



UNIVERSITY OF NIŠ

The scientific journal FACTA UNIVERSITATIS

Series: **Mechanics, Automatic Control and Robotics** Vol.2, No 9, 1999 pp. 1015 - 1017

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## MEMORY ON PROFESSOR DR MLADEN BERKOVIĆ

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Professor dr Mladen Berković was born on March 30<sup>th</sup> 1936 in Zagreb by father Stevan and mother Zora. He finished the elementary school in Bachka Topola, and the Gymnasium in Subotica. He was the senior student at the Faculty of Mechanical Engineering in Belgrade when in 1960 he won the Aviation Union competition for project of the standard glider of firm LIBIS, from Ljubljana, which was used in production on 50 glider named TRENER. At the last year of studies he was chosen to be demonstrator of subject Machine Parts. He graduated in 1961 at the Faculty of Mechanical Engineering in Belgrade, at Aerocosmotechnical division. From 1950 he has been the member of Aviation Union, where he, along intensive sport activities and participation on many national and international glider's competitions, officiated several functions in Administrative Board of Aeroclub and Glider Commission of Aviation Union of Yugoslavia.

In 1974 he defended Master's thesis titled *A Finite Elements with Assumed Stresses in Element and Displacements of the Boundaries, in Theory of Elasticity plane problem and Theory of Elastic Structures* at the Department of Mechanics of the Institute of Mechanics, of former Natural-Mathematical Faculty of the University of Belgrade, where he also got a Doctor's degree on the subject *Membrane finite elements* in 1978.

After graduation in 1961 he was employed at Aviation-Technical Institute (ATI) in Belgrade, where he had been working in the Strength Department until 1986. Already from 1966 he managed job of aero-elasticity and vibration, and in 1969 he was assign on position of the Head of Department for Structure Calculation. In 1975 he became the Head of Department for Structural Mechanics, while from 1979 he became the Head of Department for Strength Calculation, Aeroelasticity and Loading of the Structure. From 1984 he led department for information system of ATI. On those working position his significant tasks were investigation of the vibrations and calculation of the flutter of airplanes GALEB (COB) and JASTREB (HAWK), then, taking part in foundation of the

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Received December 15, 1999

laboratory for vibration investigation and calculation section of ATI, as well as structural analysis in project ORAO (EAGLE). The foundation and development of program package for structural analysis based on finite element method (FEM) he personally has seen as the most significant result of this twenty year period of work. In this period of his life he has accomplished active vocational cooperation with aviation industries of England, France and Romania. In the same time he published a number of professional and scientific papers, as well as report of ATI. He also became member of Society for Mechanics of Serbia and member of society IACM which is the branch of society IUTAM. He has also been a member of EUROMECH (European Mechanics Society) and ESIS (European Structural Integrity Society). In the period between 1976 and 1980 he was delegated from society for Mechanics to be a member of Presidency of Society of Engineers and Technicians of Serbia. As special approval of his work, in 1981, he received invitation of Department for Applied Mechanics of Teeside Polytechnics in England. Moreover he led and take part in commissions for many master's and doctoral works.

He had been working at the Department for Mechanics of Natural-mathematical Faculty in Belgrade with 1/3 of full working time since 1979, when he was the first time elected in rank of assistant professor for subjects Theory of Elasticity and Thermoelasticity. In 1984 he was elected the first time as associate professor for subjects Theory of elasticity and Application of Computers in Mechanics. From 1987 he completely dedicate himself to the work at Department for Mechanics at Natural-mathematical Faculty in Belgrade, where he was re-elected in the rank of associate professor for subjects Application of Computers in Mechanics and Research of Mechanical Properties of Materials. He was elected in the rank of full professor in 1993 for subjects Computational Methods in Mechanics and Mechanical Properties of Materials.

Professor dr Mladen Berković has several published chapters in monographs of international and national character in which, among the others, he had spoken on Theory of Thin Shells and  $C^*$  integral (with A. Sedmak and J. Jarić), on J-integral for thin shells (with A. Sedmak and J. Jarić) and about the energetic norm and error estimation in FEM (with D. Mijuča).

As invited lecturer on international level in 1979, he gave lectures on theory of thin shells, fracture mechanics and design with safety from fracture. In 1980 he gave lecture about determination of the stress intensity factor by FEM. Afterwards in 1982, about the problems of two and three-dimensional stress state in vessels and pipes under pressure, with reference to the modern aspects of the pressurized vessels design. He spoke about analysis of welded joints by FEM (with A. Sedmak and S. Maksimović) in 1985. In the same year he spoke about modern trends of software and hardware development for Computer Aided Design and FEM. In 1986 he spoke (with A. Sedmak) about the conservation law for thin shells and (with Z. Drašković and A. Janković) he also spoke about Finite element analysis of two-field non-linear shell model. Together with D. Mijuča in 1998 he spoke about the efficient and reliable mixed finite elements and about stability of primal-mixed FE scheme in 1999. In the same year he was investigating dual-mixed FE formulation (with I. Grozdanović). As an invited lecturer of national level, he spoke about problems of analysis of thin shells by FEM in 1979. About computer application in designing of airplanes he spoke in 1980 and about fracture mechanics (with S. Sedmak and J. Jarić) in 1981. In 1997 he spoke about Mixed model of FEM.

As a co-author he has published a few books and chapters in the books and the chapter in the book about the flight theory. He has published 84 scientific papers in international scientific journals and in reviewed journals on national level. Furthermore, he has more than twenty papers on international scientific congresses and papers on national scientific symposiums. Professor Berković was working mostly in area of finite element method in solid mechanics, with intention to formulate structural mechanics problems in the way suitable for numerical solutions and in this area he was one of the pioneers. He derived many new scientific results, for example new formulations in finite element method that make possible more efficient numerical solutions in plane problem and in theory of shells and coupled problem. With his scientific work he influenced and for a long time he will influence scientific development in our country and he will be an example and bearer of progressive ideas in development of school science and practice.

I had that privilege to be a student, postgraduate student and PhD student of deceased Professor DSc Mladen Berković. His love for scientific truth and for new scientific discoveries was always great inspiration for his coworkers. He had steady and peaceful approach to every scientific and life problem and that gave good environment needed for his fruitful scientific work. He didn't enforce his own ideas, neither his knowledge, and he allowed his younger coworkers to mature independently and to learn how to solve given problems independently. It was characteristic of his personality that he estimated impeccable every situation, and when he had felt concern or surprise of his partner, he spoke some proverb or Latin sentence. With that wide soul and education he initiated power in those around him, and pride because they know him. He was demanding in his scientific work, and naturally unmistakable on the beginning he made good selection of his coworkers. He left behind him, the many of them, who are thankful because he helped them to properly scientifically built themselves.