PROFESSOR MLADEN BERKOVIĆ [*]

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Professor Mladen Berković was born in 1936. He graduated from the Aeronautics Department of the Faculty of Mechanical Engineering in Belgrade in 1961. He obtained his MSc degree from the Faculty of Natural Sciences and Mathematics, Department of Mechanics. He defended his doctoral thesis entitled "Membrane Finite Elements" at the same faculty in 1978.

After graduating, he was employed at the Aeronautical Institute (AI) in Žarkovo, in the former Department for Strength. Aeroelasticity and vibrations were in his charge from 1966. He was elected the Head of the Section for Aeroelasticity and Vibrations in 1969, the Head of the Department for Structural Mechanics in 1975 and the Head of the Department for the Structure Strength Analysis, Aeroelasticity and Loads in 1979. From 1985 to the year when he left the Aeronautical Institute, 1987, the Department for the Information System of the Aeronautical Institute was in his charge. He was also Secretary and Vice President of the AI Science Council in the period from 1978 to 1987.

His university career began in 1979 at the Institute for Mechanics, Faculty of Mathematics, Belgrade, where he gave lectures on the Theory of Elasticity, Thermoelasticity and the Application of Computers in Mechanics, first as a part-time assistant professor, then as a part-time associate professor.

He was elected a full-time associate professor in 1987 for the courses of Application of Computers in Mechanics and Testing of Material Mechanical Properties and in 1992 he held a rank of a full professor for the same courses (with only their names changed into Computing Methods in Mechanics and Mechanical Properties of Materials).

His inclination towards both professional and teaching career was showed at his last year of study when he was chosen for a demonstrator at the course of Mechanical Elements and when he entered the competition, in 1960 while preparing his final examination, for the construction of a standard glider. The Yugoslav Aeronautical Association accepted his preliminary project, the prototype was made in 1964 and later the mass production was the largest of the kind in Yugoslavia. In the realization of this project he encountered many problems he would be absorbed with in his future work — matrix methods in the Theory of Constructions (called later the Element Method) and Mechanics of Materials in particular.

During his work at the Aeronautical Institute he organized activities concerning aeroelasticity, integrity of aircraft structures and computer technology in these related fields. The special emphasis should be put on his contribution to the forming of the Laboratory for Vibration Testing, the AI Computer Center in the 1970s and the project with the realization of the scientific and technical information system for the AI as well as for Yugoslav aircraft industry in the l980s. When scientific and research cooperation of the AI with English, French and Romanian related institutions and industries was concerned, he was either a team member or a team leader, spending some time in these countries working on joint projects. He was also a member of the Federal Ministry of Defence Commission for technical support in forming syllabus and choosing teaching staff for the Aeronautical Academy in Missurati (Libya).

However, the structural analysis software package based on the finite element method, as a result of team work of Professor Berković and his associates, should be pointed out as the most important result of his professional and scientific work in the period from 1961 to 1987. The education version of this software was used for students' practice during the course of Computational Methods in Mechanics as well as for a basis of many final examinations and master theses.

Most of almost 100 scientific and over 30 technical bibliographic units written by Professor Berković were related to theoretical bases and results of this software application in the field to wich he dedicated 35 years of his work − computational methods in the Mechanics of Continua, mostly solids. Most of these papers, as well as his master thesis and doctoral dissertation, aimed at formulating Solid Mechanics problem in a way suitable for numerical solving. However, in his papers theoretical and experimental problems of Mechanics of Materials are related to the problems of computer systems necessary for the treatment of resulting mathematical models. Important results of these papers are some new formulations in the finite element method which enable more efficient numerical solutions in the fields of the plane problem, the shell theory and the coupled thermomechanical problem. It should be pointed out that some of these papers[1] − belonging to the pioneer works in the fields of finite elements of thin isoparametric

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[1] Let us quote only a few of them:

Thin shell isoparametric elements, II World Congress on Finite Element Methods, Bournemouth (1978)

Nonlinear transient thin shell analysis, Second International Conference on the Computational Methods in Nonlinear Mechanics, Austin (1979)

