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# Organization of Work of Baikal Railway Crossing at the Beginning of the Russo-Japanese War

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Abstract—The paper considers the problem of studying the history of building a reliable railway communication system in Russia under the conditions of the Russo-Japanese War. The study demonstrates the scope of tasks that were solved to ensure continuous transport communication between terminal stations of unfinished Middle Siberian and Transbaikal sections of the Trans-Siberian Railway. It assesses the role and importance of the Baikal Ice Breaker Fleet in the transportation between isolated stations of the Trans-Siberian Railway and the transportation of military cargo and military troops.

Keywords—railway construction, history of Trans-Siberian Railway, Baikal railway crossing, The Baikal ferry ice breaker, organization of military transportation

## I. INTRODUCTION

In January 1904, Japanese warships suddenly attacked the Russian squadron in Port Arthur harbor thus starting an open armed conflict between Russia and Japan. This war had a significant impact on the policy of the 20<sup>th</sup> century [1; 2].

Despite the available data on Japan's preparation for the conflict, the beginning of the Russo-Japanese War was unexpected for the Russian command forces [3]. By the time of the clash of arms, the work on strengthening the fortresses in Vladivostok and Port Arthur had not been completed. The Russian Pacific Military Flotilla was not prepared for military action and had neither enough marine facilities nor sailors and officers. The underestimation of enemy forces by the Russian command resulted in a situation where the Russian army in the Far East was significantly smaller than the Japanese one [4]. Thus, with the beginning of hostilities, the leadership of the country faced a serious problem of urgent delivery of military equipment, soldiers and hundreds of thousands of tons of associated cargo to the theatre of hostilities. Only rail transport could solve such a problem. The Trans-Siberian Railway proved to be the only road providing a strong link between the economically developed center of Russia and the Far East [5; 6].

However, the construction of the Trans-Siberian Railway was not yet complete. Besides, this railway was not yet capable of providing sufficient capacity for large traffic volumes [7]. A particular difficulty of transportation was the section of the road from the port of Baikal located on the west shore of the lake to the Mysovaya station on the east bank: the road section connecting these stations by railway canvas (Krugobaikal Railway) has not been launched yet. Under such conditions, the vessels of the Baikal Railway Crossing were ensuring the transportation between the stations. However, harsh weather conditions of the territory limited its sustainability. Thus, in the most difficult military-political situation, the transportation acquired special importance for the country and required the country leaders and the workers of the industry to put all their forces [8].

Meanwhile, there is a need to study in detail various issues of the history relation to this matter, and past assessments shall be re-thought and correlated to the achieved level of knowledge [9]. The historical process as a whole can be understood and explained only by determining the significance of its individual fragments, defining the nature of links between the major events, and assessing the activities of its subjects. Based on the analysis of materials of sources and application of general scientific and special-historical methods, the study intends to reproduce the re-enactment for the operation of the Baikal Railway Crossing in difficult wartime conditions, to clarify the essential details of the organization of transportation through Baikal in 1904, to analyze the value of technical and management solutions taken by the leaders of the railway industry of the country and the heads of the Baikal Crossing service.

#### II. HISTORY OF THE STUDY

The study of the Baikal Crossing and its workflow in 1904 has recently became the subject of special attention. Surely, many aspects of this matter were reflected in various publications that appeared during the construction of the crossing and the years of its operation. Interesting materials on



the history of the study on the lines of future railways in the vicinity of Baikal can be found in the specialized publication of the *News of ESDIRGS* (East Siberian Department of Imperial Russian Geographical Society) for 1897 and subsequent years. The general layout of the Baikal Crossing was demonstrated in the editions of the *Guides to the Great Siberian Railway* and in the *Reference Books of the Transbaikal Railway*, which were repeatedly published and served a reference and publicistic material for the public. Special mention should be made of A.S. Melentyev's book *Transbaikal Railway in the Tim of Peace and the Russo-Japanese War*, which clearly outlines the problems that the railway workers of Siberia had to solve because of the beginning of hostilities in the east of the country [10].

