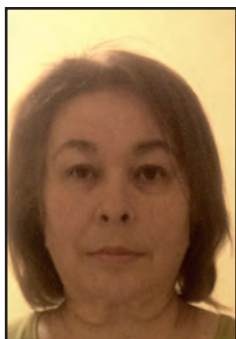




On the Water like on the Dry Land



Shelikhova, Alla K., Russian University of Transport, Moscow, Russia.*

Alla K. SHELIKHOVA

A short review is devoted to the history of the bridges and other means of crossing rivers by transport vehicles in St. Petersburg.

The line of electric tram laid directly on the ice of the frozen river is among most uncommon engineering solutions.

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*Information about the author:

Shelikhova, Alla K. – Head of the RUT Transport editions, Member of the Editorial Board of World of Transport and Transportation Journal, Russian University of Transport, Moscow, Russia, shelikhova.alla@yandex.ru.

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St. Petersburg, as everyone knows, is a city on high water. And freezing takes a special place in the fate of the city and its history. It is sufficient to recall the blockade of Leningrad. At all times and at any time of the year the Neva was the city's «transport artery».

The uniqueness of St. Petersburg lies in the fact that it stands on a very wide and very deep river. And the centre of the city is actually a huge body of water. In winter, this very body of water is covered with ice. Such a large-scale «urban» freeze-up, of course, is not found anywhere else in the world.

Until the middle of 19th century, there were no «real bridges» in the «city on the Neva». Why?! There are three simple explanations for this.

Firstly, Peter I considered the water area of St. Petersburg to be one large harbour, into which ships from all European countries should enter. And bridges would interfere with shipping.

Secondly, the bridges were not built for safety reasons – the city constantly suffered floods and storm winds from the Gulf of Finland, which could damage these structures.

There was also the third reason. Peter wanted to force the inhabitants of the capital

to move along the river and numerous canals in boats and private ships, as was the case in Amsterdam. He wanted to teach city dwellers to sail on ships.

But how then did the Petersburgers get to the other side before appearance of permanent bridges? And this was a daily requirement, especially between Vasilievsky Island and the Admiralty district. The first pontoon bridge was erected in 1727, it connected Vasilievsky Island and the current Senate Square. What is a «floating bridge»? It was also customary to call it pontoon (from Dutch *plaatschuit*: *plaat* – flat, *schuit* – boat). A pontoon is a small cargo ship that is very well suited as a support for a floating bridge. But that first bridge at Senate Square stood only for a year, then it was dismantled and was never restored.

Five years later, the Admiralty Collegium, which oversaw construction of bridges, decided to recreate the pontoon bridge. The new bridge was named Isaakievsky in honour of Isaac Dolmatsky. In the place where the Bronze Horseman now stands, there was the Church of St. Isaac of Dolmatsky, built during the reign of Peter I. It was decided to build the bridge nearby. After the ice drift and until the next freeze-up, it provided the passage across the Neva.

For crossing the bridge, a fare was charged: 1 kopeck – from a pedestrian, 2 kopecks – from a horse, 5 kopecks – from a carriage. It was quite a feasible amount – the average citizen could afford it. But by the middle of 18th century, by order of Elizaveta Petrovna, the fare on the crossing was cancelled.

Real permanent bridges across the Neva appeared only in the middle of 19th century. The first arched bridge was built in 1850. It was named Nikolaevsky (since 1918 – Lieutenant Schmidt Bridge, since 2008 – Blagoveshchensky).

After the Nikolaevsky bridge had been built, Isaakievsky was moved towards the Stock Exchange – where the Palace Bridge now stands, the construction of which began in 1913. Then Isaakievsky bridge was returned to its original place.

It stood until 1916. A spark from a passing tug hit the pontoon. Isaakievsky bridge was lit with kerosene lanterns and kerosene was stored inside the ship. The bridge burned to the ground, and pieces of it floated along the Neva towards the Gulf of Finland. Anna Akhmatova became an accidental witness of this fire and described it in her diary.

