangle from both directions: Rembertów and Wesoła. The depots of the 1st Polish Army (with excellent natural camouflage) were located at the former Wehrmacht armoured trains base (during the inter-war period the facility was held by the Polish Armed Forces). The operation of the Rembertów – Wesoła siding was rather difficult, as shunting on the siding was performed by line locomotives as there was no shunting locomotive available. The only watering point was located at the Miłosna station, and not an overly efficient one at that, ultimately requiring a four-hour interval before another locomotive could be watered again. Military trains were also routed on the way to the 47th Army and 3rd Assault Army across the 1st Polish Army base section area, from Rembertów to Tłuszcz via Zielonka.[49]

A. Kotow, one of the plenipotentiaries of the People's Commissariat for Railways and the Central Board of Military Transport at the Polish Railways Management established by the Polish Committee of National Liberation, who joined forces with a group of Soviet railwaymen to organise troop transports to the 1st Belarussian front via the main front-heading line (Brest – Łuków – Siedlce – Warszawa), has included the following account in the work Zheleznodorozhniki v velikoy otechestvennoy voyne; my own translation follows: "During the preparations for the Warsaw – Poznań operation, the 1st Belarussian Front alone required over a thousand trains to reach the frontline, while the greatest capacity on the line allowed for the passage of 10–15 train pairs per day. For this reason, a 'live' block system[50] was introduced on the line, allowing twice the number of trains to pass through. Another obstacle came up in the meantime: locomotives of the empty trains returning to Brest had to be coaled, while fuel storages at Łuków and Siedlce depots had insufficient coal resources. While coal was ultimately found at the coaling stages at the Warszawa Praga depot, it was separated from the enemy positions by the River Vistula. Provided with a favourable vantage point of the area, the Germans were able to open fire with great accuracy, which was why any daytime passage to the coaling stage was impossible. This was when the plan of operation 'Coal' was developed in collaboration with the

49 *Wojska kolejowe 1944–1946*, 62.

50 Live block system – a method of organising rail traffic particularly frequent on Soviet lines, involving people positioned at specified intervals along a railway line, using beacons as train signals. It allowed trains to be dispatched at several-minute intervals.

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military transport authorities. A group of railwaymen aboard a steam locomotive hauling five coal wagons and a crane reached the Warszawa Praga depot during night-time, and managed to load and transport 200 tonnes of coal until the following morning. The operation kept stretching out over time – ultimately, German artillery began firing at the coaling stage. Twelve railwaymen were killed and 32 injured at the time."[51]

Other lines – secondary, tertiary, and local ones – on the Polish territory were retained as standard-gauge lines (the Polish railwaymen proceeded to take over standard-gauge lines from the Russian authorities one at a time, restoring them to traffic). The railway network was divided between the reactivated Regional State Railway Management.

The standard-gauge lines serving the Podkarpacie oil region (also earmarked for re-gauging) were of considerable strategic importance as well. Yet – while oil rigs were not fitted with storage tanks – the Soviet military had a large number of standard-gauge oil tankers at their disposal. This was why a decision was made to transport oil directly to refineries via the following standard-gauge lines: Stróże – Jasło – Nowy Zagórz, Gorlice – Zagórzany, Rzeszów – Jasło – Dębica – Sobów – Rozwadów, and using the single standard-gauge track on sections where the other track had been converted to 1,524 mm gauge: Rozwadów – Przeworsk, Dębica – Tarnów and Przemyśl – Przeworsk.[52]

As two different railway transport systems were operating using different track gauges, it was decided to implement field transhipment points at locations where standard-gauge and broad-gauge lines met. Twelve transfer points were built across the Lublin Regional State Railway Management's area: in Stawy, Dęblin, Lublin, Rejowiec, Chełm, Dorohusk, Rozwadów, Ozeta,[53] Nisko, Zbydniów, Grębów, and Tarnobrzeg (the transfer capacity of these points ranging from 60 to 200 wagons per day).[54] Identical transfer points were introduced on the Nasielsk – Działdowo line, and at Warszawa, Kutno, Barłogi and Poznań stations.[55] As re-gauging works proceeded in reflection of the westward shift of the frontline, the original points were decommissioned and new ones built on key railway sections directly flanking the front area.

51 *Zheleznodorozhniki* (1987), 394–395.
52 Zamkowska (1982), 67.
53 Former name of the Polish State Railways Stalowa Wola Południe.
54 Zamkowska (1982), 67.
55 *Zheleznodorozhniki* (1987), 389.

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The 1st Belarussian Front Command planned to use two primary railway traffic directions within their area of operation: the northern (Brest – Warszawa – Poznań – Frankfurt an der Oder) and southern (Kovel – Lublin – Dęblin – Łódź – Kalisz – Ostrów – Leszno – Węgliniec) directions. On both directions, tracks were converted to broad-gauge up to the River Vistula, as it was expected that onward transport would be made possible on standard-gauge lines using a large number of rail vehicles that were captured. For afore-specified reasons, it was considered whether lines running west of the River Vistula should be re-gauged. Had these lines remained as a standard-gauge system, immense transhipment bases would have to be constructed (with a capacity of 2,000 wagons per day, 1,000 in each direction). Any critical transhipment station would have become an easy target for the German air force; the destruction of a transhipment base would have completely paralysed the delivery of supplies to all frontline units. The implementation of such an undertaking surpassed the capabilities of front-line transport units.[56]

Given the above, the War Council of the 1st Belarussian Front submitted their own proposal to the State Defence Committee; according to the proposal, the northern line was to be converted to 1,524 mm gauge, standard-gauge track to remain on the southern line. According to the State Defence Committee's decision of October 7th 1944, the lines in both directions were to be operated as standard-gauge lines. The repeated proposals of the War Council of the Front to re-gauge the Brest – Warszawa – Poznań – Frankfurt an der Oder mainline ended up with another decision of November 21st 1944 to open the line without re-gauging.[57] Furthermore, the Supreme Board of Military transport of the Red Army saw the need to re-gauge at least one direction, related reasons are appropriately clarified by the words of the Chief of military transport, General I. Kovalev:

> At that time, I was the head of the Supreme Board of Military transport as well as a member of the committee for transport of the State Defence Committee. The Committee members included the People's Commissar for Transport L. Kaganovich, the Secretary of the Central Committee of the Communist Party of the Soviet Union and a deputy chairman of the committee for transport A. Andreev, member of the State Defence Committee A. Mikoyan and the commander in chief of the Rear of the Red Army General A. Khrulov. J. Stalin was chairman of the committee. The committee for transport was formed on the initiative of J. Stalin, to the purpose of co-ordinating all transport systems operating across the country, and drafting proposals for the State Defence Committee with regard to the more important issues. The issue of converting tracks to

56 Antipenko (1970), 228.
57 Antipenko (1970), 228.

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> specific gauge widths in view of the Red Army movement towards the western borders of the Soviet Union was of paramount importance at the time. The People's Commissariat for Transport of the USSR believed that extending the lines westwards with the use of the Soviet gauge would allow further intensification of domestic transport, particularly in view of the continued works to redevelop local economy. Maximising the use of Soviet rolling stock was considered an absolute priority at the time, its primary purpose to ultimately defeat the Fascist army. I had no doubt that without gauge conversion to the Soviet gauge in at least one direction in each of the frontline operation areas, it would be impossible to secure a significant increase in the volume of military and supply transports in the final stages of war. I motioned for the concept of the War Council of the 1st Belarussian Front to be implemented. Over the course of October and November 1944, the concept had not seen support. Only later, once transport circumstances had reached their breaking point, each front was allowed to convert a single track section to Soviet gauge. It was regrettable that this delayed decision brought a number of unfortunate consequences.[58]

