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KYIV SCHOOL OF THE THEORY OF STRUCTURES¹**V.A. Bazhenov¹,**

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The paper presents a review of more than a century-long history of Kyiv school of the theory of structure, the foundation of which was laid by world-famous scientists V.L. Kirpichov and S.P. Tymoshenko. The birth of the Kyiv scientific school of the Theory of structures is associated in this paper with the establishment at the Kyiv Polytechnic Institute the Strength of Materials Department. It is noted that further formation and development of the theory of structures was facilitated by the creation in 1918 of the Ukrainian Academy of Sciences, the Institute of Mechanics of the NAS of Ukraine, expansion of relevant research in higher education institutions, creation of new academic and sectoral research institutions, most of which is located in Kyiv. The contribution of Kiev scientists to the development of methods for analyzing spatial structures of bar and shell type, their inelastic behavior, as well as dynamics and stability is reflected.

Particular attention is paid to the fundamentally new opportunities for the development of the theory of structures in the era of numerical analysis. The successes of Kiev mechanics in the field of development and improvement of structure analysis numerical methods, such as the finite difference method and various modifications of finite element methods, are emphasized. Kiev engineers and scientists are also known for their developments in the field of design and calculation of modern cable-stayed structures, as well as optimal design. The activities of the scientific school of structural mechanics of the Kyiv National University of Construction and Architecture are also covered in the review.

In the final part of the paper the new issues connected with the justification of calculation models and the analysis of reliability of constructions are considered. Some of this problems are dictated by the demands of practice, in particular those that arose in the process of Chernobyl New Safe Confinement designing.

The publication contains a wide bibliography.

Keywords: bar systems, stability, shells, structural mechanics, finite difference method, finite element method, calculation model.

Foreword. Theory of structures is complex discipline which largely lost its original essence of the “teachings about the life of structures”². Now it is identified with a number of other disciplines such as strength of materials,

¹ Dedicated to the 90th Anniversary of the Kyiv National University of Construction and Architecture

² Such a definition is given in the book by P.A. Velikhov "Theory of engineering structures" (Moscow: Gosstroyizdat, 1924).

structural mechanics, theory of elasticity and theory of plasticity (strength disciplines) and general sections of the engineering analysis of the bearing structures. Many of these disciplines are actively engaged in their own lives, naturally, serving the theory of structures, but often focused on some of the internal problems of general scientific orientation. So, to the theory of structures that is adjacent (but, in our opinion, are not included as part of) to the analysis of mechanical properties of structural materials, as well as such problems of mechanics of solids as the mathematical theory of elasticity, theories of plasticity, thermoelasticity, thermoplastic elasticity, etc. There is no clear boundary, but in this review we will not enter any seriously on “neighbouring territory”.

The emergence of the Kyiv scientific school of the Theory of structures is associated with the establishment in 1899 at the newly organized Kyiv Polytechnic Institute³ (KPI) the Strength of Materials Department.

Further, the formation and development of the theory of structures was facilitated by the creation in 1918 of the Ukrainian Academy of Sciences, the Institute of Mechanics of the NAS of Ukraine, expansion of relevant research in higher education institutions, creation of new academic and sectoral research institutions. This review presents the substantive side of these studies. The bibliography is quite extensive.

When selecting quoted sources, monographic publications are indicated first. References to articles in periodicals, as a rule, represent specific examples and are not exhaustive lists of sources. The accents in the thematic selection, of course, are determined by the interests of the authors, are open to expansion and do not pretend to be ranked according to the importance of certain problems.

The authors hope that the book will be useful and will evoke pleasant memories for many students of the Kyiv School, who now work fruitfully in many countries of the world.

Studying the history of knowledge helps to familiarize the reader with historically objective evaluations of certain research results and priorities, to realize the sometimes long and extraordinarily thorny path of formation even small and obvious scientific achievements and truths. Equally important, it helps to reflect that atmosphere of deep mutual respect and goodwill which, despite the lengthy and intense discussions, has prevailed and should prevail in the scientific community of modern society.

