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Professor Piotr Perzyna
in memoriam

On June 22, 2013 Professor Piotr Perzyna passed away. With deep regret, we said goodbye to an outstanding scientist in the field of solid mechanics, the creator of the widely used theory of viscoplasticity, a specialist in problems of thermodynamics of materials, damage dynamics, and wave propagation. He was a scientific authority, inspirer, and teacher.

Piotr Perzyna was born August 1, 1931 in Niedźwiada near Łowicz. In the years 1946–1951 he attended the Secondary School named after J. Poniatowski in Łowicz, in 1951 he began his studies at the Warsaw University of Technology. The beginnings of his research and teaching activities date back to his student days. In 1953, while still a student at the Faculty of Mechanical Engineering, Technology and Construction of the Warsaw University of Technology, he was hired as an assistant in the Department of Mechanics directed by prof. Wacław Olszak. On 28 June 1956 he graduated and received his Master Degree in Engineering. Further scientific work of Professor was carried out in the newly established Institute of Fundamental Technological Research of the Polish Academy of Sciences (IPPT PAN) in Warsaw. Professor Perzyna had been involved in this research centre for more than 45 years, being successively employed in the Department of Mechanics of Continuous Media at the positions of: senior assistant since 1956, assistant professor since 1959, associate professor since 1964, professor extraordinarius since 1971, and full professor since 1978. Since January 1964 Professor Perzyna was Head of the Division of Theory of Viscoplasticity, and since February 1979 he was Head of the Division of Theory of Inelastic Materials in IPPT PAN until retirement. Since 1974 he was a member of the Scientific Council of IPPT PAN, presiding in many of its committees. For three terms he served as Head of the Section of Solid Mechanics in Committee on Mechanics of Polish Academy of Sciences. in the years 1978–1980 he was the Head of the Doctoral Study at the IPPT PAN and in the years 1980–1982 he was the Deputy Director for Research of the IPPT PAN.

In 1959, in IPPT PAN, he received a PhD degree in Technical Sciences (supervised by Prof. Wacław Olszak), and on 25 April 1963 he received a degree of Doctor of Sciences. In the years 1961–1962 he held a postdoctoral position in the team of Prof. William Prager, the Division of Applied Mathematics, Brown University, Providence, R.I., USA.

In the years 1963–1973 he taught a monographic series of lectures on the Theory of Plasticity and Thermodynamics of Inelastic Materials at the Faculty of Mathematics, University of Warsaw. In the years 1969–1970 he was an NSF Senior Fellow at the Department of Engineering Mechanics, University of Kentucky, Lexington, USA. In 1982 and 1985 he worked as an CNRS Visiting Professor at Université Poitiers in France, and in 1982 he was a Visiting Professor at Brown University, Providence, R.I., USA. In 1985 he worked as a Visiting Professor at MIT, Cambridge, Mass., USA, and as a Visiting Professor at Tokyo University, Japan. In 1988–1991 he was an DFG Visiting Professor at the Universität Hannover in Germany.

Solid mechanics was Professor's main area of research. Piotr Perzyna was a co-founder of a new discipline – the theory viscoplasticity. His work in this area became the basis for extensive research in a number of domestic and for-

eign scientific centres. Research and results achieved in the field of constitutive modelling of inelastic materials for describing localization and damage are of special interest. Professor Piotr Perzyna proposed an original way of description within the domain of the thermodynamic structure with internal parameters. The choice of a set of internal parameters is justified by both the physical basics and experimental observations. This concept has been widely used for investigation of the localization and damage phenomena in monocrystalls and polycrystalline materials by analytical methods. This period had also resulted in formulating the criteria of localization of plastic deformation. Due to this, a detailed research on the influence of different effects on the occurrence of the phenomenon of localization was done. Professor Piotr Perzyna also achieved original results in the field of instability research of plastic flow processes and in the theory of damage. The results of these studies are of particular importance for the development of numerical methods and computer simulation of plastic flow processes. The developed numerical procedures are stable and allow to study the phenomena of localization and damage. This makes them widely cited and further developed in a number of national and international research centres.

Professor Piotr Perzyna obtained very interesting results in the field of thermodynamics of inelastic materials, as well as for dynamical and wave problems. His work in the field of description of the mechanical properties of irradiated materials were of great practical and theoretical importance. It is worth noting that subjects of PhD dissertations in various foreign scientific centres (e.g. Delft University of Technology, MIT, Tokyo University, George Washington University, Grenoble University, Barcelona University of Technology) are often inspired by the results of Professor Perzyna's research.

Many chapters in the currently published scientific monographs on the theory of plasticity describe in detail Professor Piotr Perzyna's results in the theory of viscoplasticity and constitutive modelling for describing localization and damage. After retirement he did not change his way of life and remained active in the work of the Scientific Council of the Institute of Fundamental Technological Research of the Polish Academy of Sciences, came to the Institute several times a week, was actively involved as an advisor, colleague and co-author of articles with his younger colleagues or students. He was still creative and looking for new topics. For example, in the recent years, he worked with passion on the issues of existence of Hamilton's variational principle for dissipative bodies and possible consequences of the invariance of the functional of action, and a joint publication with Witold Kosiński in the Archives of Mechanics is the result of this activity.