The main arguments against line conversion included the fear of depleting railway transport far behind the frontline as a result of depriving it of sizeable rolling stock volumes, and the temptation to use large quantities of captured standard-gauge rolling stock. The War Directorate for Railway Reconstruction No. 20[59] under Major General N. Borisov began works to increase the capacity of the re-gauged lines in the direction of the River Vistula, as well as preparations to rebuild bridges and railway lines to the west of the Vistula that were not to be re-gauged.[60] The War and Operations Board of the People's Commissariat for Railways was formed with a view to taking advantage of foreign frontline railway lines on the Polish, Romanian, Bulgarian, Hungarian, Czechoslovak, Yugoslav, Austrian and German territories.[61]

The railway bridge over the River Vistula in Warszawa – destroyed by the Germans – was among the key facilities on the railway line to Berlin. The reconstruction works were performed by the 1st Railway Brigade under General

58 Antipenko (1970), 229–230.

59 The railway forces of the 1st Belorussian Front consisted of four railway brigades: the 1st brigade of the guard rail troops (commander General W. Tisson), the 29th brigade of railway troops (commander Major General W. Rogatko), the 3rd brigade of railway troops (commander D. Vasiliev), two bridge construction trains (No. 13, commander Colonel I Moskalev, No. 7 commander Major Artiemienko) and (militarized) troops of a special formation of the People's Commissariat of Communications (consisting of Soviet mobilized civil railway workers).

60 Antipenko (1970), 230.

61 *Zheleznodorozhniki* (1987), 390.

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W. Tisson, and the bridge reconstruction train No. 7 under N. Artemenko. Due to the extent of damage (all spans blown up, most supports destroyed), a decision was made to build a temporary bridge with the use of L-23 military folding span components, resting upon wooden supports.

Works began on the second day after the Soviet army entered Warsaw on January 18th. The new crossing, 515.7 m in total length, was built 25 metres upstream of the destroyed railway bridge. The significance of reconstructing this crossing – of vital importance to the delivery of supplies to the Rear of the 1st Belarussian Front – was conducive to the arrival of Marshall Zhukov, member of the War Council of the 1st Belarussian Front Lieutenant General K. Telegin, and Deputy Commander Lieutenant General N. Antipenko, all of whom intent on inspecting the construction site. Following the inspection, the War Council of the 1st Belarussian Front issued an appeal to the military workforce to complete the work in the shortest time possible. Shortly after party meetings had been arranged by political officers of the 1st Guardian Railway Brigade, the pace of work picked up significantly. Conscripted citizens of Warsaw were forced to join the bridge reconstruction works as well. The first train carrying military goods crossed the temporary bridge on January 29th at 05:30 p.m. Upon the order of the commander-in-chief, the 1st Guardian Railway Brigade was renamed the "Warsaw Brigade" in recognition of the extraordinarily quick construction of the temporary bridge across the River Vistula.[62]

Upon completion of the temporary bridges over the River Vistula in Warszawa and Dęblin, reconstruction of the northern (main) Warszawa – Poznań and southern Dęblin – Skarżysko Kamienna – Tomaszów Mazowiecki – Łódź – Zduńska Wola – Kalisz railway lines commenced. Both lines were being returned to traffic with their standard gauge retained. Concurrently, a decision was made to build large transhipment facilities at the intersection of the two track systems in the Warsaw and Dęblin areas, with a capacity of 400–500 wagons[63] each.

Construction work on the bridge across the Vistula commenced after the 1st Belarussian Front had crossed the river. The rebuilding of railway lines without their re-gauging began at the same time. The 29th Railway Brigade under General V. Rogatko was charged with reconstructing the Warsaw railway junction and the Warsaw – Poznań line.[64] Due to the original idea for the lines beyond the River Vistula to remain standard-gauge, construction of transhipment depots at

62 *Zheleznodorozhniki* (1987), 390–392.
63 Antipenko (1970), 232.
64 *Zheleznodorozhniki* (1987), 392.

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Warszawa Zachodnia station and in the Dęblin region began. Over 30 kilometres of parallel transhipment tracks and 1 kilometre of high ramps were developed at Warszawa Zachodnia, roofing for goods storage facilities were also provided. On January 29th 1945 the rebuilding of the Warsaw – Poznań railway line and of the railway bridge over the Vistula River were both completed, an official decision was made to commission the use of the main northern line. That same day, an order arrived from headquarters to convert this line to 1,524 mm broad-gauge.[65]

Consequently, all work to reconstruct the line went to waste. Immense human and material resources had to be engaged to convert 300 km of double track mainline, and to convert the large railway junction of Warszawa Zachodnia to broad gauge. While works began at once, they were hurried and performed without proper equipment. The works ran into difficulties due to the fact that in the Soviet Union hooks were used to attach rails to sleepers – whereas the Polish system involved screws. Soviet soldiers hammered screws into sleepers, destroying them. As a result, once the line had been converted, the sleepers were damaged and trains derailed. Metal sleepers used in sidings slowed the pace of works as well. In spite of the numerous technical difficulties, the line was re-gauged and opened in February 1945.[66] The 29th Railway Brigade was also renamed the "Warsaw Brigade" in recognition of the speed of all the work performed.[67]

The 5th Railway Brigade under Colonel T. Yatsino was dispatched to reconstruct the destroyed bridge across the River Vistula near Dęblin, on the 1st Belarussian Front territory. Over an extraordinarily brief period of eight days, the unit built a temporary rail bridge 510 m in length, commissioned on January 23rd 1945.[68] Once the bridge was constructed, the 5th Brigade began rebuilding the southern section of the Dęblin – Łódź line, which was also soon reopened.[69] By order of the Commander-in-Chief of the 5th Railway Brigade, it was renamed the "Poznań Brigade."[70] The extent of damage to technical facilities on a further section of the line (Łódź to Kalisz) made rapid reconstruction impossible.

Due to the danger of the 2nd Belarussian Front being flanked by regrouped German army units in Pomerania, an urgent need arose to move troops forward towards the River Odra. The limited capacity of the Warsaw – Poznań line

65 Antipenko (1970), 261.
66 Antipenko (1970), 262–263.
67 *Zheleznodorozhniki* (1987), 392.
68 The bridge was completed 12 days ahead of the date planned.
69 Antipenko (1970), 263; *Zheleznodorozhniki* (1987), 392.
70 *Zheleznodorozhniki* (1987), 392.

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necessitated the reconstruction of an additional line as well. To replace the inactive southern line, military railway traffic commenced on February 2nd 1945 on the Bydgoszcz Główna – Piła – Gorzów Wielkopolski – Kostrzyn substitute route, which opened towards the right frontline wing, to the purpose of expedient troops transfer. The 5th Railway Brigade troops under Colonel T. Yatsino was dispatched to the section.