The authors of the work are graduates of Kyiv Civil Engineering Institute (now Kyiv National University of Construction and Architecture), which celebrates its 90th anniversary in 2020. The authors dedicate this publication to this significant event, as well as the blessed memory of their dear teachers and colleagues.

³ Over the 120 years of its existence, the Institute has repeatedly changed its name, in (1934-1944) it was the Kyiv Industrial Institute, today it is the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute".

1. FIRST STEPS

An outstanding scientist and organizer of engineering education, the first Rector of the KPI Professor Emeritus V.L. Kirpichov clearly understood the need for radical reform of higher engineering education in accordance with urgent demands of industry, as well as the development of mechanics in general and structural theory in particular (and he was personally interested in this section of mechanics) in physics and technology direction.

In 1899, a year after the opening of the Institute, V.L. Kirpichov began to lecture at the Strength of materials Department on a wide range of strength disciplines [**Ошибка! Источник ссылки не найден., Ошибка! Источник ссылки не найден., Ошибка! Источник ссылки не найден.**] (strength of materials, graphical statics, etc.). His classic work [**Ошибка! Источник ссылки не найден.**] presented the theory of statically indeterminate structures in a very compact and transparent way and completed the period of the theory of structures formation in Russia.

Kirpichov Viktor Lvovich (1845-1913) was a Privy Councillor and Professor Emeritus.

In 1868 he graduated from Mikhailovskaya artillery Academy. From 1869 he started lecturing on strength of materials. In 1873 he trained abroad. He listened the course of experimental and theoretical physics by G.R. Kirchhoff in Heidelberg. Then he got acquainted with the machine-building plants and hydraulic facilities in Germany, Belgium and Switzerland.



Later he worked under the direction of Thomson and J.C. Maxwell. In 1876 V.L. Kirpichov became a Professor of the Petersburg technological Institute.

In 1885 V.L. Kirpichov was instructed to organize practical technological Institute in Kharkiv. Viktor Lvovich brilliantly fulfilled the order. Under his leadership, the Kharkiv technological Institute quickly gained a high reputation. In early 1898 V.L. Kirpichov organized Kyiv Polytechnic Institute and headed it until 1902.

In 1902 he was appointed as a member of the Council of Minister of Finance, and in the spring of 1903 he became the Chairman of the Construction Commission of St. Petersburg Polytechnic Institute. Until the end of his days he lectured on applied mechanics and engineering

On the initiative of V.L. Kirpichov many talented scientists from different universities of the former Russian Empire was invited to KPI. Among them were the bridge building specialist Professor Yevgeni Oscarovych Paton and specialist on the mechanics of materials and structures Professor Stepan Prokopovych Timoshenko. It was they, together with V.L. Kirpichov, who laid the Foundation of Kyiv scientific School of mechanics.

By the time of moving to Kyiv, Ye.O. Paton published the first volume of his four-volume course "Iron Bridges", as well as the work that played an important role in the theory of structures [**Ошибка! Источник ссылки не найден.**]. In this work, a study was carried out, revealing the conditions under which it was possible to use a hinged design scheme of a truss, nodes of which were not perfect hinges. A notable influence on the development of the theory

of structures was made by the studies of Ye.O. Paton, dedicated to the "laws of weight" of bridge structures [Ошибка! Источник ссылки не найден.].

***Paton Yevgenii Oscarovych** (1870-1953) was a famous scientist and engineer who worked in the field of welding, bridge engineering and structural mechanics. Hero of Socialist Labor (1943), laureate of Stalin Prize. He graduated from the Dresden Polytechnical Institute (1894), and the St.-Petersburg communications engineers institute (1896). He taught at the Moscow engineering school of communications (1899-1904), at the Kyiv Polytechnic Institute (1904-1938) and at the Kyiv construction College of railway transport.*



In 1909-1911 the Mukhrani bridge across the Kura River in Tiflis was built according to his design.

In 1925 the chain bridge named after Eugenia Bosch was built in Kyiv according to the project of Paton. He was the author and project leader for more than 100 of the welded bridges. In 1929 he founded Welding lab and Welding Committee in Kyiv. E.O. Paton was head of Welding lab and Welding Committee (1929-1933), on the basis of which the Electric Welding Institute was created in 1934. Now the Electric Welding Institute bears his name.

