



## DZHANKOI-KHERSON RAILWAY BUILDING ON THE SOUTH OF UKRAINE

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**Abstract.** The article focuses on the peculiarities of Dzhankoi-Kherson railway building on the South of Ukraine at the beginning of the 20<sup>th</sup> century.

**Keywords:** railway, building conditions, budget, sleepers, railway stations.

For today the issue of regional (still it is of great importance) railway building in Ukraine remains poorly investigated, this fact indicates the topicality of the offered problem.

Dzhankoi-Kherson railway was built by the Black Sea railway society. It started from the station Dzhankoi of the South railway and went to the north-west, it turned westward after crossing the Dnipro below the Ingulets and then it was connected with Kherson-Mykolaiv railway near Kherson, so it passed through the modern Kherson area and the north territory of the Autonomous republic of Crimea. This railroad line had to connect the station Uman of the South-west railway and the station Tuapse of Tuapse-Novosenaki railway line of the Black Sea railway society, which was already building and was settled to build on July, 10, 1915 and characterized as a transit line (Konovalov 2010). It should be mentioned, that regulations of the Black Sea railway society were ratified on August, 24, 1912 (Konovalov 2010). Railway line direction was approved in summer, 1915, then the line was divided into sections, rights of way were outlined and contracts of land purchase were concluded with peasants (Konovalov 2010).

The incumbent councilor of State, the engineer of communication lines V. M. Senia-  
vin was appointed a building supervisor of Dzhankoi-Kherson railway line by authority of Minister of communication lines on August, 5, 1915, he took up a position of an engineer of V class (Konovalov 2010). On September, 3, 1915, it was found out, that the Black Sea railway society had to begin building of the line not later than one month after the approval of an executive project and pay list, and to start railway traffic on the new railway line not later than three years after the day of beginning works, but owing to the known events that took place in 1917–1920 this condition was not executed. Management of railway building had to be placed in Kherson, but temporarily before the beginning of building it was situated in Petersburg under the Black Sea railway management (Konovalov 2010).

<b>The Old Russian measures</b>	
1 verst	1066.78 meters / 1.6 km
	500 sajenes
1 sajene	2.13356 meters
	3 arshins
1 arshin	0.71 metres
	16 vershok
1 pood	16.38 kilogram
1 kilogram	0.06105 pood
1 dessiatina	1.0925 hectare
	2400 sq. sazhen
	2.7 acres

At the end of January in 1916 the commander of the Black Sea Fleet, admiral Eberghardt stated on the necessity of the rapid opening of railway traffic on the Dzhankoi-Kherson railway line for the fleet and insisted on sale of rails and fastenings for the Black Sea railway society. However, in the middle of the year 1916 it turned out that it was impossible to get the stated goods because workers were just engaged in preparatory works, an alienation of land and survey of the Dnipro within railway (Konovalov 2010). It is necessary to mention that building of Dzhankoi-Kherson railway line was endorsed with the resolutions No. 49 and No. 62 of the engineering council which were approved on May, 5 and July, 8, 1916 (Konovalov 2010). In August 1917 all documents for railway building were collected, i.e. projects of the stations, different buildings, bridges, different technical calculations, land alienation documents and etc.

The budget of railway usually consisted of four lists – A, B, C and D. Thus, in the list A basic building expenses were specified, namely, land alienation; building of railway bed; artificial buildings (stone and iron tubing, bridges); overhead structures (cross-bars, rails and fastenings); road implements (milestones, road signs, trolleys, flags and instruments for repairs of road, snow fences); a telegraph; watch houses; barracks and crossroads; station buildings (passenger structures, passenger, truck and transfer platforms, warehouses, cellars, smithies, pantries, storehouses, etc.); water-supply of the stations (water towers, pumps, wells, tubing); station implements (railway points, frogs, semaphores, loops, stop blocks, cobbling areas around passenger houses and freight yards, barriers and fences, furnishing of the stations, scales, illumination, devices for fire extinguishing, devices for oil); special works (development of the stations, building of the multiple junctions and arranging of interim ferriage across the Dnipro); general expenses on administration and medical service, implementation of survey, planning of railway line, returning of a part of expenses after first-priority surveys,

expenses on interim traffic, maintenance work on a car, expenses of other departments (upkeep of government inspectorate, upkeep of local state control, upkeep and quartering of representatives of gendarme department, upkeep of military department). The cost of rolling stock, its checkout, acceptance and its transportation on the line was determined in the list B. Extraordinary expenses which could happen depending on different circumstances were in the list C. Working capital and the capital which had to be used for buying of necessary supplies during exploitation of railway was stated in the list D (Konovalov 2010).