As works progressed to open the southward line, the concept of using it as a detour route for ammunition and materials transfer developed. Munitions were transported from outposts by road to the Warsaw-Dęblin line, specially converted to the 1,524 mm gauge for the purpose.[71] They were then reloaded in Dęblin onto standard-gauge rolling stock; 10 transports carrying ammunition and fuel were dispatched south per day. Due to the Soviet army offensive and continual changes of the frontline, trains were directed towards Gorzów and Kostrzyn.[72] The opening of the line involved numerous technical difficulties; it was ultimately converted to broad gauge: "[...] From the 3rd to the 5th of February, there were over 100 trains carrying ammunition, fuel and heavy combat equipment on this line; however not a single train had yet arrived at the unloading area. [...] In fact, trains travelled slowly, encountering many obstacles on the way, including a shortage of water or fuel for steam locomotives, speed was often restricted for technical reasons. [...]."[73] The perplexing and seemingly uneconomic way of delivering supplies (requiring the goods to be transhipped twice) frequently resulted in the war materials being delivered directly behind the advancing troops. An additional supply line was established at the same time. General Antipenko described the importance of opening an additional southward line: "[...] Admittedly, had the southbound line from Dęblin north and further west not been opened in the early days of the Vistula-Odra campaign, it is hard to imagine how we could have secured the frontline towards Pomerania. It is due to the usage of this line, the author of the memoirs claimed, that trains carrying ammunition and fuel arrived at the critical moment [...]."[74]

In February 1945, the bridge over the River Warta near Poznań Starołęka was temporarily rebuilt; a 1,524 mm track was installed, shortly followed by the rebuilding and re-gauging of the Poznań Franowo – Frankfurt and Poznań Franowo – Toruń Główny lines.[75]

71 Antipenko (1970), 264.
72 Antipenko (1970), 256.
73 Antipenko (1970), 267.
74 Antipenko (1970), 281.
75 Kroma, Sosiński (2003), 74.

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The Sandomierz – Skarżysko Kamienna line was 104 km long, running in the direction of the 1st Ukrainian Front. The 7th Railway Brigade handled the reconstruction of the largely destroyed line (demolished bridges, water stations, and primary and secondary tracks at railway stations). Railway traffic recommenced on January 28th; on January 30th, military trains pulled into Katowice.[76]

The 7th Railway Brigade, and then also the 45th Railway Brigade under Colonel A. Natalevich, rebuilt and reopened the Częstochowa – Steinau an der Oder (Ścinawa) line, 330 km in length. In Steinau, the bridge over the Oder had been destroyed, its reconstruction entrusted to the 28th Bridge Battalion led by Lieutenant Colonel W. Sokolov. Because of the need to provide troops in combat with immediate supplies, the War Council of the 1st Belarussian Front decided to build a lightweight wooden temporary crossing to carry wagons without locomotives near the destroyed railway bridge on the Odra. Two and a half days were allowed for works on the crossing. As the river was rather narrow at the location, it allowed the provision of a temporary lightweight wooden structure consisting of piling, frames, and frame-supported beams with turnout sleepers and rails. The bridge was ready to be used on March 9th. The wagons were pushed onto the bridge by one locomotive, and another took them over on the other river bank once the wagons were coupled onto it. A total of approximately 5,000 goods-carrying wagons were moved across the River Odra. On March 31st, the German air force destroyed the Steinau crossing; nonetheless, the 28th Battalion had it rebuilt, working three and a half days round the clock.[77]

The 19th Railway Brigade under General V. Miridonov, working together with bridge reconstruction train No. 7 under by A. Zhukovskyi, bridge reconstruction train No. 7 under V. Ogarkov, and water station reconstruction train No. 13 under A. Iznyarov, rebuilt the main double track line in the operational area of the 1st Ukrainian Front (Przeworsk – Dębica – Cracow – Katowice – Opole), converting it to the 1,524 mm gauge.[78]

The War Directorate for Railway Reconstruction No. 3, responsible for activities on the 1st Ukrainian Front, handled the construction of broad-gauge sidings to industrial plants in Silesia. In the area of Katowice, Chorzów, Bytom, Gliwice and Opole, the War Directorate for Railway Reconstruction constructed broad-gauge sidings to 27 mines and 40 industrial plants, totalling 300 km in length.[79]

76 *Zheleznodorozhniki* (1987), 392.
77 *Zheleznodorozhniki* (1987), 392.
78 *Zheleznodorozhniki* (1987), 392–393.
79 *Zheleznodorozhniki* (1987), 393.

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These sidings were used to ease the transport of coal and equipment plundered from industrial plants to Russia.

A sudden thaw in the spring of 1945 led to the movement of ice; railway and road bridges of the 1st Ukrainian Front were damaged or totally destroyed. On February 28th, ice floes destroyed the starlings and 10 main supports of the bridge on the Vistula near Sandomierz. The 14th and 33rd Bridge Battalions were dispatched to perform reconstruction works, with a pontoon crossing built to handle all traffic until the ice dispersed. The destruction of all frontline crossings serves to prove the temporary nature of bridge structures developed in great haste to comply with plans imposed by political officers of the Soviet military engineering units.

In order to protect the viability of frontline routes, measures were taken to defend the bridges over the River Vistula in Warsaw and Dęblin, as their destruction would have cut off the 1st Belarussian Front from its main sources of supplies.[80] Even the air force was used to bomb ice blockages, the defence of the bridge in Dęblin was handled by the bridge construction train No. 13 under Colonel Moskalev.[81] Corridors were cut between spans to allow passage of the crushed ice. Troops of the 20th Bridge Construction Battalion – part of the 1st Railway Guards Brigade (later renamed the "Warsaw Brigade") under Colonel V. Zheltikov defended the bridge in Warsaw. During the campaign to defend that bridge, head of the frontline rear units General N. Antipenko and head of the War Board of Rail Reconstruction No. 20 General N. Borisov were both present at the crossing. When defending the bridge, sappers crushed ice with explosives. The bridge was attached to the river banks with ropes, its stability ensured with 100 rock-loaded railway flat wagons. The crossing was being defended from ice floe impact for three days. Neither bridge was destroyed – only the bridge over the Vistula in Toruń (on the 2nd Belarussian Front operational territory) was ripped down by ice floes, all transports to the Front handled via a detour over the surviving bridge in Warsaw until the Toruń facility was reconstructed.[82]

On April 16th, the Soviet Army began the "Operation Berlin" with both the 1st and the 2nd Polish Armies participating. In the early days of the strike on Berlin, the entire length of the railway network on the operational territory of all three fronts (the 1st and 2nd Belarussian and the 1st Ukrainian) totalled 11,000 km. The main frontline railway was converted to 1,524 mm gauge along

