УДК 625.174 (9)

SNOWY PROBLEM FOR RAILWAYS OF UKRAINE IN WARTIME

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Проблема снігових заметів, що значною мірою визначає надійність функціонування залізниці в зимовий період, особливо загострюється в умовах воєнного часу. В статті розглядається дане питання стосовно залізниць на території України в періоди Громадянської та Великої Вітчизняної воєн.

Ключові слова: *снігоборотьба на залізницях, залізниці в воєнний період, снігові замети, снігоочисна техніка, захисні лісопосадки*

The rapid industrial development of the Russian Empire in the second half of the nineteenth century led to the rapid development of railway transport. Moreover, with it began to appear and the problems associated with the reliability of the latter, especially in winter. Particularly sensitive are the problems that they created snowdrifts. They were the one of the greatest misfortunes on the railways, mainly on railway lines southwestern part of European Russia, that the territory of Ukraine. Treeless terrain, strong winds and snowfall contributed skidding snow train tracks, and this phenomenon has become a real disaster. Snow drifts on many days, stopping normal movement, bringing tangible inconvenience or loss. To restore normal movement needed a lot of money and the cost of labor.

In addition, by the early twentieth century on the Russian railways, particularly on the railways, located in Ukraine, has evolved a system of measures addressing the problem of snow. Were conducted researching in this area and developed methods to protect against snow (mainly mobile wooden shields and afforestation), designed and manufactured mechanical means for snow removing [1]. However, the outbreak of the First World War, and Civil War negatively influenced the decision of this problem.

In general, compared to other hardships caused by the social situation and in ensuring the reliability of rail traffic in the winter, problems of struggle the snow attracted relatively less attention. However, the problem not only persists, but even worse. Especially, because during the war to the tasks that the railroad served as part of the national economic complex, contributed more caused by military service needs (supply troops, transportation, sanitary trains, etc.). This greatly increased the tension in the work of all rail services and presenting more stringent requirements on the reliability of their operation, especially in adverse weather conditions.

In addition, in wartime, there is another factor that is absent in peacetime – the direct involvement of railway engineering equipment in military operations.

First, it concerns the rapid development of that type of weapon, as an armored train. The first armored train ware built in 1914 mainly in the Ukraine, because, first, they were the main rear base of the Southwestern Front, and secondly, in terms of technology they were at the time new businesses generated by the Industrial Revolution. In fact, almost all armored trains assault class it was built. The organizational structure of the deployment conducted in Railway Troops. Their structures and the formation of both units at the railway battalions assigned to the main railway workshops of South Western Railways in Kiev [2].

Particularly significant were the achievements of armored train cause during the Civil War. It is believed that the entire area covered by the fighting in 1919, there were about 300 armored trains [3]. The most intensive applications were in the southern regions and, above all, Ukraine, due to the bitter struggle for the mastery of the resources and infrastructure of the region. This was aided by the presence of a dense rail network secured repair and operational capabilities with qualified personnel component. For example, the Donetsk Basin rail network ring structure centered at Mykytivtsi and straddles ring bond could «work» on all sides of the world [4], yielding perhaps the Moscow railway junction. To this was added bulk mine, factory branches, allowing complex play armored train party.

Ukrainian armored trains – on the one hand UNR army and parts of USS [5], on the other – military units URR (armored trains right bank and left bank armored trains groups of red between the end of 1918 - early 1919, when the in URR exist independent armored train building) - took an active part in the hostilities. That has been a massive uses of armored trains all major warring parties.

So, for the needs of military communications, and in combat use of railway equipment necessary to ensure the uninterrupted operation of the railway, including in the winter season. This is sometimes represented an extremely difficult task. That is to illustrate one of the episodes during the Civil War.

Armored train number 6 «Putylivtsi», which built in St. Petersburg in October 1918, he participated in suppressing the Left SRs uprising, returned to Moscow and was sent to the 12th Infantry Division of the 8th Army in South-Western Front. His path led through a series of destroyed bridges, which had to repair on the go. In addition, here is a snowdrift. In early December, in front of station «Liski», the armored train was stopped by the snowdrifts of such magnitude, that the armored train was covered with snow almost to the roof on armored train platform. The situation worsened extreme cold. Clear the track was only at the eleventh day [6].