Serious scientific study of the topic under interest only begins in the 1990s, and became more intense during the preparation for the celebration of the 100<sup>th</sup> anniversary of the Trans-Siberian Railway. In this regard, special studies were carried out on the history of the construction of the railway in Siberia, in which the special importance of the railway section from Irkutsk to Mysovaya station was clarified. In particular, several studies were devoted to the history of the Trans-Siberian Railway, which bears a certain importance for the country with a particular focus on a poorly studied matter, namely the history of transportation through Baikal in the absence of through railway traffic.

The history of the Trans-Siberian Railway in 1904 was covered by many authors, but there were not many scientific works about the work of the Baikal Crossing during this period. The last work, which deals with the organization of the railway crossing, was the fundamental work Security of Russia. One of the volumes of this book is specifically devoted to the analysis of the state of the railway industry in Siberia and addresses the issue of the value of the Baikal Crossing for the railway construction of the early 20th century, but it does not pay attention to the aspect of our interest [11]. In 2000, a special monograph dedicated to the 100<sup>th</sup> anniversary of the construction and start of operation of the Baikal Ferry Railway Crossing was published, in which one of the sections touched upon the topic under study [12]. In general, this book reflects the main aspects of the work of the crossing, but does not specifically emphasizes the wartime conditions. In addition, many events in the book are described exclusively factographically, not analyzed in their importance for the organization of transport. Several publications on the topic are also available in the popular science journal Siberian Land, but in general they are based on the materials of the above monographs.

Some aspects of our study were reflected in the publications of the collection *Local History Notes* and the *East Siberian Way* newspaper, as well as in small editions. Most of these publications are devoted to the history of the ice-breaker fleet at the Baikal, in which there are still many *blind spot* (for example, the loss of the Baikal ice-breaker). These publications are of undeniable interest to our study, but are mainly of a journalistic nature and build on already known developed plans.

#### III. PROBLEM STATEMENT

The authors studied the experience of representatives of all services of the Baikal Railway Crossing in organizing

transportation through the Baikal in wartime conditions. The industry leadership was located in St. Petersburg, and in the conditions of weak development of communication means it was on the ground that it was necessary to solve independently a complex of the main problems that slowed down the transportation. The authors drew attention to key problems: the development of the capacity of the Irkutsk-Baikal Port railway line, the creation of alternative routes for crossing the lake, the development of the railway route on the ice of the Baikal, the organization of ice carting across the lake. According to the plans, the ice-breaker service of the crossing was supposed to play an important role in the transportation, but due to natural circumstances at the beginning of the war the service was inactive. The authors paid special attention to the problems of interaction between different subdivisions of the railway crossing. Due to the use of a wide source base the authors were able to answer the questions raised and to reconstruct the process of operation of the Baikal Railway Crossing at beginning of the Russo-Japanese War.

#### IV. SOURCE BASE OF RESEARCH

The study covered different sources. In general, all materials can be divided into two groups: (1) archives and museums and (2) periodicals.

The first group of sources represents the variety of materials stored in funds of central and local archives and museums. Since the Baikal Railway Crossing Service was an independent department of the Ministry of Transportation of Russia, the archives contain special funds reflecting data on its activities. The authors studied the content of such funds in the Russian State Historical Archive and the State Archive of Irkutsk Region, as well as the materials of the funds of the Museum of the Department of the East Siberian Railway and the Ice Breaker Angara Museum. We shall highlight the reports of the crossing service, which were regularly submitted to St. Petersburg, orders and guidelines for the crossing service, as well as service notes issued in case of emergency. The archival files containing correspondence between the management of the crossing and the management of the Ministry of Transportation are very informative; many details of transport control can only be found there. Photo documents make it possible to clearly present the images of the organizers of works and ordinary workers, the scale and nature of the work done. Hence, it was also possible to look into the main details of images of the main technical structures (Baikal and Angara ice breakers, set up of shipping facilities at waterway stations, work on the construction of the railway line on the ice of the lake, etc.).

