



Société Française de Métallurgie et de Matériaux

***Commission Fatigue des Matériaux
14th International Spring Meeting***

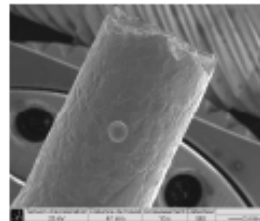
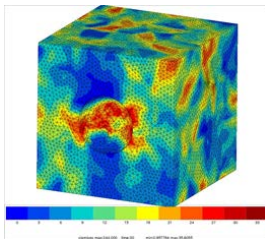
**FATIGUE DESIGN & MATERIAL DEFECTS
FDMD II – JIP 2014 –**

PROGRAM

Paris, FRANCE – June 11-13, 2014



DVM



<http://sf2m.asso.fr/FDMD2/FDMD2.htm>

TARGET

This International Symposium FDMD, joining the fourteenth International SF2M Spring Meeting, is the second in a series initiated in Trondheim, Norway may 2011.

Like in the first edition, it is focused on the influence of defects on the fatigue and durability of structural materials. This is an important scientific issue with significant human and financial implications.

All materials are concerned. The main objective is to understand the impact of a given defect population on the fatigue behaviour from a material optimization point of view (i.e. the link with the material elaboration and manufacturing process) and also from a design optimization perspective (i.e. definition of an allowable defect size).

POSTERS

Participants have the opportunity to present posters discussing fatigue studies in progress. Students have been encouraged to present their initial results or their scope of work in order to have the opportunity to interact with the fatigue community.

SPONSORS



Chimie ParisTech,
ENS de Chimie de Paris



NTNU

Norwegian University of
Science and Technology



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M. BRUNE - BMW, Germany

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GENERAL ORGANIZATION

SYMPOSIUM LOCATION

Chimie ParisTech

11 rue Pierre et Marie Curie
75005 PARIS, France

SECRETARIAT

SF2M - Société Française de Métallurgie et de Matériaux
28, rue Saint-Dominique
75 007 PARIS

Tél. : 01.46 33 08 00 - Fax : 01.46 33 08 80

Courriel : sfmm@wanadoo.fr

Site : <http://sf2m.asso.fr/FDMD2/FDMD2.htm>

LANGUAGE

The language of the conference is English.

GENERAL INFORMATION

The symposium will take place at **Chimie ParisTech**

11 rue Pierre et Marie Curie

75005 Paris, France

It is close to "Jardin du Luxembourg" and Pantheon, the very heart of Academic Paris in Quartier Latin.

PUBLIC TRANSPORTATION

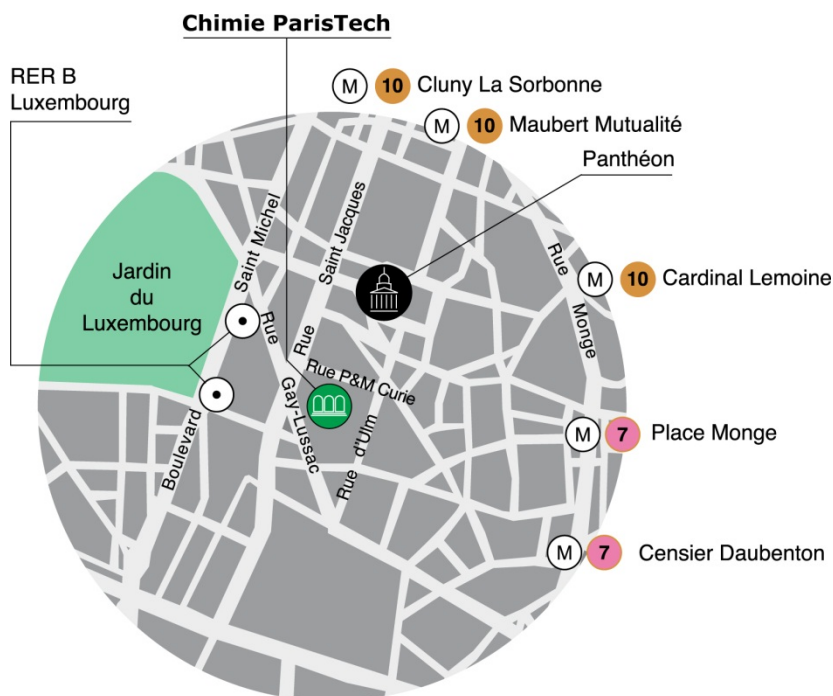
RER B, "Luxembourg" station.

Metro:

- Line 7: "Place Monge" or "Censier Daubenton" stations
- Line 10: "Cluny La Sorbonne" or "Maubert Mutualité" or "Cardinal Lemoine" stations.

Bus:

- Bus n° 21 and n° 27 : "Saint-Jacques-Gay Lussac" stop
- Bus n° 47 : "Monge" stop
- Bus n° 84 and n° 89 : "Panthéon" stop.



