Czech Society for Mechanics

under auspices of the

FME CTU in Prague

announce holding of the

Workshop on Computational Fatigue Analysis 2017

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Design and Fatigue of Weldments

Karlovo náměstí 13
Prague 2 - Nové Město,
Czech Republic

November 13 - 16, 2017

Introduction

After 6 successful volumes of the WCFA workshop (see their programs) topped by the Vibration Fatigue Analysis workshop in the last year, and based on well visited specialized Damage Tolerance courses, the organizers decided to bring along another highly specialized fatigue topic. This volume of WCFA workshop focuses on weldments in both aspects - rules of their design to sustain static or repeated loading, and it focuses on subsequent fatigue prediction above all.

The lecturer Dr Zuheir Barsoum comes from KTH - Royal Institute of Technology in Sweden. In the linked profile of him, his experience in the topic is demonstrated. His engagement in the IIW - International Institute of Welding, where he acts as a chairman, has to be highlighted as well.

As usually in the case of WCFA workshops, we decided to start with a series of introductory lectures for the first day covered by Prof Milan Růžička, Dr Jan Papuga and Dr Josef Jurenka. This part serves as a quick start for those attendants, who have no or only very limited experience with fatigue prediction.

Lecturers

Zuheir Barsoum has been at the Department of Aeronautical and Vehicle Engineering, Royal Institute of Technology, Stockholm, Sweden, for more than 15 years. He serves there as director of studies. His research interests cover fatigue and fracture of welded structures and he have authored and co-authored more than 100 articles in international journals and conferences. Dr. Barsoum is also an expert member of IIW (International Institute of Welding) within CXIII (Fatigue behaviour of welded structures and components). He is serving as an IIW chairman. A particular feature of Dr. Barsoum´s research has been in extensive collaboration with the industry, Volvo Group, SSAB, Arcelor Mittal among many others. Dr. Barsoum is also a frequently engaged consultant in welding/joining and structural integrity within the industry in Sweden and internationally.

Milan Růžička:
Employed: FME CTU in Prague (1983-...) - Head of Dept. of Mechanics, Biomechanics and Mechatronics (2015-...)
Academia: He finished his Ph.D. thesis in 1984 at the FME CTU in Prague, habilitation 1999 (Doc.), 2005 (Prof.).
Focus: Fatigue in notches, fatigue of welded structures, composite structures, fatigue in composites, use of optical fibres, structural health monitoring
Other: Secretary of the Czech Society for Mechanics, program director of WCFA&PUM meetings

Jan Papuga:
Employed: FME CTU in Prague (2007-...); Evektor, spol. s r.o. (2006-...); Fatigue Analysis RI s.r.o. (2016-...)
Academia: He finished his Ph.D. thesis in 2006 at the FME CTU in Prague.
Focus: Multiaxial fatigue, fatigue in notches, fatigue computation methods, verification of fatigue prediction methods, experimental fatigue data aggregation and manipulation
Other: Developer of PragTic fatigue freeware (www.pragtic.com), chairman of WCFA&PUM meetings, secretary of DTMA 2011 workshop, leader of the FADOFF project (Fatigue Analysis Documentation Office in 2011-2014, www.fadoff.cz).

Josef Jurenka:
Employed: FME CTU in Prague (2008-...), TechSim (2015-...)
Academia: He finished his Ph.D. thesis in 2012 at the FME CTU in Prague.
Focus: Low- and High-cycle fatigue, Fatigue of welded structures, Fatigue crack propagation, Fracture mechanics

Workshop Location

The meeting will be held at the building of the Czech Technical University in Prague on Karlovo náměstí. It can be conveniently accessed by a subway, and one of its exits on Karlovo náměstí station is directly on the edge of this building. The lecture room No. 215 will host the workshop.

Course Options

The course is built in such a way, that no prior knowledge on fatigue analysis is needed. The first day is devoted to the design of welded structures entirely. The basic principles of the common fatigue damage estimation are described in the next day, while the content related to the fatigue analysis of weldments is extensively discussed in next two days. In order to better suit the needs of participants and to fit the course better to the level of their knowledge, several variants of the course are provided as shown in the table below.