Thus, the snowdrifts that creates significant barriers to normal movement in winter and negatively influenced on the processes taking place – both in the military and in the economic sector. Therefore, they provoked a backlash of power. Most of it was to eliminate the effects of the snow disaster because of the massive involvement of clearing the tracks of the local population.

As an example, the Defense Council Directive of all provincial and district councils, located on the railway line, the fight against snow drift of December 23, 1918: «Because of the disaster that had befallen the Republic, snow cyclone ... guided by the decree of 3 November on duty to clear snow [7], immediately send all the male population aged 18 to 45 years for the clearing of snow on the track and station tracks ...». Chairman of the Defense V. Ulyanov (Lenin).

As for the government's actions UPR, Hetmanate and Directory directly in the Ukraine, the relevant resolutions at the highest level we have not found, but that does not mean that winter factors do not affect the work of this important transport link as railways. Sometimes, these factors

were even military-political implications. Thus, according to the dispatcher (the rank Comrade, is deputy of the Minister of Railways) the Ukrainian railways, winter breakdown of the water supply system on the railroad had a large impact on the situation in a particular region. «NUZ Fastov reports, that in Boyarka blowup all hydraulic crosses, destroyed facility for collection and storage of water and hydraulic valves, water flooded all railways and frozen. On the one side are Boiarka Bolsheviks, and the other side are Republicans. Between Boiarka and Glevaha, the ways corrupt in five places and blown bridge. Boiarka brought into full badness» [8, L. 88]. Moreover, two days later (18 February 1919) re- post: «Boiarka appears demarcation line and now in this area is quiet» [8, L. 92].

Interestingly, that in this kind of a Messages, to almost daily reflect the situation on the Ukrainian railways and gave a fairly complete and detailed picture of the situation of breakdown just about the impact of specific factors about the winter night is silent, and it is often possible to draw conclusions only on the basis indirect evidence. For example, «By passing the night through motion to Shepetovka [with Koziatyn] there was no movement is adjusted only at 10 am 1/III» [8, L. 118].

Obviously, the question of struggle with snowdrifts resolved locally. Especially when you consider that the primary means of clearing was a shovel, and these activities require mass. Given the circumstances, used harsh methods to ensure an uninterrupted movement (even on the railroad: the evidence of the same manager was up four cases where the orders of the Cossack officers even Machinists flogged ramrod).

The winter of 1918-1919 is an active evacuation of the Directory and of Germans (and later French), and that this issue permanently employed workers of all services of the Ministry of the railways. First, they are concerned about the lack of equipment, especially locomotives and locomotive crews, and the most sensitive issue – the lack of fuel. The question of struggle with snowdrifts – in the background. That message was manager of 1/30/19: «... the military authorities did not considered our need for locomotives, requiring them for their needs and we regard these extortion, give them all that we can, but military authorities are not satisfied with this and takes us all the locomotives, which produces a depot, such as growing equipment lines ...» [8, L. 61].

In official reports, issues related to the struggle with snow, only when were cases of serious organizational failures. For example, in late January 1919 because of bad weather had seriously violated traffic, especially at the Kiev railway junction. In another reference, Manager receives the request: «For Your Help obvious that detainees who are 19 trains of 20 locomotives, what does this mean whether they are detained under the rollers [proof] or trains equipped locomotives». In response to the request for additional help manager said: «These locomotives were detained by military authorities under echelons and are under the rolls [proof]. Now the situation is such that movement controls Cossacks. So today, I had to send for snow removal train, but the Cossacks did not allow locomotives to ten o'clock in the morning, and then somehow managed to take such a … blizzard... Now that these trains cannot go and still be in place ... can leave all this snow for a long time» [9, L. 3].

Later (11 February 1919) is similar to the situation observed in Uman railway junction: «Uman station. We have the military equipment of 248 railway wagons, free 110 indoor and 50 platforms.