80 Antipenko (1970), 282.
81 Antipenko (1970), 283.
82 Antipenko (1970), 284.

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the offensive direction of every frontline. The operation of railway traffic, as well as line maintenance, was handled by 10 War and Operations units and 5 Operational regiments. Operational regiments performed railway traffic on routes at and near the frontline, over a total length of 4,000 km. The remaining 7,000 kilometres of operational routes were operated by Polish railwaymen. Along these lines goods were transported both on standard and broad gauge tracks. The People's Commissariat for Railways dispatched 17 columns of special railway reserve locomotives to handle the military transports on frontline railway lines, a total of 426 locomotives. Six columns were dispatched to the operational territory of the 1st Belarussian Front: Nos. 5, 13, 20, 34, 35 and 111; the 2nd Belarussian Front was supported by 4 columns: Nos. 15, 22, 33 and 43; the 1st Ukrainian Front – by 7 columns: Nos. 10, 11, 21, 31, 44, 47 and 110.[83]

The Kostrzyn fortress was the key to the gates of Berlin. The Germans had destroyed two railway bridges over the Rivers Odra and Warta in Kostrzyn. Shortly thereafter, Bridge Battalions began constructing temporary crossings to replace them, using Russian military L-23 spans. During heavy combat for the fort and the town of Kostrzyn, on the night of April 18th 1945, once the construction of the bridges over the Rivers Odra and Warta was completed, the German air force attacked both facilities, causing serious damage. Units of the 29th Railway Brigade and bridge construction train No. 13 under Colonel Moskalev began reconstructing both the bridges. The task was completed over the course of one week until April 25th 1945 in conditions of continuous air raids, with enormous losses suffered. The 29th Railway Brigade and the War Directorate for Railway Reconstruction No. 20 handled the reconstruction and conversion to broad gauge of the Kostrzyn – Berlin Lichtenberg railway line. At 06:00 p.m. on April 25th 1945, the first military train carrying heavy artillery arrived at Berlin Lichtenberg station, General Antipenko noting in his memoirs: "[...] The Heavens[84] – War Council. I hereby report: this day April 25th at 06:00 p.m., railway traffic opened on the Kostrzyn – Berlin line as far as Berlin Lichtenberg. Antipenko, Chernyakov, Borisov." The report was duly annotated: "Brave boys. Zhukov, Telegin. April 26th [...]."[85] The first train to Berlin Lichtenberg station was driven by a former Sergeant-Major of the 29th Railway Brigade A. Lesnikov.[86]

83 *Zheleznodorozhniki* (1987), 397.
84 Code name for the General Staff of the Red Army.
85 Antipenko (1970), 286–287.
86 *Zheleznodorozhniki* (1987), 399.

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The reconstruction of the lines along the Red Army key operational directions comprised mainly the east to west parallel lines. The following lines were converted to broad-gauge during wartime: Warszawa Gdańska – Modlin – Nasielsk – Mława – Działdowo – Iława – Prabuty – Malbork,[87] (Königsberg) – Elbląg – Tczew – Gdańsk – Chojnice – Szczecinek – Szczecin,[88] (Insterburg) – Kętrzyn – Olsztyn – Iława – Toruń Główny – Inowrocław – Gniezno – Poznań Franowo – Kunowice (Frankfurt an der Oder), Warszawa – Łowicz – Kutno – Września – Poznań (one track converted),[89] Warszawa – Koluszki – Częstochowa – Opole, Koluszki – Łódź – Ostrów Wielkopolski – Krotoszyn – Leszno – Głogów – Żagań, and Dęblin – Radom – Skarżysko Kamienna – Tomaszów – Koluszki – Łódź – Kutno – Toruń – Krzyż – Kostrzyn.[90] In order to enable a correct rail traffic organisation in the Warsaw junction area, the Warsaw bypass line was also converted to broad gauge, forming a rail link between the left- and right-bank routes passing through Warszawa Gdańska station;[91] and the line linking Warszawa Wchodnia with Warszawa Wschodnia Towarowa, including the siding of the Praga inland port.[92]

Both tracks on the Medyka – Przemyśl – Kraków – Szczakowa – Mysłowice – Katowice line were converted to broad gauge; one track on the Katowice – Ligota line, one track on the Katowice – Hajduki – Gliwice – Kędzierzyn – Prudnik line, one track on the line from Hajduki (now Chorzów Batory) – Bytom – Mikulczyce – Pyskowice – Strzelce Opolskie – Groszowice – Opole Wschód – Wrocław (the other track remained standard gauge: 1,435 mm) – Bolesławiec,

87 According to a first-hand account of May 12th 2006 given by a retired locomotive driver of the Warszawa Praga locomotive depot, Mr. Bogdan Pokropiński, one track had been converted to broad gauge, while traffic continued also on the other standard-gauge track; while on the bridge in Modlin a dual gauge track was installed, causing significant restrictions to overall line capacity.

88 No other sources confirm information regarding the temporary reconstruction of the bridges over the River Nogat in Malbork or on the Vistula near Tczew.

89 The locomotive depot in Sochaczew was re-gauged to 1,524 mm, so that it could serve broad-gauge locomotives.

90 There is no absolute certainty as to track conversion on the Łódź – Kutno – Toruń – Krzyż – Kostrzyn line.

91 Paszke, Jerczyński, Koziarski, (1995), 336.

92 According to a first-hand account of given by a retired locomotive driver of the Warszawa Praga depot, Mr. Bogdan Pokropiński, the Russians had set up a field mobile power plant to supply the district of Praga with electricity on the siding leading to the harbour, prior to the capture of Warsaw. The power plant comprised approximately 10 FD and IS locomotives used to power electricity generators.

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with a branch line running towards Kluczbork, and one track on the Kraków – Skawina – Spytkowice – Oświęcim – Czechowice Dziedzice – Zebrzydowice – Ostrava line (the other track remained standard gauge: 1,435 mm).[93]

The Soviet Railway troops converted a total of 5,034 km of tracks on both sides of the River Vistula on the Polish territory – 38 % of tracks reopened on the so-called former Polish land (the railway lines on the Polish territory according to pre-September 1st 1939 maps).[94]

Railway line reconstruction was made considerably difficult by the extraordinarily quick and effective way of demolishing railway lines applied by the German railway troops. The Wehrmacht railway troops used special devices mounted on four-wheeled wagon chassis. The device had been given the name *Schienenwolf* [a railway wolf] – it was a special hook and arm hammered in between the rails. The wagon upon which the device had been mounted, hauled by two locomotives, ploughed across the tracks with great force, cutting the sleepers in half and ripping rails out of the ground along with other permanent-way equipment. The *Schienenwolf* allowed considerable savings in terms of the volume of explosives otherwise required to destroy railway lines. The device served the purpose of destroying tracks, whereas switches and civil engineering works were blown up with TNT.[95]

During the work carried out in field conditions by the Red Army's railway military, one track of any double-track line would usually be re-gauged, with only the most essential, non-centralised signalling devices activated. Only single tracks intended for military train formation were subject to re-gauging at stations. At smaller stations usually only loops were re-gauged to allow the trains to pass each other. Further track reconstruction and installation of railway signalling devices took place at a later date, once the frontline had receded.

The hard work to reconstruct thousands of kilometres of tracks was handled with the use of primitive methods, both by the Russian Railway Brigades and the civilian Soviet railwaymen and workers mobilised as part of the so-called *trudfront* (labour battalion) campaign. German prisoners, mobilised Polish railwaymen and civilians were put to work as well. Railway line reconstruction

93 *Polish State Railways railway network map* (1945); *History of the Katowice*. . . (1997), 166.

