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The 150th Anniversary of Academician Vladimir Nikolaevich Obraztsov (biography and bibliography)

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ABSTRACT

The cites of Moscow, Chelyabinsk, Irkutsk, Rtishchev have streets named after Obraztsov. Many are sure that these streets got their name in honour of the great puppeteer Sergey Obraztsov. But in fact, it was not the wonderful actor who was immortalised in the toponymy of Russian cities, but his father, Academician Vladimir Nikolaevich Obraztsov, an outstanding scientist in the field of transport, who proudly called himself a «Rtishchev railwayman».

The former Bakhmetyevskaya street in Moscow, where the Obraztsov family lived, still bears the name of the railway academician. It is impossible to imagine modern Moscow without this surname. Obraztsov Street still leads to knowledge, to introduction of new technologies in construction of railways and, ultimately, to progress. It is no coincidence that Russian University of Transport (MIIT), which has traditionally developed exemplary traditions laid by Obraztsov, has its campus located on Obraztsov Street.

Academician Obraztsov had an amazing gift – he knew how to talk simply about complex things – therefore he was considered a wonderful teacher, a favourite of students, and his scientific works have not yet lost their relevance.

The main scientific works of Vladimir Nikolaevich are devoted to railways, their history, their present and future. Obraztsov understood that over time the role of transport would only grow, and proposed solutions, considering the inevitable changes. The life of Professor Obraztsov is inextricably linked to his students, his ideas, his business trips…

He knew the railway very well and loved it. And he believed that it was train lines that would help Russia become an advanced country.

The article provides a bibliographic list of V. N. Obraztsov's works and a list of the largest projects he implemented.

Keywords: V. N. Obraztsov, railways, history of transport.

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The original text of the article in Russian is published in the first part of the issue.
Текст статьи на русском языке публикуется в первой части данного выпуска.

The 150th anniversary of academician Vladimir Obraztsov will be celebrated in summer 2024. Vladimir Nikolaevich Obraztsov was born on June 18, 1874, graduated from classical gymnasium in the city of Nikolaev in 1892 with a gold medal, then entered the Imperial St. Petersburg Institute of Transport.

At the institute, Vladimir Nikolaevich studied civil engineering in depth; during practical training, he travelled a lot along the railways, spending the night at stations and passing loops, and walked about 150 km with a level.

As a third-year student, he independently developed a design for a dam and spillway for water supply to Kazanka railway station, located near the city of Nikolaev. The project included a large pond of 40 hectares, and professional calculations of the possible influx of water, losses from absorption into the ground and from evaporation etc. This project was distinguished by an original solution and impeccable engineering calculations and therefore was implemented, and the student author was awarded a cash prize of 50 rubles by the institute.

Still as a student, Obraztsov led the research and construction of access railway tracks to industrial enterprises, or, as they said then, «railway branches».

After graduating from the institute in 1897, the young engineer served military service (mandatory after study) in the corps of engineers as a so-called conductor (the lowest technical position of a draughtsman).

The short military service ended, and the young engineer faced the question of further job. His close fellow students A. Alekseev and G. Perederiy left for Moscow. Vladimir Obraztsov also decided to go there.

Vladimir Nikolaevich worked on the survey and construction works of Moscow-Vindavskaya Railway line, then as an engineer at the track service department on Nikolaevskaya Railway, then as an engineer at the technical department on Moscow-Kurskaya and afterward on Moscow – Yaroslavl – Arkhangelsk railways.

The management of Moscow – Yaroslavl – Arkhangelsk Railway assigned engineer V. N. Obraztsov in 1901 a mission to develop a project for rearrangement of Ivanovo rail station. Since at that time there was not only a theory of station design, but also no technical literature on this issue, the young engineer had to work on this project for almost a year and a half. The project was developed in great detail, approved without any changes and was highly appreciated by the Engineering Council. This project was the first to be carried out on a scientific basis, and therefore it brought Vladimir Nikolaevich the well-deserved fame of «a pioneer in the design of stations».

The project was published in the journal «Inzhenernoe delo» [Engineering, further called Engineering jounral] (No. 2, 1902), because it was the first project to develop and formulate the basic scientific principles of designing railway stations, which served as the initial guidelines for drawing up large projects of railway stations in the country.

The publication of the project resulted in invitation to work as a part-time assistant of the famous scientist Professor K. Yu. Tseglinsky, head of the Department of Railways at the Imperial Moscow Engineering School (IMIU).