The situation in the department nasty, because the snow is not cleared, the work is very weak due to the fact that we have only 2 plow, which then cause stuck in the snow, with locomotives very difficult, because all locomotives capable

guards sitting Cossacks and the rolls do not give, through which stopped the transportation of firewood, and it threatens to stop moving the entire station. The Cossacks did not allow locomotives and snow plows ...»[8, L. 84].

In addition, rarely specific mention of breakdowns due to snow drifts. Is that disrupted local events to clear snow, such as in this case (17 February 1919): at Podolsk road «on Husyatyn between Ermolyntsyamy and Victoria is train in the snow drift and they sent additional train with the workers to clean up…» [8, L. 86].

Great importance to ensuring the normal operation of rail transport in the winter, including the fight against snowdrifts, gave the Soviets. Government Decrees that regulate these issues taken at the highest level. Here's an example – Resolution of the Council of People's Commissars on February 10, 1920: «In view of the difficult situation of rail transport due to snow drifts and the need to take urgent steps to purification tracks from snow and ice, the Council of People's Commissars decided:

1. Use rate for work on the railroad tracks purification of ice and snow on Sunday leaps ... all employees of the military departments».

In these regulations regulated, with some detail, the involvement of the population in clearing snow, its maintenance during the work.

December 8, 1920 issued a decree of the Council of Labor and Defense of the order of supply of citizens mobilized for labor service for the cleaning of tracks from snowdrifts. According to her «all citizens are mobilized communist labor by purification of tracks from snow drifts in duration of less than 2 days will be: 1 pound of bread a day, sugar 1 ½ day spool, spool salt 1 ½ day, 13 fish grams per day.

Horses of local people that are involved in the mobilization order to work on the cleaning of tracks from snow during snow drifts, with duration of more than one day are: oats - f., 8 pounds of hay (in the provinces that produce fodder and grain, horses not supplied)» [10].

The devastation during the Civil War for a long time affected the operation of the railway. In difficult conditions of post-war devastation, same railway has made significant efforts to ensure normal traffic in the winter. For example, in winter 1920/1921 in South Western Railway «in a complicated situation impressed the way service, without the necessary mechanisms and adaptations restore the damaged embankments, bridges and other structures, and struggle with snow drifts. There was not enough snow break shields, manufacture of which has not been established. However, the Svyatoshinskaya workshop produced daily 1000 wooden shovels to clear the tracks of snow, and this was not enough» [11].

After the devastation caused by the events of the Civil War, as during most of these events, the main way snow removal of railways were manual, and the main tool – the same shovel. Only problem was solved partly by using snow-cleaning equipment, who survived from earlier times.

At this time, there is work to S.D.Kareyshi and I.Y.Manos [12], were then on the level of knowledge taught basic information concerning issues and provides specific and detailed recommendations for practice based on existing knowledge, organization and state of technology. Rightly considered that this work S.D.Kareyshi and I.Y.Manos is very important for the engineer of the service routes and meets the requirements of the moment. It incidentally, given a detailed description of snow ploughs, which for winter 1921-22, were equipped with all of our railways, and provided detailed ways of working force [13].

Back to proactive steps to address the problem of snow at the work, that was laid in the late XIX - early XX centuries a solid foundation for further successful struggle with the snow on the railways, returned at the early 20's. However, the equipment to clear snow is not enough.

Manual cleaning (using a horsepower) has long occupied an important place in struggle with snow on our railways. All hope again relied on a shovel. Therefore, the relationship to the shovel as the main technical device for snow clearing was serious. Even were performed special studies on the effectiveness of different types of shovels. Thus, in a special article on this issue argued that the use of for fresh snow shovels of small size, and shovels with a width of 14 inches over the tray and plywood shovels – irrationally. The most productive and durable market is 14 inch a shovel aspen unshod, and which should be used for cleaning of roads from fresh snow [14].

Not just immediately after the Civil War, but in the early 30's, the snow drifts on railways, including in Ukraine still create significant problems and dealing with them is of great importance, in particular, reflected in publications rail the press. For instance, newspaper South Western Railway «Little Whistle» even in November 1931 wrote about the poor preparation for struggle with snow in winter. According to the reporter, «if you do not take immediate action – locomotives South Western Railway mired in snow as last year» [15].