94 Zamkowska (1984), 68; *Odrodzenie* (1947), 30 – the source specifies that the railway military had converted 3,518 km of lines, 1,159 km of station tracks, and 4,574 points. This discrepancy may be due to the use of incomplete data for different reporting periods.

95 In cases of sustained and long-term damage to railway lines, explosive charges were used to destroy rails as well.

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progress – which ultimately determined the timeliness of the military transports and supplies for troops in combat – was supervised by NKVD (People's Commissariat for Internal Affairs) troops.

The brutal incentive method proven "effective" in Soviet labour camps would be usually applied – the system involved food rationing based on the share of daily work norm actually delivered.

The working conditions on the re-gauging of the Warsaw – Poznań – Frankfurt line are best captured in memoirs of an eye witness to these events, a Home Army soldier and Polish railwayman Eugeniusz Macewicz:

> The Soviets rapidly began converting one track to the Russian broad gauge. Polish railwaymen were not engaged. We had no work to do at the time. I had no idea whether the tracks were converted by some sapper units or by groups of civilian workers. We couldn't tell by their clothing. At one point, I tried to learn more about it. I was walking home along the tracks one evening around 10 pm. I met a lone Russian working by the light of a candle stuck into a bottle. I asked him why he was working that late. "I haven't done my share", he said, and if you don't do your share you get no food. I'm old, over 60, I can't keep up with the young ones, and I need to work at night to eat. "Are you army or railwaymen?" I asked. "Who the hell knows," he said.[96]

The Russian railway troops were very efficient in rebuilding and re-gauging railway lines – they would usually hand over to traffic up to 10 km of re-gauged tracks per day, or even 25 km if damage was not that great.[97] Primitive track work tools would usually be employed during line conversion – occasionally, railway sleepers would even be replaced with trunks of trees felled in forests, then chiselled into shape with axes and adzes after having been laid on a rail embankment. The technical condition of such tracks rebuilt in rough conditions left much to be desired, on such sections it was not possible to reach any higher speeds, derailments were frequent. On frontline territory, rolling stock damaged in accidents was simply pushed off tracks to allow immediate restoration of rail traffic to the route.

The hasty pace of work was forced by troop movements at the time of the January offensive: Radom was captured on January 16th 1945; Skarżysko Kamienna and left-bank Warsaw on January 17th; Częstochowa on January 18th; Łowicz, Skierniewice and Kutno on January 19th; Tarnowskie Góry, Opole and Bydgoszcz on January 23rd; Katowice on January 27th; part of Poznań on January 28th; Leszno on January 31st; and Toruń on February 1st.[98]

96 Macewicz (2000), 149.

97 Antipenko (1970), 32.

98 Paszke, Jerczyński, Koziarski (1995), 332.

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The conversion of Poland's primary transport system to broad gauge resulted in a situation when strategic broad gauge lines were operated by Soviet military transport units, with the remaining system of secondary, local, and narrow-gauge lines rebuilt by Polish railwaymen and managed by the Polish State Railways.

Supplies delivered by rail were collected according to a specific set of rules: railway lines were designated for each army as stationing areas; field depots of munitions, armaments, food, propellants, and lubricants (in conformity to goods concealment requirements) would be set up near railway stations on a pre-specified route, to receive goods arriving by rail transport. Field depots delivered supplies to individual army units with the use of horse-drawn and motor vehicles. Depots were directly connected to army unit stationing areas with roads.[99] Goods were delivered directly to the frontline from rear support units by the so-called "shuttles" – compact train formations[100] carrying the required supplies and escorted by transport officers. During the Belarussian Operation, for example, such compact tank wagon "shuttles" carried petrol directly from Grozny to army depots.

During the Wisła – Odra operation, 18 shuttles with a total capacity of 3,150 tons were formed for the purposes of all the 1st Belarussian Front armies. Each "shuttle" comprised two-three fuel tank wagons, one water tank wagon to refill the locomotive, and one escort and maintenance staff wagon. In the early days, these would carry fuel reloaded from broad-gauge tank wagons on the River Vistula.[101]

Lines of strategic importance and all railway sections on the frontline territory were serviced by railway operational regiments. Due to the shortage of qualified railway personnel, a group of Leningrad Military Transport Academy students was even dispatched as supplementary personnel to the Belarussian Front. They were called to serve in operational positions on military railway routes, mostly as train dispatchers, telegraphers, switch operators, locomotive drivers, and firemen.[102] Due to the staffing issues, transport officers were occasionally relocated, serving as train dispatchers, switch operators, train guards and locomotive drivers. The re-gauged lines were staffed with Russian railway

99 Antipenko (1970), 237.

100 In railway terminology, the phrase "compact formation" applies to any train the composition of which cannot be subject to modification.

101 Antipenko (1970), 268.

102 Antipenko (1970), 266.

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military personnel (as train dispatchers and traffic control officers) reporting to the Supreme Board for Military Transports.

Furthermore, the German troops caused major damage to telephone and telegraph lines as well as to railway signalling devices on many railway routes, requiring rail traffic to recommence immediately without engaging in time-consuming tasks of rebuilding these devices. In order to restore frontline traffic the following action was taken:

> [...] A certain number of motor vehicles, Po-2 aeroplanes and numerous radio station units were put at the disposal of the head of Military Transports to secure proper communication. A Military Transports officer would drive a car alongside the railway line, overtaking the train to prevent trains from approaching from the opposite direction. This is how station-to-station traffic was handled. Other officers would fly an aircraft along designated railway line sections to map train positions. Air surveillance was often obstructed by fog and drizzle, which impaired visibility and occasionally prevented take-offs. The head of Military Transports at the frontline would receive messages twice daily via radio stations located at junction points. A special-purpose "transport division" was set up on European-gauge lines as part of the Frontline Board for Military Transports. [...] Consequently, we would receive daily data regarding the number of trains crossing the bridge in Dęblin in the western direction; we also had knowledge concerning trains on individual sections of the network [...].[103]

The train operations was based on details agreed over the telephone in Russian, and in conformity to Russian rail traffic control and signalling regulations; less frequently, conditions permitting (whenever devices were operational and sufficient staff available), announcements were dispatched by telegraph. It did happen that on militarised lines Russian railway troops used a primitive yet effective method of managing traffic manually, i.e. "a token system" – a metal shield with a special-purpose handle handed over by a train guard when trains were crossing each other or at a destination station to the crew of a train dispatched in the opposite direction.

Under extraordinary warfare circumstances, Polish railwaymen fluent in Russian would be employed as train dispatchers at stations of lesser strategic importance,[104] Soviet officers holding positions of station/ section commanders at

103 Antipenko (1970), 266–267.

104 Account of October 5th 2005 by a retired traffic controller of the Regional State Railway Management in Warsaw Aleksander Matecki from Mława; thanks to his excellent command of Russian language, he served in 1944 as a Soviet military train dispatcher on the Mława – Konopki section of the Warszawa Gdańska – Gdańsk Główny line.

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"junctions." Polish railwaymen would usually be employed as physical labourers, or to perform rail traffic control-related duties as signalmen, switch operators, shunting masters, or shunters.

Steam locomotive columns *(parovozoviye colony*) were established as early as 1941 in order to provide locomotives for military train operations; they were part of a special-purpose reserve of the People's Commissariat for Railways, all militarised, and reporting to the Red Army transport units.

