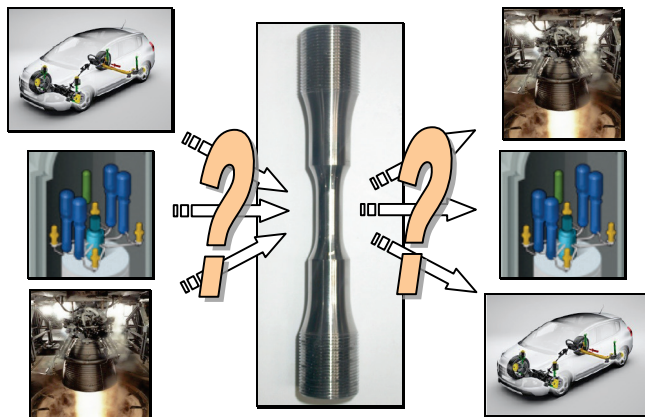




Société Française de Métallurgie et de Matériaux
Commission Fatigue des Matériaux
JIP 2013
13th International Spring Meeting

**FATIGUE BEHAVIOUR:
FROM SPECIMEN TO STRUCTURE**

PROGRAM AND REGISTRATION



Paris, FRANCE – May 22-23, 2013



<http://www.sf2m.asso.fr/JIP2013/JIP2013.htm>

Target

For fatigue design assessment, **direct validation tests on structures are not always feasible**. Hence simpler tests, which are often standardized, are carried out on laboratory specimens or elementary structures, under specified conditions.

This raises the question of how representative these tests and derived models are, with regards to the actual structure situations. In other words, **how can an approach for the fatigue assessment of structures, using test on specimens or elementary structures, be validated?**

The aim of this conference is to allow the exchange between scientists and mechanical engineers facing this problem.

Posters

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

LOCAL ORGANIZING COMMITTEE

V. AUBIN, Ecole Centrale Paris
S. COURTIN, Areva
A. KÖSTER, ENS Mines Paris
and the SF2M Fatigue Committee Board:
A. BIGNONNET, AB Consulting
E. CHARKALUK, Univ. Lille
J. CHONE, SF2M
L. FLACELIERE, Total
S. FOUVRY, Ecole Centrale Lyon
F. LEFEBVRE, CETIM
HP. LIEURADE
F. MOREL, ENSAM Angers
M.L. NGUYEN, SNCF
JL. ROBERT, Univ. Clermont-Ferrand
L. REMY, ENS Mines Paris
F. REZAI-ARIA, Ecole Mines Albi
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H. MAITOURNAM, Ecole Polytechnique, France
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T. PALIN LUC, ENSAM Bordeaux, France
S. POMMIER, ENS Cachan, France
J. SOLIN, VTT, Finland
C.M. SONSINO, FhG-LBF, Germany
M. VORMWALD, TU Darmstadt, Germany
K. WRIGHT, Rolls-Royce, UK.

GENERAL ORGANIZATON

CONFERENCE LOCATION

FIAP Jean Monnet
30 rue Cabanis
75014 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/JP2013/JP2013.htm>

JACQUES POMEY AWARD

This award will be attributed at the end of the conference to the best young author. The authors being less than 32 years old are invited to confirm their age when submitting an abstract.

LANGUAGE

The language of the Conference is English

GENERAL INFORMATION

How to come to the conference location

FIAP Jean Monnet
30 rue Cabanis
75014 Paris, France
Directly accessible by RER B, OrlyBus and Metro : "Denfert-Rochereau",
"Saint-Jacques", "Glacière".
Bus : 21, 38, 57, 62, 67, 88

HOTELS

Participants at the conference are invited to book their hotel themselves,
Pay attention: Spring is a very busy season in Paris,

REGISTRATION

Registration will be made on line exclusively

Please connect to the web site of the conference to register:

<http://sf2m.asso.fr/JIP2013/JIP2013.htm>

Registration fees:

- 200€ for students,
- 370€ for SF2M members and authors,
- 490€ for other participants, including a one year SF2M membership.
- Registration after April 15th: 70€ penalty.

The fees include:

- The participation to technical sessions,
- Lunches and pauses,
- A conference dinner in Paris Restaurant La Coupole (May 22nd), (limited number of places)
- A set of proceedings available at the conference
- Electronic Proceedings after the Conference, on the website.

CANCELLATION

No repayment will be done in case of cancellation after April 15th.

RECEPTION

RECEPTION

The reception desk will be open:

May 22th: from 8:30 to 12:30 and from 13:30 to 18:30

May 23th: from 8:30 to 12:30 and from 13:30 to 18:30.