Further, Yevgenii Oskarovych led the department of bridge engineering in KPI for 25 years and many of his students have become famous scientists. Among them are the author of the Dneproges project, Academician I.G. Aleksandrov, Vice-President of the Academy of Sciences of the Ukrainian SSR K.K. Symynsky, Academicians of the Academy of Sciences of the Ukrainian SSR F.P. Belyankin, M.V. Kornoukhov and S.V. Serensen, corresponding member of the Ukrainian SSR Academy of Sciences B.M. Gorbunov, Doctor of Technical Sciences O.A. Umansky and others.

Combining teaching with practical engineering, E.O. Paton had already done a lot in the 1920s: according to his projects, bridges were built in Tiflis (Tbilisi), two bridges across the Ros River, a pedestrian bridge across the Petrivska alley in Kyiv. The third and fourth volumes of his fundamental work "Iron Bridges" were published, as well as a separate no less serious work "Wooden Bridges". In 1917, as many as two textbooks, one atlas of drawings, and nine scientific articles appeared from his pen. The Kyiv bridge named after Eugenia Bosch (Fig. 1) was restored under his leadership.

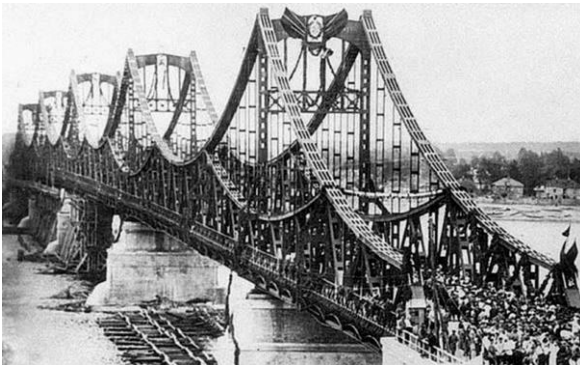


Fig. 1. Eugenia Bosch bridge

Yevgenii Oskarovich ran the Kyiv test station of the Central institute of structures of the People's Commissariat for Railways, and did a great job of summarizing the test results on operated and restored railway bridges.

In particular, an assessment of the errors that occur due to neglecting the rigidity of the nodes, when calculating bridge trusses, by comparing the data on the measured stresses with their calculated values was made [319]. Interesting data were also obtained while testing the bridge, specially designed and built by the Kyiv test station for experiments [324].

Together with his student B.M. Gorbunov, he continuously improved his multi-volume course of steel bridges, which was published in several editions and was a true encyclopedia of bridge building, in which the issues of structural resistance were presented in an exhaustively detailed form.

Timoshenko Stepan Prokopovich (1878-1972) - Professor, Academician of the Ukrainian Academy of Sciences (1918), Foreign Member of the Academy of Sciences of the USSR (1964, Corresponding Member, 1928). Honorary member of the Academies of Sciences, Scientific Societies, Honorary Doctor of the most famous universities in many countries of the world. In 1901 he graduated from the St. Petersburg communication engineers institute.



In 1906 he defended his dissertation. In 1906-1911, 1918-1920 - Professor of the Strength of Materials Department in the Kyiv Polytechnic Institute, 1912-1917 - Professor in the Polytechnic, Electrotechnical Institutes and Communication engineers institute in St. Petersburg.

In 1919 -1920 - the first director of the Institute of Technical Mechanics (now the S.P. Timoshenko Institute of Mechanics of the National Academy of Sciences of Ukraine). In 1920-1921- Professor of the Zagreb Polytechnic Institute. From 1923 to 1927 - scientific consultant of the company "Westinghouse". He organized the mechanics section at the American Society of Mechanical Engineers (1927). In 1927-1936 - Professor of the University of Michigan; 1936 -1943 - Head of the Department of Mechanics, 1943 -1960 - Professor of the Department of Mechanics in Stanford University (California). From 1960 to 1972 he lived in Wuppertal, Germany.