The immediate reason for the formation of these columns was to provide traction to military trains under circumstances of complete destruction of servicing facilities. In order to ensure their complete self-sufficiency, these units were organised along the lines of train servicing applied on long-haul sections of Russian railways. On the Siberian railway lines living vans were coupled to locomotives to accommodate a backup locomotive crew. The solution allowed considerable extension of train crew working hours: one crew worked while the other rested in the respite van. The other condition of running frontline trains required that the *parovozoviye colony* be made technically independent thanks to technical equipment, field workshop facilities, and qualified rolling stock repairmen and boilersmiths assigned to them.

The process of forming first columns began in 1941, at the Ilitsa and Podmoskovskaya locomotive depots of the Moscow railway junction; these columns went on to participate in the Battle of Moscow.[105] More often as not, steam locomotives assigned to a column transported troops over considerable distances.[106]

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105 *Zheleznodorozhniki* (1987), 311.

106 To allow maximum-intensity of steam locomotive use, each locomotive would be coupled with bogie vans with accommodation for three locomotive crews, three conductor crews, a rolling stock fitter, and an escort. Such steam locomotive crews were self-sufficient enough to perform complex locomotive repairs, even in field conditions. On order by the State Defence Committee, the People's Commissariat for Railways formed 35 NKPS Special Reserve steam locomotive columns on railway lines at the head and rear of the frontline, operating 750 steam locomotives, with over 11,000 railwaymen troops in service. The work of every column was handled by the head and political commissar (deputy for political affairs) of the unit. Each column comprised a company of up to 5 locomotives. A brigade servicing a single locomotive comprised a platoon under the command of an experienced locomotive driver. Equipment assigned to a column included workshop tools and power generators; a column would be self-sufficient in performing all boilerworks. A standard special-purpose reserve column consisted of 30 locomotives, although occasional ones would comprise 20 or 15.A column service was fully militarised, railwaymen were issued

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The system of using columns to perform rail traffic involved the formation of a group – a column of steam locomotives of the same type (in order to make their use in field conditions more expedient) – which was then assigned to one of the larger locomotive depots. Each column locomotive was then assigned 3 engine crews, 3 conductor crews, 3 wagon inspectors, 1 rolling stock fitter, and one wagon with two escorts to provide accommodation. Steam locomotives hauled trains according to schedule between two locomotive depots separated by a distance of 500 km or more, passing through stations that had their own locomotive depots on the way without stopping in these depots. The servicing of steam locomotives would be performed on station tracks or in locomotive depots, depending on conditions. Train operation began at a station adjacent to the original locomotive depot that the column had been assigned to. A steam locomotive would depart from the yard with two crews aboard – one to operate the locomotive and train, the other one resting in the van. After completing the work assignment over a specific shift, crews would rotate during a longer stopover and engine re-stoking. The third crew would remain at the locomotive yard the column was assigned to. At the final locomotive yard, the engine would undergo full servicing, and return with the train scheduled in the respective direction to the original yard it had been assigned to without stopovers.[107]

Broad-gauge steam locomotive of Russian classes ОВ, Э, Эг, Эш, Эм, С, and Су would usually be employed to operate broad gauge military trains passing through the Warsaw junction.[108] Captured standard-gauge passenger and express locomotives (coupled to passenger trains under normal circumstances), basically unsuitable for the transport of heavy military equipment, would also be employed during warfare in military rail traffic.

Field storages of coal, wood, and lubricants as well as field repair workshop facilities would be arranged to ensure uninterrupted locomotive operation. The shortage of coal (resulting in the necessity to transport it across great distances before the Soviet troops entered the Dąbrowskie Basin and Silesia) was conducive to a fuel replacement effort: railway and road military units amassed 542,000 m3 of wood for trains running in both directions on the Kovel and Brest lines.[109] Wherever water stations had been destroyed, water for locomotive tenders

military ranks, uniforms, and weapons. A quick implementation of steam locomotive columns resulted in the NKPS establishing a special-reserve railway column branch.

107 Łaszkiewicz (1959), 58–59.

108 As told by retired locomotive driver of the Warszawa Praga depot, Mr. Bogdan Pokropiński.

109 Antipenko (1970), 231.

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would be drawn from rivers, streams or wells with the use of steam-powered suction pumps mounted on steam locomotives or in the vicinity of watercourses. Nonetheless, the limited capacity of such appliances resulted in considerable extension to the travel time of military trains.

The simplified servicing procedures – restrained only by the coal and water refill time and the need to wash-out locomotive boilers – increased the intensity of use of locomotives. Concurrently, such excess and intense use of rolling stock resulted in the rapid deterioration of all equipment, locomotive boilers in particular – yet nobody paid much attention to such a situation under wartime conditions. Service in war railway columns was extremely dangerous, frequently involving operating ammunition trains under enemy fire. Pre-war mobilised Polish railwaymen served in the Soviet steam locomotive columns as well. The 1st Belarussian Front train service lost 42 staff killed in action and 57 injured; notably, every German pilot would be decorated with an Iron Cross for destroying a locomotive.[110] In an effort to eliminate air attacks on troop trains on particularly hazardous sections, single locomotives were dispatched ahead to draw enemy fire.[111] In 1943, armoured steel plate came into use as protection for steam locomotive driver cabs to improve the safety of locomotive crews.[112]

When no Russian or Polish locomotive crews were available, an occasional German locomotive crew would be brought in, guarded by Soviet soldiers. As a retired German engine driver of the Lyck (Ełk) locomotive depot recalls: "it was a journey at the point of a Nagant."[113] Troops were issued orders under which they were required to shoot both the locomotive driver and fireman for the slightest misdemeanour or locomotive failure, considered an act of wartime sabotage and punishable by death.

After the war ended and all captured property was shipped to the USSR, locomotive columns returned to the Soviet Union, where they were demilitarised and disbanded. Former column rolling stock (locomotive and wagons) was returned to the Soviet Railways.[114] The *Zheleznodorozhniki w velikoy otechestvennoy voyne*

110 Antipenko (1970), 233.
111 Antipenko (1970), 233.
112 *Zheleznodorozhniki* (1987), 323.
113 Account of May 12th 2003 by a retired driver and mechanical controller at the narrow gauge railway depot Ełk, Leszek Zumbrzycki.
114 The columns included a significant number of Polish locomotives looted by Soviet troops after the Red Army attacked Poland on September 17th 1939, as well as numerous pre-war Polish State Railways steam locomotives and locomotives seized from the Germans.