The length of ways of railway was as follows: the length of the backbone was 177.4 versts, station and railway siding – 41.7 versts, total length – 219.1 versts, but in the main calculation book it was written that the distance was 176 versts. It is necessary to state that the railway line crossed the river Dnipro 14 verst away from Kherson and starting from the 18<sup>th</sup> verst and up to the terminal station ran through a plain (Boghatchuk 2000: 196).

According to the budget it was necessary to alienate 1064.4 dessiatinas of land from Kherson to Dzhankoi for building of the railway. The average cost of land was about 348 roubles 81 kopecks, but the Society accepted the price 20% higher than the previous one, it made up 420 roubles. In 1916 according to the list A building cost was 18 046 893 roubles, i.e. it was 102 539 roubles per verst of the backbone (Konovalov 2010), but grand total of Dzhankoi-Kherson railway building according to four lists was 20 450 042 roubles, that compared to the previous calculations was 6 255 769 roubles higher. Such difference was caused by the increase of prices on goods and services, however that sum was not final, as in 1917–1918 hyperinflation began all over the country (Konovalov 2010).

Dzhankoi-Kherson railway line was unprofitable because of the lack of building materials, there were no forests, stone quarries and large brickworks, with the exception of Kherson, there was no drinking-water on a certain distance that is why all necessary goods should be delivered from Kherson or Dzhankoi (Konovalov 2010).

Water plays a considerable role for railway transport that is why during the whole building water supply was severely stipulated at the stations. An amount of water for train services at the terminal stations was not less than 20 tenders with 565-cubic feet capacity, at the way stations with depots it was not less than 40 tenders. The water-points were situated near natural sources such as rivers, ponds, wells, blow-wells. It was permitted to make artificial reservoirs, but the use of water was allowed after a chemical analysis. Water reservoirs had to contain several tanks at volume more than 8 cubic sajenes, at a height above 4.5 sajenes.

Trains should satisfy the following requirements: passenger steam locomotives according to their construction had to go with the speed of 60 verst/h., their weight should not be less than 200 tons while going up the sloping direct line not less than 0,002. Goods steam locomotives should not be worse than passenger ones (Konovalov 2010).

There were 5 stations of class IV on Dzhankoi-Kherson railway: Oleshky Station was situated on the 20<sup>th</sup> verst, Velyki Kopani Station – on the 43<sup>d</sup> verst, Perekop Sta-

tion – on the 105<sup>th</sup> verst, Denhelchyk Station – on the 128<sup>th</sup> verst, Eskykoitama – on the 153<sup>d</sup> verst. These stations were used foremost for butt-jointing and passing of trains, and also for landing and boarding of passengers, unloading and loading of local goods. Water supply of the steam locomotives of passenger and goods trains was carried out at the railway stations in Velyki Kopani, Denhelchyk and Eskykoitama (Konovalov 2010). Workers had to build four railway tracks at each railway siding and way station in addition to the main one. In addition, on this railway line several military passing tracks were planned, such as the Dnipro on the 11<sup>th</sup> verst, Radenske on the 33<sup>d</sup> verst, Brylivka on the 54<sup>th</sup> verst, Obrazhenka on the 92<sup>d</sup> verst, Filativka on the 117<sup>th</sup> verst, Karleutskyi on the 141<sup>st</sup> verst, Bohemka on the 165<sup>th</sup> verst, where, two passing tracks were built in addition to the main one (Konovalov 2010).

*Alienation of land.* Alienation of land for railway building was done in a great amount, railway should not be narrower than 20 sajenes, with the exception of cities, settlements and localities with the considerable value of estates, where the distance to the axis of the second track could be 6 sajenes, very seldom it could be 4 sajenes. A width of subgrade on railway hauls, if there was just one line, was 2.60 sajenes, if there were two lines the width increased up to 4.60 sajenes. A width of subgrade should not be less than 7.60 sajenes on the passing tracks where there were three lines. On the way to bridges one line subgrade widened on 0.20 sajene at a distance of 5 sajenes from every bridge abutment (Konovalov 2010). Hence, rural communities asked peasants not to plant grain within the limits of 20-sajene area of alienation, but sometimes it did not work because there were no signs that is why it was arranged with the representatives of rural communities and other landowners that there should be a restrictive trench (Konovalov 2010).