The years of S.P. Timoshenko work in Kyiv became a bright stage in the development of the theory of structures in the KPI. He worked in the KPI from 1906 to 1920 with a break from 1911-1917. V.L. Kirpichov knew him very well from their joint work in Petersburg and offered Stepan Prokopovich to take part in the competition for the head of the strength of materials department.

Combining teaching with active research, S.P. Timoshenko received a number of outstanding results on various issues of strength analysis [451, 450, 452, 448], including those in a series of studies on the theory of the elastic systems equilibrium stability [453, 454, 455, 456]. The work **[Ошибка! Источник ссылки не найден.]** was awarded the D.I. Zhuravsky prize and medal. In 1908 S.P. Timoshenko published a textbook on the strength of materials [449, 458], which became a classic and was later reprinted many times in many languages of the world.

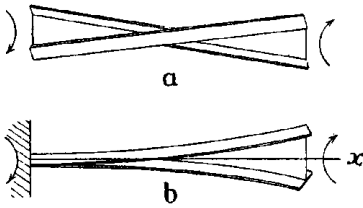


Fig. 2. Free and restrained torsion of a I-beam (picture is taken from [Ошибка!])

The energy approach was developed in the works of S.P. Timoshenko on the problem of equilibrium stability. Since his first work in 1907 [455], where the energy method was used, he has widely applied it to the most diverse problems of elastic systems stability [456], including the energy derivation of the Euler formula [454].

The problem of lateral buckling of beams with narrow rectangular cross-section was first considered by Prandtl. Further development of this problem belongs to Timoshenko, who in 1905-1906 obtained the basic differential equation for the torsion of symmetrical I-beams and on this basis investigated the lateral buckling of transversely loaded high I-beams [457]. This study by S.P. Timoshenko was later represented at the Kyiv Polytechnic Institute for the adjunct in applied mechanics degree defense (the opponents were V.L. Kirpichov, A.A. Radtsig and N.B. Delone).

But the main thing is that S.P. Timoshenko turned the Prandtl academic problem into a problem of great importance for the practice of bridge engineering. In connection with the problem of spatial buckling, the issue of torsional loss of stability, which was also considered by S.P. Timoshenko [457], became very important.

It should be noted that in solving this problem S.P. Timoshenko found that the Saint-Venant principle is not applicable for torsion of an I-beam. The twist angle depends not only on the magnitude of the torque and the torsional rigidity of the beam, but also on the way of fixing its ends (Fig. 2).

In [455] S.P. Timoshenko considered the problem of buckling of rectangular plates, under various conditions of supporting the edges parallel to the acting compressive forces. He also considered the buckling of rectangular plate whose unloaded side is unrestrained.

2. ORGANIZATIONAL ACTIVITY. FOUNDATION OF THE UKRAINIAN ACADEMY OF SCIENCES. S.P. TIMOSHENKO INSTITUTE OF MECHANICS OF THE NAS OF UKRAINE

S.P. Timoshenko did a great deal of organizational work. From 1909 to 1911 he was dean of the mechanical and engineering departments. From the post of dean, he, along with two other deans of the KPI, was dismissed by order of the Minister of Education Kasso for refusing to dismiss Jewish students who had been accepted in excess of the so-called "percentage rate". Returning to Kyiv in 1918, S.P. Timoshenko took an active part in the work of the V.I. Vernadsky commission drafting a law on the establishment of the Ukrainian Academy of Sciences.

S.P. Timoshenko's participation in the creation of the Ukrainian Academy of Sciences should be especially noted.

After the collapse of the Russian Empire, the Ukrainian Scientific Society (USS), created in 1907 in Kyiv and headed by M.S. Grushevsky, at a joint meeting on July 8, 1917 formed the Commission for the establishment of the Ukrainian Academy of Sciences. And on April 3, 1918, the USS addressed to the Ministry of Education of the Ukrainian People's Republic (UPR) with a proposal to consider the possibility of financing the work of reorganization the USS into the Ukrainian Academy of Sciences. National Academy of Sciences on the concept of M.S. Grushevskogo was to become a non-governmental institution without its own scientific institutions.