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study features an interesting note of January 22nd 1946 from *Gudok*, a Soviet railway weekly, describing the disbanding of railway columns:

> The NKPS special reserve column No. 34 formed in 1942 at Turksib, has returned to Kazakhstan from Berlin. The frontline rail columns travelled over two million kilometres. War took them to Stalingrad, the Caucasus, the Crimea, Ukraine, Belarus and Poland; Berlin was the final destination of their victorious journey. Under enemy fire, railway columns transported over 10,000 trains to the front, carrying around three million tons of military supplies. During the period leading up to the attack on Berlin, column troops worked a ring route[115] on the Warsaw – Poznań section without uncoupling locomotives or refilling water over a distance of one hundred kilometres.[116]

On territories not held by Poland between the wars (East Prussia, Pomerania and Lower Silesia), and in the part of Upper Silesia which had not befallen Poland post-1922, particularly intensive works were handled by *Trofyeynoye Upravlenyie* – Military Board for War Spoils. The special-purpose units of the Board shipped rolling stock and railway equipment out of the country, dismantling tracks and sidings. The greatest losses were sustained by East Prussia (Varmia and Mazuria) and West Pomerania, where special-purpose evacuation trains were used to dismantle a significant volume of railway lines (1,600 km,

115 The ring route mode with locomotives coaled and serviced on station tracks without stopping over at locomotive depots was widely used in the USA, where special-purpose appliances were developed, designed to re-stock coal on locomotives and clean their ashpans directly on station tracks. Such servicing method was introduced to the Soviet railways in the 1930s. The ring route method was fundamentally applied on railway sections over 130 km. The method involved locomotive refilling and servicing at the return locomotive depot, and its handover to another locomotive crew who would drive the locomotive on the return journey to its home depot. Once the home locomotive depot was reached, the locomotive would not be driven into the depot, but instead the third locomotive crew would take it over on departure tracks and drive the locomotive to another return locomotive depot. Upon reaching that station, the locomotive would not be driven into the locomotive depot either; upon refuelling and cleaning on the pit, it would be handed over to a fourth crew who would then drive it on the return journey to its home depot – and yet again, the locomotive was not driven into the depot itself, but it would be handed over to another crew tasked with the next trip, directly on station tracks. Once the scheduled distance between two boiler washouts was covered, the engine would be taken to its home locomotive depot to be cleaned and undergo periodic maintenance. While the ring route mode increased the number of active locomotives and improved route capacity, such procedures impacted the overall technical condition of locomotives.

116 *Zheleznodorozhniki* (1987), 316.

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including 165 km of narrow-gauge tracks[117]), only partly rebuilt in the 1950s. Furthermore, the Soviet units responsible for the removal of spoils of war also took Polish rolling stock and railway workshop equipment to the east; Polish railwaymen would frequently re-direct wagons carrying looted Polish property and materials useful in the reconstruction of the destroyed railway infrastructure to sidings.[118]

With regard to the problem of running railways on the Polish territory under the Red Army control, on November 4th 1944 the Transport Department of the Polish Committee of National Liberation issued a decree according to which the railway was to be militarised,[119] reporting to the Commander in Chief of the Polish Armed Forces; all railwaymen were considered troops drafted into military transport service – yet allowed the right to wear railway uniform, to modest salaries, and to food rations. As a result of railway militarisation, former Head of the Department of Transport and Postal and Telegraph Services Jan Grubecki, M.Sc. Eng.,[120] was replaced by a Polish Workers' Party activist Captain Jan Rabanowski, M.Sc. Eng. (first post-war minister responsible for railways). Pursuant to the railway militarisation decree, railwaymen charged with misdemeanour in service were brought before a court-martial. According to railwaymen accounts, they were punished with custody and given bread and water only for the slightest misconduct when on duty. When serving penalty, an employee would spend the night in detention and return to duty during daytime under armed Railway Security Service escort. In the case of Toruń railwaymen, for example, a special-purpose prison was established in a 19th-century fortified tower – a railway bridgehead.

Furthermore, a plenipotentiary for railway transport of the Supreme Board of Military Transports at the Polish Committee of National Liberation was appointed – General P. Rumyantsev.[121] In all actuality, General Rumyantsev and Colonel Platonov were in charge of the entire department of transport of the Polish Committee of National Liberation.

On June 23rd 1945, the railway was restored to peacetime operations; on July 11th 1945 an agreement was signed with the USSR, pursuant to which the Polish State Railways were to assume control of the railways across the newly formed

117 Lijewski, Lenk, Piotrowska (1967), 5.
118 Osóbka-Morawski (1981), 49.
119 Zamkowska (1982), 65–75.
120 As Jan Grubecki opposed Russian rogue management methods involving railway equipment, he was summarily dismissed by Edward Osóbka-Morawski.
121 Zamkowska (1984), 70.

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western part of Poland by August 15th 1945.[122] The actual handover process of railway lines by the Red Army was still in progress in August 1945.

In conformity with the agreement, the representative agencies of the Russian military transport authorities were established at the Polish Ministry of Transport and the regional railway management bodies.

Under the agreement concluded on August 11th 1945[123] by the Polish authorities and the government of the USSR, all railway lines converted to broad gauge by the Soviet military units were to be re-converted back to standard gauge over the period of September 15th to November 30th 1945.

On October 1st 1945, the last broad-gauge Soviet troop train from Frankfurt to Brest travelled over the Warsaw – Poznań – Frankfurt railway line.[124]

On November 5th 1945, another agreement was entered into in Lublin by and between the Polish Committee of National Liberation and the government of the USSR concerning the operation and management of Polish railways. It granted the Red Army plenipotentiaries the right to co-decide with respect to all the matters related to railway traffic and operation of railways. In practice, this was tantamount to the railway being taken over by the Soviet authorities.[125]

By year-end 1945, most broad-gauge lines on the Polish territory were converted to standard gauge. Following the decision by the Soviet Minister of Defence,[126] the Przemyśl – Kraków – Katowice – Wrocław line, as well as its branches to the Upper Silesian coal mines, all of strategic importance to the Soviet Army, remained converted to broad-gauge. The line served 18 trains a day,[127] and was used to carry huge numbers of inhabitants of the former eastern Polish territories incorporated into the USSR to the western parts of Poland. Hard coal was the chief cargo shipped on the return journey.[128] In 1946, 7.3 million tonnes of goods (96 % of which was coal) were carried by rail along the route described.

The Upper Silesian Industrial District encompassed the longest-standing survivor of the broad-gauge network; it was used until 1947, including access to 13 coal mines (the length of the broad gauge track at railway stations reached 100 km). In 1947, these facilities were used to ship 6 million tonnes of goods

122 Paszke, Jerczyński, Koziarski (1995), 335.
123 Gembora, MOHRA, Ref. No. 1138, 117.
124 Kroma, Sosiński (2003), 74.
125 Krogulski (2000), 126.
126 Zamkowska (1984), 74.
127 Zamkowska (1984), 62.
128 Krogulski (2000), 126.

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(98 % of which was coal) to the USSR. As of September 1st 1947, the overall broad-gauge network of the Regional State Railway Management in Katowice totalled a mere 31 km.[129]

The second track on the Mamonowo – (state border) – Braniewo – Bogaczewo – Elbląg line was also left as broad-gauge, serving strategic and economic purposes, the latter to a minuscule extent. In Elbląg, at the Zamech plant (the former F. Schichau Elbing factory), thousands of passenger carriages, freight wagons and steam locomotives manufactured by the H. Cegielski factory and ordered by the Soviet Railways were converted to broad gauge. Following a short test run and technical inspection by the commissioning officer for Soviet Railways in the Polish People's Republic, the rolling stock was dispatched to Kaliningrad. In the 1970s, the broad-gauge section of the Elbląg – Bogaczewo line was dismantled, the remaining part was retained for strategic reasons.