With primitive means to clear the snow, to achieve the desired effect to the work involved large numbers of people, and here played an important role the organization of related activities. For example, the organization of measures to clear the snow in some districts of Kharkiv region Southern Railway conducted even in 1933.

October 12, 1933 in the newspaper, «Pravda» were published an agreement, that he initiated the political department of the Kharkov region of the Southern Railway and of the political Lozivska MTS entered into farmers Lozova district of railway men help transport in struggle with snow.

This initiative, clearly, state authority acknowledged extremely important and urgent, because the next day publishing "Pravda" has dedicated her his editorial [16]. Moreover, immediately, promptly separate publication was prepared a small booklet with the relevant materials, which was signed in October 18 print.

Nevertheless, from the mid-thirties industrialization of the country is in full swing. Appears as a new mechanical equipment to deal with snow. However, the question of the use of local (mostly rural) population to clearing railways remain relevant in the future. Even much later, when were developed thoroughly enough protection technology from snowdrifts and deal with them, not always possible to abandon mass attracting people to the cleaning of railway tracks and stations. Even in 1940, when were particularly unfavorable conditions, to ensure the continuity of railway traffic «every day about 2,000 housewives took to the ways for cleaning lines and railway switches from snow and defended railway junction from the onslaught of natural elements» [17].

In the future, due to the increased attention of public authorities, the rapid development of technology begins to fight with snow. Practically all developed the same direction as before, but at a higher technical and organizational level. Appeared and fundamentally a new machines. In particular, besides snowplows, were developed equipment for snow removal. However, the most important is the fact that the liquidation private ownership of land made it possible to effectively used protective reforestation.

The principle of operation of most types of protection from the snow, which became widespread in practice, and came down on the delay and the deposits on the windward side of the road the whole mass of suffering winds snow. The main type of artificial snow protection, until the early 50's, on our roads were portable wooden boards, which at the time was surrounded by about a third of the way which was brought snow. For a considerable time is artificial protective devices have helped to

solve the problem of combating the formation of snowdrifts.

Simultaneously with them developed methods of protection through planted forests. Over time, forest plantations have taken a major role in the protection of the railway from snow [18]. Attitude towards forest protection plantations as a means of preventing the formation of snowdrifts in pre-revolutionary Russia gradually changed significantly. In the end though, it was decided that in this regard they have a very significant perspective – what, in particular, by the decision of a special commission headed by O.M.Gorchakov. However, two years later, the First World War. As noted, the First World War, and following it the revolutionary events, significantly slowed down implementation of these decisions.

Soviet authorities from the beginning to pay very close attention to the issue of the use of forest plantations to protect the railroad tracks from snowdrifts. In August 1920, the General Directorate of Railways issued an order number 1212/28 «On the fight against snow drifts», which stated the need to «immediately begin drafting organizational work plan in the gubernia for the use of forest plantations to protect railways and detailed material and monetary estimates for these works».

Tremendous progress in the socialist transformation of the country, exceptional in strength and scale development of the industry, the collectivization of individual farmer's fragmented small farms and successes state farms imposes on the railways unprecedented demands. Many times put on increased cargo turnover of all the reconstruction of transport, that is its transition to full service of socialist construction of the country. Respectively, and increased demands on the reliability of rail transport, particularly in winter, and therefore the problem of struggle against snow in which the fore more and more out planting forest shelter. «At the moment [at the beginning of the thirties] railways steppe part of the Soviet Union to be 17 hectares forest plantations in young age from one to seven years, on both sides of the railway track along the railway lines, which are recorded snow in a wide (40-60 m) forest plantations. For more or less the full protection of the railway track from snowdrifts, within the existing rail network, need additional formation about 70 thousand hectares of forest plantations of the same, without considering the narrow spruce forest plantations, which play the same role, but in the more northern areas location ... Meanwhile, the experience of recent years shows that the band performed a technically correct protection from snow, are one of the most reliable and cheapest ways to deal with snow drifts» [19].

That such was the condition of with the decision the snow problems on the railways before the Great Patriotic War. Obstacle for further systematic development of forest plantations system again became military events. These events not only significantly reduce the possibility of active reforestation, but also while damaged much of the forest plantations that already existed. However, «even during the Great Patriotic War of 1941-1945, the railroad were able to plant trees and shrubs along the railway for thousands of kilometers.