During the process of alienation of land a price fluctuated from 100 roubles to 500 roubles per dessiatina depending on its soil and location. All land bills of sale were executed by Kherson notary S. A. Charnetskyi. In case a notary could not arrive in a village for making similar contracts (though it happened very rarely), a way to Kherson and back by authority of the chief engineer was repaid to the peasants or landowners by the Black Sea railway society (Konovalov 2010).

During Dzhankoi-Kherson railway building not only arable land but also farmlands were dugged out, all buildings, including houses, were demolished at a distance of ten metres away from the railway (Konovalov 2010).

*Building of interim river crossing and bridge.* According to the main project Dzhankoi-Kherson railway crossed the Dnipro below the influx of the Inhulets. The most comfortable place for building was near Shyrokye village above the town of Oleshky on the 14<sup>th</sup> verst of the line. It was decided to build the bridge across the river in that place (Konovalov 2010). On February, 24, 1915 five bridge projects were approved. Under the main variant (Variant A) ten 58-sajene trusses crossed the riverbed and backwater. In accordance with the variant №1 there were three 75-sajene trusses and two 58-sajene trusses; in the variant No. 2 there were six trusses, each 58 sajenes long; in the variant No. 3 seven 50-sajene trusses were mentioned and in the vari-

ant No. 4 there were two 75-sajene spans overlapped with cantilevered trusses, two 64-sajene spans overlapped with suspended 50-sajene trusses with a cantilever, one 79-sajene span overlapped with a 50-sajene truss with two cantilevers.

In all four variants the bridge was planned on the line with a slope of 0.004. The distance between the bottom of the truss and water surface in the navigable part was 8 sajenes. The main idea of the bridge scheme was common for all variants. It was planned to cross the backwater with 25-sajene trusses for carts driving above them and metal transition 12-sajene trusses of spans on the right and left banks. All trusses were with a curvilinear girth (Konovalov 2010). Piers and wooden spans were allowed for an interim building and they should not be higher than 4 sajenes (Konovalov 2010).

Transportation of building materials from Kherson to Oleshky was performed by a boatman L. O. Elperin during the navigation. In 1916 it should be paid 26 kopecks per wooden sleeper, 8 kopecks per pood of rails and 60 kopecks per barrel of cement (Konovalov 2010).

According to the engineering council register of June, 8, 1916 travel part of the bridge was placed high enough, that clearance space under it in the middle of the third span was 8 sajenes. Such distance was considered to be optimal because the height of masts and spars of river boats from water surface was 50 feet (Konovalov 2010).

In summer 1917 it was planned to build 14 versts of the line from Kherson to the Dnipro and to drop bridge cofferdams in autumn of the same year. That plan was not fulfilled because of the revolution. Delivery of building materials was stopped and only small quantity of it was delivered to Kherson at the end of the year. Rolling stock, purchased in 1916, and a part of sleepers were transferred to Tuapse-Novosenaki railway.

It is necessary to state that only in 1939 railway bridge building was begun farther Antonivka. Piers were placed on the bank and building was stopped in the result of World War II. In 1944 German soldiers built a pontoon bridge across the Dnipro during occupation but soon it was blew up. After the War, in 1949 a railway regiment was charged to build the bridge. A settlement and a building ground appeared there.

Railway bridge building across the Dnipro was completed on December, 12, 1954 and it was set in operation (Kucherenko 2004: 14).

*Transportation of sleepers and other materials.* Under the agreement of August, 26, 1915 the administrative board of the Black Sea railway and Petrograd-Brahorsk timber processing stock-company made a vendor contract. A supplier should supply sleepers for railway building. According to the contract it was necessary to deliver not more than 120 000 of pine sleepers and not less than 80 000 of fir sleepers to Dzhankoi. Final delivery date of 130 000 of sleepers was on November, 1, 1915, final delivery date for the rest of 70 000 of sleepers was on December, 1, 1915. Later it was postponed on January, 20, 1917. It was prohibited to mix those sleepers with the piles of sleepers of another supplier. The other supplier was S. Z. Hurarii.