This early period of the young scientist's scientific activity includes his fundamental work «Geometric elements for calculating turnouts when designing stations,» which was published in the Engineering journal (No. 1 and No. 2 in 1904). This work became the basis for laying a scientific approach to design calculations of railway stations and their most important elements.

Following the first scientific works, other works on stations' development were accepted for publication. The work «On the issue of designing stations and their calculations» (Engineering journal, No. 1, 1905) became especially famous. It evoked much positive feedback in the media, including by Professor A. N. Frolov, a famous scientist and authority among railway employees, who wrote «We welcome this new attempt to shed light of analysis on the hitherto dark side of engineering creativity».

In 1906, a new article published in the Proceedings of the 14th Congress of Railway Track Services was devoted to the issue of station design. These early scientific works of the young scientist became widespread among the engineering and technical community, became the main guide for engineers in the design of stations and junctions, and brought their author wide fame. He began to be invited as a consultant on station design by many railways in the country.

During this period, interest was also aroused by the article «The profitability of the railway and its graphical representation depending on tariff rates» (Scientific works of IMIU, issue 1, 1907).

V. N. Obraztsov was one of the first researchers and engineers to assess the importance of the turnover of a goods (cargo) wagon. In 1909, he published his work «Theoretical Research on the Turnover of Cars» (Izvestia of Moscow Engineering School, 1909), which examined the issues of determining the required size of the working fleet of cargo wagons for a given volume of transportation. The study was carried out considering the influence of speed, uneven traffic, specialisation of wagons, issues of regulation of empty car flows and other indicators.

In his further works, Vladimir N. Obraztsov uses the indicator of accelerating movement of wagons as the basis for research and technical measures for development of stations and junctions. These ideas of Vladimir N. Obraztsov are valid even now, when our scientists and railway employees are striving to speed up the turnover of wagons.

The outbreak of the First World War showed that Russia's railway network in the main strategic directions was underdeveloped, and railway stations and junctions did not have the necessary capacity. During this period, Vladimir N. Obraztsov developed several large projects for railway stations on the main routes of the network. As a direct participant, leader and consultant of complex design work in the field of stations and junctions Vladimir N. Obraztsov developed scientific principles for development of railway stations and junctions and implemented them in specific projects. Among the most significant, it is necessary to note the projects of Perovo-Sortirovochnaya and Nikitovka stations (1914–1915), Vyazma station (1915–1916), the Smolensk and Smolensk-Sortirovochny stations (1915–1917), the second stage of Ivanovo station, stations of Arkhangelsk line in connection with rearrangement of Vologda–Uroch section to broad gauge (1916), stations in Moscow–Baranovichi direction and others. It should be noted that in the developed projects, the issues of capacity of stations and directions of the Russian railway network were solved in a completely new way.

The well-deserved authority of engineer V. N. Obraztsov allowed him to take the post of chairman of the railways department in Moscow Military-Industrial Committee, and in 1917, the position of comrade (deputy) chairman of the Organising Committee for the convening of the 4th All-Russian Congress on Technical and Craft Education.

After his trip to the front in 1917, his new scientific works appeared: «On the issue of transportation routes for the front», «On organisation of lead transports», «Reconstruction of destroyed bridges» and others.

These articles were devoted to current issues of organising transportation under war conditions, and they also described new types of plank road construction for swampy areas.

After the end of the First World War and the Civil War, it was extremely necessary to quickly restore the destroyed economy and, first, the railways. Vladimir N. Obraztsov got involved in this interesting and creative work.

Soon after the revolution, V. N. Obraztsov was elected to the Committee from the workers and employees of Aleksandrovskaya (now Belarusian) railway.

The lack of fuel was at that time one of the most pressing problems for the railways. On the initiative of V. N. Obraztsov, the Committee began organising independent fuel procurement, and for this purpose the Durovskaya railway line was built, intended for provisions with firewood and peat. Its organisation and the measures taken on the initiative of V. N. Obraztsov saved the situation, and even in that difficult time, Aleksandrovskaya railway never suspended train traffic.

In 1918–1923, Vladimir N. Obraztsov and his students drew up projects for several large railway junctions in Zaporozhye, Nizhny Novgorod, Ryazan, Smolensk, Syzran and others.

The results of this enormous work were published by V. N. Obraztsov in 1925 in the Proceedings of the 21st Advisory Congress of Representatives of the USSR Railway Operation Services in the form of an exceptionally informative work «Projects and ideas for development of Russian stations during the World War and Civil War».

