



## On the press review

### «Extent and duration of construction of indispensable railways» (publication of 1912 in the Rail Business [Zheleznodorozhnoe Delo] Journal)



#### Press archives

In 1912, the Rail Business journal published a material that was, in fact, a statement of the approaches that had developed at that time to the expediency and pace of further development of the railway network, including the uniformity of this pace, as well as, in modern terms, to the transport connectivity of the country's territory, the socio-economic effects of its growth, and sources of investment. Three points of view were presented: that of the chairman of the High Commission for the Study of the Railway Business; that of his opponent under the initials A. F. whose name remained unknown, but, who, apparently, had the authoritative opinion; and that of the editorial board of the journal itself.

Despite the radically changed economic conditions and technological structure, which have led to the loss of relevance of some of the issues discussed, some other fundamental points raised in the discussion in absentia on the pages of the journal being adapted to modern realities may be of some interest, including, possibly, in the aspect of the implementation of modern large infrastructure projects.

The reprinted, slightly abridged text preserves as much as possible authentic punctuation, vocabulary and abbreviations commonly applied at the time of initial publication.

**Keywords:** railways, transport connectivity, development of transport infrastructure, history of transport.

«Extent and duration of construction of indispensable railways». Under this title, Novoye Vremya in its №№ 12822 and 12823 published an article by N. P. Petrov, the Chairman of the High Commission for the Study of Railway Affairs in Russia, devoted to the topical issue of expanding the railway network.

«If, with too much haste in developing the network», says N. P. Petrov, «the population does not sufficiently increase their needs for railway services, and they, not receiving all the work they need, will not be able to pay all the interest on their construction capital, then the population will be forced to assume the payment of the entire missing amount of interest. Such a deficiency can amount, according to previous examples, to hundreds of millions of rubles. If, on the contrary, with too much caution in construction of rail

tracks, the construction will proceed slowly and the length of tracks per 10000 inhabitants will increase less than the increase with which the population, with benefit for itself, could deliver to the roads the work they need, it will suffer a major loss in its industrial productivity».

The author further calculates how much the work of railways, expressed in gross income, would have decreased if by 1925 the network length per 10000 inhabitants, for example, will have attained not 6, but only 5 versts. The loss of gross income, it turns out, would have reached 209 million rubles. «The cost of works that will not be transported, and therefore will not be produced, should, according to N. P. Petrov, be considered 7 or 8 times higher than the cost of transportation», i.e. approximately 1 ½ billion rubles.

**Acknowledgements:** the editors express their gratitude to the staff of the library of Russian University of Transport for their help in preparing the publication.

**For citation:** On the press review. «Extent and duration of construction of indispensable railways» (publication of 1912 in the Rail Business [Zheleznodorozhnoe Delo] Journal). World of Transport and Transportation, 2024, Vol. 22, Iss. 3 (112), pp. 263–268. DOI: <https://doi.org/10.30932/1992-3252-2024-22-3-15>.

**The original text of the archival article in Russian is published in the first part of the issue.**

**Текст архивной статьи на русском языке публикуется в первой части данного выпуска.**

It is impossible to agree with this thought, repeated twice in the article (what is not transported, is not created). For clarity, we present our objection using the following specific example. Due to improvement of transport, the Englishman finds it more profitable, instead of sowing grain in England, to eat bread collected in the Samara steppes. Here we do not have creation of a new product, but only relocation of production points. But reduction in price of a product also increases the demand for it, depending on which more advanced transport is a factor in creation of new products. *Thus, the railway creates a product not to the extent that it transports it, but because it makes it cheaper.* And consequently, of the quantity of products transported, additional due to development of the network, part falls on the newly created product, and part falls on the one created at new places of production *to replace the previous ones.* Which part exactly is it in both cases? – hardly anyone will be able to answer.

Moving on to determining the norm for the required construction, the author of the study bases it on construction of the nineties. During the period of 1892–1900 our construction proceeded at the most accelerated pace, namely: annually per 10000 inhabitants the network of European Russia increased by 0,14 versts, reaching 3,61 versts by 1900.

