Professor Nikolai M. Gersevanov is a Founder of the Russian School of Soil Mechanics and Geotechnical Engineering

NIIOSP NAMED AFTER N.M. GERSEVANOV

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Specially for Time Capsule Project

Professor Nikolai Mikhailovich Gersevsnov

Professor Nikolai Mikhailovich Gersevanov is a founder of the Russian School of Soil Mechanics and Geotechnical Engineering. He was born on February 16, 1879 in the city of Tiflis (now known as Tbilisi).

He descended from a noble Russian stem of Gersevanov, who came of the Georgian stock. His family moved to Russia in 1722 during the reign of Peter I.

His father, M.N. Gersevanov, was a famous civil and hydraulic engineer. He was a privy councilor in deed, a rector of the St. Petersburg Institute of Communications, and the chief inspector of civil structures in the Caucasus.

SHORT BIOGRAPHY

In 1901, N. Gersevanov graduated from the St. Petersburg Institute of Railway Engineers.

Since 1903, N. Gersevanov taught the course "Port facilities and hydraulic structures" at the St. Petersburg Institute of Railway Engineers, St. Petersburg and Tbilisi Polytechnic Institutes.

In 1923, he was given a title of professor and headed the Department of Port Facilities at the Moscow Institute of Railway Engineers.

In 1930, Professor N. Gersevanov left the Moscow Institute of Railway Engineers for the Foundation Department of the State Institute of Structures.

Father of Prof. N.M. Gersevanov
Mikhail Nikolaevich Gersevanov

In 1931, Professor N. Gersevanov founded the USSR Institute of Structures' Foundations (VIOS). Now it is known as the Gersevanov Research Institute of Bases and Underground Structures (NIIOSP). He became its director and scientific leader then.

In the period of 1933 to 1937, Prof. N. Gersevanov headed the Department of Hydraulic Structures at the Military Transport Academy of the Red Army.

In 1935, he was approved for the degree of the Doctor of Technical Sciences. In 1936, according to a decree of the Soviet Government, Prof. N. Gersevanov was awarded the title of the Honored Worker of Science and Technology.

In 1939, Prof. N. Gersvanov became a corresponding member of the USSR Academy of Sciences, in the field of Mechanics.

In 1948, he was awarded the Stalin Prize (one of the highest state awards of the USSR) for the development and introduction of new construction methods in macroporous (loess) soils.

In the period of 1901-1917 N. Gersevanov took part in the construction of the Bologoe - Sedlec railway, and port facilities of St. Petersburg, Navar and Kronstadt.

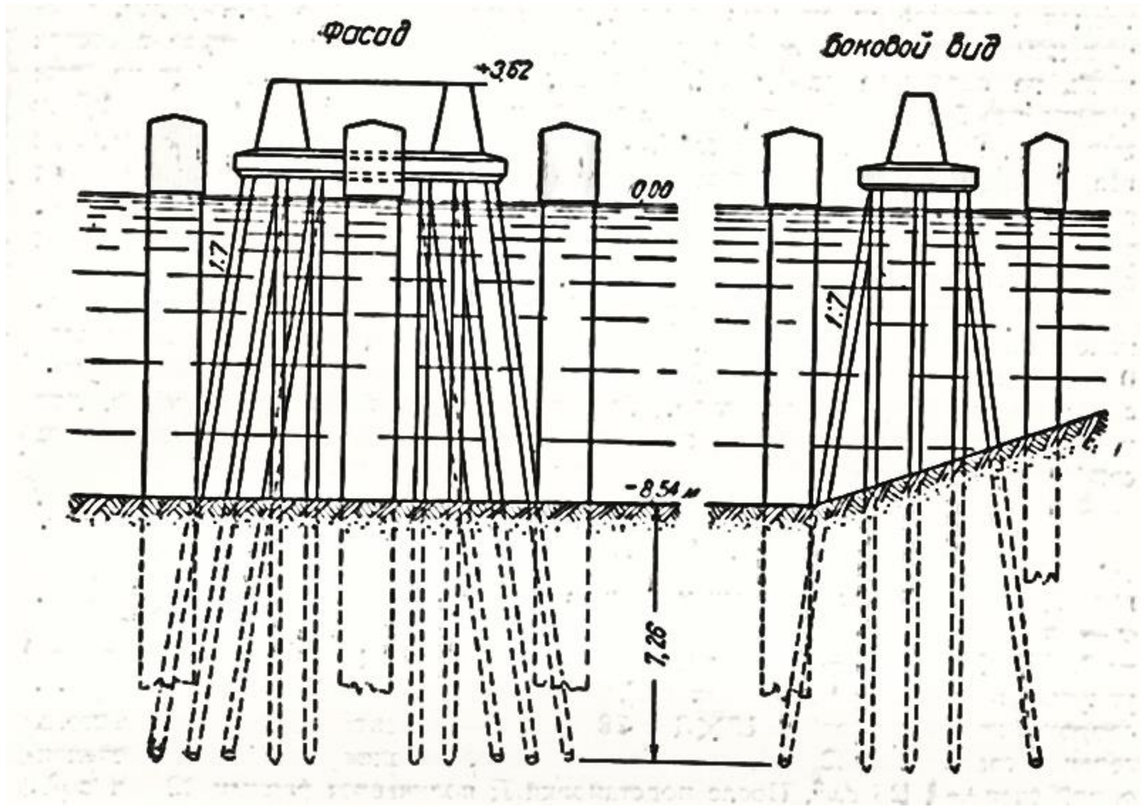
At that time, he participated in construction of the large facilities of a high responsibility level, which included mechanized backfilling of the territories of the Customs and Coal harbors of Volny Island, timber warehouses, installation of deep-water berths, lengthening of the dam of the Sea Canal and Khlebnaya Harbor by more than 3 km; deepening of the Sea Canal between the port of St. Petersburg and the Kronstadt roadstead to 6.7-8.5 m; the construction of a sea canal in Moonsund for the withdrawal of the battleship "Slava", which was locked up there by the German fleet, etc.