The depth of the ideas presented in this work, their scientific validity and practical significance have remained valid to this day. Until now, this work is among the main tools for designing stations and junctions.

In those years, consolidation of railway junctions with a change in the principles of their management and organisation, followed in some cases by their redesign, was of great importance for the country's economy. This great work was led and ideologically directed by V. N. Obraztsov, who was a member of the Special Commission for Consolidation of Junctions under the Main Inspectorate of the People's Commissariat of Railways (NKPS) and a member of the Reconstruction Committee at the NKPS. The commission also included leading experts E. A. Gibshman, S. V. Zemblinov, M. V. Senkovsky et al.

In 1922, Vladimir N. Obraztsov developed once again a project for integrating Smolensk junction, which became a model for designers of other railway junctions. In the same year, V. N. Obraztsov prepared the work «Project for distribution of junctions on the Russian railway network and the sorting operations of junctions, in order to reduce shunting work and downtime of wagons», which was published in the journal «Tekhnika i ekonomika putei soobshcheniya» [Technology and economics of railway transportation] (No. 12, 1922).

By the mid-20s of the last century, sufficient experience had been accumulated in redesigning

stations and junctions during their reconstruction and consolidation. The development of technical design specifications, calculation methods and design of stations and junctions, as well as individual elements of complex station facilities, was headed by V. N. Obraztsov, who received the academic title of Professor in 1919.

In 1924, Professor V. N. Obraztsov was appointed head of the department of stations and junctions, a new one at Moscow Institute of Transport Engineers (MIIT Institute) and the first one in the country. Due to the unfavourable situation of station facilities, the curriculum was changed and the time allocated for studying the discipline of stations and junctions increased. A lot of organisational work to create a completely new department could not tear him away from scientific and project activity.

In 1922–1929, the consolidation of almost all major junctions of the country, lead by Professor Obraztsov, made it possible to significantly improve the work of the railways. This period saw published major scientific works by Vladimir N. Obraztsov, devoted to various issues of stations and junctions:

– «Stations and their attributes» (Proceedings of MIIT, 1922);

– «Encyclopaedia of Transportation Routes» (Gosizdat, 1925);

– «Tunnel overpasses in design of junctions and stations» (Proceedings of MIIT, 1926);

– «Technique for designing junctions» (Proceedings of MIIT, 1927);

– «Standard V–III class station with gradual development» (Proceedings of MIIT, 1927);

– «On the issue of traction calculations for marshalling humps» (Proceedings of MIIT, 1928);

– «Basic data for design of railway stations» (Gosizdat, 1929). This classic work has long been a reference book for design engineers and practitioners. All these works, like many others, served as the basis for creation of the textbook «Stations and Junctions» for teaching students.

V. N. Obraztsov, using his experience as a design engineer, developed the theory and practice of designing marshalling humps. In 1928, he published a work that is still relevant today: «On the issue of traction calculations for marshalling humps». It summarises and develops various methods for calculating the conditions for rolling sets of wagons off humps. Vladimir N. Obraztsov obtained and presented a rigorous solution to the differential equation for motion of a set of wagons along a track with a variable slope under the influence of wind force and the main resistance to movement. In this and other scientific works, he clearly substantiated the requirements for marshalling humps. For example, the provision that the height and the slope of the hump should be such that wagons with higher resistance in difficult conditions could roll to a certain point.

This provision has become basic for all marshalling hump designers and is included in all regulatory documents on station design.

Vladimir Nikolaevich worked especially hard on the problem of developing transport in the city of Moscow and within Moscow transport hub.

The Council for the Project of New Moscow organised in 1921 based its work on the project of redevelopment and future development of Moscow by Academician A. V. Shchusev. Simultaneously, development of the Moscow hub project started in a special Commission chaired by engineer L. N. Bernadsky. At this time there was no longer any doubt that the capital was becoming and would quickly become one of the world's largest centres.

V. N. Obraztsov was assigned to lead the development of a project for reconstruction of Moscow hub and the integration of several land plots divided by railways by connecting them with overpasses. The project included creation of a port on the Moscow River, a few railway diameter lines and much more.

