

Program of

29th Colloquium on Fatigue Mechanisms

on the occasion of 80th birthday of Prof. Jaroslav Polák

21st – 22nd March 2019,

Brno, Czech Republic

organized by



Institute of Physics of Materials
Czech Academy of Sciences

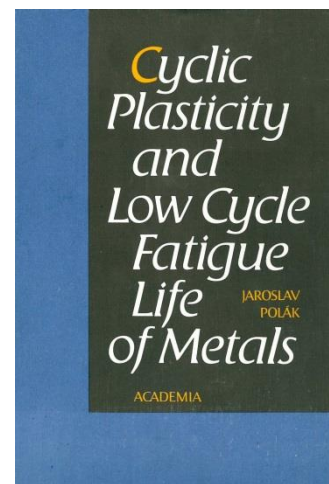
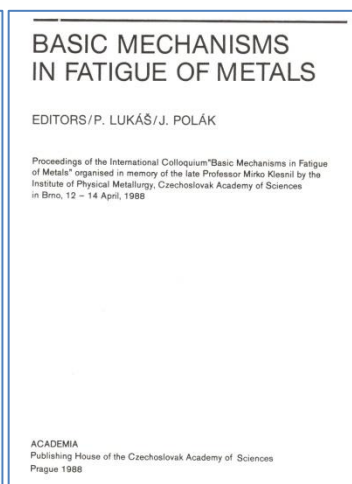
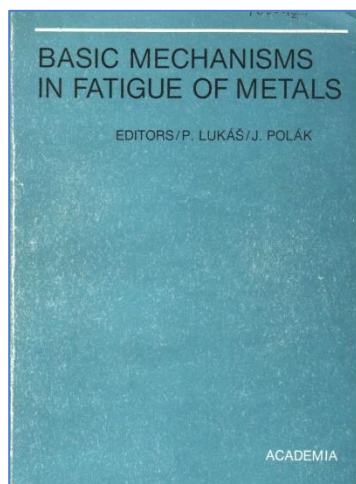


Address: Žižkova 513/22, 616 62 Brno, Czech Republic

Prof. Jaroslav Polák is ranked among key scientists of the Institute of Physics of Materials, Czech Academy of Sciences for many decades. He graduated from the Department of Physics at the Faculty of Science of the Masaryk University in Brno in 1961. The dissertation thesis focused to point defects he defended in 1965 at the Institute of Solid State Physics of the Czechoslovak Academy of Sciences in Prague. After post-doctoral stay at NRC in Ottawa he began to work in the research group of prof. M. Klesnil in the Institute of Physics of Materials, where he applied his knowledge on point defects in the study of the cyclic deformation of metals and alloys. Since that time, during his long research career, he contributed to numerous areas of material research studying fatigue behavior of simple f.c.c. and b.c.c. metals, stainless steels, duplex steels, TiAl alloys, ODS alloys and superalloys. Probably the most important contributions to the general field of materials science and damage mechanisms are his experimental and theoretical studies of statistical analysis of hysteresis loop shape and particularly his model of surface relief formation in bands of localized cyclic plastic deformation. This model contributes to description and elucidation of the basic damage mechanisms of fatigue crack initiation in metallic materials. It was repeatedly experimentally verified and up-graded using advanced experimental equipment and techniques. His model of fatigue damage is valuable both for expanding the basic knowledge and also for prediction of service life of cyclically loaded components in engineering practice. His broad contribution to the fatigue of materials is reflected in his monograph “Cyclic plasticity and low cycle fatigue life of metals”.

Prof. Polák stood at the birth of this Fatigue colloquium more than 30 years ago. In 1988 the first Fatigue colloquium “Basic Mechanisms in Fatigue of Metals” was arranged in Brno. Since that time the Colloquia have been organized in the Czech Republic, Germany, Austria and France and became an informal place to meet, discuss and exchange views on the latest findings in the field of fatigue damage mechanisms.

The organizing team of the 29th Colloquium thanks prof. Polák for his contribution to the success of this series and wishes him a lot of enthusiasm for the years to come.