The Black Sea railway society paid 1 rouble 99 kopecks per every inspected pine sleeper and 2 roubles 09 kopeks per fir sleeper. In 1918 the price raised to 5 roubles 50 kopecks. It included all loading and unloading expenses, transportation, military

tax, warehouse rent, stacking, insurance, etc. The sum total was about 406 000 roubles (Konovalov 2010).

It should be mentioned that there was one more vendor contract; it was made on August, 19, 1915 with S. Z. Hurarii. The agent of the Black Sea railway society O. K. Karpov was responsible for the quality of sleepers. Supplier's representative Y. N. Zlatopolskiy controlled an acceptance and transfer of goods. Insurance agencies "Volga", Odessa insurance partnership, "Russian Lloyd" insured the sleepers (Konovalov 2010). On January, 1, 1917, insurance expenses were 4.750 roubles (Konovalov 2010). The acceptance of sleepers was carried out at Tsaritsyno, Uryssa, Holovanovo, Sarepta, Khotynets, Malyhino stations. Freight charges per rail from Tsaritsyno to Dzhankoi were 40.428 kopecks under the first consignments (Konovalov 2010).

The acceptance of sleepers was conducted in two phases. At first they checked a quality and size of sleepers according to technical specifications, then checked sleepers were counted. Unfit sleepers were piled separately in term of seven days and during one month the supplier had to take it out from the station, otherwise the Society could sell it (Konovalov 2010).

Different situations happened during the check up of sleepers. On September, 10, 1915 only 2 340 of 49 289 of sleepers were considered to be fitting. That problem arose because the sleepers were not piled and inspectors could not check and measure it, there was no acceptance certificate. The acceptance was suspended and it was advised to pile the sleepers (Konovalov 2010).

On January, 12, 1916 an assistant chief of the district inspected Kherson port station and there was assigned an area in the remote place for a warehouse of building materials. Eight carriages were unloaded there. Seven carriages were firstly unloaded in the freight yard of Kherson station but then removed to the warehouse. Sleeper butts were covered with lime for a longer storage (Konovalov 2010).

The Society was also obliged to build a telegraph. The supplier of telegraph posts was chosen a businessman Y. S. Kunin and on November, 13, 1915 there was made a vendor contract with him. On July, 16 and on June, 15, 1916, there were delivered 2 745 of posts. There were only 62 unfit posts, but a great number of posts were badly unbarked and about 20% of posts from the first and second deliveries were 0.25% thinner, it was 18% of a total amount of cargo (Konovalov 2010).

On March, 3, 1917 there was made a vendor contract with industrialists Z. Y. Bepalov and B. A. Liublin. They had to deliver 4 250 of 9-arshin and 12-arshin logs. Sum total was 60 000 roubles. Logs should be transported from Bohushevskaiia station of Riga-Orlovskaiia railway to Kherson station. On August, 16, 1917 delivery advance of 30 000 roubles was paid. On September, 30, 1917, the industrialists sent a telegram and asked for a permission to sell logs because there were no carriages for its transportation. Logs were needed for bridge building across the Dnipro, later it was found out, that the administrative board abolished these works, as workforce prices had improved and revolutionary events took place in Russia that is why there was no necessity in logs (Konovalov 2010). Nevertheless an order term was extended to October, but the

delivery took place on November, 13 and 15, in an amount of 9 carriages of 70. Through the dramatic change of circumstances there was no need in these building materials. The rest of the carriages (61 carriages) were passed to Kherson committee of aircraft factory building (Konovalov 2010).

During backbone building pine sleepers were used. 50% of sleepers were of type No. 1 and 2 and 50% were of type No. 3 and 4. The station yards were built with pine sleepers of the following types: No. 3, 4, 7, 8. Sleepers of type No. 7 and 8 were used for by-line road building (Konovalov 2010).

As sleepers which were piled at Dzhankoi station were not used and railway building was stopped, there were thefts. The administration of Kherson-Dzhankoi railway building and the merchant S. Z. Hurarii made a contract. The merchant bought 80 937 of sleepers which had been delivered by Brahorsk stock-company. The deliveries were made on October, 17 and 30, on November, 5, 1918. The merchant paid 5 roubles 25 kopecks per sleeper. He was obliged to deliver sleepers in the same amount and of the same type in summer 1919 and 1920 to Dzhankoi station. On October, 30, 1918 there was made an inventory and paid 424 919 roubles 25 kopecks for all sleepers (Konovalov 2010).