On the nonlinear transient analysis of the coupled thermomechanical phenomena, Computers and Structures 10 (1979) 195-202

Linearized equations of the coupled thermomechanical general membrane problem in the finite element method, Teorijska i primenjena meanika 5 (1979) 3-13

Thin shell analysis, "Advanced Topics and New Developments in Finite Element Analysis", MARC, Rijswijk, The Netherlands (1979) 1-43

Equations of motion of shell finite elements, "Anton Kuhelj Memorial Volume", SAZU, Ljubljana (1982) 167-182

An efficient solution procedure in mixed finite element analysis, International Conference on Numerical Methods in Engineering: Theory and Applications, Swansea (l985)

C* integral − theoretical basis and numerical analysis, "The Application of Fracture Mechanics to Life Estimation of Power Plant Components", Ed. S. Sedmak, Pitman Publishing, London (1990) 71-88

J-integral for thin shells, "Defect Assessment in Components — Fundamentals and Applications, Ed. J. G. Blauel & K.-H. Schwalbe, ESIS/EGF Publication 9, MEP, London (1991) 45-43

On the essential mechanical boundary conditions in two-field finite element approximations, Computer Methods in Applied Mechanics and Engineering 91 (1991) 1339-1355

shells, numerical solution of the coupled thermomechanical problem and application of the generalized inversion to the problems in the finite element method − left the trace in the development of the Computational Mechanics through quotations in eminent publications, including reviews of extra-categories.

Professor Berković took part in scientific projects of the Republic Association for Science and the Republic Fund for Science of Serbia ("Mechanics with its Applications", l981-1985 and l986-1990). In the project "Contemporary Problems of Mechanics" (1991-1995) he was a member of the Project Council and the head of the theme "Computational Mechanics". He contributed considerably by managing the Seminar on Rheology at the Mathematical Faculty from 1988. Moreever, he wrote reviews for a number of scientific and research projects from the competence of the Republic Fund for Technological Development and the Federal Ministry of Defence.

As a chairman or a member of organizing or scientific committee he participated in the organization of many relevant Yugoslav and international meetings (let us mention only a few of them − 1st Yugoslav Symposium on the Finite Element Method in Vrnjačka Banja, 1975; International Seminar on New Developments in the Finite Element Method in Portorož, 1979; Conference on Hardware and Software in the Structural Analysis and Computer Aided Design in Belgrade, 1980; several congresses on Theoretical and Applied Mechanics, etc.).

Many years of teaching at the undergraduate studies at the Mathematical Faculty, where he was leading students successfully into important and relatively new fields of the Computational Mechanics and the Mechanics of Materials, resulted into his significant contribution to the postgraduate studies at the Department of Mechanics where he held the course on the Computational Mechanics as well as some other special courses. He also teaches the Computational Mechanics to postgraduate students at the Centre for Multidisciplinar Studies and the Mechanics of Materials at the postgraduate studies of the Faculty of Technology and Metallurgy. At one time he received a written invitation of the Teesside Polytechnic, England, to give lectures on the Finite Element Method and Numerical Analysis to postgraduate students at the Department of Applied Mathematics, during 1981-82, but he was not able to accept it because of his obligations towards the AI.

Professor Berković was an adviser of numerous diploma pieces, magister theses and doctoral dissertations. Furthermore, he was a member of many commissions for evaluation and defence of magister theses and doctoral dissertations at the Mathematical, Technology and Metallurgy and Civil Engineering Faculties in Belgrade, as well as at the Faculties of Mechanical Engineering in Belgrade, Kragujevac and Mostar.

Finally, on this occasion of the 60th birthday of Professor Mladen Berković and the 35th anniversary of his scientific, research and teaching work, let me, the undersigned − who had the honour to be one of his associates from 1976 and not only once a witness of his readiness to offer wholehearted and precious professional support, generous aid and unassuming encouragement to younger associates − wish respected and dear Professor good health, personal happiness and many more years of fruitful work.

3rd April 1996