



Northern Siberian Trade Route and Polar Urals Railway. Part 2



Archival publications

A reproduced article published in the journal «Zhelezнодороzhnoe delo» in 1912 is devoted to a project to build a railway line linking the river network of Siberia (approximately from the current Salekhard to the Ob) with the Arctic coast in Varandey region, where it was supposed to build a seaport.

Regardless of the fact that development of the transport infrastructure of the Polar Urals and the North of the European part of Russia eventually went the other way, the economic geography, the foreign trade balance changed, the article is interesting in the historical aspect by the balanced and verified approach to the comprehensive assessment of complex transport projects that was developed more than 110 years ago and their feasibility study. The authors of the project under consideration took into account, when arguing, many factors – of a strategic nature (development of the Siberian region, reduction of the transport load on the backbone transport network of the European part of the country, minimization of competition between domestic producers along the route of goods flows), foreign trade flows, seasonality of navigation along rivers and the Northern Sea Route, technical and economic aspects of construction, distribution of private and public investments, projected optimal tariffs and taxation, payback periods, taking into account payment of dividends, and many others.

Of course, the content of factors taken into account and assessment methods have changed significantly since then. One of the paradoxes is that, despite new technologies, modern engineers already assess the risks and difficulties of building in the subpolar zone much higher, which at the beginning of the last century was considered almost an easy and cheaper option for building a railway. In general, we must give credit to the authors for complexity of their approaches, taking into account the time when they were made.

Keywords: transport, transport history, infrastructure project, subpolar Urals, Arctic zone.

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Area of influence and its cargoes. On the basis of a very rich, but, unfortunately, scattered statistical material on the productive forces of Western Siberia, the following conclusions can be drawn: the annual surplus of the main local products in recent years has been¹:

| | |
|---|-------------------------|
| I. Wheat, rye, barley and oats: | |
| a) in Tomsk province from 8 300 000 to 20 200 000 p. | |
| b) « Tobolsk province «10 700 000 «23 000 000 « | |
| c) «Akmolinsk province « 2 000 000 « 11 800 000 « | |
| d) «Semipalatinsk « 2 000 000 « 11 800 000 « | |
| Total from 21 000 000 to 55 000 000 p. | |
| Av. number – «38 000 000 p. ² | |
| II. Flax, hemp and tows | 500 000 |
| III. Flaxseed | 700 000 |
| IV. Cow butter..... | 2 000 000 |
| V. Live cattle (up to 200 thous.)..... | 1 600 000 |
| VI. Bacon and pork..... | 800 000 |
| VII. Wool, leather and furs..... | 550 000 |
| VIII. Meat salted and frozen and game..... | 2 800 000 |
| IX. Fish in different forms..... | 300 000 |
| X. Pressed hay..... | 2 000 000 |
| XI. Ores, metals and coal | ? |
| XII. Other goods | 1 000 000 |
| Total per year (except item XI) not less than 50 250 000 p. | |
| Kr. ch..... | 50 000 000 ³ |

It is obvious that a lot of this amount of Siberian raw materials will continue to be exported to the Urals and further to Arkhangelsk and to the west along the existing communication routes. There is also no doubt that some cargo will continue to be sent from Western Siberia to Eastern Siberia. However, taking into account the vast expanses of the most fertile chernozem soil within Western and Central Siberia, the cultivation of which has only recently begun, with development of resettlement, as well as the fact that an increase in productivity of the region is directly dependent on demand and ease of export corresponding products to their

¹ According to the Siberian Department of Imp. Geogr. Society, verified and replenished by E. A. Zhernakov and I. I. Ignatov. Very valuable indications are also given in hist. essay: «Siberian railway, the road in its past and present», comp. S. Sabler and I. Sosnovsky, under ch. ed. senior secretary Kulomzin. St.Petersburg, 1903, pp. 402–415, and in the article by V. Grigoriev: «What can the Turkestan-Siberian railway give us». Vestnik putei soobshcheniya 1905; Nos. 25 and 26.

² This amount of the annual supply of Siberian bread is also confirmed by the reports of local governors and heads of regions over the past ten years (from 1894 to 1904).

³ With addition of ores, metals and coal – over 80 million pounds. Average cargo traffic counts of the Siberian railway.

destinations, there is no doubt that the main part of the above-mentioned goods will gravitate towards European markets, choosing for themselves *the most convenient* and *cheapest* way of export, i. e., the considered *Northern Siberian trade route*.

The validity of this assumption is confirmed by the following calculation.

Local prices in Western Siberia, for example, for wheat fluctuate at present from 35 to 45 kop. per pood, the average price of a pood of wheat in London⁴ in recent years has been kr. ch. 107 kop. There is no doubt that, with the opening of a secure route for the sale of Western Siberian products to Europe, Siberian raw materials will rise in price, which means that the difference in the cost of the same Siberian wheat in the places of production and consumption will not be 107–40 = 67 kop., but, perhaps, only 50 kop. The cost of transporting one pood of wheat along the route under consideration, including overhead costs, will be:

- 1) water from st. «Ob» to st. «Sob», 2 400 v. downstream. 7,00 kop.⁵
- 2) along Polar-Ural railway from st. «Sob» to the seaport «Varandey» (400 ver.), with the cost of reloading and other expenses...12,00 kop..⁶
- 3) port expenses..... .3,50 kop.⁷

⁴ The following conclusions apply to most other markets as well.

⁵ According to Tyumen steamship owners.