CONTRIBUTION TO THE DEVELOPMENT OF THE SOIL MECHANICS AND GEOTECHNICAL ENGINEERING

A founder of the USSR Institute of Structures' Foundations (now known as the Gersevanov Research Institute of Bases and Underground Structures (NIIOSP))

The development of the method for calculation and construction of the structures rested on the high pile cap foundations

In 1914, the journal "Cement" published an article "Construction of reinforced concrete supports for coal loaders in the port of Petrograd", where a method for calculating high pile cap foundations was first described. The method was widely used in the design and construction of ports installations. In other countries, the construction of such supports on high pile cap foundations began a great deal later (in 1922, a bridge near Stockholm (Sweden); in 1927 in Germany, in 1943 in Mexico, etc.), and the calculation method was developed only in 1925.



In 1917, the journal "Cement" published an article "On determining the resistance of piles by their refusal", which presented the results of the theoretical development of the formula for evaluation of the pile resistance by its "refusal". The results were in good agreement with experimental data. The advantage of the technique was the theoretical substantiation while other authors solely relied on empirical data.

Since 1925, the technique has been included in the construction regulatory documents and is still widely used.

$$P = -\frac{n}{2}F + \sqrt{\frac{n^2}{4}F^2 + n\frac{F}{e}QH\frac{Q + 0.2q}{Q + q}}$$

where P – pile resistance; F – cross-section area of the pile; e - pile refusal; Q – drop weight; q – pile weight; H – dropping-lifting height; n – coefficient that depends upon driving method and a type of the pile.

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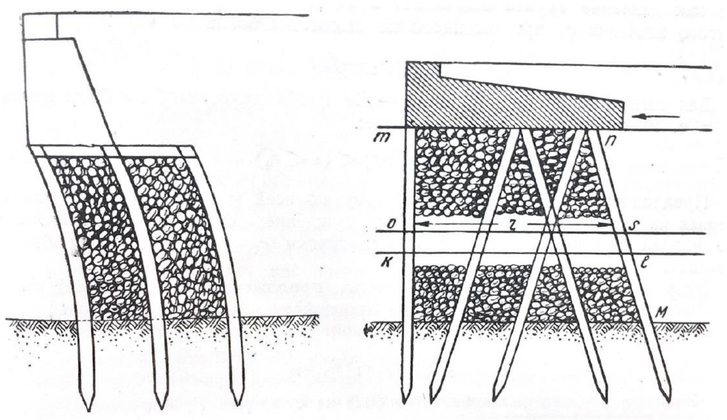
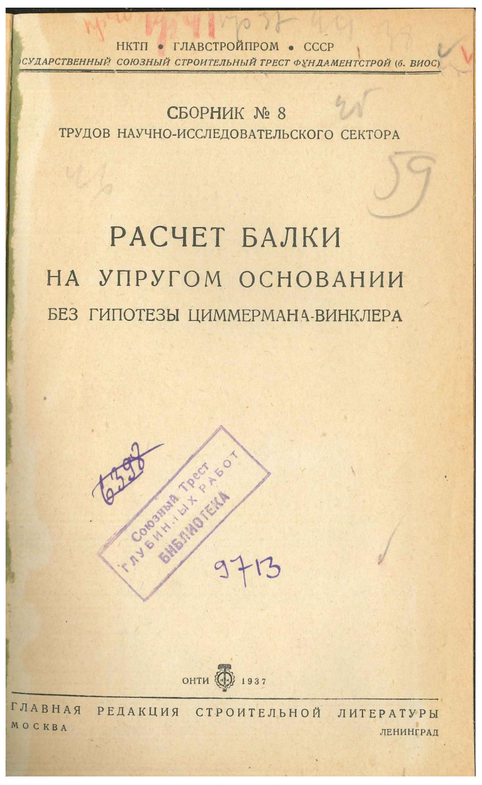
Application of mathematical logic to the calculation of the structure foundation