Thursday 21st March 2019

8:00 - 9:00 Registration

9:00 - 9:15 Welcome speech
L. Kunz

Session 1.1 chairman: Heinz Werner Höppel

9:15 - 9:40 Surface or internal crack initiation during VHCF (FL)
loading of martensitic steel
U. Krupp, A. Giertler, K. Koschella

9:40 - 10:05 Impact of dislocation movement and voids on the (FL)
response of fatigue cracks on VHCF loading of copper
polycrystals
S. E. Stanzl-Tschegg

10:05 - 10:30 Evaluation of very high cycle fatigue zones in (FL)
42CrMo4 steel with plate-like alumina inclusions
M. Seleznev, A. Weidner, H. Biermann

10:30 - 10:45 Influence of loading frequency on fatigue damage in (SC)
pure copper
S. Fintová, A. Chlupová, I. Kuběna, M. Jambor, L. Kunz

10:45 - 11:15 Coffee break

Session 1.2 chairman: Michael Zehetbauer

11:15 - 11:40 The fatigue life of AISI 4140 in the VHCF regime at (FL)
high temperatures
A. Schmiedel, A. Weidner, H. Biermann

11:40 - 12:05 Temperature effect on fatigue behaviour of nickel- (FL)
based superalloy MAR-M247
I. Šulák, K. Obrtlík

12:05 - 12:20	In-situ characterization of fatigue crack growth in 316L steel <u>A. Vinogradov</u> , A. Sendrowicz, S.W. Wierdak, A. O. Myhre	(SC)
12:20 - 12:35	A personal tribute to Jaroslav Polák <u>H. Mughrabi</u>	(SC)
12:35 - 13:00	Point defects and their role in cyclic plastic straining <u>J. Polák</u>	(FL)
13:00 - 14:30	Lunch	
Session 1.3 chairman: Christine Sarrazin-Baudoux		
14:30 - 14:55	Crack growth and fatigue life of ultrafine-grained laminated metal composites produced by accumulative roll bonding <u>F. Kümmel</u> , H.W. Höppel	(FL)
14:55 - 15:10	Fatigue properties and in situ monitoring of fatigue crack propagation in UFG Al/steel laminates using a large chamber SEM <u>P. Pohl</u> , H.W. Höppel	(SC)
15:10 - 15:25	Mechanical properties of CuSn intermetallics under static and cyclic loading <u>A. Betzwar Kotas</u> , G. Khatibi	(SC)
15:25 - 15:40	On the specific nature of structure destabilization of grain-refined 301LN austenitic stainless steel <u>J. Man</u> , A. Järvenpää, I. Kuběna, S. Fintová, A. Chlupová, T. Kruml, L.P. Karjalainen, J. Polák	(SC)
15:40 - 15:55	Damage mechanisms in TMF of superaustenitic steel Sanicro 25: in-phase vs. out-of-phase regime <u>R. Petráš</u> , V. Škorík, J. Polák	(SC)
15:55 - 16:15	Coffee break	
16:15	Bus departure from IPM to social event	

17:00 - 18:30 Guided tour of Villa Stiassni

18:30 Walk to restaurant from Villa Stiassni (1.2 km)

19:30 - 23:00 Colloquium dinner

23:00 Bus departure back to hotels Continental and SONO

Social event: Visit of villa Stiassni (Thursday 21st March)



The Villa Stiassni was built in 1927-1929 for the Jewish textile manufacturer Alfred Stiassni, according to designs by the famous Brno architect Ernst Wiesner. Alfred Stiassni lived in the villa alongside his wife Hermine and daughter Susanne for just nine years; in 1938 the entire family fled to London before the imminent Nazi occupation, and subsequently moved to Brazil before settling California, where their descendants still live today.

In the minds of most Czechs the villa is strongly associated with the idea of government. It was first seen in this light shortly after World War II, when it was visited by Edvard Beneš. Later it was used to accommodate famous and important visitors whenever they stayed in Brno. President of Cuba, Fidel Castro, stayed here, as did the majority of Czechoslovak presidents in the post-war regime. The list of illustrious visits is considerable, and indeed continues to grow.