Following the victorious Soviet Army with the construction workers were foresters. They purified launched forest plantations and restored forest plantations, destroyed by the German occupiers. The Germans cut down and burned trees, even where it was not military necessity ... Foresters in place of uprooted trees planted new trees growing species: poplar, maple, birch, acacia ... South Road has long since abandoned shields to protect against snow. Only because of the destruction of forest plantations Germans, she was forced to temporarily revert to the old method of protecting the railway line» [20].

Thus, the development of methods of struggle the snow, which received a significant boost during the industrialization

of the country, greatly slowed down during the Great Patriotic War, although the problem of struggle against with snow, as well as during the Civil War, not only not disappeared, and in a sense became even complicated due to the difficult circumstances of wartime. Capabilities necessary expenses decreased it, and the need to ensure uninterrupted movement of the railways remained and even increased - by the relevance to transport troops and military cargo.

At this difficult time for the railroad pinned extremely important tasks. Meet the needs of the front was a priority railway in wartime. They were extremely large.

Only for offensive operations in January-February 1944 in the territory of the railroad Right Bank Ukraine was required to send 78,000 railway wagons carrying troops and cargo on Stalin railway and about 100,000 rail wagons on the South-Western Railway [21]. In addition, these needs are constantly growing, including in connection with an increase in the technical equipment of the Red Army. So, if in 1942 for the needs of troops by rail was transported 1.5 million tons of ammunition and 2,662 thousand tons of fuel, whereas in 1943 the number had increased to 3 million tons of ammunition and 3261 thousand tons of fuel [22].

With the major load of all modes of transport, especially for the supply of fuel, had the railroad [23]. This, like the redeployment of troops, demanded an increase in the intensity of the railway. Accordingly, in the southeastern regions of Ukraine railway men have reached increase rail capacity from 6 to 22 pairs of railroad trains in per day [24]. In addition, in transport plans included State economic cargos. Especially considering the need of restoration in the liberated areas of Ukraine. All it took to ensure uninterrupted functioning the railway transport, especially in adverse weather conditions.

Great importance as a railway communication, and ensure its reliability in winter, it was also noted by the adversary, to the point that «the question of what goals can be put in front of you... will depend on the intensity of our railways». Moreover, for this purpose, it was necessary to «ensure the clearing of snow from the railways», because «due to of snowdrifts difficult to move rail transport», despite the fact that the local population entirely «busy at work on clearing snow from railroad tracks» [25, p. 53, 130, 151, 153].

Great importance was also trained technicians to winter conditions. In this regard, one of the senior German commanders noted, «In the steam boilers of locomotives that are not adapted to the conditions of the Russian climate, the water froze. Each locomotive could pull only half the usual number of railway wagons. Many of them are covered with snow and ice for days were idle in deadlocks railway stations», at the time, as «on Russian railways cruised locomotives designed to operate with in Siberia, at low temperatures» [26, p. 100-101].

All this concerned and combat use of railway equipment. Although compared to the times of the Civil War, armored trains occupied a relatively small amount in the total armed in quantitative measurement of this type of military equipment has increased significantly. During the war, we had deployed a massive construction of armored trains once at many factories and railway depot building on internal material resources of enterprises and regions, despite the non-specialized production and isolation of weapons contingent on the residual principle. In addition, this kind of military hardware at the time playing a significant role in combat operations. In the summer and autumn of 1941 units and subunits of armored trains still prewar formation, took a significant part in the border battles and defensive combat troops. Later (1941-1942 years), they

played a significant role in the defense of Kiev, Odessa, Leningrad, Moscow, Sevastopol, Stalingrad, [27], Donbass [28], Caucasian [29], and in the years 1945-1944 was – in offensive operations the entire front of the Baltic to the Black sea [30]. Moreover, for their proper functioning winter in combat, fighting with snow played an important role.

