

Visit to the Institute of Mechanics, Chinese Academy of Sciences, Beijing, China, September 26, 2017

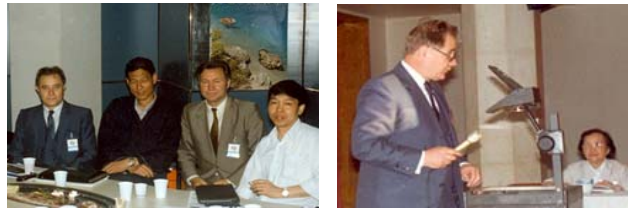
On September 26, 2017, Prof. Aleksandar Sedmak (University of Belgrade, Faculty of Mechanical Engineering, Serbia, vice-president of ESIS, and president of Serbian Structural Integrity and Life Society 'Prof. Dr Stojan Sedmak') has visited the Institute of Mechanics, Chinese Academy of Sciences in Beijing, China, as a guest of Prof. Youshi Hong, prominent top world figure in the field of Fracture Mechanics, and editor-in-chief of *Fracture and Fatigue of Engineering Materials and Structures*, and has presented the invited lecture 'Application of fracture mechanics to structural integrity and life assessment'. The lecture deals with theoretical basis for nonlinear fracture mechanics parameters, from the conservation law of J integral type to beyond the limits of static loading, plane 2D problem and homogeneous material. The two-fold meaning of J integral, as a crack driving force and as material crack resistance is employed to apply fracture mechanics' basic concept to assess structural integrity of critical components as welded joints on pressure vessels, hip replacement biomaterials and aeronautical structures. Nonlinear finite element numerical simulation calculates crack driving forces, whereas standard and non-standard experimental evaluation is used for material testing. Some specific aspects of this approach are discussed, even in case of static loading numerical simulation is not a simple task, because of complex geometries and material nonlinearity and heterogeneity. Micromechanical modelling of elastic-plastic crack growth is presented as a promising approach to overcome shortages of the traditional approach. Besides static loading, other important practical problems are tackled, e.g. fatigue and creep crack growth. In both cases the remaining life is the focus of investigation, using empirical laws for crack growth rates. Numerical simulations for

fatigue and creep crack growth are inherently complex, due to complex material damage processes and the lack of a sound theoretical basis. A combination of theoretical, experimental and numerical approach is presented that enabled reliable and efficient estimation of life for complex problems.

Note: This lecture is dedicated to Prof. Stojan Sedmak (1929-2014), the father of Fracture Mechanics in Southeast Europe, founder of the Serbian *Structural Integrity and Life Society*, named after him in 2014. His gigantic effort made the whole region and especially ex-Yugoslavia the important part of Fracture Mechanics in Europe and on the World map.



Prof. A. Sedmak showing 30 year old photos of his father, Prof. Stojan Sedmak' on visit to Beijing Sinhua University (below).



Visit to Northwestern Polytechnic University, Xi'an, China

Serbian delegation: Prof. Nataša Trišović, Dr Žarko Mišković, Dr Ana Petrović, Prof. Snežana Kirin and Prof. Aleksandar Sedmak, visited Xidian University, Xi'an, China, Sep. 20-23, 2018, in the scope of bilateral cooperation with the University of Belgrade, Faculty of Mechanical Engineering, as guests of Prof. Wei Li.

Two lectures related to structural integrity have been presented:

- *Risk-based approach to structural integrity and life assessment*, by Prof. Snežana Kirin
- *Application of fracture mechanics to structural life assessment*, by Prof. Aleksandar Sedmak

In the scope of bilateral cooperation the Mini-Symposium was also held in Belgrade, 4th July. The following lectures, related to structural integrity, had been presented:

- *Application of improved genetic algorithm in microstructure optimization of closed cell material*, Junfeng Zhao (Applied Maths Department, School of Science, Northwestern Polytechnical University, Xi'an, China), Radivoje Mitrović (University of Belgrade, Faculty of Mechanical Engineering, Serbia)
- *First passage problem of a kind of fractional dynamical system under noise excitations*, Wei Li (School of Mathematics and Statistics, Xidian University, Xi'an, China), Nataša Trišović (Univ. of Belgrade, Faculty of Mechanical Engineering, Serbia)
- *Vibration analysis in the thermal power plant*, Aleksandar Veg, Emil Veg (Univ. of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia)
- *Fatigue crack growth in friction stir welded AA 2024 T joint*, Aleksandar Sedmak (University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia), Dražan Kozak (University of Osijek, Faculty of Mechanical Engineering, Slavonski Brod, Croatia)

- *Reinventing gradient mechanics*, Dejan Momčilović (Institute for Materials Testing IMS, Belgrade, Serbia), Radivoje Mitrović (University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia)

- *Fatigue crack initiation in a spur gear tooth root*, Daniela Ristić (Tehnikum Taurunum High School of Engineering, Belgrade - Zemun, Serbia)

- *Risk-based approach to integrity assessment of a large steel structure*, Aleksandar Sedmak (Univ. of Belgrade, Faculty of Mech. Engineering, Belgrade, Serbia), Snežana Kirin (Univ. of Belgrade, Innovation Centre of the Faculty of Mech. Engineering, Belgrade, Serbia).

The Mini-Symposium was dedicated to the late Prof. Aleksandar Veg, who had died in a tragic accident just a week before.

For more details please download:

2014--PROGRAM MINI SYMPOSIUM STOCHASTIC VIBRATIONS AND FATIGUE.pdf ([download link](#))