HOTELS

Participants at the conference are invited to book themselves their hotel.

RECEPTION

The reception desk will be open:

June 10th: from 17:00 to 19:00

June 11th: from 7:30 to 10:45

REGISTRATION

Registration will be made on line exclusively. Please connect to the web site of the conference to register:

<http://sf2m.asso.fr/FDMD2/FDMD2.htm>

Registration fees are:

- 340€ for students,
- 520€ for SF2M members and authors,
- 640€ for other participants, including a one year SF2M membership,
- Registration after April 30th: 80€ penalty.

The fees include:

- Welcome reception,
- Access to all scientific and poster sessions,
- Access to the exhibition area,
- Conference bag and badge,
- Program and Proceedings,
- Social events (Paris visit and Conference Dinner),
- Lunches and drinks,
- Coffee breaks.

CANCELLATION

Cancellation before March 11th 2014: full refund,

Cancellation between March 12th and April 11th: 75 % refund,

Cancellation between April 12th and May 11th: 50% refund,

Cancellation after May 11th: no refund at all.

FATIGUE DESIGN & MATERIAL DEFECTS

FDMD II

JIP 2014
14th International Spring Meeting
Paris, FRANCE – June 11-13, 2014

PROGRAM

Wednesday June 11th

7:30 **Registration**
Reception desk

8:15 *Amphi Friedel*
Opening of the Symposium. Welcome Address.

8:30 **Keynote:**
Probabilistic integrity assessment of turbine disks in presence of potential defects
S. BERETTA¹, S. Foletti¹, M. Madia², E. Cavalleri³
¹Politecnico di Milano, Italy, ²BAM division 9.1, Germany, ³Ansaldo, Italy

Session 1: Introduction (Fracture Mechanics, Castings, VHCF)
Y. MURAKAMI (University of Kyushu, Japan)

9:00 – 10:15 **Amphi Friedel**

9:00 *Analysis of the influence of defects on fatigue resistance of metallic components.*
M. CHAPETTI (University of Mar del Plata)

9:25 *Effects of casting defects, matrix structures and loading conditions on the fatigue strength of ductile irons.*
M. ENDO*, K. YANASE (Fukuoka University, Japan)

9:50 *Fatigue strength of VDSiCr spring steel under cyclic torsion and cyclic axial loading at different load ratios in the VHCF regime.*
R. SCHULLER*¹, H. MAYER¹, D. IRRASCH¹, M. HAHN², M. BACHER HÖCHST²
(¹Institute of Physics and Materials Science, BOKU, Austria, ²Robert Bosch GmbH, Corporate Sector Research and Advance Engineering, Germany)

10:15 **Coffee Break**
Poster Session

Wednesday June 11th

Session 2: Probabilistic model

G. HARKEGARD (NTNU, Norway)

10:45 – 12:25 Amphi Friedel

10:45 ***Towards proper sampling and statistical analysis of defects.***

A. CETIN^{*1}, A. ROIKO², M. LIND² (¹Subsea, Norway, ²VTT, Finland)

11:10 ***A flexible modeling framework leading to a probabilistic multiaxial Kitagawa-Takahashi diagram: applied to cast Al-Si alloys.***

V.D. LE^{1,3}, D. BELLETT¹, F. MOREL¹, N. SAINTIER², E. PESSARD¹, P. OSMOND³
(¹Arts et Métiers ParisTech, LAMPA, France, ²Arts et Métiers ParisTech, I2M UMR CNRS 5295, France, ³PSA Peugeot Citroën, France)

11:35 ***Probabilistic Fatigue Stress-based Curve definition: a New Formulation and Comparative Study on Heavy-walled Ductile Cast Iron GJS400.***

M. COVA^{1,2}, M. NANNI¹, R. TOVO²,
(¹SACMI Imola S.C., Italy, ²Universita' di Ferrara, Dipartimento di Ingegneria, Italy)

12:00 ***Influence of measurement and material uncertainties on the prediction of residual life of cracked structures.***

P. BOUTET^{*1,2}, F. HILD², F. LEFEBVRE¹
(¹CETIM, France, ²LMT-Cachan, France)

12:25 Lunch (Buffet)

Session 3: Fatigue and Defects in Castings

M. ENDO (Fukuoka University, Japan)

13:45 – 16:30 Amphi Friedel

13:45 ***Fatigue Characterization of Flowformed A356-T6.***

M. J. ROY, J. ZHAO, D. M. MAIJER
(The University of British Columbia, Vancouver, Canada)

14:10 ***Improvement of the mechanical behaviour of cylinder head alloys.***

C. KLIEMT¹, F. WILHELM², J. HAMMER²
(¹IABG, Germany, ²LWM, University of Applied Sciences, Germany)

14:35 ***Mechanisms of fatigue-crack initiation and their impact on fatigue life of AlSi7MgCu0.5.***