But when there were no bridges in St. Petersburg yet, the inhabitants of the city were ferried from one bank to the other by boat. There was a large boat trip where Gagarinskaya Street is now located. And this street is called not in honour of the first cosmonaut, as many think, but thanks to the «Gagarin ferry», which belonged to prince Gagarin. In winter, the boats were replaced by sled carriages.

In 18th century, as soon as the Neva froze, the floating bridges were dismantled. People just started to move on the ice. But Isaakievsky pontoon bridge in 19th century was already in operation during the freeze-up period. Numerous oversized cargos had to be transported across the





Neva, but it was dangerous and not very convenient to do this on ice on a sled.

But the most unusual «transport project on ice» can be safely called the «Ice Tram» in St. Petersburg. The «most unusual» in Russia, and in the world, the tram line amazed not only by the fact that it operated from 1895 from the contact network.

In 1874–1876 Russian engineer Fyodor Apollonovich Pirotsky conducted a series of experiments on transmission of current along rails over a distance of 1 km. For this purpose, he used an abandoned section of Sestroretsk railway, one of the rails of which was a direct wire, and the other was a reverse. The experiments were successful and already in 1876 Pirotsky installed an electric motor on one of the carriages of Petersburg horse-drawn railway. After a series of tests carried out, on August 22, 1880 at 12 noon in St. Petersburg, on Peski, this is at the corner of Bolotnaya Street and Degtyarny Lane, that for the first time in Russia the possibility of a tram car movement was tested by «*electric force running on rails along which the wheels of the carriage are rolling*». The motor suspended from below, the transmission of rotation by means of gears and a number of other devices were made by Fyodor Pirotsky himself together with another outstanding electrical engineer — Vladimir Chikolev. The former No. 114 horse carriage was destined to become the world's first electric tram. Despite the heavy load — 40 passengers — the carriage moved «at the speed of a horse trot» (about 36 km/h), sufficient speed for urban

transport. There are reports from which it follows that the experiments continued for several days; September 1, 14, 15, 16.

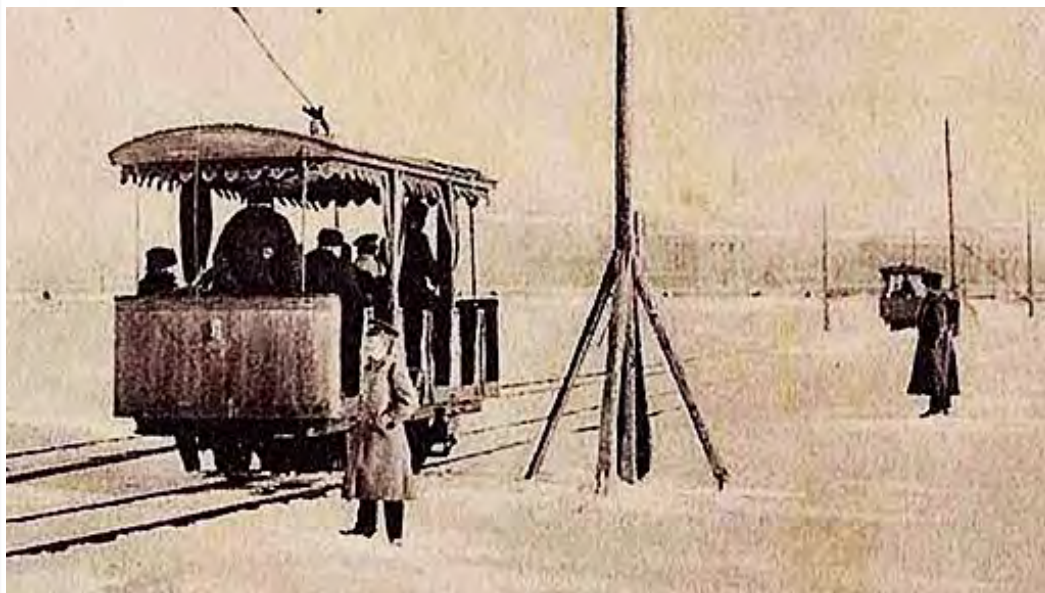
The carriage, which moved independently, amazed all the spectators gathered in the Rozhdestvensky park. In the words of one of them: «*It is strange, even creepy to look at a carriage that moves without a horse and which, at the mere request of the coachman driving it, can suddenly stop and move in the opposite direction*».

