A brief historical review of the main scientific activities at the S. P. Timoshenko Institute of Mechanics, National Academy of Sciences of Ukraine, is outlined. Current trends are examined, in the Institute as a whole and in particular departments. As a resource, reviews of the Institute’s activity published between 1955 and 1999 in this journal and elsewhere are listed in a bibliography.

The editorial board of this journal has decided that, in each issue of volumes 36 and 37 (during the years 2000 and 2001), two review articles will be devoted to scientific developments at the S. P. Timoshenko Institute of Mechanics, Ukrainian Academy of Sciences (AS). Since the goal is to show the basic achievements of the Institute in various fields within mechanics at the beginning of the third millennium, it is appropriate to briefly review the scientific activity of the Institute in various periods. A fuller account may be found in the review articles published in this journal since 1955. A complete listing of review articles by Institute scientists (including those published in the foreign press) up to 1999 (inclusive) is appended to this article. The papers in this list, together with the review articles to be published in these pages over the next two years, give a full picture of the achievements of the Institute as a new millennium begins.

1. A Brief History. The S. P. Timoshenko Institute of Mechanics was the first scientific institution in the Ukrainian Academy of Sciences. It was founded on November 30, 1918 (three days after the founding of the Ukrainian AS on November 27, 1918).* S. P. Timoshenko was the founder of the Institute and its first director (1918–1920). On June 9, 1993, the Presidium of the Ukrainian Academy of Sciences named the Institute in honor of S. P. Timoshenko, in acknowledgement of his contributions to science.


Over the years, the Institute has operated under various names, as the main areas of scientific activity have changed. Initially, as the Institute of Engineering Mechanics, Ukrainian AS (1918–1929), its focus was on engineering problems associated with economic reconstruction after the depredations of the Civil War; in this period, the materials-testing laboratory was organized and equipped. With the expansion of its experimental base, staff, and research program, the Institute was recognized as an important scientific center in the field of structural strength and dynamics.

In 1928, at a general assembly of the Ukrainian AS, the Institute’s director K. K. Siminskii argued that it could not address all engineering problems but had to specialize on the strength of materials, structures, and machines.

Accordingly, by decree of the Presidium of the Ukrainian AS, it was reorganized as the Institute of Structural Mechanics, Ukrainian AS (1929–1959). At first, the reorganized Institute focused on the fatigue of welded iron in bridges, the properties of stone, sand, and earth as materials for highways and residential and industrial buildings, and the experimental


mechanical characteristics of Ukrainian wood specimens (including the fatigue of wood). At the same time, theoretical research was conducted in linear mechanics and other fields.

Two broad scientific interests of the Institute at this stage were: the creation of effective methods of calculating the strength and stability of metallic and wooden structures; and the investigation of the dynamic strength of machine parts. In addition, in the prewar period, two new laboratories were created: the engineering laboratory, for experimental research on the strength and stability of large structural models and their components; and the physical-engineering laboratory, for the development of new methods of investigating the strength of structural elements and the creation of corresponding new equipment. In this period, the Institute gained wide recognition for its work on the structural mechanics of machines (in combination with the mechanics of materials) and the structural mechanics of buildings.

In World War II, the Institute was evacuated to Ufa (1941–1943). Its goals in this period were assistance to the war effort and economic development in Bashkiria. Its scientific activity was coordinated with the work of the Scientific and Engineering Committee on Military Cooperation created in the Presidium of the Ukrainian AS.

After the War, the Institute took an active part in the nation’s industrial recovery, focusing on relevant areas of science and engineering. In particular, a department of reconstruction was created at the Institute, and research on the strength, stability, and oscillation of structures was undertaken.

In 1948, the department of elasticity theory led by A. N. Dinnik at the Institute of Mine Mechanics, Ukrainian AS, was transferred to the Institute. Under Dinnik’s leadership, research was undertaken on the stability of rods and arches, the optical determination of stress, and other topics.

In this period, research on nonlinear mechanics was conducted under the leadership of N. N. Bogolyubov. The methods that he developed are also used in statistical physics, quantum mechanics, and thermomechanics. The initial work in this field was undertaken in collaboration with N. M. Krylov.

In 1958-1959, under the leadership of G. N. Savin, the Institute considerably expanded its research agenda and modified its priorities, in response to the nation’s economic needs. In 1959, by decree of the Presidium of the Ukrainian AS, the Institute was renamed the Institute of Mechanics. In this period, the Institute included the following departments (their directors are given in parentheses): mathematical theory of elasticity (G. N. Savin); structural strength (F. P. Belyankin); structural stability (I. Ya. Amiro); metals science and contact strength, with a metallographic laboratory (B. D. Grozin); engineering theory of elasticity (A. D. Kovalenko); dynamic strength, with a dynamic laboratory (N. I. Chernyak); design (V. P. Zavertailo); experimental engineering, with three workshops (I. Z. Pashchenko); the physical-engineering laboratory (S. V. Malashenko); the laboratory of measurement techniques (N. P. Khotyaintsev); the laboratory of electric modeling (V. G. Bessonov); and the mechanical laboratory (A. N. Golubentsev).*

At this period, two members (F. P. Belyankin and G. N. Savin) and two corresponding members (B. D. Grozin and A. D. Kovalenko) of the Ukrainian AS, six Doctors, and 24 Candidates of Science worked at the Institute.

In the late 1960s, the structure of the Institute was significantly modified, with 18 departments grouped into three sectors.

I. Mechanics of a deformable solid (led by I. Ya. Amiro). Departments: rheology (G. N. Savin); thermoelasticity and thermoplasticity (A. D. Kovalenko); dynamics and stability of continuous media (A. N. Guz'); structural mechanics of thin-walled structures (I. Ya. Amiro); experimental structural research (P. S. Polyakov); plastic deformation in structures (A. I. Strel'bitskaya); plasticity of materials (N. I. Chernyak); computational methods (Ya. M. Grigorenko).

II. General mechanics (led by N. A. Kil‘chevskii). Departments: theory of vibrations (V. O. Kononenko); hydroelasticity (N. A. Kil’chevskii); physical-engineering (S. V. Malashenko) and experimental methods of vibrational research (N. P. Khotyaintsev).

III. Mechanics of composite structures (led by G. A. Vanin). Departments: mechanics of composites (G. A. Vanin); calculation and design methods for composite structures (O. A. Goroshko); modeling composite structures (V. G. Bessonov); properties of new materials (I. I. Ishchenko); static strength (F. P. Belyankin); fatigue of structures (M. É. Garf).

* Our account here focuses on the structure of the Institute, without itemizing the research interests within each department. For full details, see: S. P. Timoshenko Institute of Mechanics [in Russian], A.S.K., Kiev (1998).