⁶ And namely:

- a) actual transportation cost 400x1/45= kr. ch. 9,00 kop.
- b) additional railway costs substituted for Polar-Ural Railway of railway «forwarding fee» in..... .1,50 kop.
- c) for passing grain through two elevators..... 1,50 kop.
- Total

⁷ For Polar-Ural railway, which rests, on the one hand, on the seaport (Varandey), and on the other hand, on the river harbor (Sob station), supplied with necessary hydraulic structures and equipment, – as components of the road – at the expense of private society, it is proposed to set the collection fee at 0,50 kop. higher than in other ports, i. e. in the amount of 0,75 kop. up to 1,50 kop., or on average, one kop. each from all cargo passing through both end points of the road; as for the actual ship dues, this can amount to approximately 2,50 kop. per a pood, and therefore the full port dues for the future Medynsky port will be 3,50 kop. This amount of the total port dues cannot be considered exaggerated if we take into account the significant costs that will be associated with construction, maintenance, repair and gradual development of the river harbor and seaport with their accessories (flyovers, cranes, steamers, icebreakers, etc.), as well as repayment of the necessary funds.



4) for transportation of grain by sea from Medynsky port to London, with insurance costs10,00 kop.⁸

Total 32,50 kop.
and therefore the difference in the prices of wheat, when it is exported along the Northern Siberian route, will give a still free (useful) stock of 50–32,50 = 17,50 kop. per pood.⁹

In parallel to this, transportation of bread in grain from st. «Ob» to London, through the main ports of European Russia costs:

From a pood in kopecks:

| through and namely: | Arkch. | Spb. | Revel | Riga | Libava |
|---|--------------------|-------|-------|-------|--------|
| 1. Carriage fee for railway. ¹ | 35,26 | 54,88 | 57,43 | 57,81 | 59,29 |
| 2. Freight river and sea. | 13,50 ² | 6,00 | 6,00 | 5,00 | 4,50 |
| 3. Overheads ³ | 6,23 | 6,23 | 6,23 | 6,23 | 6,23 |
| Total | 54,99 | 67,11 | 69,66 | 69,04 | 70,02 |

Here it is appropriate to note that on the existing railways, additional railway fees for grain cargoes amount to 1,23 kop. from a pood (including cumulative station expenses – 0,50 kop.; for loading and unloading – 0,33 kop.; for weighing – 0,20 kop.; and for a fee of $\frac{1}{5}$ kop. – 0,20 kop., total – 1,23 kop.), and for other goods – according to their classification – from 0,97 to 1,48 kop. for a pood. But since the road under consideration will be in exceptional conditions, requiring the possible simplification of its cargo operations and calculations, it is proposed to replace the aforementioned rates with one general *forwarding fee* of 1,50 kop. from a pood for grain cargo and 1,75 kop. for other cargoes.

Adding to these rates 107–50=57 kop., corresponding to the above av. Siberian wheat prices at st. «Ob», its value on London market would have received only ... 111,99 | 124,11 | 126,66 | 126,04 | 127,02, i. e. it would have been *higher than* the average prices for kop. that existed there in recent years 4,99 | 17,11 | 19,06 | 19,04 | 20,02.

⁸ With regard to the event held with the Dutch Trading House «William Ch. Miller & C^o» agreement, on the basis of which the indicated tariff is established for all sea transports between Arkhangelsk, on the one hand, and Rotterdam, Amsterdam, Antwerp, Bremen, Hamburg, London, Hull, Newcastle and Leith, on the other.

⁹ In reality, the indicated difference should be even greater, since transportation of grain by railway in bulk is taxed at a rate lower than 1/45 kop. from a pood and a verst.

These conclusions explain, among other things, why Siberian bread, when exported abroad, even along the shortest of the existing transit routes, through Chelyabinsk, Kotlas and Arkhangelsk, enters the markets of Western Europe in a relatively limited amount (only from $1\frac{1}{2}$ to 3 million poods a year) and, moreover, only when its purchase price at the place of production does not exceed 46 to 48 kop..¹⁰

It was not mentioned above about the export of *Siberian* timber because, until now, it actually did not exist. However, there is no doubt that, with the opening of a convenient and cheap way to sell it abroad, it can become one of the most important items in the export trade of Siberia.

Based on research carried out in 1898–1903 by the Samarovsky forester A. A. Dunin-Gorkavich on the state of state forests in the northern part of Tobolsk province,¹¹ as well as according to data cited by the railway engineer S. A. Zhbikovsky in his brochure «Ob-Yenisei waterway and its economic importance»,¹² the forest areas of Siberia in the basins of the Ob and Yenisei are so extensive that they cannot even be compared with Canada.¹³ Taking into account only the forest plantations of Berezovsky and Surgut districts of Tobolsk province that are closest to the rail track under consideration, the annual vacation of forests from them, thickness, from 9 to 12 versh, at breast height, can be determined at 1 700 000 pieces logs,¹⁴ or trimmed, kr. ch. in 51 million cubic meters foot. (310 000 standard), weighing the same number of poods.

The cost of felling, transportation and delivery of timber along the Ob and its tributaries

¹⁰ At these prices for interest on working capital and on profits, only 6 to 4 kopecks remain from a pood.

¹¹ Izvestiya M-va. Zemledeliya. 1903 № 41.

¹² «Materials for the description of Russian rivers and the history of improving their navigation conditions». Iss. II. 1903.