S. REDIK, M. TAUSCHER, F. GRÜN, (Montanuniversität, Leoben, Austria)

15:00 ***Mean Stress Sensitivity of Ductile Iron with respect to Technological and Statistical Size Effect Considering Defects.***

P. KAINZINGER^{*}, F. GRÜN
(Chair of Mechanical Engineering, Montanuniversitaet Leoben, Austria)

Wednesday June 11th

15:25 *Role of defects in fatigue damage mechanisms of cast polycrystalline superalloy MAR-M 247.*

M. SMID*, S. FINTOVA, L. KUNZ, P. HUTAR (Institute of Physics of Materials, Academy of Sciences of the Czech Republic, Czech Republic)

15:50 *Short crack effects at stress concentrations in cast single crystal superalloy under high temperature low cycle fatigue.*

F. BOURBITA¹, L. REMY*¹, M. GEUFFRARD^{1,2}, A. KOSTER¹ (¹Mines ParisTech, Centre des Matériaux, CNRS UMR 7633, France, ²ESI Group, France)

16:15

Refreshments

Main Hall

16:45

Poster presentation

Amphi Friedel

17:00

Poster session 4A Fatigue and Defects.

Poster session 4B Defect Distribution and Characterisation

Poster session 4C Fatigue Crack Initiation and Growth

Poster session 4D Fatigue Design against Defects

Main Hall

18:45

Guided Tour in Paris “Passages”

Departure from the Conference welcome desk

Thursday June 12th

Session 5: DVM/SF2M Evaluation of constructional Manufacturing Defects with regard to structural Fatigue

M. BRUNE (BMW, Germany)

8:30 – 11:00 **Amphi Friedel**

8:30 *An Approach for the Fatigue Estimation of Porous Cast Iron Components based on Non-Destructive Testing Results.*

A. HEINRIETZ*, J. HESSELER, C. BLEICHER,
(Fraunhofer Institute of Structural Durability and System Reliability LBF, Germany)

8:55 *Surface defects created by the forging process and their effects on the fatigue performance of Al-alloys.*

P. BLACKMORE, Z. LU*, K. RAWLINGS (Jaguar Land Rover Ltd, UK)

9:20 *Concepts for estimating the fatigue strength of sintered steel components.*

S. GÖTZ*, K.-G. EULITZ (TU Dresden, Germany)

9:45 *Model for fracture mechanics based prediction of the fatigue strength of engineering alloys containing microscopical initial defects.*

U. ZERBST*¹, M. MADIA¹, T. BEIER² (¹BAM Federal Institute for Materials Research and Testing, Germany, ²Technische Universität, Germany)

Thursday June 12th

- 10:10** ***Probabilistic Thermal-mechanical Fatigue Criteria for Lost Foam Casting Aluminium Alloys based on 2D/3D porosities distribution.***
F. SZMYTKA^{*1}, N. LIMODIN², L. WANG², P. OSMOND³, J. ADRIEN⁴,
E. CHARKALUK², J.-Y. BUFFIERE⁴ (¹PSA Peugeot Citroën, France, ²LML,
Ecole Centrale de Lille, France, ³PSA Peugeot Citroën, France, ⁴MATEIS, INSA Lyon,
France)
- 10:35** ***Transferability of Fatigue Resistance Data for Welded Joints.***
M. KAFFENBERGER^{*2}, E. SHAMS¹, I. PLATTE¹, M. VORMWALD¹
(¹Institute for Material Mechanics, Germany, ²Chair and Institute for Materials and
Technology, Germany)

11:00

Coffee Break
Poster Session

Session 6.1: Non-Destructive Examination

V. DOQUET (CNRS, Laboratoire de Mécanique des Solides, École Polytechnique)

11:25 – 13:05 Amphi Friedel

- 11:25** ***3D characterisation of RCF crack networks.***
J. AHLSTROM^{*}, C. JESSOP, (Chalmers Univ Tech, Sweden)
- 11:45** ***Shrinkages in heavy-sized cast components of nodular cast iron - NDT and fatigue.***
C. BLEICHER^{*}, H. KAUFMANN, R. WAGENER,
(Fraunhofer Institute for Structural Durability and System Reliability LBF, Germany)
- 12:05** ***Integrity and quality assessment applied on laser welded titanium components.***
H. WIRDELIUS^{*}, E. LINDGREN, K. HAMBERG,
(Chalmers Univ. of Technology, Sweden)
- 12:25** ***Fatigue Damage monitoring in 304L steel Specimens by an acoustic emission method.***
A. OULD AMER^{*1}, A.-L. GLOANEC¹, S. COURTIN², C. TOUZE¹,
(¹ENSTA ParisTech - UME, France, ²AREVA NP, France)