After the Velvet Revolution the villa was hired out to celebrate birthdays and weddings. The latest chapter in the building's history began in 2009, when the villa was brought under the administration of the National Heritage Institute, which set about its restoration. The building was officially opened to visitors 13 December 2014.

Friday 22nd March 2019

Session 2.1 chairman: Jaroslav Polák

9:00 - 9:25 A comparison among different fitting models for definition of crack growth rate curves. (FL)
A. Fernández-Canteli, S. Blasón, M. Madia, C. Rodríguez

9:25 - 9:50 Crack tip fields in an aluminum alloy in the near threshold regime (FL)
M. Wicke, A. Brueckner-Foit

9:50 - 10:15 Determination of a non-propagation criterion for short and long fatigue cracks in a Ti-6Al-4V alloy (FL)
C. Sarrazin-Baudoux, C. Gaëlle

10:15 - 10:30 Influence of the prestrain effect on the fatigue crack growth rate in P355NL1 steel (SC)
M. Duda, S. Blasón, M. Smolnicki, G. Lesiuk, R. Dantas, J.A.F.O. Correia, D. Rozumek, A. Fernández-Canteli, A.M.P. De Jesus

10:30 - 10:55 Coffee break

Session 2.2 chairman: Anja Weidner

10:55 - 11:20 Strategy of plasticity induced crack closure modelling (FL)
T. Oplt, M. Šebík, F. Berto, L. Nahlík, P. Pokorný, P. Hutař

11:20 - 11:35 Cyclic delamination behaviour of thin film multilayers (SC)
T. Walter, G. Khatibi

11:35 - 11:50 Fatigue behavior of Ag-sintered joints (SC)
Z. Gökdeniz, G. Khatibi, J. Nicolics

11:50 - 12:15 Fatigue crack growth in Armco Iron under high pressure gaseous hydrogen: plastic strain analysis in the vicinity of crack tip (FL)
M. Arzaghi, G. Bilotta, T. Shinko, G. Benoit, G. Hénaff, D. Halm

12:15 - 12:30 Fatigue behavior of double shear connections with preloaded injection bolts in a bridge strengthening scenario (SC)
B. Pedrosa, J. Correia, G. Lesiuk, C. Rebelo, M. Veljkovic, P. Montenegro, A. Jesus, R. Calçada

12:30 - 12:40 Closing remarks

12:40 Lunch

13:45 Optional visit of IPM laboratories

Colloquium contributions:

Full length (FL): 20 min presentation + 5 min discussion

Short contribution (SC): 10 min presentation + 5 min discussion

Colloquium venue:

Institute of Physics of Materials (IPM) Academy of Sciences of the Czech Republic, Žitkova 22, 616 62 Brno, Czech Republic

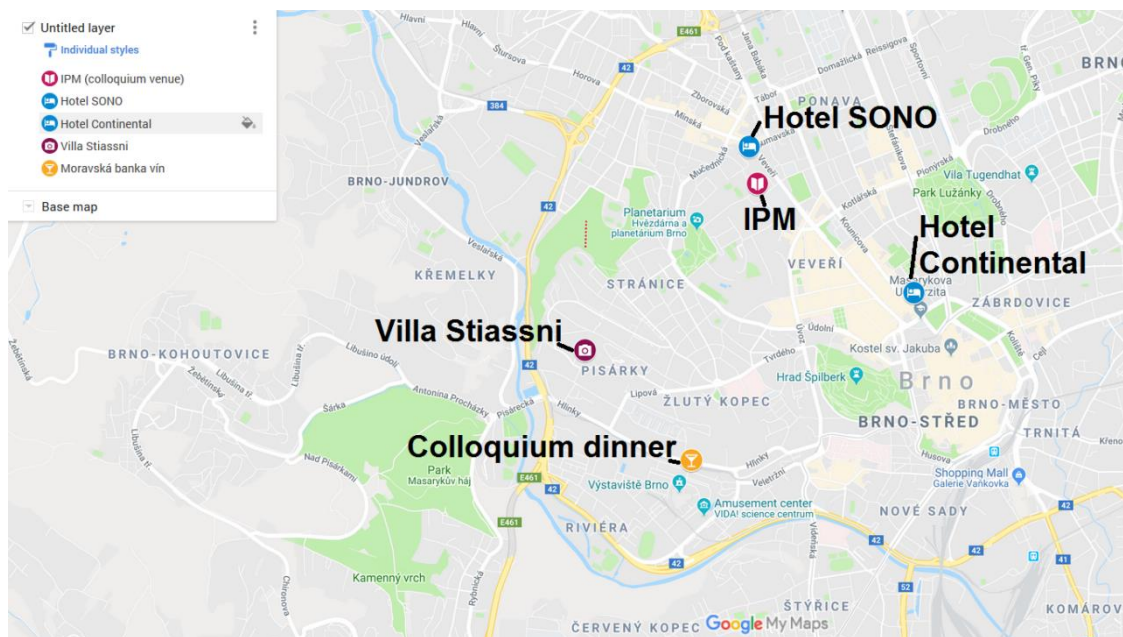
Lecture hall (4th floor)