¹³ The area of currently surveyed forest thickets of Tobolsk province is estimated at 16 520 000 des., and that of the four counties of the Yenisei province, which make up only 1/10 of the entire province, is 8 mil. dec. Taking into account the remarks made on this subject by Eng. S. A. Zhbikovsky, as well as the instructions of A. A. Radzing in his book: «Forest and Forestry», 1901, there is a reason to believe that the forest spaces of the Yenisei province are over 100 mil. des. For various reasons based on calculations, we stop at the following figures:
pure forest plantations in Tobolsk province 20 000 000 des.
« « Tomsk « 11 200 000
« « Yenisei « 32 800 000
total 64 000 000

¹⁴ See A. A. Dunin-Gorkavich. «Tobolsk North». 1904.

| № п. по пор. | Кл. тарифа. | Отъ: | До: | | | ст. «Обь». | | | ст. «Иркутск». | | |
|--------------|-------------|--------------|--------|---------|--------|------------|---------|--------|----------------|---------|-------|
| | | | через: | | | Батрак | Вар. п. | Разн. | Батрак | Вар. п. | Разн. |
| | | | Челяб. | «Собь». | ш. | Челяб. | «Собь». | ш. | Челяб. | «Собь». | ш. |
| 1 | I | С.-Петербург | 195,31 | 62,93 | 132,38 | 262,63 | 160,40 | 102,14 | | | |
| 2 | | Москвы | 179,96 | 114,27 | 65,69 | 234,02 | 211,83 | 22,19 | | | |
| 3 | II | С.-Петербург | 182,69 | 56,86 | 125,83 | 262,63 | 138,80 | 123,83 | | | |
| 4 | | Москвы | 158,86 | 99,64 | 59,22 | 234,02 | 181,58 | 52,44 | | | |
| 5 | III | С.-Петербург | 152,49 | 50,78 | 101,71 | 219,10 | 116,98 | 102,12 | | | |
| 6 | | Москвы | 136,96 | 85,01 | 51,95 | 195,26 | 150,81 | 44,45 | | | |
| 7 | IV | С.-Петербург | 126,20 | 46,48 | 79,72 | 164,70 | 103,33 | 61,37 | | | |
| 8 | | Москвы | 115,96 | 75,30 | 40,66 | 146,82 | 131,05 | 15,77 | | | |
| 9 | V | С.-Петербург | 100,02 | 41,42 | 58,60 | 132,05 | 84,10 | 47,95 | | | |
| 10 | | Москвы | 92,34 | 62,81 | 29,53 | 117,75 | 105,49 | 12,26 | | | |
| 11 | VI | С.-Петербург | 92,08 | 38,13 | 53,95 | 132,05 | 72,97 | 59,08 | | | |
| 12 | | Москвы | 77,76 | 55,24 | 22,52 | 117,75 | 90,08 | 27,67 | | | |
| 13 | VII | С.-Петербург | 76,98 | 36,11 | 40,87 | 110,29 | 65,72 | 44,57 | | | |
| 14 | | Москвы | 65,04 | 50,27 | 14,77 | 98,37 | 79,98 | 18,39 | | | |
| 15 | VIII | С.-Петербург | 69,43 | 34,84 | 34,59 | 99,41 | 61,81 | 37,60 | | | |
| 16 | | Москвы | 58,69 | 47,68 | 11,01 | 88,68 | 74,68 | 14,00 | | | |
| 17 | IX | С.-Петербург | 61,88 | 33,83 | 28,05 | 88,57 | 58,22 | 30,35 | | | |
| 18 | | Москвы | 52,33 | 45,23 | 7,10 | 78,99 | 69,63 | 9,36 | | | |
| 19 | X | С.-Петербург | 61,22 | 31,96 | 29,26 | 88,57 | 52,53 | 36,04 | | | |
| 20 | | Москвы | 51,77 | 41,25 | 10,52 | 78,14 | 62,82 | 15,32 | | | |
| 21 | XI | С.-Петербург | 53,25 | 31,13 | 22,12 | 76,09 | 50,20 | 25,89 | | | |
| 22 | | Москвы | 45,07 | 39,18 | 5,89 | 67,92 | 58,33 | 9,59 | | | |
| 23 | XII | С.-Петербург | 40,31 | 29,78 | 10,53 | 57,44 | 45,02 | 12,42 | | | |
| 24 | | Москвы | 34,17 | 35,82 | -1,65 | 51,31 | 51,06 | 0,25 | | | |

to the station «Sob», including overhead costs, will be about 4,75 rubles per circle from a log, and with sawing and lining – 6,10 rubles, i. e., per cubic meter or pood – $6,10:30 = 20$ kopecks, while transporting a pood of handicrafts to foreign ports, with all additional costs, will cost no more than 40 kopecks. Thus, the cost of the Siberian timber, in a processed form, in the markets of England, France and Germany will not exceed for a cubic feet 60 kopecks, while the current prices for forest products fluctuate there between 76 and 115 kopecks.¹⁵ On the other hand, since construction of the road will require about $3\frac{1}{2}$ years, then, already before its completion, at st. «Sob» a significant amount of timber¹⁶ can be delivered, which, in view of the increasing demand for it abroad, from the very first year of opening along the road of correct movement will have the opportunity to go to the places of sale.

It remains to add that 4,75 rubles included in the above price per stumps [payment to the treasury for the number of trees cut down, «stumps» – ed. note] money is, on average, not less than 1,15 rubles per a tree, and therefore it is obvious that with implementation of Polar Urals Railway, state revenues from state-owned forests can take on unprecedented proportions.

¹⁵ See S. A. Zhbikovskiy. «Ob-Yenisei waterway». p. 35.

¹⁶ Here, by the way, it should be noted that sale of timber materials abroad from Arkhangelsk port is:
in 1862184 000 stand.
in 19001 240 000 stand.
« 1890 « 366.000 «
« 1905 «1.590.000 «.

On the basis of the given data, it is possible to assume that, with rebuilding of the railway in question and with establishment of the correct steamship communication along the Ob, out of the above total amount of Siberian cargo (50 million poods, except for timber and metals) for export to European Russia and abroad, through the Varandey port, in the very first years of operation, at least 50 %, i. e., up to 25 million, and together with forest products and metals – from 55 to 70 million poods, will flow.

As for the goods *imported* into Siberia, it is not yet possible to draw exact conclusions with respect to the communication under consideration, but in order to illuminate, as far as possible, this side of the future activity of the Northern Trade Route, we present the following considerations.