N. P. Petrov considers this growth rate of 0,14 versts necessary and safe to allow in the future. But development of railways with an annual increase in the norm of more than 0,14 versts may turn out, in the opinion of N. P. Petrov, to be a risky business, «unless some particularly favourable circumstances are discovered in the economic life of European Russia that justify the risk».

Based on the norm of 0,14, it turns out that to achieve the level of railway service for the population that Austria-Hungary now has (8,9 versts per 10 thousand inhabitants), European Russia will need 35 years, and during this period it would be necessary to build 143 thousand versts in the amount that cost 16 billion rubles. Investigating the relationship between the length of the network, its gross income and population growth<sup>1</sup>, N. P. Petrov found an empirical formula for the period 1888–1902 according to which the residents' expenditure on railway services is determined as follows: [it is necessary to] multiply 1 rub. 64 k. per number of versts per 10000 inhabitants, and subtract 1 rub. 39 k. from the resulting product. Using this empirical formula, it is easy to determine the gross income of the future network and check its financial capacity.

We note that N. P. Petrov's formula can be paraphrased as follows: gross income per verst is  $16.400 \text{ r.} - 13.900/l$ , where  $l$  is the number of versts per 10.000 inhabitants.

<sup>1</sup> N. P. Petrov. Criterion for railways and its application. [Footnote in the original text].

Since now  $l = 3,67$ , then income per 1 verst should now be equal to  $16.400 \text{ r.} - 13.900/3,67 = 12\,858 \text{ rub.}$  With development of the network, this income should grow, reaching its limit of 16.400 r. per a verst. But, as every railway employee knows, even the norm of 12.858 rubles, generally speaking, is completely sufficient for the break-even existence of railways. Consequently, further development of network density per unit of population should promise great and rich favours... if the empirical formula is extrapolated beyond the time of observation.

The question, therefore, comes down to whether one can be sure that at the rate of network development that took place in 1892–1900 (0,14 versts per year per 10 thousand inhabitants), newly constructed lines will be paid for by the population according to the above (in the empirical formula) calculation? And if we can have this confidence, then shouldn't we, in addition, expect that such «particularly favourable circumstances» will be found in the economic life of the country that would justify the risk of network development above the norm of 0,14?

The first question must be answered very carefully. Although the development rate of 0,14 is taken from nature, we must not forget that it ended with the network falling into shortfall. This shortfall was due to both increased operating costs and a decrease in traffic density. The number of pood-versts per a verst, which increased continuously from 1890 to 1900, changed the law of growth after 1900: as if fatigue had set in the network, severe interruptions began. *This crisis had occurred two years earlier than the crisis in network growth, which began to slow down only in 1902*<sup>2</sup>. As for another reason for the deficiency regarding growth in expenses, despite significant improvements in recent times in railway management, the rate of operation of the network of European Russia, due to the rise in prices of labour and materials, in 1910 turns out to be still less favourable than the average for five-year period 1895–1900 (0,62 versus 0,60). So, we cannot draw courage for the future from the *past*. Let's turn to the future directly and see if it promises us any particularly favourable hopes in economic terms. I would like to answer this in the affirmative.

Is it really possible to close our eyes to the fact that a tremendous shift has taken place in the fate of our fatherland, all the consequences of which are now impossible to take into account! Already in the early stages of the new order of things, a colossal reform of communal land ownership was carried out (law of November 9). There is no doubt that within a relatively short time there will be a complete mobilisation of land ownership. The so-called hunger standards will

<sup>2</sup> A fact clearly visible from the chart attached to the document submitted to the State Duma on February 8, 1911, regarding programs of railway and economic research. [Footnote in the original text].

be replaced by labour standards. Instead of possession that allows the use of some one-tenth of the owner's labour energy, there will be possessions that use this energy entirely. This process of concentration of land in the hands of «strong» workers will be accompanied by the release of a mass of workers who will require new applications. These essentially creative forces, under certain conditions, can turn into destructive forces. The instinct of self-preservation of the nation must direct the liberated energy to productive work. The increase in the well-being of agriculturists, as a consequence of concentration of previously fragmented plots of land, will cause a corresponding demand for items of the manufacturing industry and will require new labour force for it. Thus, the incentives for an enhanced and sustainable economic recovery of the country are undeniable. In connection with this circumstance, it is possible for the railway network to develop not only at the pace of the nineties, but even a very faster pace of construction does not seem implausible. However, it is not within our means to foresee an exact and definite number of versts, the construction of which will satisfy financial and economic interests in the best possible way. We are even inclined to admit that this financial and economic function is not an unambiguous function. The variety of interested factors is so enormous, and their interaction is so complex, that there is nothing impossible in the assumption that the complex of financial and economic interests will be equally well satisfied by both the decision, for example, on 3000 versts of annual construction, and on 4000 versts, and consequently, on all intermediate ones.