Session 6.2: Surface Defects

E. PESSARD (Arts et Métiers Paris Tech)

11:25 – 13:05 Amphi Chaudron

- 11:25** ***Fatigue crack propagation from in-service and handling surface anomalies in a Nickel based superalloy at high temperature.***
L. DOREMUS^{1,2}, S. GOURDIN^{*1,2}, Y. NADOT¹, G. HENAFF¹, S. PIERRET²
(¹Institut Pprime, UPR CNRS 3346, Département Physique et Mécanique des Matériaux,
ISAE-ENSMA, ²Snecma, Etablissement de Villaroche, France)
- 11 :45** ***Influence of the surface roughness on the fatigue properties in ausferritic ductile irons (ADI).***
R. SVENNINGSSON, H. SVENSSON, H. BORGSTRÖM, A. GOTTE (Swerea
SWECAST AB, Sweden)

Thursday June 12th

- 12:05** *In-service life estimation of damaged gas pipelines.*
G. BURGAUD^{*1}, R. BATISSE², S. HERTZ-CLEMENS², Y. MADI¹, G. ROUSSELIER GILLES¹, G. CAILLETAUD
(¹MINES Paristech, France, ²GDF SUEZ, France)
- 12:25** *Influence of surface defects on the fatigue crack initiation in pearlitic steel.*
J. TORIBIO^{*}, J.-C. MATOS, B. GONZÁLEZ (University of Salamanca, Spain)
- 12:45** *Effects of surface roughness on plastic strain localization in polycrystalline aggregates.*
Y. GUILHEM^{*1,3}, S. BASSEVILLE², H. PROUDHON³, G. CAILLETAUD³
(¹ENS Cachan, France, ²LISV, Université de Versailles, France, ³MINES ParisTech, Centre des Matériaux, France)

13:05

Lunch (Buffet)

Session 7: Fatigue Crack Growth and Thresholds at Defects
C. VALLELANO (Univ of Sevilla)

14:25 – 16:05 **Amphi Friedel**

- 14:25** *Effect of orientation of small defects on fatigue limit of steels.*
P. LORENZINO^{*1}, S. OKAZAKI², H. MATSUNAGA^{2,3}, Y. MURAKAMI⁴
(¹Department of Mechanical Engineering and Materials, Spain, ²Department of Mechanical Engineering, Kyushu University, Japan, ³International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Japan, ⁴Professor Emeritus, Kyushu University, Japan)
- 14:50** *Une approche de type mécanique de la rupture pour le "Fretting-Fatigue", à l'épreuve des résultats d'essais sur 3 matériaux.*
C. MONTEBELLO^{*1}, SYLVIE POMMIER²
(¹LMT, ENS CACHAN, SAFRAN, ²LMT, ENS CACHAN)
- 15:15** *Inclined defects and their effect on the fatigue limit and small crack growth.*
A. ROIKO^{*1}, J. SOLIN¹, Y. MURAKAMI²
(¹VTT Technical Research Centre of Finland, Finland, ²Kyushu University, Japan)
- 15:40** *Influence of particles and microstructure on short fatigue crack initiation and propagation in AA2050-T8 and AA7050-T7451.*
E. NIZERY^{*1,2}, J.-Y. BUFFIERE¹, H. PROUDHON², A. DANIELOU³, S. FOREST²
(¹INSA Lyon/MATEIS, France, ²Mines ParisTech/Centre des Matériaux, France, ³Constellium CRV, France)

16:05

Refreshments
Main Hall

Thursday June 12th

Session 8.1: Microstructural effect

N. Limodin (*Ecole Centrale Lille*)

16:35 – 18:15 Amphi Friedel

16:35 *Effect of grain boundary on single crystal turbine blade lifetime under cyclic loading at high temperature.*

A. KOSTER^{*}, M. LEROY, D. RYCKELYNCK, L. REMY (Mines ParisTech, France)

16:55 *Characterising the impact of surface integrity on the fatigue behaviour of forged components*

B. GERIN¹, E. PESSARD, F. MOREL, C. VERDU (¹ LAMPA, Arts et Métiers ParisTech Angers ; ² MATEIS, INSA Lyon)

17:15 *A study of Fatigue Crack Tip Characteristics using 3D Dislocation Dynamics.*

L. KORZECZEK^{*1}, R. GATTI¹, A. ROOS², B. DEVINCRE¹
(¹LEM, CNRS-Onera, France, ²DMSM, France)

17:35 *The fatigue limit of steel: A numerical solution to the short cracks problem.*

M. SHARAF^{*1,2}, S. MÜNSTERMANN¹, P. KUCHARCZYK¹, A. HARTMAIER², W. BLECK^{1,2} (¹Steel Institute, RWTH Aachen University, Germany, ²Interdisciplinary Centre for Advanced Materials Simulation (ICAMS), Ruhr University Bochum, Germany)

17:55 *A surface defect versus microstructure under fatigue loading: experimental and numerical approach.*

M. VINCENT^{*}, Y. NADOT, C. NADOT-MARTIN, A. DRAGON
(Pprime Institute, France)

Session 8.2: Multiaxial stress effect

A. RAUJO (*UnB, Brasillia*)

16:35 – 18:15 Amphi Chaudron

16:35 *Influence of the microstructure and defects on the high cycle fatigue strength of 316L stainless steel under multiaxial loading.*