Almost at the same time, another concept of creating a national academic center emerged. In September-October 1917 in Petrograd, N.P. Vasilenko, who was a friend of the Minister of Public Education of Russia, together with V.I. Vernadsky, who was also a fellow of the Minister of Education of Russia, and others advocated the creation of state-owned research organizations in Ukraine, Georgia, and Siberia.

For the organization of the Ukrainian Academy of Sciences (UAS) M.P. Vasylenko invited V.I. Vernadsky, who was in Poltava during this period. The famous organizer of science V.I. Vernadsky was a supporter of the creation of a state network of research institutes. He, as a man of advanced views, openly believed that "the task is not a state organization of science, but state assistance to the scientific creativity of the nation." On June 7, V.I. Vernadsky discussed the creation of the UAS with M.S. Grushevsky, who stood on the principles of building the UAS as a free union of high scientific authorities. His position was against the concept of Vernadsky-Vasylenko. The same thing happened with respect to the staff and direction of the UAS. V.I. Vernadsky insisted on creating the "Academy of Ukrainian Studies", at least at the initial stage. M.S. Grushevsky himself categorically refused to participate in any activities proposed by the government of P.P. Skoropadsky.

The first meeting of the Commission for the development of the bill on the establishment of the Ukrainian Academy of Sciences was held in the office of Minister M.P. Vasilenko on July 9, 1918. It was attended by V.I. Vernadsky, N.F. Kashchenko,



Mykola
Prokopovych
Vasilenko
(1866-1935)



Volodymyr
Ivanovych
Vernadsky
(1863 - 1945)



Pavlo Petrovych
Skoropadsky
(1873 - 1945)

D.I. Bagaley, S.P. Timoshenko, P.A. Tutkovsky and others. Later A.E. Krymsky, M.I. Tugan-Baranovsky and others became members of the Commission.

The Commission identified the fundamental problems associated with the development of the structure of the Academy and the composition of its departments, a list of departments, scientific institutions, and the procedure for their formation. At this meeting, they came to the conclusion that the

appointment of the first Academy staff by the highest authority is logical, given that the UAS was created by the state.

The initiative group, headed by V.I. Vernadsky instructed S.P. Timoshenko to make a report on the organization of the unit of applied sciences in the physical and mathematical department of the Ukrainian Academy of Sciences. The idea of bringing science closer to the demands of life has always been attractive to S.P. Timoshenko, and he joyfully and with great interest began to compose a note.

S.P. Timoshenko wrote in the introductory part, “A characteristic feature of the modern development of industry and technology is the widespread use of the scientific method and the facts gathered by science. The times when science and technology have taken different paths is over, and now they often use the powerful tool that mathematics and mechanics give us to solve purely technical problems. They use the methods of experimental sciences and widely adapt them to solve technical problems in the laboratory. ... The Academy of Sciences should take the initiative in combining science and technology. Due to its central position and scientific authority, it will be able to gather around itself the few scientific forces that currently exist in Ukraine and combine them in a common work where cooperation between people of technology and science will be possible.” S.P. Timoshenko further noted that “representatives of technical science will be able to use scientific methods and knowledge accumulated by pure science to a greater extent than now. On the other hand, representatives of pure science in the field of applied natural sciences will encounter a number of new, unexplored issues, the solution of which will not only enrich science, but will also contribute to the development of industry and the technical life of the region. In the field of experimental activity, people of science will be able to use those powerful tools that modern technology gives into the hands of the experimenter.”

S.P. Timoshenko believed that the newly formed Ukrainian Academy of Sciences should pay more attention to combining pure science with the solution of technical problems, in accordance with the needs of technology.

The commission completed its work on the draft law on the creation of the Ukrainian Academy of Sciences on September 17, and on October 12, the Minister of Education and Arts N.P. Vasilenko submitted a package of documents to the Council of Ministers. On November 14, 1918 Hetman of Ukraine P.P. Skoropadsky approved the “Law of the Ukrainian State on the Formation of the Ukrainian Academy of Sciences in Kyiv” adopted by the Council of Ministers, as well as the Charter and staff of the Academy and its institutions attached to it.