It seems to us that it is not so important to guess this figure exactly as it is important to establish the possible uniformity of construction over time. If, for example, in one construction period we build 3000 versts a year, in another – 4000 versts, and in the third again 3000 versts, then this would be a great evil. Changes in the norm are inevitable, but they should not be abrupt but should be smooth. The front of construction and plant production, deployed over 4000 versts, can then shrink to 3000 versts only at the cost of great economic upheaval. This upheaval is of the same order as the consequences of crop failures. But if we still do not know how to repel the adversity sent by the elements, then we have the right to demand from railway policy that it no longer periodically send disastrous droughts to our labour field.

*A. F.*

#### **From the editors [of the Rail Business journal].**

We are deeply grateful to the Chairman of the High Commission for the Study of Railway Affairs in Russia for raising his conclusions on the issue of the order of future development of the railway network for general discussion. The highly respected Nikolai Pavlovich, presenting his thoughts and conclusions, remained

invariably faithful to numerical combinations, although they led him to a rather sad conclusion for the state. We are also grateful to his opponent, Mr. A. F., who pointed out the possibility and validity of hopes for a better future in this matter and those dangerous decisions that could harm it. A state that wants to live and be powerful, as well as its neighbours, should know that it can be powerful at any time, or at least not in the very distant future.

We count ourselves among those publicists who – judging by the first paragraph of the article in question, although popular, but weighty – caused it.

We began discussing this very important issue about the future development of the railway network back in 1882, and we followed its growth without ceasing<sup>3</sup>. Therefore, we hope that His Excellency will kindly allow us to give some thoughts about the significant, in our opinion, omissions in his article, published in *Novoye Vremya* and interpreted here.

1. This article is based mainly on the size and activity of the population. But the state consists not only of the population, but also of the territory with all its riches, given to it by God and the labours of many previous generations. In the «Comparative Table» of 1882, this was expressed in average values per kilometre of railway length: of the number of inhabitants, as in the article under consideration, but in the opposite ratio, and the number of square kilometres of space, which is not in it. Meanwhile, this last ratio is precisely the value by which one can judge, in general, the difficulty of transporting local products to the railway and transporting goods arriving by rail to places of consumption – if we do not lose sight of the fact that the entire population has the right and wants to use the railways – and which can free the population from the accusation of inactivity provided for in the article, of non-compliance with the needs of the railway, while these qualities are easily explained by the special range of horse-drawn transportation.

2. The very concept of non-use of railways by the population, correct, so to speak, in a cash sense, is hardly so significant in relation to the state, if the population correctly understands the principle that railways are built and operated for them, and not they grow and develop for the railways. But this situation is undoubtedly correct. Otherwise, all the burdens of the actual occupation of the rich parts of the state, but remote from the centre, would lie on the settlers, and not on the state, perhaps even until the time when their numbers and activities in the new place of settlement would exactly correspond to the needs of the railways. No matter how great the contrast is between the size of the railway networks of the North American United States and ours, it is not so much the absolute size of their network that these states should serve as an example to us, but rather the consideration in railway

<sup>3</sup> It is enough to point to №№ 5 and 6 of *Rail Business* of 1882 and № 2 of 1906 [Footnote in the original text].



construction that they showed in relation to their settlers. The settlers rewarded them for this with their entrepreneurship and labour. The consequences of the lack of such consideration are a completely inappropriate delay in occupying the mentioned parts of the state, leaving them unsettled economically and, in the end, forced consent to the occupation by their neighbours. Unfortunately, there are examples of this.