Back in 1920, Vladimir Nikolaevich scientifically substantiated the entry of cargo trains into the central districts of Moscow in his work «On bringing cargo trains deeper inside Moscow»[1] (Bulletin of NKPS, 1920). In 1925, he published the work: «Redevelopment of Moscow junction of Moscow – Kazan Railway» («Zheleznodorozhnoe Delo» [Rail Business] journal, 1925, No. 12), and in 1926, the article «Moscow junction and the main ideas of its reconstruction» (Proceedings of the 22nd Consultative Congress of Representatives of the USSR Railway Operation Services, 1926). All these works were devoted to reconstruction of transportation and planning of Moscow. Considering Obraztsov's proposals, work was carried out at Moscow junction to reconstruct connecting tracks, build new sheds at many stations of the junction, and to additionally lay second, third and fourth tracks at the most important sections. These and other proposals made it possible to eliminate the movement of freight trains along the old connecting tracks and transfer cargo traffic to the Moscow Rail Circle Railway.

In 1927, V. N. Obraztsov was sent to China to work on development of the Harbin transport junction on

[1] Obraztsov introduced into scientific use a short expression that can be conditionally translated as «deep extension» or «deep entrance». Further in the article these expressions are used in the sense of expanding underground or ground railways and bringing passenger or cargo trains deeper inside the city and integrating them into urban transport system. – *Translator's note.*

the Chinese Eastern Railway (CER). The Harbin hub, located on the banks of the Songhua River, was a bottleneck and required reconstruction considering the use of water transportation along the river. Professor V. N. Obraztsov successfully completed this difficult task, for which he received gratitude and a bonus from the leadership of the CER.

In 1930, an interesting article by Obraztsov «On the issue of deep extension and the metro» («Kommunalnoe khozyaistvo» [Public Utilities] journal) was published that argued for a comprehensive solution to the problem of the metro and suburban railways entering deeper inside the city. In 1931, Vladimir Nikolaevich published several articles in the «Kommunalnoe khozyaistvo» journal on this important issue: «On the entering of suburban electric railways deeper into the city», «Deep extension», «The urgent question of the connection of the metro and trams with electric suburban transport» and others. V. N. Obraztsov considered the possibility of metro trains using railway tracks. This required determining the transit and carrying capacity of diameter railways, selecting the necessary dimensions of electric rolling stock designed to operate underground and on ground suburban lines. This would provide direct access for suburban trains to any destination point within the city.

In 1927–1930, Professor V. N. Obraztsov was a member of the Engineering Council of Dneprostroy, the largest construction site in the country at that time. This responsibility allowed him to test his scientific ideas on the transport provision of the Dnieper Hydroelectric Power Station and the city of Zaporozhye.

In response to the Government decree of April 30, 1931, on the prompt construction of the Chelyabinsk railway junction, Vladimir Nikolaevich developed and implemented a project for its renovation.

In 1932–1933, Vladimir Nikolaevich organised two teams of students, Ph.D. students and lecturers of MIIT Institute. One team was put under his scientific leadership, and the second – under the leadership of his first disciple, Professor S. V. Zemblinov. According to the instructions of the NKPS, it was necessary to inspect 35 largest stations and junctions. Teams went out and inspected the site, planned activity and drew up projects for the redesign of the largest stations and junctions. As a result of this extensive work, projects were drawn up for the rearrangement of junctions in Moscow, Leningrad, Donbass, Kuzbass, as well as of Perm, Yaroslavl stations and a few others.

In 1933, Vladimir Nikolaevich completed the major work «Railway Junctions» (Transzheldorizdat publishing house); the scientific developments contained here-in formed the basis for a whole series of textbooks on stations and junctions.

The ability to think broadly, to see the essence of the questions posed and the ability to quickly understand the very essence of the problems are qualities characteristic of V. N. Obraztsov's scientific works devoted to a variety of transport problems and his practical activity. Therefore, as a general specialist, he was attracted to the most relevant and responsible work. Here is a far from complete list of his responsibilities in engineering, scientific, research and social activities:

– consultant to the railway construction department (1919–1921);

– member of the Commission for Consolidation of Junctions under the Main Inspectorate of NKPS (1923–1924);

– member of the Reconstruction Committee (NKPS) (1919–1933);

– member of the Engineering Council of Dneprostroy (1927–1930);

– consultant to Giprogor [Research Institute for Urban Planning] (1932–1934);

– member of Scientific Engineering Council at the Ministry of Railways (from 1935 until the end of his life);

– member of Moscow Metro expert team, etc.

As a consultant to Giprogor, V. N. Obraztsov was directly involved in development of issues related to functioning of transport during planning and reconstruction of many cities, namely of Moscow, Stalingrad, Magnitogorsk, Baku, Rostov-on-Don, areas of the Southern Coast of Crimea, Mineralnye Vody, the Black Sea coast of the Caucasus, etc. In his further works, he developed his idea of «deep extension» and criticised the opinions of some experts regarding removal of railways from the city. Here is a list of just some of these works: «Railway in the city», «Transport and city planning», «Off-street intersections in city planning», etc. It should be noted that these works are still of current importance today and are in demand by the contemporaries.