In 1923, Gosstroyizdat published a monograph "The Application of Mathematical Logic to the Calculation of Structures", in which Prof. N. Gersevanov suggested method for assessing the bearing capacity of foundations by means of mathematical logic, taking into account observations of the structures' failure in-situ and during laboratory testing (modeling). Essentially, modern mathematical modeling stemmed from this method.



Theoretical research on applied mathematics and soil mechanics

In 1927, in his article "The general integral of the Maurice Levy equation and its applications" published in Proceedings of the Moscow Institute of Transport Engineers, Prof. N. Gersevanov presented a general form of the Maurice Levy equilibrium equations for a plane problem. In 1933, in the article "The General Method of the Theory of Elasticity applied to determination of the Ground Stresses under a prescribed Load applied from day surface" published in the "Soils and Foundations" Collection, in 1933, Prof. N. Gersevanov introduced the notion of a "functional interrupter", which preceded the generalized functions in mathematics. As a result, a number of problems of the elasticity theory, encountered in the practice of foundations design, could be successfully solved.


НКТП • ГЛАВСТРОЙПРОМ • СССР
ГОСУДАРСТВЕННЫЙ СОЮЗНЫЙ СТРОИТЕЛЬНЫЙ ТРЕСТ ФУНДАМЕНТСТРОЙ (б. ВИОС)

СБОРНИК № 8
ТРУДОВ НАУЧНО-ИССЛЕДОВАТЕЛЬСКОГО СЕКТОРА

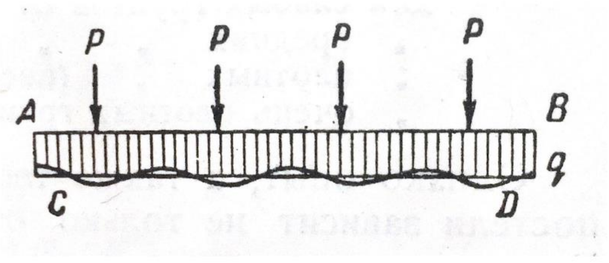
РАСЧЕТ БАЛКИ
НА УПРУГОМ ОСНОВАНИИ
БЕЗ ГИПОТЕЗЫ ЦИММЕРМАНА-ВИНКЛЕРА

Союзный Трест Глубинных Работ Библиотека

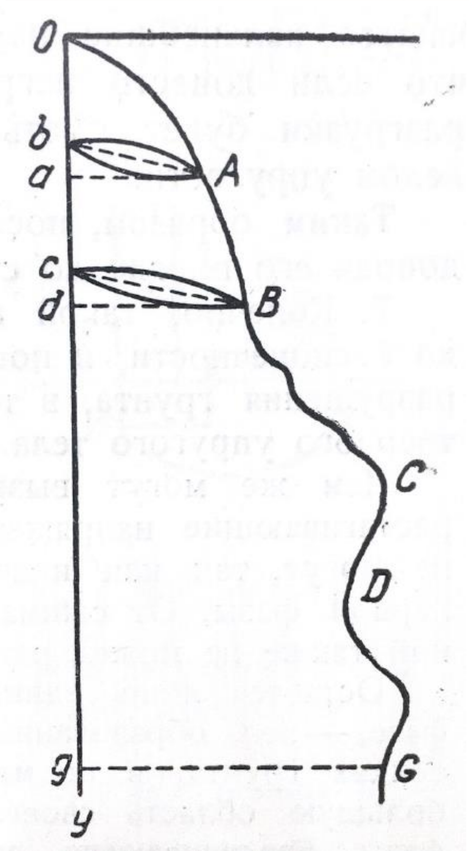
ОНТИ 1937

ГЛАВНАЯ РЕДАКЦИЯ СТРОИТЕЛЬНОЙ ЛИТЕРАТУРЫ
МОСКВА ЛЕНИНГРАД

In particular, **in 1937,** the problem of the beam on an elastic foundation was solved without using the Zimmermann-Winkler hypothesis. This opened the way for conducting researches on calculation of structures on an elastic foundation.