3. The article being discussed, devoted to the economic issue, divides Russia into two huge parts, mutually opposite in space and population: one has a larger population, the other has more space, i.e., European Russia with the Caucasus and all Asian possessions, with the exception of southern part of the Caucasus; but the division is only geographical, and its application in this case is hardly correct. It would seem that, for the sake of homogeneity in relation to the degree of supply by railways, Arkhangelsk province, part of Vologda province and the southern part of the Caucasus should be considered along with Siberia and Central Asia.

Finding Arkhangelsk and Vologda provinces and the southern part of the Caucasus in the same account or in the same group with other parts of European Russia, and not with other parts of the Asian possessions, with a separate calculation of the number of railways for these groups and with the dominance of the principle of the population in these calculations, can, obviously, lead the named provinces to a constant loss: their shares in distribution of funds for construction of railways, which they could receive according to the principle of space, will have to go to strengthening the railway network in other parts of European Russia, which is not at all desirable.

4. In the article being interpreted, the sequential construction of new railways in European Russia and Transcaucasia is calculated over five-year periods even until 1947. Such a detailed calculation for the Asian possessions is not given in the article but is explained only based on the principle of population, that by 1946 it is necessary to add 16.000 versts of railways to the existing 10.000 versts there, on the assumption that the population growth there will be close to its growth to Europe Russia. But apparently, this calculation does not consider the ongoing movement of population from European Russia to Asian Russia, which with the construction of new railways in the latter should even intensify. If we count this population movement, then it will be necessary to reduce the number of versts of new railways assigned to European Russia, and those assigned to Asian Russia with Arkhangelsk and Vologda provinces can be added, which, in the fair opinion of the author of the article, will only be to the benefit of the general affairs.

*«Firstly, since the population moving beyond the Urals from European Russia will be located closer to the new railways and will therefore use them more. Secondly, because the Trans-Ural railways will*

*provide new, additional and therefore profitable freight transportation to the railways of European Russia».*

These words of the highly respected author are very opportune for our goal of promoting the construction of railways from the centre to the outskirts of the state and within these outskirts to protect them from their neighbours and to develop the wealth available there. It was not for their neighbours that the previous generations of the Russian people worked and shed blood to acquire them. The author of the article has the same opinion:

*«This last and, of course, most important need is what publicists most often discuss. They are not mistaken in this, placing it on the first place».*

5. Thus, it is desirable to change the order of the sequential construction of railways set out in the article being interpreted somewhat, and if it is not possible to increase the allocations for this construction at all, then it is better to base the increase in allocations for the outskirts on the reduction of allocations for European Russia without Arkhangelsk and Vologda provinces and the southern parts of the Caucasus, rather than leaving the outskirts in their unprotected and unsettled state.

European Russia is so well provided with railways that it has already begun to move on to straightening lines, to constructing roads of the shortest direct route with a gain of several hours in time, and this can be considered a comparative luxury, when neither Yakutsk, nor Przhewalsk, nor even Murman is not yet connected to the centre of the state by rail and it is too early to talk about connecting Kamchatka with the centre of the state in this way, according to even the State Council<sup>4</sup>.

6. The article under review also does not give any space at all to the possibility of using, in order to reduce costs, other types of railways, except for the Russian normal one, developed by technology and suitable for the outskirts... Why not extend the type of 3<sup>1</sup>/<sub>2</sub>-foot gauge railway to Arkhangelsk province? Why not use, to the east of the future main line connecting Siberia with Turkestan, for example, a gauge of 3 or 2,5 feet, and in other, most difficult places, as in Yakutia region and Kamchatka, also a single-rail railway, whose verst in Alaska, according to newspaper reports, will cost 6.000 rubles (Rail Business, 1911, № 27)?

And in European Russia there are such deviations from the normal gauge.

Of course, many people object to transfers and transshipments, regardless of those who demand a normal gauge at all costs. But there may be cases when one must put up with the circumstances that cause such movements of passengers and cargo, and not only put up with them, but also prefer them...

Without a doubt, these questions deserve the attention of the High Commission for the Study of

<sup>4</sup> See Rail Business, 1908, №№ 15–16, p. 68 d. [Footnote in the original text].

Railway Affairs in Russia and a detailed, but quick, study. The 8<sup>th</sup> Department of the Technical Society has already dealt with similar issues, even with participation of representatives of the military department, and could assist in this study.

