



Faculty of Mechanical Engineering
University of Belgrade



Society for Structural
Integrity and Life



Faculty of Technology and Metallurgy
University of Belgrade



Institute GOŠA d.o.o.

THE CHALLENGE OF MATERIALS AND WELDMENTS

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Edited, reviewed and corrected by:

Prof. Dr Stojan Sedmak
Doc. Dr Zoran Radaković
Jasmina Lozanović, dipl. ing.

Reviewed by:

Prof. Dr Vitomir Djordjević
Dr Petar Agatonović

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To contact the Publisher

Doc. dr Zoran Radaković, MF (Faculty of Mechanical Engineering, University of Belgrade)
Kraljice Marije 16
11120 Belgrade 35, Serbia
E-mail: zradakovic@mas.bg.ac.yu
<http://divk.org.yu> , <http://www.mas.bg.ac.yu>

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PREFACE

International Fracture Mechanics Summer Schools (IFMASS), founded 28 years ago, back in 1980, have been organised nine times, the last (IFMASS 9) was held in Golden Sand (Zlatni Pjasci), Varna, Bulgaria, in 2005. Following the already established tradition, organisers decided to publish the monograph

“The Challenge of Materials and Weldments”
with the subtitle
“Structural Integrity and Life Assessments”

Publishing monographs after each Summer School enabled to form useful references for introduction of fracture mechanics as an effective tool for structural integrity assessment, but also supporting its theoretical, experimental and numerical development. The first monograph “Introduction to Fracture Mechanics and Fracture-Safe Design”, published in 1981, based on lectures held at IFMASS 1 in 1980 in the former Yugoslavia, had been prepared after the request of participants, and also by strong support from the industry. In order to educate as much as possible, several lectures in this monograph have been published in both Serbian and English. It was an extended request from the industry to organise the next Summer School (IFMASS 2) “Modern Aspects of Design and Construction of Pressure Vessels and Penstocks” and publish the monograph (in Serbian) in 1982. It turned out that IFMASS served not only to educate, but also as a forum to exchange experience and ideas among participants and lecturers, many of which were invited and attracted from abroad. The next very important event was the joint Yugoslav-USA project “Fracture Mechanics of Weldments”, performed by six institutions from former Yugoslavia and the National Institute of Standards and Technology (NIST), Boulder, Colorado (USA) that started in 1982 and ended in 1992. Following the already established pattern, IFMASS 3 “Fracture Mechanics of Weldments” was organised in 1984, again for education and as a forum, and the monograph being published the same year. The success of IFMASS was continued through the fourth School “Prospective of Fracture Mechanics Development and Application” in 1986 and the monograph in 1987, leading to the most successful fifth, held under the title “The Application of Fracture Mechanics to Life Estimation of Power Plant Components” in Dubrovnik, 1989. IFMASS 5 was supported by the Serbian Electric Power Industry (EPS), with an impressive number of 145 participants and 24 lecturers recognised in the power industry world-wide. The monograph under the same title had been published in English by EMAS Publisher from England in 1990, and upon the request from our industry in somewhat reduced version, in Serbian, in 1991.

With IFMASS 5, the flourishing period in fracture mechanics and structural integrity development had ceased due to unfortunate chain of events in the former Yugoslavia. It happened that during IFMASS 6 “Service Cracks in Pressure Vessels and Storage Tanks” in June 1991, these unfortunate events started, making confusion among participants from Slovenia. However, even IFMASS 6 was successful, though the publishing of the monograph was complete only in 1994. Once again unfortunate circumstances prevented the organisation of the following Summer School until 1997,

when again with strong support from the Industry “GOŠA”, IFMASS 7 was held under the title “Experimental and Numerical Methods of Fracture Mechanics in Structural Integrity Assessment”. It was the time when foreign lecturers hesitated to come to our country, but IFMASS still saved its importance, attracting 137 participants and 8 foreign contributions out of 25 given lectures. Unfortunate events culminated in 1999 with NATO bombardment which delayed monograph publishing until 2000. Three years later IFMASS 8 was held under the title “From Fracture Mechanics to Structural Integrity Assessment” in Belgrade, in 2003, since the Society for Structural Integrity and Life (DIVK) was established in 2001 and took care about IFMASS. This was also a very successful event, and the monograph was published in 2004.

Based on promoted cooperation in the South-East Europe Initiative (SEEI) and agreement made among SEE countries representatives during IFMASS 8 in Belgrade, DIVK has tried to organise IFMASS 9 as the SEEI event. Although the cooperation in SEEI looked promising, the expected support from Bulgaria and Greece failed. However, IFMASS 9 was organised, more or less as the previous, and its success could be attributed to lectures from Romania, Ukraine, Germany, France, Macedonia, alongside from Serbia. Based on these lectures, this monograph presents important development in the scope of the given title and serves as valuable reference in the field of structural integrity. By publishing this monograph under number ‘9’ we intend to continue the established series of monographs, and to announce the next one for IFMASS 10.

We wish to acknowledge the financial support of the Serbian Ministry of Science in all nine organised IFMASS and all the published monographs.

Belgrade, June 2008

Stojan Sedmak

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