Before construction of the great Siberian railway goods, imported to Siberia from European Russia, including foreign ones, were sent for the most part to Nizhny Novgorod, then along the Volga and Kama to Perm, and from there along the Perm-Tyumen railway to Irbit (to the fair) and further, along the systems of the Irtysh and Ob rivers, or along the old Siberian highway, into the region. But since 1897, upon opening of traffic in the Central Siberian section, the indicated import route through Perm has gradually been left aside, now serving only for transportation of bulky items and such goods and products that do not require urgent



delivery to their destinations. In view of this, in order to clarify the future position of Siberian imports, one should first compare the tariff rates established for the Siberian railway with the freight charges that will take place for the Northern Trade Route. For greater clarity and simplification of calculations, the table below shows the totals of expenses only for three most profitable (shortest) directions of the routes under consideration, between St. Petersburg and Moscow, on the one hand, and the Ob and Irkutsk stations, on the other.¹⁷ In addition, in order to facilitate various commercial combinations, the cost of transporting goods imported to Siberia is determined by the classes of their tariff differentiation, which was put into effect on January 1, 1901 (Fifth ed.).

Table of freight charges from a pood in kopecks.¹⁸

From this comparison of freight charges, it is not difficult to draw a conclusion about the significance of the Northern Trade Route for Siberian imports. Bearing in mind that, in addition to some manufactured goods and weaving, sugar and granulated sugar, groceries, tobacco (shag), candles, kerosene and oil residues, cement and some other materials, most of the goods needed for Siberia are delivered there already now from abroad, through St. Petersburg, Moscow and Chelyabinsk, and that this import (and at the same time export) for goods of the first eight classes for 132 to 11 kop. from a pood will be cheaper if it is sent

through the Varandey port,¹⁹ it will become even clearer that the predominant influence that implementation of Polar-Ural railway should have for development of not only Western and Central Siberia, but also the areas adjacent to them.

Having caused in this case beneficial competition in the foreign trade of Siberia, this influence will be expressed, first of all, by *cheaper* necessities for the local population, including *agricultural tools and machines*, without which the future success of agriculture is inconceivable, and at the same time cultural development of the country.

But this will not be the *only* task of the projected path: it will no less serve *to awaken and develop the productive forces of our North*, both from European Russia and from Western Siberia. In this regard, *the facilitation and cheapening*, through this path, of *importing* the most necessary auxiliary shells and devices for developing the wealth of the *plant and fossil* kingdoms²⁰ that are still untouched and for streamlining the *animal and fisheries* will immediately revive the entire polar North, which, in turn, will also affect increase in imports.

Based on data borrowed from the operational reports of the Siberian Railway,²¹ the number of goods *imported* to Siberia along this route reached 18 million poods in 1902²²; but in view of the fact that the size of imports is directly proportional to the purchasing power of the region, which, as you know, depends mainly on the more or less facilitated and secure sale of local agricultural products (bread and livestock products), we can hope

¹⁷ Namely, along the lines: 1) St. Petersburg–Moscow–Penza–Ruzaevka–Chelyabinsk–st. «Ob» and Irkutsk; 2) Moscow–St. Petersburg–Varandey port – st. «Sob» and st. «Ob»; 3) from St. Petersburg and Moscow, through Varandey to the station «Sob», then along the Ob and Chulym to Achinsk and further along the Central Siberian Railway, through Krasnoyarsk to Irkutsk.

¹⁸ The following individual rates have been taken into account:

a. for transportation of goods along railway lines – the current tariffs, according to the length of the lines;
b. additional charges – 1,23 kop. from a pood, for each continuous route of cargo along railways, with the exception of Polar-Ural, for which the indicated costs are replaced by a general «forwarding fee» of 1,75 kop. from a pood, for all cargoes, except for grain (see pr. 2 in No. 33 «Zheleznodorozhnoe delo» this year on p. 195);
c. sea freight from St. Petersburg to the Varandey port – 10 kopecks, and hand freight: from st. Sob, up the Ob to st. «Ob» – 8 kopecks; from the same st. «Sob» to Tomsk – 9 kopecks, and to Achinsk – 10 kop.; finally,
d. the total port charge for voyages between St. Petersburg and the port of Varandey, on average, is 4 kopecks.

¹⁹ The difference in the cost of transporting goods imported into Siberia will actually be incomparably greater if we take into account the indirect costs associated with freight traffic along long railway lines. Not to mention the frequent and prolonged stagnation of cars inherent in transportation along such lines, accompanied by frequent damage to goods, the main reasons for the increase in the cost of transportation are that delivery times become extremely uncertain, as a result of which not only interest on costs capital, but the trading combinations themselves are subject to great changes.

²⁰ Forests and forest subblocks; metals and ores (loose gold, silver, copper, lead, manganese and iron ores, etc.); graphite; coal oil, etc.; See A. A. Dunin-Gorkavich «Tobolsk North». 1904; N. Podrevsky. «About a trip to the Northern Urals in the summer of 1892» (According to the diaries of Syromyatnikov and Andreev); and V. S. Reutovsky. «Mineral resources of Siberia». St.Petersburg, 1905.

²¹ Stat. M-va P. S. Vyp. 84, 1904, tab. III, p. 33.

²² Starting from 2,5 million poods in 1897 – the time of traffic opening.

that with the opening of Polar-Ural railway of correct movement and in attention to the above considerations, the number of annual imports along the designated route will be at least 6 000 000 poods²³ in the very first years of operation.

Summing up all of the above, the cargo turnover of the road will be obtained in the following form:

1. *For the export of Siberian products.* All *exported*, in the near future, cargo was meant, from 65 to 70 million poods per year. Such a figure, however, as experience on other roads shows, can only be achieved after 4–5 years, while from the first year of traffic opening, the export will most likely be less. In view of this, only 24 000 000 poods are entered into the calculation so far.²⁴

2. *On the import of goods and products.* The quantity of *imported* goods is set above in such a moderate amount that there is no reason to assume that it will not take place in the first year of operation.