R. GUERCHAIS^{*1,2}, F. MOREL¹, N. SAINTIER², C. ROBERT¹
(¹Art et Métiers ParisTech, France, ²Art et Métiers ParisTech, France)

16:55 *Prediction for multiaxial fatigue strength with small defects.*

K. YANASE^{*}, M. ENDO (Fukuoka University, Japan)

17:15 *Thermo-mechanical behavior and fatigue strength of a grey cast iron for automotive brake discs considering graphite flakes debonding.*

L. AUGUSTINS^{*1,2}, F. HILD², R. BILLARDON²
(¹PSA Peugeot Citroën, France, ²Laboratoire de Mécanique et Technologie, France)

17:35 *Influence of loading pattern in fatigue life for notched round bars subjected to bending-torsion loading.*

R. BRANCO^{*1}, J. DOMINGOS COSTA², F. ANTUNES²

(¹Polytechnic Institute of Coimbra, Portugal, ²University of Coimbra, Portugal)

Thursday June 12th

17:55 *Effects of multiaxial cyclic loading conditions on the evolution of porous defects.*

A. BRICE MBIAKOP NGASSA^{*}, A. CONSTANTINESCU, K. DANAS

(Ecole Polytechnique, France)

19:30

Symposium dinner on the Seine river *Poster Award during the dinner*

Departure Quai Branly Paris (in front of the Musée du Quai Branly)

Passerelle DEBILLY RIVE GAUCHE

Friday June 13th

Session 9: Fatigue Crack Growth and Thresholds at Defects

Y. NADOT (ENSMA Poitiers)

8:30 – 11:00 Amphi Friedel

8:30 *A unifying approach to fatigue design in presence of defects and notches subject to uniaxial loading.*

ATZORI^{*1}, LAZZARIN¹, MENEGHETTI¹ (¹Department of Industrial Engineering,

University of Padova, Italy, ²Department of Management and Engineering, University of Padova, Italy)

8:55 *A new proposal of effective stress and critical distance for fatigue at notches.*

C. VALLELLANO^{*}, A. NAVARRO, V. CHAVES (University of Sevilla, Spain)

9:20 *A crack arrest methodology based on Bazant's parameter to estimate threshold fretting conditions.*

R. ARAUJO, E. R. FERREIRA DE SOUZA CAMPOS, J. L. DE ALMEIDA

FERREIRA, F. COMES DE CASTRO, J. A. ARAUJO^{*}

(Universidade de Brasília, Brazil)

9:45

POMEY Award Ceremony / Cristina Revilla-Gomez

10:15

Coffee Break

Poster Session

Session 10.1: Very High Cycle Fatigue

T. PALIN-LUC (Arts et Métiers ParisTech)

10:40 – 12:20 Amphi Friedel

10:40 *Development of a probabilistic model for the prediction of fatigue life in the very high cycle fatigue (VHCF) range based on inclusion population.*

A. KOLYSHKIN^{*1}, A. GRIGORESCU¹, E. KAUFMANN², M. ZIMMERMANN^{3,4}, H.-

J. CHRIST¹ (¹Institut für Werkstofftechnik, Universität Siegen, Germany, ²Department Mathematik, Universität Siegen, Germany, ³Institut für Werkstoffwissenschaft, TU

Dresden, Germany, ⁴Fraunhofer Institut für Werkstoff- und Strahltechnik, Germany)

Friday June 13th

- 11:00** ***VHCF of spray formed hypereutectic aluminium silicon alloy.***
M. FITZKA^{*1}, H. MAYER¹, R. SCHULLER¹, S. STANZL-TSCHEGG¹,
T. PRZEORSKI², P. KRUG³ (¹Institute of Physics and Materials Science, BOKU,
Austria, ²PEAK Werkstoff GmbH, Germany, ³Institute of Automotive Engineering,
Cologne University of Applied Sciences, Germany)
- 11:20** ***Gigacycle initiation from metallurgical defects***
C. BATHIAS^{*}, Q. WANG, C. WANG, I. MARINES, A. NIKITIN
(UPO, LEME, France)
- 11:40** ***Influence of defects on the very high cycle fatigue behaviour of forged aeronautical titanium alloy.***
A. NIKITIN^{*1}, A. SHANYAVSKIY², T. PALIN-LUC³, C. BATHIAS¹
(¹LEME, U. Paris Ouest Nanterre La Defense, France, ²SCCAFS, Air.Sheremetevo-1,
Russia, ³Arts et Metiers ParisTech, I2M, CNRS, Universite Bordeaux 1, France)
- 12:00** ***Very high-cycle fatigue behaviour of cast 42CrMo4 steels with different populations of non-metallic inclusions.***
D. KREWERTH^{*}, A. WEIDNER, H. BIERMANN
(TU Bergakademie Freiberg, Institute of Materials Engineering, Germany)