\*\*\*

So it seems to us, firstly, that the question of the indispensable railways, indicated in the title of the article being treated, is presented in it in a completely one-sided way, namely, about the roads necessary for the population only in accordance with its proven adaptability in the last decade; and the railways necessary to the state for the people's well-being in terms of the wealth of their regions, including for political and strategic purposes, are apparently left by the author of the article without the corresponding calculations, and, secondly, that the very recognition of the need for railways for the population is made dependent only on whether the population provides the income the railways need or does not, that is, depending on the circumstances, is a completely conditional value, at least for the first years of operation of the railways, both from the actual and speculative side.

The North Donetsk railway, which showed itself to be profitable from the very first day after the opening of traffic on it, is perhaps the only one; and statements by the highest representatives of the state in 1842 against the construction of St. Petersburg-Moscow, now Nikolaevskaya, railway and articles in the «Moskovskie Vedomosti» in 1879 against the construction of the Ekaterininskaya Railway, i.e. against the construction of railways that are now very profitable ones, have been even condemned by history. Relatively recently, condemnations of the construction of both the Siberian railway were heard, and the State Control classified it as unprofitable, attributing an increase in the income of European railways from transportation of Siberian goods to the merits of European railways, and not of Siberian one.

The proportion of construction of new railways derived from calculations of 0,14 versts per every 10.000 population annually, leaving the sparsely populated outskirts of the state for a long time without railways or with only a small number of them, cannot, it seems, under the influence of the third-party reasons explained by us, expect exact fulfilment or do without amendments, all the more necessary since the author of the article himself states:

*«Whichever direction the construction of economically necessary railways deviates, whether towards surplus or towards shortage, the population is exposed to huge losses».*

We hope that the losses are only calculated and, in case of excess, easily corrected.

The cursory examination carried out here of the method for determining the length and construction period of the railways necessary for Russia, set out by

the Chairman of the High Commission for the Study of Railway Affairs in Russia, obviously does not promise to this method a long period of application without changes. We regret very much that, probably, the size of the popular article did not allow its author to be critical of another method of determining resources for expanding the railway network, first recommended in our country by I. S. Bliokh [Ivan Stanislavovich Bliokh] in his special work (Rail Business, 1906, № 2, P. 18) and repeated in the Rail Business several times:

*«According to the research of the engineers [Charles de] Freycinet, [Jules] Dupuit and [Léon] Leygue, the monetary savings delivered to the country by the railways are estimated at 2 to 4 times the gross income of the railways».*

We believe that this formula is applicable to all nationalities and is broad enough to be able to protect the population of the state that uses it from actual losses for construction of railways. It shows both the benefit the population receives from railways and their ability to pay for new railway services. In the article reviewed, the considerations are based on gross income taken only once, i.e., only in the amount in which the population has already paid for railway services. It would seem that the amendment here is very simple – for the first step, it is enough to double the figure of 0,14 versts per 10.000 inhabitants proposed in the article and carefully check the feasibility of this in practice.

To this, however, an objection can be made approximately as follows:

«In 1910, the annual cost of maintaining Russian railways (operation and interest on capital) approached 1 billion rubles. Fortunately, the gross income is close to the same billion. But what would happen if, with an expenditure of a billion, the income would be only half a billion, and the deficit – also half a billion – according to Freycinet, Dupuit and Leygue – would have to be found in those indirect savings that the population receives from railways? Obviously, in addition to the existing indirect taxes (vodka, tobacco, kerosene, trade certificates, stamp duty, etc.), another half a billion would have to be collected! This is where the consideration would be justified: population is for the railways.

No matter how true the idea is that railways cause an increase in values greater than their income, but we must not forget that these added values are not for free. If, for example, we assume that now, due to railways that *directly* create a billion worth value, values are also created *indirectly*, also worth a billion, then this second billion, just like the first, is allocated according to the expense items of the corresponding enterprises: for labour, administration, materials, payment of capital, taxes, etc.

Thus, of this additional billion, only what was included by enterprises in the expenditure heading



«taxes» ends up in state resources, probably from 5 to 10 %. Only this share can be used to cover railway shortfalls.

