

Preface

This special issue of *Archives of Mechanics* is dedicated to Professor Zenon Mróz on the occasion of his 70th birthday.

Zenon Mróz was born at Suchowola in Poland on November 2, 1930. He completed his university education in 1952 at the Department of Mechanical Engineering of the Warsaw University of Technology. In the period 1952-1955 he worked as a designer in the Central Design Office for Internal Combustion Engines. Next, he attended doctoral studies at the Institute of Fundamental Technological Research (known under the Polish abbreviation as IPPT) of the Polish Academy of Sciences in Warsaw. He completed a Ph.D. thesis entitled "Limit load-carrying capacity of plates and shells" under the supervision of Professor Waclaw Olszak in 1959. His scientific career was significantly influenced by a postdoctoral fellowship in 1960-1961 at Brown University, Providence, where he worked on the theory of plasticity and structural optimization with Professor William Prager. A few years later, in 1965, he defended at IPPT his D.Sc. (habilitation) thesis on "Constitutive modelling of elastic-plastic materials". He was conferred the title of full professor in 1978, and in 1986 he was elected a corresponding member of the Polish Academy of Sciences. In 1961 Zenon Mróz was married to Barbara, and they have one son and one daughter.

The permanent position of Zenon Mróz, till today, has been at the IPPT in Warsaw, where he is the head of the Division of Inelastic Analysis of Structures and Materials. However, his scientific activity has always had international character. He was invited as visiting professor to a number of foreign universities, including Virginia Polytechnic Institute and State University (1985, 1987, 1990) and University of Minnesota (1996, 2000) in the United States, Ecole Polytechnique (1980) and Université Paris Nord (1992) in France, University of Wales (1979) and Cambridge University (1983) in the United Kingdom, University of Waterloo, Canada (1972), University of Kyoto, Japan (1984). Also, many foreign and Polish researchers stayed at IPPT in Warsaw for longer or shorter periods to take the advantage of co-operating and exchanging ideas with Professor Mróz. His broad spectrum of interests, readiness for deeper discussions and inspiring criticism have been widely appreciated.

Zenon Mróz has made significant scientific contributions to several branches of applied mechanics. One of the main subjects of his work has been the constitutive modelling of inelastic materials. His basic paper "On the description of anisotropic workhardening" (*J. Mech. Phys. Solids*, 15, 163-175, 1967), where an original model of multi-surface plasticity was proposed, has been exceptionally frequently cited and followed in the literature world-wide. In his related papers,

the concepts of discrete memory and damage accumulation under cyclic loading were developed both for metals and geomaterials. The Mróz model of multi-surface plasticity, in different versions, has been implemented in many numerical codes for analysis of inelastic materials and structures. Zenon Mróz is also known as one of the pioneers of non-associative plasticity.

Another important area of his activity encompasses limit states, sensitivity analysis and optimal design of structures. In a series of papers, he developed a unified variational approach to the sensitivity analysis of structures with respect to variable design parameters, shape and topology in pre- and post-critical states. Numerous applications have been presented to optimal design of various structures composed of beams and plates.

The work of Zenon Mróz has also been directed at contact mechanics and the modelling of effects of sliding, friction and wear. Recently, he has developed two-scale models for interaction of surface asperities, as well as phenomenological models for friction and wear in metal forming processes.

Zenon Mróz is the author of over 240 publications, most of them in recognized international journals, and several monographs written jointly with his collaborators. He is currently a member of editorial boards of 17 scientific journals: *Acta Mechanica*, *Acta Mechanica Sinica*, *Archives of Computational Methods in Engineering*, *Archives of Machine Design*, *Archives of Mechanics*, *Engineering Computations*, *European J. Mechanics A/Solids*, *Int. J. Analytical Methods in Geomechanics*, *Int. J. Cohesive and Frictional Materials*, *Int. J. Engineering Analysis and Design*, *Int. J. Numerical Methods in Engineering*, *Int. J. Solids and Structures*, *J. Theoretical and Applied Mechanics*, *J. Structures and Machines*, *J. Thermal Stresses*, *Mechanics of Materials*, *Mechanics Research Communications*. Impressive is also the list of his invited lectures and memberships in scientific committees of international conferences, including the IUTAM Congress Committee in 1988-1996. Among many distinctions and awards, he received an honorary doctor's degree from 4 universities: Miskolc University, Hungary (1995), Polytechnique de Mons, Belgium (1997), Cracow University of Technology, Poland (1997), University of Waterloo, Canada (1999).

Many friends and colleagues around the world have contributed to this Anniversary Issue to honour Professor Zenon Mróz for his inspiring work and scientific achievements. The journal *Archives of Mechanics*, edited at his home institute and supported by his activity as a member of the International Advisory Board, seemed to be a natural place for publishing the articles dedicated to him.

Henryk Petryk