Despite the successful experiment, the owners of horse-drawn railways were not very happy about this and did not support the innovation. Re-equipment of the existing horse-drawn road into an electric one required an impressive investment, and the owners of the horse track did not see any additional benefits. Because of this, the opening of tram traffic in St. Petersburg was delayed by as much as 27 years.

The whole point was that between the Joint Stock Company of Horse Railways and the city authorities since 1875 a long-term agreement was concluded prohibiting the transfer of the right to passenger transportation in St. Petersburg to anyone else. The government could redeem the horse-drawn railways only after 15 years, or in forty years the roads themselves had to return under government control.

By this time, the tram had become a familiar form of transport, which was already in full swing on the streets of Vitebsk, Yekaterinoslav, Zhitomir, Kazan, Kiev (here the tram started operating first, in 1892), Kursk, Moscow, Nizhny Novgorod, Orel, Sevastopol... And in





St. Petersburg, the most popular form of transport was horse-drawn trams, which appeared in the city in 1863.

Two horses were pulling a metal carriage along the rails, inside of which there were seats for passengers. On the back landing there was a staircase that led to the imperial (roof), there were two benches with their backs to each other. At the front part of the car there was a small platform for the cabman driving the horses. The speed of such cars did not exceed eight kilometres per hour. A ride inside the carriage cost 5 kopecks, on the roof – 3 kopecks. In the 90s of 19th century, the horse tram carried about 57 million passengers annually and brought huge profits.

Since the law protected horse-traders from competition only on land and city streets in 1894, the Engineers of the Society of the Finnish Light Shipping Company under the leadership of R. K. von Hartmann, who came up with this grandiose project, decided to start the carriages along the frozen river, laying sleepers and rails there, and installing pillars frozen in the ice.

They organized the so-called «rail roll», which successfully operated for two winters. At first, the cars were small and moved in a natural way along an inclined route from one bank of the Neva to the other.

The very first ice line was laid across the Neva between Senatskaya Square and Vasilievsky Island and had a length of only 180 fathoms

(about 380 m) – i.e. in fact, it was just a transport from one coast to another. Nevertheless, it enjoyed immense popularity. Therefore, the very next year, the «Imperially approved Partnership for operation of electricity by M. M. Podobedov and Co» was created, which first laid three tram routes across the ice: from Senatskaya Square to Vasilyevsky Island, from Palace Embankment to Mytninskaya Embankment, from Suворovskaya Square to the Vyborg side. Then another route was added: from Suворovskaya Square to the Petersburg side. The transports themselves also belonged (perhaps not all) to the partnership of M. M. Podobedov and Co.

The miniature open cars were replaced by a real electric tram, which the townspeople immediately called the «ice tram».

28 thousand rubles were spent on preparations for the launch of the tram across the ice of the Neva. On January 19, 1895 according to the old style (February 2 according to the new), the first electric tram was launched.

It was the first affordable electric public transport. The current on rails of the narrow-gauge railway was fed by a dynamo installed on a barge near Mytninskaya embankment. The pantograph was rod-type, 1067 mm track, 225 V voltage, speed of 20 km/h, 20 seats. Single-track lines were operated, but there were also double-track inserts-passing. Most likely, the ice under the roadbed was additionally reinforced by pouring water. Pillars were frozen into the ice, along which wires were pulled, and

current was sent along them and on the rails. The carriage of the horse tram was used. The fare was from three to five kopecks, for children with parents the ride was free.

As the magazine «World Illustration» wrote in 1895: «*During movement of the carriage, sparks appear in uneven places of the wire in contact with the electric receiver, producing a curious sight. The movement of the car is regulated by closing and uncoupling of the electric current and special brakes. All carriages have been assigned for transportation of passengers so far, and payment for transportation is set at three kopecks per passenger*».

During the entire existence of this tram there have never been sinkholes under the ice. The engineers worked very competently, calculated the thickness of the ice, the rails were laid in those places where the ice was strong. The most serious accidents that have happened over the entire period of operation are wire breakage and «self-propelled» tram without a driver, when the car began to slide by itself. But there were still accidents. Several cases were described in St. Petersburg newspapers of that time. Somehow it was reported that the wires were broken, as a result of which the tram stopped in the middle of the river, and the passengers had to walk. And once a thaw was reported, when «the river rose and spoiled the rails».