Professor Piotr Perzyna participated in a large number of international conferences and had been invited to their scientific committees and to deliver plenary lectures. Since 1964, he participated in all International Congresses of

Theoretical and Applied Mechanics (IUTAM), presenting there papers based on his own research. At the Congress of IUTAM in Toronto in 1980, he was asked to deliver a plenary lecture. He participated in many IUTAM Symposia and EUROMECH Colloquia. He was the organizer of international conferences, responsible for the scientific level of these meetings. Because of his extensive, friendly contacts he had always been able to accumulate the most prominent scientists at these meetings, providing the highest level to the events. He organized three EUROMECH Colloquia himself in 1972, 1979, and 1986. He was also the main organizer of the XVI-th Polish Solid Mechanics Conference (Krynica 1974) and XXXIII-th Polish Solid Mechanics Conference (Zakopane, 2000). In 1978, 1980, 1988, and 1997, he organized international courses at the European Centre for Mechanics CISM in Udine, Italy. In 1981–1986 Professor Piotr Perzyna was a member of the European Committee for Mechanics (EUROMECH).

Since 1964, for 30 years he was a member of the Editorial Board of the Archive of Applied Mechanics and Engineering Transactions. From 1972 to 2002 he was a member of the Editorial Board of the Library of the Applied Mechanics, IPPT PAN. In the years 1991–1996 he was a member of the Advisory Board of the International Journal of Plasticity, Pergamon Press; from 1990 to 1996, a member of the Advisory Board of International Journal of Impact Engineering, Pergamon Press; and from 1992 to 1998, a member of the Advisory Board of the JSME International Journal of Mechanics and Material Engineering, the Japan Society of Mechanical Engineers; from 1992 to 1997 a member of the Advisory Board of the European Journal of Mechanics.

The creative achievements of Professor include six scientific monographs, two university textbooks, and about 270 original scientific works, the vast majority of which were published in reputable journals currently covered by Thomson Reuters databases. Professor's publications are widely cited, and a few of them belong to the most frequently cited Polish works in the field of technical and mathematical sciences (works from the years 1963, 1966, 1971, 1978). The theory of viscoplasticty created by Professor is widely discussed also in the most significant monographs published in prominent scientific publishing houses. Moreover, Professor is author or co-author of more than twenty books, including one of the first in the world books on plasticity in 1966. Citations of Professor's work are not limited to the publications listed in the Web of Science databases. Hundreds of doctoral and postdoctoral works referring to the issue of plasticity always discuss the fundamental results of Professor Perzyna.

Looking at the impressive number of his international research internships, professors' visits, and travels to the most prestigious conferences in the world, one can say without a doubt that he belonged to a small group of truly world scientists, for whom, even during the difficult years of our post-war history, borders did not constitute a major barrier.

Professor Piotr Perzyna had supervised 17 completed PhD theses. Nine of his co-workers gained degrees of Doctors of Sciences, and 7 became professors. Professor also inspired many other researchers, and the value of scientific discussions with him could not be underestimated. He was a researcher who excellently and effectively directed research topics of discussion participants or seminar panelists. There is a numerous group of co-workers who do not change the presented statistics, but who truly belong to the group of his students; thanks to Professor, Polish mechanics maintains and strengthens its position in the scientific world. The names of his doctoral students in the alphabetical order are: Angel Baltov, Józef Bejda, Paweł Dłużewski, Aldona Drabik, Kurt Frischmuth, Tadeusz Jeske, Witold Kosiński, Sumio Murakami, Zdzisław Nowak, Anna Pabjanek, Ryszard Pęcherski, Amalia Pielorz, Jacek Rońda, Katarzyna Szmit-Saxton, Tomasz Wierzbicki, and Włodzimierz Wojno.

Professor was a very demanding supervisor, but also an excellent and highly respected professional, colleague, and friend. His enthusiasm, high standards of ethics, and scientific honesty in an effort to solve research problems, to find an explanation of the observed phenomena, and his approach to research in general, shaped the minds of generations of co-workers. Many of his students and graduate students have become well-known scholars in Poland and beyond its borders. For example, Tomasz Wierzbicki is a professor at MIT, Angel Baltov for many years worked as the scientific director of the Bulgarian Academy of Sciences, Sumio Murakami was a professor at Nagoya University, Witold Kosiński is a professor at the Polish-Japanese Institute of Information Technology, where he worked for six years as a vice-rector for research, and Aldona Drabik is the general vice-rector there, Jacek Ronda, currently a professor at the AGH University of Science and Technology, was for many years a professor at Cape Town University, Kasia Szmit-Saxton has been for many years a professor at Loyola University in New Orleans, Paweł Dłużewski and Ryszard Pęcherski are professors at the IPPT PAN, and Kurt Frischmut is a professor at the University of Rostock.

Professor Perzyna was the winner of prestigious awards. In 1960, the M.T. Huber Prize, Division IV of the Polish Academy of Sciences; in 1968, the State team award of II degree; in 1974 and 1978, awards of the Scientific Secretary of the Polish Academy of Sciences; in 1984, individual State award of II degree; and in 1993, together with prof. Erwin Stein from Hanover, Max Plank Research Award (Max Plank Society and the Humboldt Association). In the year 2008, Professor Piotr Perzyna has been awarded the doctor Honoris Causa title by the Poznań University of Technology. Professor Piotr Perzyna was awarded the Chevalier Cross of the Polonia Restituta Order.

Witold Kosiński
Zdzisław Nowak
Ryszard Pęcherski