Thus, in both directions of movement, only 30 000 000 poods of cargo are taken into account.²⁵

²³ Very interesting data on the future foreign trade of Siberia are given in the Russian-English Mining Bulletin for 1900 by N. G. Hudson, who traveled around Siberia as a representative of the Ermak company.

²⁴ The carrying capacity of the railway, i. e., the number of stalls, rolling stock and workshops, should be equated to this quantity of export. Taking into account, however, that the influx of goods on the road can increase rapidly, its carrying capacity is calculated at 40 mln poods per year in one direction.

²⁵ The following official statistics on movement of goods along the Siberian Railway can serve as evidence that this figure cannot be considered exaggerated and, on the contrary, is rather below the probable norm:

Transported, of which bread, gr.

in 1897 21 078 000 pood 13 739 000 pood

« 1898 « ... 37 027 000 « 19 825 000 pood

« 1899 « ... 40 004 000 « 18 735 000 pood

« 1900 « ... 42 841 000 « 17 452 000 pood

« 1901 « ... 50 590 000 « 20 972 000 pood

« 1902 « ... 63 379 000 « 23 504 000 pood

« 1903 « ... 64 293 000 « 19 587 000 pood

« 1904 « ... 65 221 000 « 24 583 000 pood

The growth of cargo (transit) traffic along Rybinsk-Pskov line is even more vivid. This line connects, as you know, the Volga with the Baltic Sea (Riga), which had no direct connection until 1897, that is, before construction of Bologoe-Pskov section, did not exist. Since the same year, the total amount of cargo transited between Rybinsk and Pskov is expressed in the following figures, borrowed from the annual reports of the board:

in 1897, total ... 418 000 pood

« 1898 « ... 13 920 000 pood

« 1899 « ... 16 415 010 pood

« 1900 « ... 21 087 000 pood

Conditions for its implementation. Turning to the analysis of the economic side of the enterprise and the results that can be expected from the operation of Polar-Ural Railway, it is necessary to touch first on the conditions with which its implementation is associated.

The projected railway will *stand out sharply* from a number of existing rail communications, not only because of its geographical location, but also because the conditions for its operation will be *completely different* from those of other railways.

Above, a general description of its significance was given, as well as the impact that it should have on the vast region of Western Siberia with the adjacent regions: Semipalatinsk and Akmolinsk and Berezovsky districts of Tobolsk province, and it was also indicated that its mission, as link of an outstanding transit route, will be closely connected not only with the needs and requirements of the ever-increasing endowment of Siberia in its central parts, but also with the tasks of world trade. As for its proper *local* significance, in this respect it will be in a *completely exceptional* position, since it does not foresee either *internal commodity* or *mandatory* (daily) *passenger* traffic. Such a distinctive property, however, will not serve it to the detriment; on the contrary, being in this case a natural consequence of the everyday nature of the polar countries, it will deliver *high advantages* to the projected route over other rail communications. These benefits will include:

1) *With regard to construction of the railway itself:*

a) in the comparative *cheapness* of the economy of its construction (53 thousand rubles per ver.), since it will not require the construction of *passenger buildings* at all, with all their diverse furnishings, and at intermediate stations – *nor goods platforms, warehouses and other structures* caused by local traffic, – *nor long sidings* (with the exception of *one* siding at each stopping point), nor, finally, *complex* signaling devices;

b) in *reducing the number* of intermediate stations and sidings, as well as rolling stock, which will consist mainly of cargo cars and steam locomotives of the latest type.²⁶

2) *With regard to operation:*

a) in *simplifying* it, reducing station manipulations and the number of employees to *an extreme* (reasonable) *minimum*;

²⁶ Thus, cargo cars are assumed to have a carrying capacity of 37 tons = 2 296 poods and a container of 17 tons = 1 055 poods, and in total in laden state 54 tons = 3 350 poods, as a result of which their number is relatively limited.



b) in *reducing the time trains stop* at stations and sidings, which, in turn, will *speed up* the circulation of trains and, therefore, lead to a *more rational* use of rolling stock;

c) in *increasing the profitability* of railways, separating out of operation low-income, if not unprofitable in most cases, items: *regular* passenger and *local* goods traffic; finally,

d) in the *most perfect* utilization [effective use – ed. note] of the route itself, transportation of goods along its *entire* length of 400 ver., both in *one* direction and in the *opposite* direction.

As seen further from the design data, the construction of Polar-Ural railway in the direction that is now planned for it, namely: from the confluence of the river Sob to the Bolshaya Ob, through the so-called Yelets watershed, to the Varandey port, will not be associated with any *special* difficulties; its maximum slopes will not exceed 0,008, with the smallest radius of curvature of curves being 300 sazhen; the line itself will run, for the most part, across flat polar tundras, which represent an excellent, in terms of construction, and completely *reliable foundation* for construction of the road surface; there are relatively *few* artificial and other linear structures; finally, the prices for building materials are generally moderate. С приданием же верхнему строению пути крайне *солидной* конструкции (с рельсами вес. 24 фун. в п. фута и со скреплениями новейшего американского типа «*con*With the track superstructure being given an extremely *solid* structure (with rails weighing 24 pounds per foot and with fastenings of the latest American «*continuous joint*» type, 2000 crossbars per verst of track and using ballast made of *crushed stone*, thickness layer of 0,22 sazhen), the above-mentioned advantages will become even more important and will undoubtedly have a beneficial effect on the entire economic structure of the rail service under consideration.

On the other hand, the projected the road will require a number of additional structures and facilities, caused both by its geographical location and the conditions of its future operation. These buildings and facilities include:

1. *Mooring* and various *transshipment* devices at terminal stations at the commercial seaport and river harbor, as well as various mechanisms included in them; steamships, barges, boats and other accessories of the port and harbor; finally, *the inventory* necessary for local workers' artels, etc.