Moreover, the obstacles that created snowdrifts were very significant. Here he writes in his memoirs about the winter of forty-one, one of the commanders – not able to go to the front road through the same snowdrifts on the road: «I got in touch with the railway and unexpectedly learned that in a day or two on the train was sent to the front, which was released of capital renovation, № 2-11 ... Comrade Prusenko who occupied the commander of an armored train, with a smile, gracious host said: «We will deliver to the target, as a fast train». The next day I moved to the armored train, and we were off. It was a long way to go. Despite all the efforts of the team, moving at a snail's pace: dense snow flunked rails. Four kilometers overcame four days. Then had to pick up a shovel and together with the soldiers to clear the way. Cleared the snow, disperse to places, drive three or four hundred meters - the team again, «Come out!» It turns out the new snowdrift, must again take up the shovel» [31].

Research works in the struggle with snow in the WWII slowed down considerably. However, measures of struggle with snow were continued. Even in this difficult time (1943), in the MSHS factories were organized production output of a new type of snow blowers developed by Soviet specialists. They had not their own steam boiler, moreover, worked from steam locomotives series of FD or L, which pushed them. These snowplows differed for its operational features [32]. Used existing equipment. The very same struggle with the snow continued to play a significant role in ensuring the smooth operation of rail traffic in the winter.

Extremely important role in of its effectiveness played organizational arrangements and the dedicated work of railway men. At the time gaining strength so-called «luninskyy movement», the duty officer at the train station Dronovo Debaltsevskogo station North Branch Donetsk railway, Nikolai Alexandrovich Lunin, founded before the war. At the time, wrote: «Every promotion deserves remarkable undertaking the duty officer at the train station Dronovo Debaltsevskogo station comrade Lunin who was the initiator of socialist competition among the «ruhovtsev» for faster turnover locomotives for public service employees' attitudes railway traffic using locomotives» [33]. The developed in those days and subsequently developed in the future, these methods work particularly useful in wartime conditions [34-35].

Despite the danger of death, the railroad was running a transport. Here, for example, wrote about one of railroad sections with corresponding services: «There were days when on a small section the railway track at the same time swooped fifty aircraft. Nevertheless, people selflessly worked under the bombs. Railway section with corresponding services not only exists, but the first on the railroad received a passport ready for winter. In between recovery, path workers produced 2000 shields to protect railroad from snow, have prepared 3000 stakes. ... Commanders and workers railroad sections done everything to snowstorms not detained by the military trains» [37].

Thus, in wartime conditions the railroad did everything possible that, despite the winter weather, to ensure reliable operation of the rail, which at that time played an extremely important role. In the rear, in addition to ordinary measures to solve the problem of snow, which provide reliable operation of rail transport for the national economy and the supply front also emphasizing the struggle with the snow

in the liberated areas, where buildings were destroyed to protect from snow [38]. However, it was also very important to establish uninterrupted work of rail transport in the winter as in wartime and post-war reconstruction of the national economy.

After the war finished, work on creating effective new snowplows and snow protecting structures, were resumed on a large scale. Nevertheless, continued to pay special attention to forest protection plantations. In the postwar period, the program of forest plantations already developed under the State program to create forest plantations [39], that, in fact, eventually led to the final decision of the snow problems in the sense that it has lost the character of the disaster and became the object of systematic activities to ensure the railroad uninterrupted functioning of rail transport in all weather conditions.

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Потапенко Л.Л. **Снеговая проблема на железных дорогах Украины в условиях военного времени.** *Проблема снежных заносов, в значительной степени определяющая надежность функционирования железной дороги в зимний период, особенно обостряется в условиях военного времени. В статье рассматривается данный вопрос относительно железных дорог на территории Украины в периоды Гражданской и Великой Отечественной войн.*

Ключевые слова: *снегоборьба на железных дорогах, железные дороги в военный период, снегоочистительная техника, лесозащитные насаждения*

Potapenko L.L. **Snow problem for Ukrainian railways in wartime.** *Problem snowdrifts, largely determines the reliability of the operation of the railway in the winter, particularly acute in wartime. The article discusses the issue concerning railways in Ukraine during the Civil and Great Patriotic War.*

Keywords: *fight with snow on the railways, railways during the war, snow machinery, planting shelterbelts*