<table>
<tr><td>Monday
Nov 13, 2017</td><td>V1: Design Aspects (Z. Barsoum)</td><td rowspan="2">V4</td><td></td><td rowspan="4">V6</td><td>V7
P1</td></tr>
<tr><td>Tuesday
Nov 14, 2017</td><td>V2: Introduction to Fatigue (M. Růžička, J. Papuga, J. Jurenka)</td><td rowspan="3">V5</td><td></td></tr>
<tr><td>Wednesday
Nov 15, 2017</td><td rowspan="2">V3: Fatigue Analysis of Weldments
(Z. Barsoum)</td><td rowspan="2">V7
P2</td></tr>
<tr><td>Thursday
Nov 16, 2017</td><td></td></tr>
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More detailed information about the programme will be subsequently published during September 2017 on the workshop website.

Content of Lectures

The complete program of the workshop will be presented during September 2017 on the workshop website www.pragtic.com/DFW.php. Only an overview of discussed topics is provided hereafter for the invidual lecturing days.

Design Aspects: Welding Technology (Welding technology, Welding terminology, Welding symbols and design drawings, Overview of welding processes, Materials and weld metallurgy); Design of Welded Structures (Basic theory of structural systems, Loads on structures, Introduction to the design of structures, Design guidance documents, codes and standards); Design of Welded Joints (Categories of welded joints, Design of welded joints with predominantly static loading, Design of welded joints with predominantly dynamic loading, Design against brittle fracture); Design of Welded Plate Structures (Plates and shells, Beam and column structures, Design considerations for welding residual stresses and distortion, Design for Purpose of Welded Structures)

Introduction to Fatigue: History of Fatigue and Fatigue Methods; Materials Considerations; Loading Considerations; Stress-Life Based Fatigue; Strain-Life Based Fatigue; Factors Affecting Fatigue Life; Processing of Load Records; Fracture Mechanics and Crack Propagation; Multiaxial Fatigue; The Concept of FE Based Fatigue Analysis; Commercial Applications; Available Data Sources.

Fatigue Analysis of Weldments: Introduction, Fatigue design of welded structures, Notches, Stress concentration, Weld defects and residual stresses, Fatigue assessment methods (Nominal stress, Geometric hot-spot, Effective notch stress, Linear Elastic Fracture Mechanics), Improvement techniques, Spectrum loading, Residual stress relaxation, Weld quality systems, Finite element modelling, Fatigue design of welded structures – Case studies, Latest in development in fatigue design of welded structures – HFMI.

Attendance Fee

The conference fee includes access to the lectures, printouts of the presentations, attendance certificate, meals during lunches plus drinks and meals during coffee breaks. The price for the accommodation is not included.

After informing, a substitute can be sent for the registered participant, who cannot come, for no other additional cost. It is also possible to share some of the longer course variants among several employees.

Members of the Czech Society for Mechanics pay 10% less from any of the prices mentioned hereafter.

The fee is set in several versions, which can be paid either in EUR or in CZK.

The **Early Bird rate** is available to those who will pay before Sep 22, 2017, the **Regular rate** is to be paid afterwards.
The individual variants of the course composition are these:

Var.	Days	Date	Early Bird rate		Regular rate	
			EUR	CZK	EUR	CZK
V1	1	Nov 13	190	5000	210	5500
V2	1	Nov 14	90	2400	100	2600
V3	2	Nov 15-16	350	9200	400	10500
V4	2	Nov 13-14	250	6500	280	7300
V5	3	Nov 14-16	400	10500	450	11800
V6	4	Nov 13-16	550	14500	600	15500
V7	3	Nov 13, 15-16	510	13500	550	14500

More details about the payment conditions can be found on the workshop website.

Used Language

English language is the official language of the lectures.

Organizing Committee

Chairman: Jan Papuga, papuga@pragtic.com
Secretary: Ivona Vízková, ivona.vizkova@gmail.com
Finances: Jitka Havlínová, csm@it.cas.cz

Conference Contacts

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