2. *Elevators* at the end stations, with all related equipment for drying, cleaning and sorting, as well as the speedy reloading of grain and various seed products.

3. Construction of *two electric stations* both for driving the mechanical drives of elevators, cranes, etc., as well as for lighting terminal stations and settlements, supplying energy to electric trams, and for other needs.

4. The arrangement of *wire* and *wireless telegraphs*, in connection with telephone communications between the Varandey port and the village Ust-Tsylma, on Pechora,²⁷ and st. «Sob» and the village Samarovsky (at the mouth of the Irtysh)²⁸ in order to connect the projected road with a network of Russian and foreign telegraph lines, as well as to streamline river navigation along the Ob.

5. The construction of *two settlements* at the end points of the road, both for the needs of the local administration and its diverse institutions, and for the convenient accommodation of employees and workers, not only railway, but also those of the future customs and other departments and various persons involved in the case.

Finally, the construction of the Varandey commercial port itself and the Sobsкая river harbor should also be included among the additional accessories of the trade route under consideration. These structures, as not directly related to the railway enterprise, in connection with the construction of the future customs house and with all other accessories of the port and harbor, are not included in the cost sheet for the railway construction, but are subject to a special agreement with the government.

Cost sheet results. Based on the cost sheet, what is actually required for construction of Polar-Ural railway construction capital is determined at 21 **200** 000 rubles, which will amount to 53 000 rubles per verst.

The following is also added:

1. for various station unloading facilities, for acquisition of inventory property of the port and harbor and for construction of river piers – 3 000 000 rubles.

²⁷ From here runs the postal route through Pinega to Arkhangelsk, along which, since 1895, Ust-Tsylma has been connected by telegraph wire to the general network of the Empire and to the foreign one.

²⁸ This point is already connected to Tobolsk and therefore also belongs to the general telegraph network.



2. for construction of elevators – 4 000 000 rubles

3. the same – of electric stations – 800 000 rubles

4. the same – of telegraph and telephone messages between terminal stations, Ust-Tsylma and the village Samarovsky – 500 000 rubles

5. for construction of two settlements – 2 800 000 rubles

Total 11 100 000 rubles

6. working capital – 500 000 rubles

7. for payment of interest and repayment of capital on bonds during 3½ years of road construction – 2 700 000 rubles

8. expenses for setting up the enterprise and selling construction capital and interest on shares during the execution of work – 4 500 000 rubles

Total – 40 000 000 rubles

or per verst of a road – 100 000 rubles

This capital is meant to be realized:

a) through issuance of 20 000 shares, adv. priced at 500 rubles each, for the total amount – 10 000 000 rubles;

b) issuance of 120 000 pcs. of *non-government guaranteed* bonds, from 5 % interest and redemption, adv. priced at 250 rubles each for – 30 000 000 rubles.

Total – 40 000 000 rubles.

It remains to be added that the above considerations and conclusions are based, among other things, on detailed surveys carried out in 1900, both for selecting terminal points²⁹

²⁹ As stated above, in the first year after traffic opening, it is planned to transport only 24 million poods of sold cargo. Attributing 60 %, i. e. 14 400 000 poods, to the share of grain products, timber, metals, etc. of cargo, their freight charge can be accepted at 1/45 kopecks per pood-verst, while for the rest 9 600 000 poods it will be 1/24 kopecks per circle. This will correspond, for the entire distance, to a fee of 9 and 17 kopecks. Adding to these rates an expedition fee of 1,50 and 1,75 kopecks (see Appendix 4), the full freight charges will be: 10,50 and 18,75 kopecks for a pood.

and establishing the general direction of Polar-Ural railway, as well as clarification of economic conditions of its construction, and that, thus, there is already solid ground for approaching the issue under consideration with complete objectivity, without which a successful undertaking and, moreover, implementation of such a serious enterprise is unthinkable, as upcoming.

Financial results of operation. According to the above considerations and data, the expected operating cash flows will be presented in the following form:

Gross income.

1. Revenue from transportation along a road 400 versts long:

a) cargo sold⁴, namely: various grain cargoes, timber, coal etc.

14 400 000 p. x 10,50 kop. = 1 512 000 rub.

other exported goods,

9 600 000 p. x 18,75 kop. = 1 800 000 rub.

b) cargo imported,

6 400 000 p. x 28,75 kop.³⁰ = 1 725 000 rub.

Total from transportation of 30 mln poods – 5 037 000 rub.

2. Various additional income³¹ – 250 000 rub.

³⁰ The indicated cargo is taxed at 1st to 7th class general tariff, i. e., kr. ch., 1/15 kop. from pood-verst, which, for the entire distance, will be: 27 kop. + 1,75 kop. = 28,75 kop.

³¹ This mainly includes: 1) fee from transportation on service trains: passengers, luggage, parcels and high-speed goods; from piece transportation; for transportation of mail and military luggage; from animals, etc. (60 000 rub.); 2) various items of income: for the use of water supply, commodity platforms, station yards, tracks, etc.; for the rental of premises and land; collection from line telegraph; income from the sale of old property and other income (50 000 rub.); 3) income from financial and additional turnover and enterprises (40 000 rub.); 4) income from taxing business transportation (80 000 rub.), and 5) income from telegraph and telephone communications on a new line (20 000 rub.), – total 250 000 rub.



3. Income from processing goods through elevators and from other mechanical manipulations:

14 400 000 p. x 2,00 kop. = 288 000 rub.

Total – 5 575 000 rub.

4. Telegraph fee from side lines (Varandey–Ust-Tsilma and Sobol–Samarovo – 40 000 rub.

Total – 5 615 000 rub.

per verst – 14 037,50 rub.

Expense.

Such, in fact, for *operation of the road*, is accepted for a circle of 50 % of the gross income³² (except for the telegraph fee from side lines) and therefore will be:

5 575 000 rub. x 0,50 kop. = 2 787 500 rub.