He was one of those who organised and created the Scientific Research Institute of Industrial Transport (VNIIPT) and then served as a scientific consultant. Projects of the largest metallurgy giants – Magnitogorsk, Zaporozhye and Kuznetsk plants, Uralelectromash, etc. – passed through his hands.

Taking part in planning the development of areas of the Black Sea coast of the Caucasus and Crimea, Vladimir Nikolaevich raised with the Government of the country the issue of building passenger aerial cableways in the country. He proved the feasibility of using such cableways back in 1910 in his published work «Mountain Roads in Switzerland».

Such aerial cableways on Mount Elbrus, Ai-Petri and Mashuk were subsequently built and are successfully operated today. The funicular project for a sanatorium in Sochi (also the first in the country) was also carried out under the leadership of V. N. Obraztsov, and he personally took part in its pre-launch tests. It was at that time that he wrote works on industrial transport: «Special roads», «Land roads with continuous traction», «Single-rail railways», «Theoretical elements of aerial cableways», «Resort roads of a special type», etc.

In 1935, for great scientific and engineering merits in development of transport, V. N. Obraztsov was awarded the title «Honoured Scientist of the RSFSR», he was also attributed academic degree of D.Sc. (Eng).

In the same year, V. N. Obraztsov became a member of the Scientific and Engineering Council of the NKPS and the head of the Scientific Research Institute of Railway Transport (NIIZHT). In this responsible position (from 1935 to 1940), Vladimir N. Obraztsov carried out a great deal of scientific and organisational work. The institute was organised on the basis of the previously existing institutes of traction, operation, wagons, communications, electrification and metals. The new head began work by restructuring all scientific work in transport industry. Under his leadership, the institute quickly became a leading scientific centre, carrying out extensive research on numerous transportation issues. During this period, new methods for producing traction calculations were developed at the institute, the designs of steam locomotives and wagons, automatic couplers, and automatic brakes were designed, and the problem of heating a steam locomotive, which was very important at that time, was successfully resolved. Under the leadership of V. N. Obraztsov, a new type of switch turnout was also developed, which enabled the use of a steeper grade of cross (1/6 instead of 1/9) while maintaining the radius of the curve. This made it possible not only to reduce the length of the switch zone, but also to significantly reduce the cost of constructing marshalling humps.

In 1938, V. N. Obraztsov developed a scientific topic in the field of transport and proposed it to the USSR Academy of Sciences, where it was successfully accepted. Soon the Presidium of the Academy decided to organise a Section for scientific development of transport problems within the system of Academy of Sciences. Professor V. N. Obraztsov was appointed head, who held this post until the end of his days.

Subsequently, the section was transformed into the Institute of Complex Transport Problems under the USSR State Planning Committee, which was engaged in development of complex issues of transport development.

The outstanding merits of V. N. Obraztsov as a leading scientist, a remarkable populariser of science, a talented lecturer, an innovative engineer, a public figure and a patriot of his Motherland served as the basis for his election in January 1939 as a full member of the USSR Academy of Sciences.

Vladimir Nikolaevich, with his characteristic temperament and passion, developed ideas for integrated development of all modes of transport throughout his life.

In 1940, he published in Izvestia of the Academy of Sciences of the USSR (No. 10) the work «Basic principles for constructing the transport network of the USSR», in which he outlined the scientific foundations for harmonious development of all types of transport. In this significant work, Vladimir Nikolaevich gave a comprehensive analysis of the prospects for development of the railway network of the Soviet Union and other countries and made a conclusion unexpected for that time: «there is no need for us to catch up with the United States in terms of the length of the railway network», because the traffic intensity of US railways is 2,8 times less than on domestic railways.

The creative thought of the scientist Vladimir Nikolaevich Obraztsov, who wanted to see his country even more powerful in terms of transport, haunted him, as a result of which he published the articles «Perspective Issues of Transport» («Planovoe khozyaistvo» [Planned Economy] journal, 1940, No. 5), « On the Basic Principles of Building the Transport Network of the USSR» («Stroitelstvo dorog» [Road Construction] journal, 1940, No. 11), «Mainlines of the USSR» («Tekhnika Molodezhi», 1940, No. 8–9).