The absolute military, political, and economic enslavement of Poland by its eastern neighbour during the Stalinist times may be proven by the curious example of the permanently destroyed electric railways in Lower Silesia. Following an agreement with the Soviet government, Polish State Railways took over the slightly damaged, electrified rail network in Lower Silesia, formerly owned by the Germans, 321 km long (it had been subject to gradual electrification from the early 20th century until the late 1930s, 15 kV and 16 2/3 Hz alternate current was applied). The early electrification of railways within the Eisenbahndirektion Breslau was associated with the need to operate trains on the difficult mountainous Lower Silesian railway network (inclines of up to 20 ‰, curves of 170m radius), and the resulting technical difficulties with operating steam-hauled trains. Moreover, the short distances between stations and halts were detrimental to the overall economics of using steam traction (frequent starts and stops). During the period of 1912–1914, the Siemens-Schuckert Werke company constructed a power plant in Ścinawka, equipped with four sets of turbines providing power to the electric Lower Silesian railways. Coal was carried to the plant by block trains from the Nowa Ruda Słupiec mine, 12 km away.[130]

The Polish State Railways took over the following electrified railways lines from the Soviet military transport authorities:[131] Wałbrzych Szczawienko – Szczawno Zdrój –Boguszów Gorce Wschód – Mieroszów – (state border) – (Mezimesti)

129 *History of the Katowice* (1997), 166.

130 Szynkiewicz (2004), 32.

131 Line electrification dates quoted from Lijewski, Koziarski (1995), 106.

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(June 1st 1914[132]), Boguszów Gorce Wschód – Boguszów Gorce (July 15th 1914), Świebodzice – Szczawienko – Wałbrzych – Boguszów Gorce Wschód (January 1st 1916), Świebodzice – Jaworzyna Śląska (April 1st 1917), Boguszów Gorce – Sędzisław – Marciszów – Jelenia Góra (July 15th 1920), Sędzisław – Kamienna Góra – Lubawka (August 17th 1921), Jelenia Góra – Rybnica – Gryfów Śląski – Lubań (1922), Jelenia Góra – Cieplice Zdrój – Sobieszów – Piechowice – Szklarska Poręba – Jakuszyce – (state border) – (Kořenov) (February 15th 1923), Lubań –Mikułowa – Zgorzelec – (state border) – (Görlitz) (September 1st 1923), Jaworzyna Śląska – Żarów – Kąty Wrocławskie – Wrocław Świebodzki (January 28th 1928), Lubań – Węgliniec (April 3rd 1928), Lubań – Leśna (June 22nd 1928), Wrocław Zachodni – Muchobór – Wrocław Świebodzki (June 25th 1928), Jelenia Góra – Mysłakowice – Kowary – Kamienna Góra (December 9th 1932), Mysłakowice – Miłaków – Karpacz (1934), Marciszów – Kamienna Góra (January 1st 1939). Furthermore, the Polish railway authorities took over numerous electric railway vehicles and state-of-the-art, very well equipped electric traction repair workshops in Lubań Śląski (Lauban).

As stated earlier, the railway network in Lower Silesia did not suffer extensive wartime damage. Only the overhead catenary of the Wrocław junction, the Wrocław locomotive depot (completely destroyed), and the overhead catenary on the Wrocław – Jaworzyna Śląska line were damaged once heavy combat commenced during the Siege of Breslau.[133] Shortly after the end of warfare, the German railway personnel – working together with the Polish railwaymen who had operated the Warsaw railway junction lines electrified between the wars and then completely destroyed by the Germans – re-commissioned electric traction on a major part of the Lower Silesian Railway Management, having removed minor damage to the overhead wires. The following lines were operational: Lubań Śląski – Leśna, later Jelenia Góra – Lubań Śląski, Jelenia Góra Zachodnia – Szklarska Poręba and Jelenia Góra – Karpacz; after several weeks of work, traffic was also restored to the Jaworzyna Śląska – Zgorzelec line.[134]

Unfortunately, already after the reopening of electric railways, under the agreement between the governments of the USSR and Poland of July 8th 1945, the rolling stock, machines and equipment of the Lower Silesian electrified railway network were to be shipped to the USSR (with an extraordinarily short period of three weeks allowed for disassembly).[135] Consequently, the use of

132 All electrification dates listed in brackets.
133 Szynkiewicz (2004), 37.
134 Szynkiewicz (2004), 38.
135 Szynkiewicz (2004), 38.

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electric trains ceased and power was disconnected; the Soviet railway military forces proceeded to disassemble the overhead wires, equipment and sub-stations. Workshops, equipment, overhead wires, sub-stations, high-voltage power lines, power plants, rolling stock and even disassembled second tracks of double track lines, were all sent to the USSR.[136] Components of the railway power plant in Ścinawka Średnia, transformer sub-stations, and equipment from electric traction workshops in Lubań Śląski were also disassembled and shipped out. The rogue plundering of electric traction equipment did not even spare thousands of traction poles, cut with torches up to the height of an upright soldier. The following equipment was shipped to the USSR: 2 E17 class electric locomotives, 3 E42 class locomotives, 2 E44 class locomotives, 2 E90 class locomotives, 5 E91 class locomotives, 11 E94 class locomotives, 2 ET31 class EMUs, 3 ET51 class railcars, and 6 ET89 class railcars.[137]

The rolling stock – and traction substations – were shipped to Soviet military railway equipment depots, where they remained disused for several decades. Some of the electric locomotives captured from the Polish State Railways in 1945 were presented by the Soviet authorities to East Germany after 1956, in a gesture of "brotherly assistance." Notably, the Soviet Railways used 3,000 V DC and 25,000 V AC – consequently, rolling stock seized in Lower Silesia was totally useless to the Soviet railways.[138]

Old, run-down steam locomotives and wagons (often dating back to the early 20th century) returned to the previously electrified railway lines of the Regional State Railway Management in Wrocław, the lines were partly re-electrified only in the 1970s and 1980s.

136 The overhead catenary on the Jelenia Góra – Jakuszyce section was left intact, probably by omission; yet this section was dismantled soon thereafter and used to rebuild the damaged catenary at the Warsaw Rail Junction.

137 Szynkiewicz (2004), 39.

138 The existence of an electric railway network in Lower Silesia became a censorship-safeguarded secret. Even specialist publications on electric traction from the time of the Polish People's Republic contain no information concerning the electrification of these lines. It is only in the work by the notable pioneer of Polish State Railways electrification, Stanisław Kuczborski [Kuczborski (1963), 100] that we find the following laconic statement: [...] *15 kV AC, 16 2/3 Hz (standard voltage employed by the German railways) electric traction was introduced already between the wars, on the Wrocław – Wałbrzych – Jelenia Góra line. Currently, the 3kV DC system adopted by the Polish State Railways is to be introduced.*

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The re-electrification of the Wrocław – Wałbrzych – Jelenia Góra line was completed only in the years 1965–1966. This was a line with a particularly difficult mountainous profile. With steam traction, up to three engines were required for a single freight train. Heavy freight trains required the assistance of bankers – locomotives that were pushing the trains, mainly on the particularly difficult sections of the line. The Mysłakowice – Karpacz line, on the other hand, featuring the greatest longitudinal incline on the complete Polish State Railways network (44 ‰ immediately before Karpacz station), was never electrified again.

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