Session 10.2: Corrosion and welding defects
S. BERETTA (Politecnico di Milano, Italy)

10:40 – 12:20 Amphi Chaudron

- 10:40** ***Short-crack modelling of the effect of corrosion pits on the fatigue limit of steam turbine blade steel.***
G. HÄRKEGÅRD (NTNU, Norway)
- 11:00** ***Influence of DEFect on the FATigue behaviour of As7g06T6 aeRonautical alloy (IDEFFAAR).***
Y. NADOT^{*1}, A. CHABAUD², I. SERRANO MURA³, P. MU¹, C. VERDU³, J. Y.
BUFFIERE³, P. EMILE⁴, C. RICHARD⁵, L. ANSSEMS⁶
(¹ENSMA, France, ²CTIF, France, ³INSA, France, ⁴AIRBUS, France, ⁵Fonderie
Messier, France, ⁶Hispano Suiza, France)
- 11:20** ***Non-local high cycle fatigue criterion for materials with corrosion defects.***
M. EL MAY^{*1}, N. SAINTIER¹, T. PALIN-LUC¹, O. DEVOS²
(¹Arts et Métiers ParisTech, I2M, CNRS, France, ²Université de Bordeaux 1, I2M,
CNRS, France)
- 11:40** ***Fatigue assessment of corroded turbine blade steels.***
B. SCHÖNBAUER^{*}, S. STANZL-TSCHEGG, A. PERLEGA, U. KARR
(Institute of Physics and Materials Science, BOKU, Austria)
- 12:00** ***Defects and stresses across the interface in bimetallic composite manufactured by explosive welding technology.***
A. KAROLCZUK (Opole University of Technology, Poland)

12:20

Close for Symposium

POSTERS

Wednesday June 11th

Main Hall

Session 4A: Fatigue and Defects

17:00 – 18:15

Laser Peening Technology.

J-Y THIEULEUX*¹, L. HACKEL²

(¹Curtiss Wright Surface Technologies, France, ²Curtiss Wright Surface Technologies, USA)

Fatigue life prediction of welded joints as function of their singularity degree using energy release rate.

N. RECHO^{1,5}, L. CHIN FOO*^{1,2}, M. FARALDI⁴

(¹ERMES, EPF-Ecole d'ingénieurs, ²Haute Etude D'ingénieurs de Lille, France, ³Institut Charles Delaunay, Université Technologique de Troyes, France, ⁴Dipartimento di Ingegneria Meccanica e Aerospaziale, Politecnico di Torino, Italy, ⁵Institut Pascal, Université Blaise Pascal, France)

Effect of graphite degradation on the LCF properties of nodular cast iron.

J. DENK

(ABB Turbo Systems, Switzerland)

VHCF of nitrided maraging steel sheets.

H. MAYER*¹, R. SCHULLER¹, D. TAN², B. PENNINGSS²

(¹Institute of Physics and Materials Science, BOKU, Austria, ²Bosch Transmission Technology, Advanced Engineering, The Netherlands)

Inverse determination of the HAH model's flow potential shape evolution for LCF and ULCF conditions.

Y. DI*, D. NOVOKSHANOV, K. GILLNER, S. MUNSTERMANN

(Department of Ferrous Metallurgy, RWTH Aachen University, Germany)

VHCF Failure of a Quenched and Tempered Steel.

M. KORN, T. ROHM, K.-H. LANG*

(Karlsruhe Institute of Technology (KIT), Germany)

Fatigue characterization of honeycomb sandwichpanels: Influence of small defects.

A. AHMED*¹, C. TIXIER², G. JOSEPH², A. ZITOUNI^{2,1}

(¹ENSA, Morocco, ²ENIM, France)

Analytical Modeling of Mechanical Behavior of Microstructures : Comparative Analysis, Experimental Validation and Numerical Correction with FEM of Materials Defects Generated by Anisotropic Etching.

H. BOUROUINA*¹, R. YAHIAOUI², N. BELGROUNE¹, A. HASSEIN-BEY^{1,3},
A. SAHAR¹

(¹University of Blida, Algeria, ²Institut Femto-St UFC, France, ³MEMS & SENSORS DMN CDTA, Algeria)

Wednesday June 11th

Main Hall

Effect of axial and shear prehardening on fatigue behavior of the 304L SS.

A. BELATTAR*, L. TALEB, C. KELLER
(INSA de Rouen, France)

Influence of casting defects on fatigue strength of an investment cast Ti-6Al-4V alloy.

G. LEOPOLD*^{1,2}, Y. NADOT², J. MENDEZ², T. BILLAUDEAU³
(¹EDF R&D, France, ²Institut Pprime, France, ³Airbus France, France)

Thermomechanical Fatigue Behavior of Carbon nanotube Reinforced Sn-Ag-Cu Solder Joints.