For maintenance and repair of station reloading devices at the end points of the road, river piers, as well as side telegraph lines – 200 000 rub.³³

total – 2 987 500 rub.

per verst – 7 468,75 rub.

Net income.

Total 5 615 000 rub. – 2 987 500 rub. = 2 627 500 rub.

per verst – 6 568,75 rub.

Net income distribution.

³² This amount of total expenses cannot be considered, in this case, to be underestimated if we take into account not only the economic structure of the operation of Polar-Ural railway – especially its traffic and traction services, with relatively limited personnel, due to the exclusion of regular passenger and any local traffic from the range of its activities – but also other extremely favorable conditions inherent in the route under consideration: the possibility of the most intensive utilization of rolling stock by transporting sold and import cargo along the entire length of the road; moderate cost of maintaining and repairing the track, due to the solid design of the latter and other road structures; comparative cheapness of main building materials and fuel; finally – and special emphasis should be placed on this – the complete isolation of the road in question and, therefore, its independence from many factors that constrain the economy of other railways. The fact that consumption is not underestimated is confirmed by direct calculations. From the reporting data of operated Russian railways (Stat. collection. Min. p. s. 1904, issue 85, p. 37) it is seen that the average total of expenses for 1900–1904 was per 100 train-verts of all roads kr. ch., – 140,40 rub., and the Siberian railway – 169,50 rub. For Polar-Ural railway, with an annual transportation of 30 million poods, the sum of all train verts will be equal to 1 108 800. Dividing the total expense accepted above – 2 787 500 rubles by the latter value, we get 251,40 rubles per 100 train-verts, or only 35,55 % of the gross income, i. e. the rate is incomparably more profitable than on all other railways. It remains to be noted that on American roads operating costs for goods traffic, amounting to 45 % of gross income in 1897, dropped in 1902 to 40 %. (Report by engineer E. E. Nolte, board Moscow-Kazan railway, 1902).

³³ Of these, the actual maintenance and repair of station unloading devices, inventory property, etc. – 100 000 rubles and the same amount for maintenance of side telegraph lines.

To pay 5 % of interest and repay capital on bonds in the amount of 30 000 000 rub. – 1 500 000 rub.

To reserve capital (10 % of net income):

2 627 500 rub. x 0,10 = 262 750 rub.

total – 1 762 750 rub.

therefore *the remainder of the net profit* will be:

2 627 500 rub. – 1 762 750 rub. = 864 750 rub.

and for 10 mln rub. of share capital – 8,65 %.

If such a result, from the very first year of traffic opening along the railway, deserves attention, especially given the caution of the tasks that are the basis of the calculations, then there is a reason to assume that, with an increase in traffic, the net income of the road will also increase over time, and thus shipping along the Siberian waterways and the North Sea will sooner and more successfully develop, in connection with the expansion of the commercial sea port (in Varandey Bay) and the Ob harbor, with unloading facilities in them.

On the issue of construction of a seaport and river harbor at the final points.

It was indicated above that the number of additional structures and works caused by the local conditions of the future operation of the rail track in question also includes the construction of a seaport in the Varandey Bay of the Arctic Ocean, and at the opposite end of the road, at the confluence of the river Sob in Bolshaya Ob, a manual harbor.

These capital structures were not included in the cost sheet of Polar-Ural railway on the grounds that they are necessary not only for the needs of a private enterprise, but, mainly, for development of shipping and trade in the north of Russia, and therefore these structures have the character of national buildings, erected, in most cases, by the government itself.

Under normal conditions this would probably be the case in the present case; However, taking into account the current financial situation of the state, and on the other hand, the impossibility of carrying out the correct operation along the indicated route, without supplying it, at the same time, with such devices that would ensure the unimpeded export and delivery of cargo by water, there remains only one outcome: to leave the implementation of the said structures also to private initiative.

It is clear that the significant monetary costs required for this cannot be attributed to the construction capital of Polar-Ural railway, since the corresponding sums are intended exclusively

for construction of a rail track, with all the already numerous additional structures and facilities,³⁴ while the seaport and river harbor, to which, perhaps, a customs office will be attached, are the essence of government³⁵ buildings, subject to construction using special resources.

It is most correct to include the so-called port revenues to such resources, namely: the by-product tax on all cargo passed through the seaport, and the ship tax – from each of the ships arriving at the port and departing from it. These fees, levied since 1902 in all ports of the Empire on the same basis and at equal rates, are now: first, that is, by-product – from 0,25 to 1,00 kopecks and ship – per circle 2,50 kopecks or in complexity – from 2,75 to 3,50 kopecks, per a pood. With an increase in the by-product fee for the port of Varandey by 0,50 kopecks, the average port dues will amount to kr. ch. 3,50 kop..³⁶

Since at present it is impossible to determine with accuracy the cost required for construction of a sea commercial port and river harbor, i. e. the cost of dredging work, as well as jetties, unloading dams, docks, lighthouses, etc., is equal to the cost of various facilities, like that; dredging machines and dredgers, steamships, barges, ice cutters and other equipment and accessories of the port and harbor, except for those already included in the cost sheet for the needs of the railway – then the said expense is set for now at 10 million rubles, inclusive of administration costs and deductions for payment, during production of work, interest and repayment on the capital expended. Taking the port income as kr. ch. at 3,50 kop. per pood, and the average cargo turnover is 30 million poods, the gross port dues will be at least 1 000 000 rubles per year.

Under such conditions, the Society of the Polar-Ural Railway, with the assumption of the structure of the seaport and river harbor, it will be possible – without burdening the state

budget – to erect and equip the said structures *simultaneously* with construction of the railway, which, in this case, is not only *desirable*, but also an *indispensable* condition for implementation of the enterprise in question, since otherwise proper operation would be impossible.