The second group of sources is not so diverse. There were not so many periodicals in the early 20<sup>th</sup> century in Russia compared to the present day. Moreover, they were censored even at the usual time and ever more at the outbreak of the war. In order to find out the details of the transportation process, the authors used the publications available in the local periodical press. These publications reflect the events at the crossing, as well as the opinion of journalists and public figures on the nature of that time, on the progress of works aimed at unimpeded movement of military columns and equipment through the Baikal. An important source for the authors was the publications of the journal *Railway Business* by the Russian Technical Society from 1882 to 1917. The authors of publications in this journal are professional engineers and technicians, who were directly involved in the organization of transportation and were engaged in the design of technical equipment.

### V. RESEARCH METHODS

The study was conducted using all-scientific theoretical methods of induction and derivation, abstraction and generalization, systematization and interpretation of facts. In order to make reasonable conclusions, the authors used sociological methods of analyzing the empirical data (content analysis, measurement, comparison). However, this study is mainly based on the historical method, and the guidelines of the study covered the principles of objectivity and historicism.

The empirical basis of the study included diverse data in terms of importance and nature, which was collected by the authors in archives and libraries. The use of standard search methods was hampered by the high degree of fragmentation of archival sources and the clarity of contained information.

In order to interpret the obtained data and summarize the results of the study, the authors relied on special historical methods. The historical and genetic method allowed systematizing the obtained data, establishing the main milestones of the process transportation through the Baikal. The use of historical and comparative method made it possible to consider different states of the process in unity, and at the same time to highlight specific features of certain states of this process, to clarify the importance of certain decisions in the joint activity related to transportation. Through causal analysis the authors were able to establish links between principal and secondary events providing for a logical sequence of states of the process under study. The use of historical reconstruction methodology allowed considering the processes of organizing the transportation within subjective and objective perspective. A complete picture of the process of organization of transportation works in complex natural, climatic and social conditions was obtained on the basis of historical and genetic method and the combination of synchronic and diachronic approaches.

#### VI. RESULTS

With the outbreak of the war it was urgent to develop freight and passage capacities of the Transbaikal Railway. The construction of Krugobayikal Railway connecting the Middle Siberian and Transbaikal Railway will be completed only in October 1905. Therefore, the capacity of the road was increased by additional tracks and trips. The carrying capacity could only be increased by traffic intensification. The traffic schedules were constantly changing. If at the end of 1903 the road was able to pass up to 7 train-pairs per day, then from April 1, 1904 -9 train-pairs and by the summer of 1904 - up to 12 train-pairs. Gradually the trains shifted from wood to coal heating: initially cheremhovsky coal was used on ice breakers only, but later, due to the gradual removal of firewood from the places of cutting and their increase in price, steam locomotives were also transferred to coal. This improved the efficiency of the road in general.

The organization of the crossing in wartime required urgent measures. On February 26, 1904, the Minister of Transportation M.I. Khilkov authorized the head of the Transbaikal Railway to independently make decisions assuming expenses of the treasury in order to speed up works on adjusting the transportation system. This concerned contracting issues, the acquisition of equipment and the increase in the staffing of different road services. The head of the railway was then to report to the minister on the facts of derogation from the instructions, but still such freedom of action contributed to further efficiency, especially since M.I. Khilkov himself was on the Transbaikal Railway almost all the time of the war. As for the Ministry, it also was not cutting down expenses. The problem of staff shortage was solved by attracting able-bodied local residents, for instance, in addition to salaries the employees of the railway and the crossing were paid the mobilization allowance: unmarried additionally received the third of the salary, while married - half of the salary. In some cases, soldiers were involved in the work at the crossing. Thus, in February 1904, the troop of soldiers of the Irkutsk Garrison was repairing the damage of the railway track [13]. This did not fully solve the problem of understaffing, but reduced its tension.

The organization of transportation was also hampered by natural causes. Thus, the winter of 1903-1904 was very cold and at the end of 1903 it became clear that due to rapid increase of ice thickness on the lake the Baikal ice breaker will only be able to transport cargo for a short time. Its termination was scheduled for January 14. In order to ensure transportation, the carriage ice crossing of passengers and cargo was launched already from January 12. The transportation was provided by Irkutsk merchants, who were obliged to transport soldiers and prisoners, passengers and their baggage, mail and money revenues and other cargo between Baikal and Tankhoy stations (42.5 km), and if necessary between Baikal and Pereemnaya (48 km) or Baikal and Mysovaya (77 km). According to the contract, the carriage crossing was to carry passengers and cargo daily in the number of two trains. The construction and maintenance of a sleigh road was carried out by the Railway Administration [14].