S. XU*¹, X. ZHU², H. LU², C. BAILEY², Y.-C. CHAN¹
(¹City University of Hong Kong, Hong Kong, ²University of Greenwich, UK)

Influence of niobium on the hardening phenomenon and wear in the manganese steel (12% Mn) destined for the railway.

H. MAOUCHE*^{1,2}, A. HADJI², K. BOUHAML^{1,2}
(¹Welding and NDT Research Centre (CSC)BP 64 CHERAGA, Unité de Recherche Appliquée en Sidérurgie Métallurgie URASM/CSC, Algeria, ²Laboratoire de Fonderie, Université Badji Mokhtar, BP 12, Annaba 23000, ALGERIE, Algeria)

Effect of silicon content on the lifetime of ductile cast iron.

A. ALHUSSEIN^{1,2}
(¹University of Technology of Troyes, France, ²University of Technology of Compiègne, France)

Surface Treatment by Laser Peening (F.O.D.).

S. LERAY
(METAL IMPROVEMENT COMPANY, France)

Phase-Field-Crystal Modeling for Microcrack Propagation and Branching of Ductile Materials.

G. YINGJUN
(Physical college of Guangxi Univ., China)

Wednesday June 11th

Main Hall

Session 4B: Defect Distribution and Characterisation

17:00 – 18:15

Effect of non-metallic inclusions on the local mechanical behaviour of a G42CrMo4 casting.

S. HENSCHER*, L. KRUGER

(Institute of Materials Engineering, TU Bergakademie Freiberg, Germany)

An ultrasonic methodology to non-destructively estimate the grain orientation in an anisotropic weld.

H. WIRDELIUS*, Q. LIU

(Chalmers Univ. of Technology, Sweden)

Nondestructive Characterization of Fatigue Processes by Acoustic Emission Technique.

A. VINOGRADOV*, E. MERSON, M. LINDEROV

(Togliatti State University, Russia)

Self-magnetic-leakage field detection using magneto-optical sensor technique.

R. STEGEMANN*, N. SONNTAG, M. KREUTZBRUCK, B. SKROTZKI

(BAM Federal Institute for Materials Research and Testing, Germany)

Effect of a cracked surface of porous silicon on the behavior of the acoustic signature.

S. BOUHEDJA*^{1,2}, F. HAMDJ¹

(¹Faculté des Sciences Médicales, Université3, Algeria, ²Laboratoire Hyperfréquences et semiconducteurs, Université1, Algeria)

Coupling of experimental measurements to study the influence of microscopic defects on the fatigue damage in A319 Al-Si alloy.

L. WANG*^{1,2}, N. LIMODIN^{1,2}, A. EL BARTALI^{1,2}, E. CHARKALUK^{1,2}

(¹Laboratoire de Mécanique de Lille (LML), CNRS, UMR 8107, France, ²Ecole Centrale de Lille, France)

Nanogauges for Optical Strain Sensors.

T. MAURER*¹, J. MARAE-DJOUDA¹, G. MONTAY¹, Y. MADI⁴, P.-M. ADAM¹, T. BURGI³, R. CAPUTO²

(¹Institut Charles Delaunay (ICD), University of Technology of Troyes, France, ²Liquid Crystals Laboratory, University of Calabria, Italy, ³Université de Genève, Switzerland, ⁴Ecole Polytechnique Fémnine, France)

Inclusion control and fatigue properties of NiTi wires for medical applications

S. BERETTA*, M. F. URBANO², A. CADELLI², P. LUCCARELLI¹

(¹Politecnico di Milano, Italy, ²SAES Getters, Italy)

Session 4C: Fatigue Crack Initiation and Growth

17:00 – 18:15

Coupled fracture mode of a cracked plate under anti-plane loading.

L. POOK*¹, F. BERTO², A. CAMPAGNOLO², P. LAZZARIN²

(121 Woodside Road, Sevenoaks TN13 3HF, UK, UK, 2University of Padua, Italy)

Fracture Mechanics in New Designed Power Module under Thermo-mechanical Loads.

**C. DURAND*^{1,2}, D. COUTELLIER², H. NACEUR², M. KLINGLER¹, O. WITTLER³,
A. GRAMS³**

(¹Robert Bosch GmbH, Automotive Electronics, Germany, ²LAMIH UMR CNRS 8201, France, ³Fraunhofer IZM, Germany)

Fatigue notch sensitivity as a function of the notch-size to grain-size relationship.

P. LORENZINO*, A. NAVARRO

(Department of Mechanical Engineering and Materials, University of Seville, Spain)

Generalization of crack growth rate under multiaxial loading based on plastic stress intensity factors.

V. SHLYANNIKOV*, A. ZAKHAROV

(Research Center for Power Engineering Problems of the Russian Academy of Sciences, Russia)

Fatigue behaviour FEM modeling of deep groove ball bearing mounted in automotive alternator submitted to variable loading.

