Professor Vsevolod Ivanovich Feodos'ev (1916–1991)

The following biography is from an article entitled "Vsevolod Ivanovich Feodos'ev (the 100th anniversary of his birth)", in Journal of Applied Mathematics and Mechanics, 2016 (PMM in press); Wikipedia material was used (ru.wikipedia.org); Translated by P.S.C.

Biography:
A prominent Soviet scientist in the field of mechanics of solids, Professor Feodos'ev was for over 40 years involved in the publication of the journal Prikladnaya Matematika i Mekhanika. He was a doctor of technical sciences, a professor, an associate member of the USSR Academy of Sciences (1977), an Honored Figure of Science and Technology of the Russian Soviet Federative Socialist Republic (1956), a winner of the Lenin Prize (1960) and the State Prize (1976), and a Hero of Socialist Labor (1986), and he was decorated with orders of Lenin, the October Revolution, and the Red Banner of Labor.
He was born in Kaluga into a family of schoolteachers. The family then moved to Moscow, where, in 1935, he finished his schooling and entered the N.E. Bauman Moscow Mechanical Engineering Institute (now the Moscow State Technical University). In 1941 he graduated from the institute with distinction and after a year became a Candidate of Technical Sciences and a postgraduate of the Resistance of Materials Faculty. In 1945, he brilliantly defended his doctoral dissertation 'Flexible shells in engineering (theory and calculation)', in which he examined problems of the stability of thin-walled shells of revolution, and in 1947 he became a professor.
By this time, the scientific interests of Feodos'ev, which had been in the development of methods for calculating elastic elements in fine instrument making, had switched to the area of strength and stability analyses of the shell elements of structures. In his book Elastic Elements in Fine Instrument Making (Oborongiz, Moscow, 1949), he formulated the principal non-linear problems of the static stability of elastic elements.
In 1948, Yu.A. Pobedonostsev, together with S.P. Korolev, founded the Long-Distance Ballistic Missile Faculty in the N.E. Bauman Moscow Higher Technical School (MHTS), for the training of specialists in the design of missiles with liquid-propellant rocket engines. On their recommendation, V.I. Feodos'ev was made Head of the

faculty in 1950, and from 1951 to 1953 he was at the same time Dean of the Rocket Technology Department. Feodos'ev, an excellent talent spotter, was able subsequently to attract outstanding scientists to work at the faculty. Lectures on the theory of vibrations and the dynamics of rockets were given by future academicians V.N. Chelomei and K.S. Kolesnikov, and lectures on launch equipment by V.P. Barmin. Leading specialists of Scientific Research Institute No. 88 (NII-88) were recruited with the help of S.P. Korolev to take other courses. Knowing Feodos'ev as a specialist of the highest class in the area of the strength and dynamics of thin-walled structures, S.I. Korolev recruited him at the end of the 1940s as a Special Design Office (SDO) consultant on issues in strength and stability of structures and analysis of vibrational processes. As a result, Feodos'ev became an active member of the NII-88 Scientific Council. By the beginning of the 1950s, because of his excellent qualities, he had become well known and had acquired great authority among specialists of the SDO. At this time, he was developing methods for calculating the compartments of ballistic missiles and the docking units of satellites. In his monograph The Strength of Heat-Loaded Units of Liquid-Propellant Rocket Engines (Oborongiz, Moscow, 1957), he analyzed central problems of the thermal strength of rocket engines, giving specific examples from practice and the results of calculations.

Towards the end of the 1950s, our rocket technology was faced for the first time with catastrophic flight test results due to uncontrolled vibration. The extremely fruitful collaboration that evolved between V.I. Feodos'ev and S.P. Korolev began during stormy meetings of several emergency committees looking into flight tests of the famous R-7 rockets in 1958. It was established that the failures were due to low-frequency vibrations of the oxidant feed systems. It was necessary to give a diagnosis and urgently to install air dampers in the fuel line. In this intense work, Feodos'ev showed his outstanding talent and secured his place within Korolev's inner circle. For his participation in the development of prototypes of new technology in 1956, Feodos'ev was given the title Honoured Figure of Science and Technology of the Russian Soviet Federal Socialist Republic. In this period, he worked on the book Selected Problems and issues in the Resistance of Materials (Nauka, Moscow, 1950), which during the next 46 years was reprinted several times. It included new, interesting problems of mechanics, the solution of which required non-standard approaches to be taken, and also sections devoted to computer simulation of different structures.

The work of Feodos'ev was brought together in a fundamental work produced by a team of scientists at the MHTS, Strength Analyses in Engineering (Mashgiz, Moscow, 1950–1959). This three-volume book is now a reference book for design engineers. In 1960, Fedos'ev, with his coauthors, was awarded the Lenin Prize for this work.

For more than 40 years, Vsevolod Ivanovich gave lectures to students of the MHTS on the resistance of materials. Throughout this time he updated the content of this course. After the first publication of his textbook for engineering college students The Resistance of Materials (Nauka, Moscow, 1960), it was republished 10 times, and in 1976 it won the USSR State Prize. This course was supplemented excellently by the book Ten Discussion Lectures on the Resistance of Materials (Nauka, Moscow, 1969).

He was a superb lecturer, able to convey complex material clearly and brilliantly to students. In his lectures on the resistance of materials and the principles of rocket technology, far from simply imparting the minimum standard knowledge, he set out his philosophical view of the problems of science and rocket technology that were central at that time. His improvisations, great skill, and sense of humor, together with his deep understanding of the subject, made a strong impression on his students. Many of his students went on to follow the scientific directions set out in his lectures. Under the direct supervision of V.I. Fedos'ev, over 40 candidate and doctoral dissertations were completed. By giving postgraduates complete independence, he directed and developed their creative thought, played a key role in assessing their scientific work, and at the same time paid close attention to the form of presentation of material.

In 1986, Feodos'ev was given the title Hero of Socialist Labor for his outstanding service in research and teaching.

Feodos'ev devoted his final book, The Principles of Rocket Flight Technology (Nauka, Moscow, 1979), on which he worked for about 25 years, to those whose lives had been closely bound up with rocket and space technology, of whom Vsevolod Ivanovich himself was a bright, talented, dedicated example. He wrote: 'They created the technology of the forties, fifties, and sixties, remaining willingly bound to their duty, their obligations, their immutable passion. And only a few of the brightest names are now familiar to us. But there were more of them'.