Thus, the creation of the carriage crossing was planned even before the beginning of the war, but from the end of January 1904 its work became more intensive. In view of the anticipated increase in traffic, special measures have been taken. Traffic on ice carriage road was carried out day and night. Sheepskin coats and felt snow boots, which were given to passengers for travel, were purchased at the expense of the road. The number of traction horses was significantly increased and reached 3,000 heads. Private stagecoach drivers were also involved in the transportation. The carriages were equipped with three labels with numbers: one was nailed at the arc, the other – to the back of the seat, and the third hung on the back of the driver [15]. This simple measure contributed to improving traffic safety and controlling its organization.

The condition of the ice road was maintained by specially created groups of workers who cleared the way and built bridges, put lighting at crack sites or even guard posts in dangerous areas. At night, the path was illuminated by lights on mile stones. Every 6 km warm barracks were built along the track and in the middle of the way – Seredina station, where

drivers stopped for an hour for rest, and passengers could have lunch in the dining room and warm up in warm buildings. In case of very frequent snowstorms and blizzard on the lake there were special bells to indicate the direction near all barracks. Besides, there was a telephone wire along the whole track, and the phones were available at Baikal, Seredina, Tankhoy stations, and in all barracks. Therefore, incidents on the road and the occurrence of cracks or drifts could be immediately reported along the whole line [13, pp. 249].

The leaders of the crossing exercised strict control over the carriers, and there was no complaint from the passengers. Between 12 January and 1 March, about 7,899 passengers were transported along this road from Baikal to Tankhoy and 6,023 in the opposite direction. The goods were transported to unloading, and during the same time 1,702 cars of cargo and 311 cars were transported from Baikal to Tankhoy station and back [14].

The increase of traffic volumes also caused additional problems for traffic organizers. Thus, already by mid-February 1904 Tankhoy station was filled with cargo to the bitter end. To solve the problem, the contractors began to transport cargo to the nearby station Pereemnaya and even to Mysovaya.

In general, the transfer of troops was also organized. The traffic schedule was built so that three to four military echelons arrived at Baikal station at night, between 12 and 5 a.m. At the station, the soldiers had breakfast, received warm clothes if necessary and were on their way to Tankhoy from 4 a.m. to 8 a.m. Usually the troops moved in columns, and the cargo followed the soldiers on carts. In all cases, the columns of soldiers were followed by several sleds for weakened people. At the Seredina station the soldiers had lunch, rested for two hours and moved on. In Tankhoy, the columns arrived from 3 to 8 p.m. and were housed in prepared warm cars. According to the reports of the crossing service, during the period from January 12 to March 1, 1904, about 12,297 officers of reserve lower ranks, 10,401 infantry soldiers and 3,200 artillerists passed along the carriage track from Baikal to Tankhoy [14].

More complex problems had to be solved during the transfer of rolling stock through the Baikal. As early as 1901, the projects on transportation of passengers in cars through the Baikal by means of steam traction were discussed [16]. But in those years, such a risky case was rejected by many people. Now by the order of Nicholas II the Minister M.I. Khilkov personally coordinated all works on the crossing of cars and steam locomotives.

The the rail track construction tasks on the ice of the lake as early as January 24, 1904 were taken over by Irkutsk merchant D.M Kuznets. The project of the railway and the materials for its construction were provided by the railway administration. D.M. Kuznets undertook to break the road under the track and clear snow and ice (4 m wide) from each side of the track. It was needed for the movement of horse traction and for the free supply of materials for track-laying from Baikal and Tankhoy stations. For this road it was planned to use the lightest rails, which were laid on 4-meter patches, and when building the line of descent on ice near Baikal station 2 kilometers of tracks were laid on 8-meter patches [14]. A big frost of November – December 1903 made the ice of the lake very strong. However, this was not the only problem the builders faced – it was also the uncontrolled crack formation in the ice, which overset all calculations. They learned to fight this on their own experience: in places of probable appearance of cracks the stands of untightened timbers were laid under the track, and rail joints in such places were not bolted. These measures strongly reduced the number of track damage.