Colloquium secretary: Dr. Pavel Pokorný, pokorny@ipm.cz

Parking of cars is possible inside of IPM (please ask for that at the reception).



Other important addresses:



Social event (Thursday 21st March):

Villa Stiassni, Hroznová 14, 603 00 Brno

Colloquium dinner (Thursday 21st March):

Moravská banka vín, Hlinky 156/88, 603 00 Brno

Hotel Continental:

Kounicova 680/6, 602 00 Brno

Hotel SONO:

Veverí 113, 616 00 Brno

Registered participants at Fatigue colloquium 2019:

University Erlangen-Nürnberg, Germany

Prof. Haël Mughrabi
Dr. Heinz Werner Höppel
Mr. Philip Pohl
Mr. Frank Kümmel

RWTH Aachen University, Germany

Prof. Ulrich Krupp

University of Oviedo, Spain

Prof. Alfonso Fernández Canteli

Brno University of Technology, Czech Republic

Prof. Libor Pantělejev
Prof. Jaroslav Pokluda

University of Natural Resources and Life Sciences, Austria

Prof. Stefanie E. Stanzl-Tschegg

Technische Universität Bergakademie Freiberg, Germany

Dr. Mikhail Seleznev
Dr. Anja Weidner
Mr. Alexander Schmiedel

University of Vienna, Austria

Prof. Michael Zehetbauer
Mr. Moritz Hartleb

Norwegian University of Science and Technology, Norway

Prof. Alexei Vinogradov

Wroclaw University of Science and Technology, Poland

Dr. Grzegorz Lesiuk
Mrs. Monika Duda
Mr. Michal Smolnicki

TU Wien, Austria

Dr. Golta Khatibi
Dr. Agnieszka Betzwar Kotas
Mrs. Zeynep Gökdeniz
Mr. Thomas Walter

Universität Kassel, Germany

Prof. Angelika Brückner-Foit

ISAE-ENSMA, France

Prof. Christine Sarrazin-Baudoux

Dr. Mandana Arzaghi

University of Coimbra, Portugal

Mr. Bruno Pedrosa

University of Porto, Portugal

Mrs. Rita Dantas

Montanuniversität Leoben, Austria

Dr. Florian Arbeiter

IPM - Czech Academy of Sciences, Czech Republic

Prof. Jan Klusák

Prof. Jaroslav Polák

Prof. Karel Obrtlík

Prof. Luboš Náhlík

Prof. Ludvík Kunz

Prof. Stanislav Seidl

Prof. Tomáš Kruml

Dr. Alice Chlupová

Dr. Ivo Kuběna

Dr. Milan Heczko

Dr. Miroslav Šmíd

Dr. Pavel Pokorný

Dr. Stanislava Fintová

Dr. Tomáš Vojtek

Mrs. Veronika Mazanová

Mr. Hector Navarro

Mr. Ivo Šulák

Mr. Jan Poduška

Mr. Ladislav Poczklán

Mr. Lukáš Trávníček

Mr. Ondrej Slávik

Mr. Pavol Dlhý

Mr. Roman Petráš

Mr. Tomáš Babinský

Mr. Tomáš Oplt

Mr. Vít Horník