In the pre-war year, V. N. Obraztsov, in the Section of Academy of Sciences he led, solved scientific problems aimed at strengthening the country's defence capability. These included high-speed construction of railways and highways («Vestnik AN SSSR», 1940, No. 7). Two all-Union meetings were held on this problem. The «bottleneck» in the country at that time was the weak cement industry, and Vladimir N. Obraztsov wrote a relevant article «Prospects for development of the cement industry» («Planovoe khozyaistvo», 1940, No. 10).

Fuel economy in railway transport was of extremely great national economic importance for the Soviet Union («Vestnik AN SSSR», 1940, No. 1), and Vladimir Nikolaevich raised the question of ways to reduce fuel consumption and the transition to new types of future locomotives (article «Parameters of Operation of the Future Locomotive» in the

«Ekspluatatsiya zheleznykh dorog» [Railways Operations] journal, 1941, No. 1).

At this time, V. N. Obraztsov wrote articles «On Dissemination of Engineering Knowledge in the USSR» («Sovetskaya nauka» [Soviet Science], 1940, No. 1), «Science and Railway Transport» («Sovetskaya nauka», 1940 No. 10), «Inventors and Railway Transport» («Stakhanovets», 1940, No. 10), «On the Issue of the Transport Problem of the City of Moscow» («Arkhitektura SSSR» [Architecture of the USSR], 1940, No. 2).

The World of Transport and Transportation Journal (2021, Iss. 3) published an article by Mikhail and Larisa Roshchevsky titled «Post-war Projects of Academician V. N. Obraztsov for Development of Transport in the European North of the USSR», dedicated to Obraztsov's projects, in which he laid the foundations for long-term planning of railway, road, river and air transport in the European North of the USSR for several decades to come. These works, as always, amaze with the far-reaching prospects for development of the territory of the European North and the Arctic. V. N. Obraztsov's programs for development of the North, being of great scientific value, have not yet been implemented, and are especially relevant in 21st century.

Even from the very short list of pre-war works by V. N. Obraztsov, quoted in the article, makes visible the multifaceted activity of the scientist.

Preserving the scientific legacy of Academician V. N. Obraztsov, the second part of the article is dedicated to the bibliography of his works.

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THE LARGEST PROJECTS OF V. N. OBRAZTSOV FROM 1914 TO 1936

1914–1915: Project of Perovo-Sortirovochnaya marshalling yard of Moscow – Kazan railway.

1914–1915: Project of a standard station and development of all stations on Aleksandrovsk – Dzhankoy section of the Southern railway according to this standard in connection with construction of the second track on this section.

1914–1915: Project of Nikitovka station of the Southern railway.

1915–1916: Project of complete and partial development of Smolensk and Smolensk-Sortirovochnaya stations (Smolensk junction).

1915–1916: Ditto, Vyazma station.

1915–1916: Redesign and development of stations on Moscow – Baranovichi line in connection with the needs of military operations (offensive and retreat).

1915–1916: Project of Arkhangelsk line stations in connection with rearrangement (1915–1916) of Vologda – Uroch section to a broad gauge.

1915–1916: Project of Vologda station in connection with the above rearrangement.

1915–1916: Design of several small stations (up to 30) on the Northern Railway.

1916: Project for reconstruction and further development of Moscow – Mytishchi section stations.

1916: Project for reconstruction of the Ivanovo station (second stage).

1916–1917: Project for Novosokolniki station of Moscow – Vindavo – Rybinsk railway.

1916–1924: Project for development of Odintsovo country houses' station and several suburban country houses' areas on Moscow – Mozhaisk section.

1917–1924: Project for complete and partial development of Moscow-Aleksandrovskaya station.

1920: Project for Zaporozhye junction (jointly with I. I. Kostin).

1920–1922: Project for Nizhny Novgorod junction.

1922: Project for consolidation of Selensky junction.

1923: Project for one-way traffic on single tracks at Moscow station of Aleksandrovskaya railway. (jointly with S. V. Zemblinov).

1923: Project for consolidation of Syzran junction (jointly with S. V. Zemblinov).

1923: Project for consolidation of Ryazan junction (jointly with M. F. Gunger).

1923: Project for reconstruction of Moscow junction (Moscow – Kazan railway) in terms of goods transportation (jointly with Konkov).

1928–1929: Project for reconstruction of Kochetovka station.

1929: Project for reconstruction of Saratov junction.

1929: Project for the network of urban roads in the city of Bolshoe Zaporozhye (jointly with Zaorsky and Kostin).

1931: Project for deep extension in Moscow (team research work at the Research Institute of MIIT).

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