As planned, tank-locomotives, the reserves of water and fuel in which were very limited and therefore required continuous replenishment, were used for the emergency transfer of cars through the crossing. On January 24, 1904, the head of the traction service S. Tvardovsky proposed a complex project, which provided for the creation of four "feeding points" of steam locomotives. This and many other projects have never been implemented in practice. The organizers considered the horse traction as the most reliable option.

On February 17, 1904, the rolling of cars began on the track through the Baikal. The Minister Khilkov personally followed the trial batch moving to Tankhoy. On February 18, more than 100 cars were put on ice moving by horses at a distance of 100 m from each other. At first, a four-horse team was used for the transfer, but then it was found that two animals are also able to do the job.

Certainly, the rolling of cars took a lot of time and effort. So, out of 100 cars put on ice on the first day, only 18 arrived to Tankhoy on the same day. But sometimes it was possible to roll up to 200 cars along the rail track. They were taken from the ice to the shore by a free steam locomotive, but if it was not possible, the cars remained overnight on the ice path, which was very dangerous. Thus, on February 27, due to the absence of a steam locomotive, Tankhoy accumulated 90 cars. To solve this problem, the head of the railway ordered to assign a permanent steam locomotive to the harbor [14].

The problem with the lack of cars for rolling was not resolved. There were also accidents on the road line that suspended the traffic. But the core of the problem was low capacity of the Irkutsk-Baikal line. Besides, postal and military cars returned almost entirely to Irkutsk. It turned out that only five trains could supply cars for crossing, but in wartime conditions it was required that these train sets, which had 23 cars each, should carry 30% of the cargo on their platforms. But the platforms were not yet moving over the ice. Thus, only 125-150 cars were actually supplied for ice rolling instead of the 200 required by the contractor.

In general, the rolling of cars continued until March 1, 1904, after which the rolling of steam locomotives was planned. The case was delayed due to the elimination of consequences of road destruction due to a severe ice fault along the road line from the 10<sup>th</sup> to 25<sup>th</sup> verst post. The crack developed at the end of February, and by March 2 it had extended to 20 km weaving along the track and passing between the rails. As a result, it was necessary to move the path from the crack along its entire length. This task was only completed by March 5. The railway track was moved aside by 20-50 m along the entire crack [14]. To test the strength of the track on that day, 28 loaded freight and 10 passenger cars were sent to Tankhoy. The path turned

out to be strong, and from March 6 the rolling of steam locomotives began.

However, there were different problems. The attempt to use sledges to transport steam locomotives through the Baikal ended in failure: the sledges, on which the steam locomotive was laid, were frozen into the ice, and even 20 trios of horses were unable to rip them off. According to another plan, the steam locomotives were supposed to be transferred entirely by means of horse traction. The thickness of the ice allowed, but the cracks weakened the strength of the path. The attempts to transport a small old locomotive along a track laid on the stand, through a crack, proved the risk of the plan. The steam locomotive settled with its front wheels into the ice, it was pulled out and transferred ashore, but this method of transportation was abandoned. It was decided to disassemble the steam locomotives into two parts: the boiler was removed and loaded on two platforms, and the frame of the steam locomotive on wheels moved on the rail road in a known way. In Tankhoy these parts were assembled in especially built temporary workshops [14]. According to this scheme, 65 steam locomotives were transported to Tankhoy and at the same time goods and passenger cars were rolled over. However, as early as 9 March, a serious increase in the crack along the track was observed, and the road management decided to stop the rolling of steam locomotives.

Meanwhile, spring was coming quickly, and the ice started thoroughly melting. On March 15, the railway began to be dismantled, which also required serious actions. It was decided to transport the first ten versts of the roads to Baikal station, and the rest to Tankhoy. It happened that the loaded cars, waiting for a queue for removal, were heating the tracks on which they stood. There were periods when there were not enough working hands for disassembly and loading of rails and sleepers [14]. But overall, the contractor D.M. Kuznets did his job well. Later, for his participation in the works on the crossing, he was awarded gold watch and the rank of the hereditary honorary citizen.