In the period from November 1918 to January 1919, the UAS carried out active scientific and organizational work. The Department of Physics and Mathematics of the UAS consisted of 14 departments of the main class and 16 departments of the class of applied natural sciences.

At this time, academic departments of the physics and mathematics subdivision were founded, including the Department of Applied Mechanics,

which was headed by S.P. Timoshenko. At the same time, elections and approval in the posts of directors were held. On November 27, 1918, the first General Meeting of the UAS was held, at which V.I. Vernadsky was elected Chairman-President of the Academy. And at the second General Meeting of the UAS, which held on November 30, the Institute of Technical Mechanics of the UAS was formed and S.P. Timoshenko was approved as its director. During the first decade of its existence, the institute occupied a leading place in the physical and mathematical subdivision.

In 1929 the Institute of Technical Mechanics was divided into the Institute of Structural Mechanics and the Cabinet of Transport Mechanics. In 1959, by the Decree of the Council of Ministers of the Ukrainian SSR, the Institute of Structural Mechanics was renamed the Institute of Mechanics of the Academy of Sciences of the Ukrainian SSR, and in 1993 by the Decree of the Presidium of the National Academy of Science of Ukraine (NASU), the Institute of Mechanics was named after S.P. Timoshenko.

Actually the entire history of the development of the institute, on the basis of which a number of other independent scientific institutions of the Academy of Sciences of the Ukrainian SSR was created, is based to some extent on the principles laid down by S.P. Timoshenko at the dawn of the emergence of Ukrainian academic science. It is worth recognizing that the ideas expressed by him almost a hundred years ago during the organization of the Ukrainian Academy of Sciences turned out to be quite progressive and embodied in practice. The experience of the first Ukrainian Academy of Sciences, where technical sciences were included in the number of academic sciences for the first time in world practice, was later spread in the practice of the USSR Academy of Sciences and in all other republican academies. Ideas of S.P. Timoshenko, laid down by him during the creation of the Ukrainian Academy of Sciences, over time having received further development, today contributes to the widespread implementation of the results of scientific achievements in practice.

The Institute was headed by well-known academicians of the NAS of Ukraine: S.P. Timoshenko (1918-1920), D.A. Grave (1921), K.K. Syminsky (1921-1932), S.V. Serensen (1932-1940), M.V. Kornoukhov (1940-1944), F.P. Belyankin (1944-1958), G.M. Savin (1958-1959), A.D. Kovalenko (1959-1965), V.O. Kononenko (1965-1975). Since 1976, the Institute has been headed by O.M. Guz.

Today, Ukraine has a high world level of development of mechanics and related sciences.

The level of science is determined, for example, by the existence of the Department of Mechanics and a number of scientific institutions at the National Academy of Sciences of Ukraine. These are such well-known in world science institutes as S.P. Timoshenko Institute of Mechanics, G.S. Pisarenko Institute for Problems of Strength, Institute of Hydromechanics, Ya.S. Pidstrihach Institute for Applied Problems of Mechanics and Mathematics, Karpenko Physico-Mechanical Institute, Institute of Applied Mathematics and Mechanics, M.S. Polyakov Institute of

Geotechnical Mechanics, Institute of Technical Mechanics and a number of institutions close to mechanics: V. Bakul Institute for Superhard Materials, E.O. Paton Electric Welding Institute, A. Pidgorny Institute of Mechanical Engineering Problems and others. It should also be noted that in Kyiv, Lviv, Odessa, Dnieper, Kharkiv there are world-famous scientific schools on mechanics and 4 scientific journals on mechanics are published, which are translated into English by the world's largest scientific publishing house Springer Group. Significant research has been carried out in departments and research institutes of leading universities, research institutes and other institutions.