A. E. AZIANOU*^{1,2}, F. BOLAERS¹, K. DEBRAY¹, P. CHIOZZI², F. PALLESCHI²

(¹Reims Champagne Ardenne University, France, ²Valeo Electric Systems, France)

Multi-Scale modelling of AISI H11 martensitic tool steel surface anisotropic mechanical behaviour.

A. ZOUAGHI*^{1,2}, V. VELAY¹, A. SOVEJA², R. CHIERAGATTI², F. REZAI-ARIA¹

(¹Université de Toulouse ; INSA, UPS, Mines Albi, ISAE ; ICA (Institut Clément Ader), France, ²Université de Toulouse; INSA, UPS, Mines Albi, ISAE; ICA (Institut Clément Ader), France)

Fatigue behavior of electrical steel.

B. BODE*, F. ZEISMANN, A. BRUECKNER-FOIT

(University of Kassel, Germany)

Role of Bonding Defects in a Self-Reinforced Polypropylene (PURE) under Fatigue Loading.

C. SKOTAREK*, A. BRUECKNER-FOIT

(University of Kassel, Germany)

Wednesday June 11th

Main Hall

Session 4D: Fatigue Design against Defects

17:00 – 18:15

Automotive stamped part fatigue design

M. CAUDOUX*^{1,2}, R. RAYNAL¹, M. FACHNETTI¹

(¹PSA Peugeot Citroën, Frane, ²Université de Valenciennes, France)

Geometrical Size Effect in High Cycle Fatigue Strength of Heavy-walled Ductile Cast Iron GJS400: Weakest Link vs Defect-Based Approach.

M. COVA^{1,2}, M. NANNI*¹, R. TOVO²

(¹SACMI Imola S.C., Italy, ²Universita' di Ferrara, Dipartimento di Ingegneria, Italy)

Experimental study on multistage strength degradation in S25C and its possible application in fatigue design.

Z. SHI, M. NAKANO*, C. LIU

(R&D Center, Nippon Koei Co., Ltd., Japan)

Fatigue damage accumulation and lifetime Prediction of defective C35 Steel subjected to Block Loading.

H. SALLEM*^{1,3}, Y. NADOT², C. BOURAOUI¹

(¹Laboratoire de Génie Mécanique, Ecole Nationale d'Ingénieurs de Monastir, Tunisia,

²Laboratoire de mécanique et de physique des matériaux, École nationale supérieure de mécanique et d'aérotechnique, France)

³Laboratoire de Tribologie et Dynamique des Systèmes. Saint-Etienne.

High cycle fatigue criterion for defective material based on multiaxial stress gradient approach.

A. NASR*, W. HASSINE, C. BOURAOUI

(LGM ENIM, Tunisia)

Thermal Fatigue of Electrical Fuses.

J.-L. GELET

(MERSEN France SB SAS, France)

Fatigue Modeling at Details Manufacturing of Turbines from Nickel Superalloy.

S. S.B. BELIKOV*¹, Y. E.L. SANCHUGOV², V. V.P. VALUEV³, S. S.A. LUKIN⁴

(¹National technical University, Ukraine, ²ZEL University Hanover, Germany, ³State

Polytechnic University, Russia, ⁴State Polytechnic University, Russia)

Mean Stress effect under Multi-Axial high Cycle Fatigue loading for cast A356-T6 Alloy.

M. IBEN HOURIA*¹, Y. NADOT², R. FATHALLAH¹, D. MAIJER³, M. ROY³

(¹Ecole Nationale d'Ingénieurs de Monastir, Tunisia, ²ISAE-ENSMA - UPR CNRS 3346, Institut Pprime, France, ³Dept. of Materials Engineering, The University of British Columbia, Canada)

Wednesday June 11th

Main Hall

HCF behaviour of a heat treated steel: modeling evolution of the defect sensitivity with hardness.

E. PESSARD*, F. MOREL, B. ABRIVARD, F. ABROUG
(LAMPA Arts et Metiers ParisTech, France)

Effects of voids on thermal-mechanical reliability of lead-free solder joints.

L. BENABOU^{*1}, Van Nhat Le, Z. SUN², P. POUGNET³, V. Etgens
(¹Université de Versailles Saint Quentin-en-Yvelines, France, ²Université de Technologie de Troyes, France, ³Valeo Powertrain Systems Business Group, France)

Fatigue of clip connectors for offshore oil drilling pipes under biaxial tension.

V. GAUR^{*1,2}, A. BRICE MBIKOP-NGASSA¹, V. DOQUET¹, E. PERSENT²,
E. ROGUET²
(¹CNRS, Laboratoire de Mécanique des Solides, Ecole Polytechnique, France, ²IFPEN, France)

Microplastic Limit of Steels as a Means of the Fatigue Limit Determination.

V. MENTL^{*1}, J. KAISER¹, L. GAJDOS², M. SPERL²
(¹University West Bohemia, Czech Republic, ²Institute of Theoretical and Applied Mechanics, Academy of Sciences of the Czech Republic, Czech Republic)