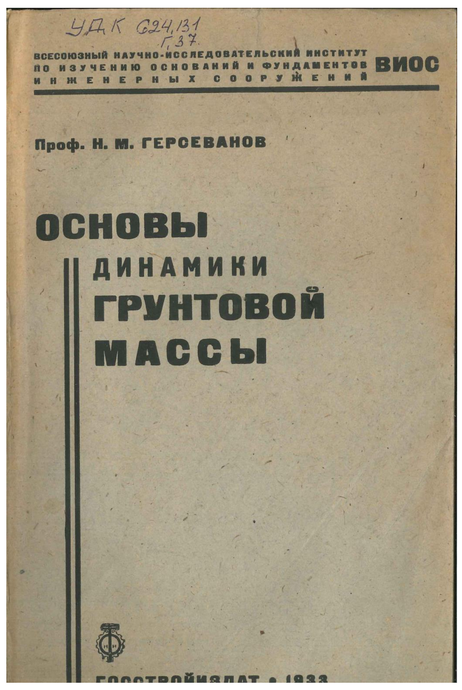
In his article "Experience of the application of the elasticity theory to the determination of the allowable soil loading on the basis of experiments" published in the Proceedings of the Moscow Institute of Transport Engineers, issue XV, **1930**, Prof. N. Gersevanov distinguished three sequential phases of soil deformation under load: compaction, shear and collapse. He identified soil states important for design and construction. This helped significantly improve the methods for determining soil compression, for calculating settlements and for evaluation of the distribution of the soil response to the bottom of foundation beams, slabs and rigid mass. As a result, a new philosophy was introduced into design practice, namely, the choice of soil pressure depended on allowable ultimate deformations of the structure and soil conditions. Thereby, the empirical principle of assigning the allowable pressure was replaced with the principle of limit states calculation.



Deformation stages under loading

Fundamentals of the soil mass dynamics

In 1931, the fundamental work of Prof. N. Gersevanov "Fundamentals of soil mass dynamics" came out. It was the first Soviet handbook on soil mechanics and geotechnical engineering. The book answered many questions that came up during the construction of foundations and earthworks for industrial and hydraulic facilities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ВСЕСОЮЗНЫЙ НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ ПО ИЗУЧЕНИЮ ОСНОВАНИЙ И ФУНДАМЕНТОВ ИНЖЕНЕРНЫХ СООРУЖЕНИЙ ВИОС

Проф. Н. М. ГЕРСЕВАНОВ

ОСНОВЫ
ДИНАМИКИ
ГРУНТОВОЙ
МАССЫ

ГОССТРОЙИЗДАТ • 1933

Soil mechanics was represented as a synthesis of the elasticity theory, granular material, filtration and the physical theory of soils. This was based on the experimental results.

The handbook drove many Institutes and Universities to thoroughly reconsider their educational programs.

The handbook was many times reprinted, and additions with respect to world experience were made. Thus, the preface to the third edition said that the book had been supplemented with materials from the reports of the First International Conference for Soil Mechanics and Geotechnical Engineering (1936), including reports of A. Casagrande and Prof. K. Terzaghi. The handbook became world known, and defined the high level of soil mechanics and geotechnical engineering in the USSR and Russia.

In 1940, in his publication "Experience in the development of soil mass dynamics" Prof. N. Gersevanov supplemented mechanics of saturated soil with the laws of vapor and gas formation in a soil mass.

In 1948, in collaboration with Ph.D. Dmitry E. Polshin, Prof. N. Gersevanov created one of the best handbook on soil mechanics in Russian "Theoretical Foundations of Soil Mechanics and Their Practical Applications".

A large scope of the industrial and hydraulic construction set a number of important construction tasks before the institute headed by Prof. N.M. Gersevanov. Some of those major construction projects should be noted: the construction of the underground railway facilities, the construction of the Palace of Soviets and Stalin's Skyscrapers, the Moscow-Volga Canal, and factories - Spetsstal, Kramatorsk, Azovstal, Zaporozhstal, etc.

Ph.D. Dmitry E. Polshin

In 1999, the Russian Society for Soil Mechanics, Geotechnics and Foundation Engineering (RSSMGFE) established the medal named after. Prof. N.M. Gersevanov to reward specialists for outstanding achievements in the field of soil mechanics and geotechnical engineering.