Ice trams travelled on four routes:

- «Senatsky transport» between Senatskaya Square and Rumyantsevsky Square on Vasilyevsky Island;

- «Palace transport» from the Winter Palace to Mytninskaya embankment on the Petrogradskaya side (probably, there was still a stopping point near the spit of Vasilyevsky Island);

- Line from the area of Suvorovskaya square to the Vyborg side;

- Line from the area of Suvorovskaya square to the Petrogradskaya side (was laid later).

The first electrified line on the ice became «a great convenience for the inhabitants of the Petrograd side», wrote the same magazine «World Illustration»: for three kopecks, they received «*excellent fast communication with the central parts of the capital*». Crossing the Neva on ice from the Winter Palace to the Zoological Garden in a small «self-propelled» trailer was considered a fun winter attraction.

According to employees of «Gorelektrotrans» of Petersburg, winters at that time were severe, and Petersburgers were not at all afraid to use

such transport, and with the onset of spring, after an ice drift, ferry crossings began to operate again on the same routes. The «ice trams» started work as soon as the ice became strong — around January 20, and finished on March 21.

The project turned out to be quite profitable — in the first season, about 900 thousand passengers were transported, which prompted the city authorities to litigate with the owners of the horse-drawn railways. The litigation lasted from February 1896 to September 1902, with the aim of invalidating the aforementioned 1875 treaty. After the victory in court, the City Duma decided to build ground tram lines. On September 16, 1907, the first route from the General Staff Building to the 8th line of the Vasilyevsky Island was opened. But the «ice tram» continued to carry passengers for three more years.

In 1910, tram lines were laid on the ice of the Neva for the last time. Unfortunately, apart from the drawings kept in the city museum, no evidence and samples of the «ice tram» have survived. By the end of the 80s of the last century, the tram system in St. Petersburg became the largest in the world and was included in the Guinness Book of Records.

REFERENCES

1. From horse tram to the electric tram: from the history of transport of Petersburg [Ot konki do tramvaya: Iz istoriyi Peterburgskogo transporta]. The album. Compiled by E. Shapilov, M. Velichenko, L. Protsay, N. Buiniakova. St. Petersburg, Liki Rossiyi publ.; Moscow, Juliya publ., 1993, 239 p. [Electronic resource]: <https://www.rulit.me/books/ot-konki-do-tramvaya-iz-istorii-peterburgskogo-transporta-sostaviteli-shatilov-e-velichenko-m-proshch-download-558746.html>. Last accessed 20.10.2020.

2. Tram and trolley bus of St. Petersburg. Dedicated to the 90th Anniversary of inauguration of tram traffic in the city [Tramvay i trolleybus Sankt-Peterburga. K 90-letiyu otkrytiya tramvaynogo dvizheniya v SPb]. Written and compiled by M. N. Velichenko, B. S. Kantorovich, L. G. Pitkanen, V. A. Popov, Kh. S. Rubin. St. Petersburg, Liki Rossiyi publ., 1997, 240 p.

3. Ice Tram on the postcards [Ledoviy tramvay na otkrytkakh]. Peterburgsky kollektsioner, 2007, Iss. 4 (44), pp. 46–47. [Electronic resource]: <https://www.studmed.ru/peterburgskiy-kollekcioner-2007-04-44-be3db8fc6e3.html>. Last accessed 20.10.2020.

4. Alexandrov, F. Winter tram routes to cross Neva [Zimnie tramvaynye puti cherez Nevu]. Adresa Peterburga, 2004, Iss. 11 (23). [Electronic resource]: <https://adresaspb.ru/category/different/history/zimnie-tramvaynye-puti-cherez-nevu/>. Last accessed 20.10.2020.

5. Ledovy tramvay [Ice Tram]. [Electronic resource]: <https://fishki.net/anti/1307474-ledovyy-tramvaj.html>. Last accessed 20.10.2020.