It remains to be added that, in accordance with the above, the reporting on performance of the relevant work and related expenses should be separated from that on construction of the railway; but, in order not to burden the progress of work with unnecessary formalities, it would seem most appropriate to provide the Society of Polar-Ural Railway with preparation of detailed projects and estimates for construction of a seaport and river harbor, and after their consideration and approval by the government, grant the Society of Polar-Ural railway the right to independently dispose of established loans, on a par with production of expenses for construction of the railway itself, so that the amounts intended for the port, harbor and their accessories are not at all used for extraneous needs.³⁷

The closest definitions on this subject, including the procedure for collecting port dues, should be stipulated in the Society's charter or set out in a special addendum to it.

Memorandum by mechanical engineer E. K. Knorre, presented to the Minister of Railways.

Here is its content, which explains both Mr. Knorre's attitude towards Mr. Golokhvastov and Mr. Golokhvastov's attitude towards this case

«Referring to our repeated petitions for permission to construct a public railway between the Samoyed coast of the North Sea and the mouth of the river Sob and also taking into account the very important importance of this line, especially at the present time, when it could provide the state, even before its complete completion, with a great service by facilitating military transport from the Far East to European Russia, providing many thousands of workers with reliable income and development of resettlement in Siberia, the undersigned allows himself to again disturb Your Excellency with a respectful request for possible assistance in the speedy implementation of this route of communication».

³⁷ This procedure has already been applied during the expansion of the port of Riga, work on which was carried out and continues to be carried out mainly by order of the local exchange committee.

³⁴ As can be seen from the cost sheet, the cost of constructing the railway itself will not exceed 53 000 rubles per verst, while additional buildings, facilities and expenses are expected to be in addition 11 100 000 rubles, or per verst – 27 750 rubles, i. e. 50 % of the construction cost of the road.

³⁵ The desirability of having a maritime stronghold on the Samoyed coast has been repeatedly expressed, both for development of our fishing and animal industries, and for facilitating sea expeditions to explore the North of Siberia. In these respects, the Varandey port will be of outstanding importance, especially if we take into account its proximity to the mouth of the Pechora and the Kara Sea.

³⁶ See note 1 on page 228 in «Zheldor. Delo» of this year No. 37–38.



«Expecting, even in the current state of the money market, to sell construction capital without any guarantee from the government, the undersigned is limited to requesting only the right to duty-free import from abroad of the building materials and accessories required for construction of the road, based on the same privilege, Your Highest granted to Mr. Golokhvastov. Further basic definitions of the company's charter do not differ at all from the conditions established for other private railways of the Empire».

«Based on the surveys performed in 1900 by the engineer Gette, the cost of the enterprise was determined, with all the caution of the assignments, in extremely moderate amounts: the railway track itself, 400 versts long, is estimated at 51 thousand rubles from a verst away (total 20 400 000 rubles); with the cost of port facilities, elevators, power stations, telegraph communication with the village Ust-Tsylma and Tobolsk and construction of roads in two settlements at the end points will require 75 425 rubles per verst, and in total with expenses for exchange rate losses and the payment of interest on bonds during construction of the road – 36 million rubles. At the same time, the throughput capacity of the designed line is designed for 120 million poods per year, and carrying capacity – by 40 million poods».

«To this, the undersigned allows himself to add that the subsequent, for the fourth time, by virtue of the Highest permission, extension of Mr. Golokhvastov's right to construct and operate the Ob railway of private use due to the submission of survey results by April 2, 1906; and since Mr. Golokhvastov, after 18 years of inactivity, has still not begun to carry out this research, then – as his last petition proves – he will in no way be able to fulfill his obligations by the specified time, exactly just as it happened before».

«Meanwhile, with the start of necessary activities this fall, the Polar-Ural Railway Society of public use being formed would have the opportunity to use the entire working period of the next year, both for carrying out final surveys, with surveying and studying the corresponding part of the Samoyed coast, and for building settlements, laying telegraph lines, etc., without which it would be impossible to open construction works, with a full guarantee of their successful execution. «Adding to this:

1) that the proposed Ob route for private use cannot be of significant interest either for the state or for trade in Siberia, since it excludes the possibility of using it by anyone except the owner, and 2) that the permission granted to Mr. Golokhvastov for construction of a private road does not deprive the Government of the right to issue a concession for construction and operation of routes parallel and competing with the first, – as stipulated in the first permission given to Mr. Golokhvastov for implementation of his enterprise – the undersigned humbly request Your Excellency not refuse to equalize the rights of all persons involved in the matter, by asking the Highest Sovereign Emperor for permission to allow him to form the now private Society of Polar-Ural Railway and, upon approval of the Society's charter in a legal manner, then begin work».

The last memorandum dates back to the time when the prince M. I. Khilkov was the minister. The benefits that E. K. Knorre asks for in this note were recognized as possible and expedient by the Commission on New Railways in March 1907 (see Zhel.-dor. Delo of this year, p. 214), i. e. already under the second successor of the late prince. The current Minister of Railways, St. Secret S. V. Rukhlov, in respect of the works of P. E. Gette, provided powerful support to his widow, Mrs. Gette, according to the accounts of the State Control. From these facts we can obviously conclude that both the personal works of P. E. Gette and those joint with E. K. Knorre, in their common cause, received sympathy from the government, and if the concerns of these highly respected entrepreneurs were not realized in reality, then the failure of their project for Polar-Ural railway must be sought outside of them – in the obstacles caused by their competitor, Mr. Golokhvastov, who did nothing seriously to draw up his project and only abused the Most High favors granted to him for delays. It remains to sincerely wish that such persons would not appear in the railway enterprise, that fate would finally allow E. K. Knorre to carry out his Polar-Ural business, and that even the note published [in the journal] about steamship routes in the northern waters would serve him, if possible, to his benefit.

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