

C H R O N I C L E

The Fiftieth Anniversary of the Scientific Work of Prof. Dr. Jerzy Ranachowski



Prof. J. Ranachowski

The 3-rd International Symposium devoted to new trends in the technology and investigation of ceramic materials was held in Białowieża from the 8-th to 10-th of June this year. The participants of this meeting were scientists working in the field of materials technology and acoustics as well as representatives of the ceramic materials industry and electrical power engineering. The focus of attention was the presentation of the fifty years' scientific and technical output of Prof. J. Ranachowski and the research connected with his activity, especially the progress in the production and quality testing of high-voltage elements that has been achieved on the basis of Prof. Ranachowski's investigations. It should be emphasized that acoustic methods were the main tool in most of his research work. It seems therefore that *Archives of Acoustics* is the proper place to give a short profile of Prof. Ranachowski and a comprehensive presentation of his fifty years' scientific output.

Prof. Ranachowski was born in 1926; fifty years ago is assistant at the Electrical Faculty of the Technical University in Wrocław, he started his research by designing a High-Voltage Laboratory at this University. In the years 1951–1975 he worked as assistant, and later as senior lecturer and assistant professor, at the Institute of Electrical Engineering in Warsaw. At that time, it was a leading research institution that contributed to a large extent to the development and progress in the electrical engineering industries and electrical power systems in Poland. Over these years, Prof. Ranachowski was concerned mainly with technology of ceramic and materials elements, as well as with the investigation causes of breakdowns in electrical power systems. This was the subject of his Ph.D. Dissertation (1963) and, later on, of his thesis presented for professor title (1968). In connection with his research of that time, he was looking for the most effective methods of testing the electrical power systems. Prof. Ranachowski focused his attention on the application of acoustic techniques that have been considered then as the most innovatory ones. That is just why he start to cooperate in 1956 with the Institute of Fundamental Technological Research of The Polish Academy of Sciences. In 1975, Prof. Ranachowski started to full time work at this Institute holding for more than twenty years several responsible positions; among other things, he was active as laboratory chief and assistant director of this Institute. During the last years, before he retired, Prof. Ranachowski was the managing director of the Acousto-Electronic Centre. He was nominated the full professor in 1976.

A complete profile of the scientific output of Prof. Ranachowski requires a more detailed study. Therefore, I would like to restrict myself only to the listing of Prof. Ranachowski's achievements that in my opinion are the most outstanding ones. They are connected mainly with the application of acoustic methods to the complex investigation of ceramic materials and elements. He found and determined quantitative relations between the velocity and absorption of ultrasonic waves and the structure and microstructure of ceramic materials, particularly the effect of porosity and the type of pores and texture defects in insulants. He made also a significant contribution to the study of the correlation between the acoustic properties of a material and its dynamic elasticity parameters.

Particularly profitable were the scientific and technical works concerning the application of the acoustic emission (AE) that were initiated by Prof. Ranachowski and have been continued by a scientific group working under his leading. Prof. Ranachowski has proved that the AE method is a unique tool for the investigation of dynamic processes occurring in ceramic materials, first and foremost of cracking and microcracking processes. Among other things, the research of Prof. Ranachowski resulted in a widespread application of the AE method in quality testing and in the evaluation of the current state of insulators and in the forecasting of their "life-time", particularly in the case of high-voltage insulators. His achievements concerning the study of thermal shock and dynamic load effects by the AE method are of special interest. This was connected with a new approach to the determination of the critical stress intensity vector K_{IC} .

Prof. Ranachowski came up with significant improvements in the AE measuring equipment initiated the production of those equipments in Poland. This enabled the application of AE methods in many fields of technology and science. Beside the mentioned

above applications in the ceramic material industry and electrical power engineering, some other applications should be enumerated:

- investigation of transition states in superconductors,
- monitoring of hazards in engineering objects,
- evaluation of the state of electrical power systems,
- testing of concrete and concrete constructions,
- testing of technological process in the woodworking industry,
- monitoring the chemical reactions.

The above list of applications indicates that the scope of the effect of Prof. Rana-chowski's research achievements extends far beyond his strict discipline.

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