

Professor Tadeusz Tumidajski (1944–2017)



Professor Tadeusz Tumidajski graduated from the Department of Mathematics of Pedagogical University in Krakow in 1968, where he gained a degree of Master of Science on the basis of diploma thesis concerning the tensor analysis and analytic geometry. From the 1st of October 1968 he started working at the Department of Mineral Processing, Faculty of Mining, AGH University of Science and Technology in Krakow as apprentice, assistant and finally senior assistant.

In June of 1974 he obtained a scientific degree of doctor of technical sciences from the Faculty of Mining (AGH University of Science and Technology) on the basis of the thesis entitled *Stochastic model of copper ores processing for ZPR ZG Polkowice as an example*. The supervisor of his thesis was Professor Kazimierz Sztaba. From the 1st of October 1974 he became an adjunct professor and worked on this position till 1999.

In the academic year of 1998/99 he was a vice head of the Department of Mineral Processing, Environmental Protection and Waste Utilization (current name is the Department of Environmental Engineering and Mineral Processing) at the Faculty of Mining of AGH University of Science and Technology.

On the 26th of March 1998 he was appointed, by the Faculty of Mining of AGH University of Science and Technology, on the basis of the monograph *Stochastic analysis of grained materials properties and their separation processes*, associate professor of technical sciences in mining with specialization in mineral processing.

On the 1st of June 1999 he was granted the position of AGH Professor. From October, 2003 he was a vice head for scientific research of the Department of Mineral Processing, Environmental Protection and Waste Utilization of the Faculty of Mining and Geoengineering of AGH University of Science and Technology in Krakow. In 2003 he became a full professor.

Scientific and research works of Prof. Tadeusz Tumidajski were theoretical and practical. According to his education, he applied mathematics for description of mineral raw materials and their processing. He conducted mathematical modeling of automation and monitoring of industrial technological processes. On the basis of these works he published, as author or co-author, about 150 papers, 4 monographs, 3 books and 4 textbooks. These works ended, in many cases, with proposals prepared for industry.

His initial interests concerned theory of sampling, rules of sampling material streams and statistical evaluation of sampling results. Generally, probability theory and mathematical statistics and their applications in mineral processing became the main subject of research of Professor Tumidajski in the following years of his work. The works from this period of time can be divided into several groups:

- application of special methods of experiments to investigate various processes of mineral processing (pelletizing, microbiological beneficiation, magnetic beneficiation)
- development of methods of approximation of particle size distribution curves for processing products
- application of methods of correlation and regression analysis for description of processing processes or their circuits (copper ores beneficiation, zinc and lead ores beneficiation, coal beneficiation)
- Markov processes in description of gravity beneficiation processes
- statistical analysis of comminution models.

He wrote a textbook on application of statistical methods in an analysis of mineral processing, which after some corrections and significant expansion was published as a book used in teaching of many courses related with mineral processing. In 2009 its re-edited version was published in cooperation with Dr. Daniel Saramak.

In the middle of 1970's he started a cooperation with the Institute of Meteorology and Water Management (Krakow, Poland) what led to several important works concerning evaluation of air pollution in Krakow and its influence on the residents health. These works were based on a very rich statistical material concerning multiple observations of mean daily gas and dusts concentrations registered by monitoring stations located in several places of Krakow, meteorological conditions (air temperature, directions and velocities of wind, humidity etc.) as well number of deaths and interventions of ambulance concerning various sorts of illnesses. Influence of pollution in Krakow (which was very severe in those years) on residents health was very important statistically. Later, he returned to this issue in his work in cooperation with co-workers and doctoral student, currently doctor of technical sciences, Jarosław Siewior. In that time, as the object of analysis, they selected Upper Silesia.

Special methodologies and new ideas allowed him to perform his associate professor monograph dedicated to stochastic analysis of grained materials and processes of their separation. This work was mainly based on the widely understood balance equation, which was treated as an integral equation. The individual parts of it were described in details taking into consideration their stochastic character. The significant new elements of the work were applications of complex functions of random variables in analysis of mutual correlations between grained materials features as well analyzing multidimensional (features influence aspect) character of separation processes. The effects of this work were multiple significant publications being published internationally and presented at the mineral processing congresses in Sydney, Rome, Cape Town and Istanbul. It can be said that this line is currently being continued by co-workers of Professor Tumidajski including Professors Tomasz Niedoba, Daniel Saramak and Dariusz Foszcz from AGH University of Science and Technology.

Equipment of Polish copper ores processing plants with measuring and monitoring units as well computer data storage allowed to apply techniques of regression analysis to describe industrial processes more efficiently. Such approach allowed to apply adaptive modeling methods and wider experiment schedules. This led to several important publications as well doctoral theses. Furthermore, application of computer methods allowed to introduce the theory of mixtures of distribution functions in description of mineral processing (papers, thesis).

Since introduction of specialization of Environmental Engineering at the Faculty of Mining and Geoengineering, he and his group returned to the issue of air pollution in Upper Silesia taking advantage of access to new data. Several publications concerning this aspect were published in Poland and Czechia.

In the last periods of his life his main interest was modern methods of mathematical modeling of mineral processing (especially comminution) as well problems of ores beneficiation economy. It should be underlined that Professor Tumidajski promoted nine doctors of technical sciences and several dozens of engineers and masters of science in Mining and Geology, Environmental Engineering as well Management and Production Engineering.

Prof. Tumidajski started his didactic work in 1968/69 by teaching Technological Processes Monitoring. Through many years, this subject as well Classification, Comminution and Mineral Processing were delivered for various student specializations. Furthermore, he delivered lectures in Mineral Processing as well Methodology and Experimental Technique. After introduction of new fields of studies at the Faculty of Mining and Geoengineering, he started to teach Statistics for part time students of Management and Marketing as well Mathematics for Environmental Engineering.

It should be added that Professor Tumidajski was also perennial organizer or co-organizer of scientific conferences on mineral engineering and processing, currently known as Mineral Engineering Conference (MEC). Last time he was an honorary

chairperson of the conference organized in Bialka Tatrzańska in 2012. He was also a member of the Utilization of Materials Section of Mining Committee of Polish Academy of Sciences.

Professor Tumidajski was a great mentor and university teacher. He was forwarding his own observations and suggestions to young researchers in a very delicate, but precise manner. As a tutor, he never imposed his opinions, but tactfully gave accurate advices and guidance. He respected the opinion of every single young student, PhD student and co-workers. He said that in the researcher work the main goal is not a pursuit of achievement but the honest exploration and investigating the truth. He and his generation always remembered this, and he paid great attention that his disciples follow such principles.

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