However, even such use of tax resources will result in a slowdown in improvement of other parts of the state mechanism with all undesirable consequences for the overall progress of the nation. In a word, one cannot say: since this tax was received due to the railways, it must be spent on the railways. Taxes must, in a certain pattern, satisfy all state needs, regardless of considerations about the sources of the tax».

In this objection, regardless of the fact that the formula of Freycinet, Dupuit and Leygue indicates the third and even the fourth billions of people's savings, four points actually deserve special attention:

- 1) about a billion-dollar expenditure with an income of half a billion;
- 2) an indication of the need to levy a new tax as a justification for the situation that the population is for railways;
- 3) an indication of government resources that can be used to cover railway shortfalls, and
- 4) on slowdowns in improvements in other parts of the state mechanism.

The first point is obviously of a hyperbolic nature, since with the tendency of gross income to reach only half a billion, spending a billion on the railways is completely unacceptable, and at present it is impossible, due to the experience of the administrations. It will be prevented, and the deficit will be much smaller. The source for covering the possible shortfall is indicated in accordance with the 3<sup>rd</sup> of the points given here. The success of such deficiency payment depends on the wisdom of the administrators.

The second point in this case gives grounds to recognise the correctness of the stated position, and railways in this regard are no exception among all the needs of the state.

The third point, as already explained, is in accordance with the first point.

Finally, the fourth point, which seems to us the most serious, raises the question, what state needs should be given priority in satisfaction? We will not go into a detailed consideration of this issue and will limit ourselves to our opinion regarding the state's need for railways, that everyone and everything needs satisfactory routes of transportation and that, having such routes, the state can succeed much better in all other respects. By reducing travel time, such routes increase for those using them, as well as for the entire state, time and money to satisfy other vital and cultural needs. This is no longer an indirect, but a direct benefit delivered to the population by means of transportation, and paying it in one amount or another with taxes, in addition to fares and transportation, cannot be considered injustice in any respect.

We also believe that the formula of Freycinet, Dupuit and Leygue has not been refuted by the

considerations of our imaginary opponent; but, in addition to it, we also have, as if in reserve, a fair and interesting proposal by E. Yu. Stoll, published in Rail Business, 1907, № 42, under the title «Special taxes of the Ministry of Railways», unfortunately, attracted little attention four years ago. Perhaps it will deserve the attention of supporters of improvement in Russian railway economy now. We will not repeat this article here, but will only cite a postscript to it from the Editorial Board of Rail Business (P. 477):

«It would be reasonable to assume that this article (by E. Yu. Stoll) was inspired by its venerable author by those cries of our press about shortages of railways that impede the construction of new railway lines and dictate to our financial department, as well as to the State Control, a constant reduction in allocations for maintenance of railways that are already in operation. The author pointed out a way by following which it would be possible to directly cover these deficits. This path, which has not yet occupied our ruling spheres, is indeed similar to the treasures revealed to Peter the Great by Prince Romodanovsky, preserved by him, and obtained by Tsar Alexei Mikhailovich. And if we add to it the accumulation of that wealth in the population of Russia, which was discussed in the article «On railway construction in Russia according to the lessons of history» (Rail Business, 1906, № 2) and to which it owes railways, then the treasures accumulated in our country, thanks to railways and navigated waterways, will undoubtedly, in many, many times exceed in size the treasures preserved by Prince Romodanovsky. But, of course, the path indicated by the author must be developed in detail by those who will manage it.

«Thus, in our opinion, there is no reason to bemoan the lack of funds in Russia for maintenance and expansion of railways or waterways and to deny the Ministry of Railways (as well as other departments) the allocations it needs, but it is only necessary for wise rulers – «profit-makers» to find the key to the indicated funds and, having removed the seal of oblivion or ignorance from them, establish the correct use of them and not be afraid of their use, since they are constantly increasing while the population lives and works».

In any case, the most successful solution to the question raised by the article of the highly respected Nikolai Pavlovich currently lies not behind treasures, not behind the population and not behind the technical press, but behind the «profit-makers» of the newest system of the Russian State. They should first of all abandon their financial *non possumus* and then turn to the keys to the country's treasures and give the latter to its population in the form of new railways, as well as in the form of a consistency that is necessary for everyone and ensures quick success.

***Rail Business [«Zheleznodorozhnoe delo»],  
1912, № 10–11, pp. 70–74 ●***