Stepan
Prokopovych
Timoshenko
(1878-1972)



Dmytro
Olexandrovych
Grave
(1863-1939)



Kostiantyn
Kostiantynovych
Symynsky
(1879-1932)



Serhii
Volodymyrovych
Serensen
(1905-1977)



Mykola
Vasyliovych
Kornoukhov
(1903-1958)



Fedir Pavlovych
Beliankin
(1892-1972)



Guriï
Mykolaïovych
Savin
(1907-1975)



Anatolii
Dmytrovych
Kovalenko
(1905-1973)

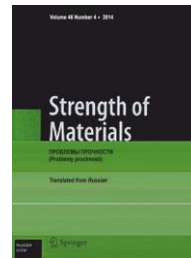
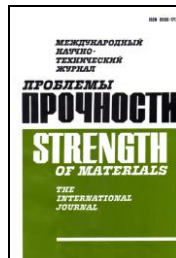


Viktor
Olimpanovych
Kononenko
(1918-1975)



Olexandr
Mykolaïovych
Guz

The National Committee of Ukraine for Theoretical and Applied Mechanics (NCU) was formed in accordance with the Decree of the Presidium of the Academy of Sciences of Ukraine No. 191 dated July 3, 1992. The same Decree entrusted the Institute of Mechanics of the Academy of Sciences of Ukraine (IM) with the functions of the base institution of the NCU.



The constituent meeting of the committee, which was attended by 202 leading scientists of Ukraine, working in the field of mechanics and related

sciences and representing various scientific centers of Ukraine, was held on June 7, 1993.

The main tasks of the NCU are: preparation and holding of scientific forums on theoretical and applied mechanics and related sciences; facilitating the coordination of scientific research on selected issues of mechanics conducted by scientists in various institutions, departments and industries; strengthening the relations of Ukrainian mechanics with foreign scientists, as well as organizations and international societies with the aim of developing mechanics; spread of scientific and technical information on mechanics; representation of Ukrainian mechanics at the International Union of Theoretical and Applied Mechanics (IUTAM) and other international organizations in mechanics and related sciences.

IUTAM was organized on September 22, 1946 at the constituent assembly of the world's leading mechanics at the Sorbonne University in Paris and is currently the most prestigious scientific union in the field of mechanics. It is appropriate to indicate that world physics is united into the International Union of Pure and Applied Physics - IUPAP.

Second most important after IUTAM is the European Mechanics Society, this society assumes only the personal membership of scientists. The third is the Society for Applied Mathematics and Mechanics (GAMM - Gesellschaft für angewandte Mathematik und Mechanik), where Ukrainian scientists have their representatives along with other scientists from Eastern Europe.

The last at the time of writing this work, the Presidium of the NCU was elected at the General Reporting and Election Meeting on February 10, 2014. It consists of 5 people: the chairman - Guz O.M., the deputy chairman - Bazhenov V.A., Matveiev V.V., Martynyuk A.A., Shevchenko V.P., Scientific Secretary - Ruschitsky Ya.Ya. Chairman of the Committee O.M. Guz is an academician of the National Academy of Sciences of Ukraine, member of European Academy of Sciences (Brussels), Member of Academia Europaea (London), member of the World Innovation Foundation (London).

NCU is an affiliate of IUTAM (in total, 55 countries in which mechanics have reached a certain level of development are affiliated members). In 2000 at the session of the IUTAM General Assembly in Chicago (USA), following a vote, Ukraine was admitted to IUTAM. O.M.Guz was elected representative of Ukraine in the General Assembly.

NCU promotes the development of all important and relevant areas of basic research in the field of mechanics and related sciences, using various means (support for publications in the international scientific journal *International Applied Mechanics*, discussion at scientific seminars and scientific conferences, etc.).

In total, the NCU currently consists of 282 members - doctors of sciences in mechanics and related branches of science, who represent approximately equally academic and university science.

NCU is the only all-Ukrainian public organization that brings together scientists from all areas of Ukraine working in the field of mechanics and related sciences, and which creates a platform for discussing all the important

problems of the development of mechanics and related sciences. The influence of NCU members on scientific research in the field of mechanics is dominant and determining.

The activity of the NCU is aimed both at maintaining the world level of development of mechanics achieved by previous and modern generations of Ukrainian scientists, and at developing new areas of mechanics (for example, nanomechanics, biomechanics, tribomechanics, etc.)