On November, 6, 1918 there was an additional contract and it was sold 30 761 of sleepers more. The sum paid was 184 576 roubles, the price was 6 roubles per sleeper. In November all sleepers were delivered to the customer (Konovalov 2010). Under two contracts the Society sold 111 698 of sleepers, the sum total was 609 485 roubles 25 kopecks.

On June, 28, 1917 the engineering department of the management of railway building submitted to the chief supervisor an application. The department asked to rename the railway stations, because there had already been stations with the same names on the territory of the Russian empire. Preobrazhenka station was renamed in Obrazhenka, Soliani Ozera was renamed in Dehelchyk. Ministry of communication lines confirmed corresponding changes in October 1917 (Konovalov 2010).

On June, 7, 1917 the Tavriisk province commissar and Military volost executive committee sent another application to Petersburg. They asked to change the railway line direction from Dzhankoj station to Perekop station at a distance of 71 versts away from the previous project. They paid no attention to the locals who lived southward. According to the project the railway line should cross the territory which belonged to the landowner Sophiia Falts-Fein, skirt Novo-Oleksandrivka village, cross a big estate of baron Hinsburg through salt lakes and come up to the neutral zone between Armiansk and Perekop. The authors of the application considered that this direction would be profitable for Falts-Fein and Hinsburg families.

There was one more project, according to it a new line should be placed southward of the previous one and cross dozens of villages and settlements. There were 50 peasant homesteads in Dzhadra village, 45 peasant homesteads in Bohemka village, 30 peasant homesteads in Volodymyrivka village, 60 peasant homesteads in Borlak village, 70 peasant homesteads in Novo-Ivanivka village, up to 150 peasant homesteads in

Voinka and Schaslyvtsevo villages, etc. Voinka was the main village in the north part of the district. There was a medical station, a veterinary clinic, a post-office, a saving and loan association. Thus, this line should cross densely populated territory but it should be several versts longer than the previous one (Konovalov 2010).

On July, 21, 1917 the administration of Dzhankoi-Kherson railway did not approve introduced projects. It gave the following arguments: 1) during railway building only national interests were taken into consideration; 2) the northward was 8 versts or 10% shorter than the line between Dzhankoi and Perekop. Railway extension would cause increasing of expenses. There would be a necessity to build an additional station of the IV class at the cost of 184 800 roubles. Railway building would cost 80 000 roubles per kilometer, it would result in additional 824 800 roubles (Konovalov 2010).

As follows, the chief engineer I. I. Morozovskyi could not begin railway building in the result of a difficult political and economic situation that was both in Russia and in Ukraine at the beginning of 1918. There was no connection with the government, he did not get an order and money for railway building. Thus workers did the calculations and made projects of farther railway.

As for further building, it should be noted that goods costs went up and they could not follow the previous plan of interim railway. The Black Sea railway society could not start building of Dzhankoi-Kherson railway line because there was a complete absence of rolling stock, there was not sufficient quantity of sleepers and fastenings, it was impossible to start main building. A great amount of unemployed people could do secondary works. Earth works should be done in a great amount on the territory of Tavriisk province, only 10% should be done on the territory of Kherson region, total area volume was about 300 000 cubic sajenes, 180 000 of which should be covered with soil brought far from the place of building. In 1918 earth work cost per cubic sajene was 36 roubles and according to the appraisal in 1916 it was 3 roubles 50 kopecks, so it was ten times lower. For implementation of building it was necessary to hire about 6 000 of workers and to borrow 7 920 000 roubles. At that time the chief engineer almost did not have money. There was money only to pay salaries to office employees (Konovalov 2010).

Thus, summarizing stated above, it is necessary to mention, that Dzhankoi-Kherson railway was a strategic trunk line, it was important for goods and military cargo transporting from Ukraine to the Crimea. Military department insisted actively on its building. Railway building was begun in a very difficult time for both the state and population. From 1914 and to 1916 all calculations were executed, but building was not begun through revolution and hostilities in the result of which the Russian empire ceased as the state. Railway building was successfully finished but in a new soviet country.

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## DŽANKOI-CHERSONO GELEŽINKELIO STATYBA UKRAINOS PIETUOSE

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