The termination of carriage and sleigh roads again aggravated the need for transportation. Now the hope was laid on ice breakers. The Minister reported to St. Petersburg that the navigation for ice breakers could not begin until April 20, 1904. [17] In the meanwhile everything was being prepared for navigation, which was opened that year on April 18. By that time, the repair of Baikal and Angara was completed, and they were able to get underway breaking the melty ice. On 22 April, the Baikal ice breaker had already reached Tankhoy.

By the order of the head of the railway of April 21, 1904, clear conditions were defined for preparation of cars for loading on the ice breaker, landing of troops on a ferry, rolling of cars with horses and platforms with heavy loads on it. By the order of April 29, 1904 the procedure for transportation of troops on Baikal and Angara ice breakers was defined. It was intended that the ferry should carry 2-3 military echelons per each travel. Even before the arrival of the ice breakers, the soldiers had to climb the upper parapet of a wharf, from where the soldiers were getting onboard. The soldiers were getting onboard at the command after the ice breaker produced a second whistle. Some of the soldiers that embarked onto the upper deck were then transferred to the carriage deck at the direction of the ferry captain.

All Baikal unloading and loading operations were continuous. A serious problem in the organization of traffic at the crossing was related to the need for correct car spotting. According to its specifications, the Baikal had a 1° list to port, so the cars had to be distributed in advance depending on cargo weight. The cars on a starboard should be heavier than the cars on a portside. This shall be taken into account during loading. Besides, it was necessary to bring three cars with coal from the shore, which will be unloaded into the coal pit of the ice breaker, when the ferry was unloaded immediately upon clearing of the middle track. Once the cars were removed from the extreme tracks, the rolling of new cars on the ferry began. In general, it was done in this order: (1) at first half of a train set was conveyed to the portside of a ship, (2) then all cars were supplied to the starboard, (3) other cars were brought to the left lane, (4) empty cars unloaded from coal were removed from the middle lane of the ferry, (5) all cars were brought to the middle lane.

During the war, the ferry carried both mortars, submarines, and heavy coastal guns. Earlier they were delivered to the Far East by sea, but now this way was cut and such cargo went along the Trans-Siberian Railway through the Baikal Crossing. The ferry also handled such cargo thus ensuring the continuity of cargo and passengers. It was assisted by the Angara ice breaker and other vessels, the joint work of which helped the country during this tough time.

#### VII. CONCLUSION

The studied issues are of particular importance for explaining the historical process in Russia during the beginning of the Russo-Japanese War. The country had to mobilize. The Trans-Siberian Railway and it's the most sticking point – Baikal Railway Crossing – rendered invaluable assistance to the country.

The war was unexpected, but the actions of workers of all services of the Transbaikal Railway were successfully coordinated. The management of the industry as a whole, the Directorate of the Transbaikal Railway and the service of the Baikal Railway Crossing managed to ensure efficient transportation.

The decisions of the heads of the railway and the service of the Baikal Crossing were often dictated by the wartime features. The organizers did not spare their own efforts or those of ordinary workers. In many ways, therefore, it was possible to maintain the railway in harsh natural winter conditions of 1903-1904.

The rationalization of decisions taken by the management was undoubtedly facilitated by the experience gained in 1900-1903 in the construction and operation of the railway crossing at the Baikal, both the experience in the operation of ice breakers and the experience in the arrangement of carriage tracks. Due to this, the road was ready for complex tasks.

In order to carry out difficult works, the managers of the crossing bravely attracted private entrepreneurs. The experience of the crossing in wartime showed the possibilities



of effective interaction of private persons with state structures in solving critical state tasks.

The experience gained in the organization of railway transport on ice, when rolling stock and locomotives were transferred along a hastily arranged line, is especially highlighted in the history of Russian Railways. Although such movements were very complex and quite expensive, they were well organized and there were no major accidents during these movements.

However, the study also revealed quite high cost of ice transportation. Not only in winter, but also in summer, even with the full use of the Baikal ferry and the Angara ice breaker the transportation of cargo and passengers along the railway opened in the autumn of 1905 was more profitable.

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