FATIGUE BEHAVIOUR: FROM SPECIMEN TO STRUCTURE

Paris, FRANCE – May 22-23, 2013

JIP 2013

13th International Spring Meeting

PROGRAM

May 22nd

8:30 Welcome

8:50 Introduction by H.P. Lieurade

Session 1 : Fatigue Design & Structural Integrity

1 9:00 Keynote:

Engineering methods for assessing structural integrity.
A BIGNONNET (AB Consulting)

2 9:35 *Fatigue design of gears.*

P.E. DUMOUCHEL (PSA)

3 10:00 *Fatigue under vibration environment: For accelerated fatigue tests purpose, specimen designing, in order to validate the dimensioning approach of an actual structure.*

H. ROGNON¹, T.DA SILVA BOTELHO¹, I.TAWFIQ¹,
M.BENNEBACH² (¹LISMMA Supméca, ²CETIM Senlis).

10:25

COFFEE BREAK
POSTER SESSION

May 22nd

Session 1 : Fatigue Design & Structural Integrity

- 4 11:00 *Fatigue characterization of Electrical Steels for designing high efficiency electrical machines for automotive traction in complex conditions.***

SIGRID JACOBS¹, DENNIS VAN HOECKE¹, EMMANUEL ATTRAZIC³, BASTIEN WEBER², SÉBASTIEN BERGAMO⁴, RICHARD MONTAUDON (¹ArcelorMittal Global R&D, Gent, ²ArcelorMittal Global R&D, Maizières-lès-Metz, ³ArcelorMittal, Saint Chély d'Apcher, ⁴Renault DIMAT TechnoCentre, Guyancourt)

- 5 11:25 *Experimental approach to predict the reliability of electronic components,***

MOHAN RANGANATHAN, ZE MA, FLORENT CHALON, RENE LEROY, RMILI WAFAA (LMR, Univ. de Tours)

- 6 11:50 *Surface relief sensor for Structural Health Monitoring***

MIKHAIL KARUSKEVICH¹, JEAN-BERNARD VOGT², INGRID PRORIOU SERRE², TETIANA MASLAK¹, (¹National Aviation University, Kyiv, ²Université de Lille 1, Unité Matériaux Et Transformations).

12:15

LUNCH

May 22nd

Session 2 : Process impact

- 7 13:30 **Keynote:**
Durability evaluation in the car development process – an overview, MARTIN BRUNE, THOMAS BRUDER (BMW Group)
- 8 14:05 *Influence of surface integrity of 15-5PH on the fatigue life.*
VINCENT CHOMIENNE^{1,2}, CATHERINE VERDU¹, JOËL RECH² (¹Université de Lyon, INSA-Lyon, MATEIS, ²Université de Lyon, ENISE, LTDS, CNRS UMR 5510, Saint-Etienne)
- 9 14:30 *Influence of surface integrity induced by anodizing process on fatigue life of Ti-6Al-4V.*
ERIC VERMESSE^{1,2}, LAURENT ARURAUULT², CATHERINE MABRU¹ (¹Université de Toulouse, ICA, ²Université de Toulouse, CIRIMAT, Toulouse)
- 10 14:55 *The Effect of microstructural heterogeneities on the fatigue behaviour of 22MnB5 sheet steel.*
BENJAMIN ABRIVARD^{1,2}, FRANCK MOREL¹, ETIENNE PESSARD¹, PHILIPPE DELHAYE² (¹Arts et Métiers ParisTech, Angers, ²Renault SAS)
- 11 15:20 *A study of the effect of microstructure on the fatigue behaviour of high strength welded steel treated by hammer peening.*
CRISTINA REVILLA-GÓMEZ¹, JEAN-YVES BUFFIERE¹, CATHERINE VERDU¹, CATHERINE PEYRAC², FABIEN LEFEBVRE² (¹INSA Lyon, ²CETIM).
- 15:45 **COFFEE BREAK
POSTER SESSION**

May 22nd

Session 2 : Process impact

- 12 16:30 ***A Rapid Estimation Method of the Cyclic Behavior in a confined plasticity zone : application to welded assemblies for shipbuilding.***

SARAH PLESSIS^{1,2}, DAVID THEVENET¹, CÉDRIC DOUDARD¹, SYLVAIN CALLOCH¹, MIKAEL CAZUGUEL^{1,2}
(¹LBMS, ENSTA Bretagne/UBO/ENIB, ²DCNS, DNA\ING\DCSE\CSB)

- 13 16:55 ***Assessment of HFMI post-treated joints by notch stress approach.***

MARTIN LEITNER, MICHAEL STOSCHKA, WILFRIED EICHLSEDER (Montanuniversität Leoben)

- 14 17:20 ***Fatigue strength of welded joints through GMAW and GMAW-DWOA welding process.***

LUIS MARQUES¹, EMANUEL SANTOS^{2,4}, RODRIGO MACIEL^{3,4}, EDUARDO BRAGA⁴ (¹Federal University of Pará, Marabá, ²University of Waterloo, ³University of Birmingham, ⁴Federal University of Pará, Belém)

- 15 17:45 ***Fast determination of welded joint fatigue properties by using "self-heating" measurement under cyclic loading.***

PIERRICK FLORIN^{1,2}, MATTEO LUCA FACCHINETTI¹, CÉDRIC DOUDARD¹, SYLVAIN CALLOCH¹ (¹LBMS, ENSTA Bretagne, ²PSA).

18:10

END OF THE DAY

May 23rd

8:30 Welcome

Session 3 : Nuclear issues

- 16 9:00 **Keynote:**
Design by Analysis – Original ideas of ASME III lost or preserved in evolution to current design codes?
JUSSI SOLIN, (VTT, Espoo)
- 17 9:35 ***An Integrated Approach for Initiation and Fatigue Crack Growth of Stainless Steel Components in a PWR Environment - Bridging the gap between specimen and plant experience.***
KEITH WRIGHT¹, **DAVID TICE**², **CHRIS WATSON**¹, **ADRIAN ALLEN**¹, **JOHN STAIRMAND**², **DAVID GREEN**² (¹Rolls-Royce, Derby, ²Amec, Manchester)
- 18 10:00 ***Addressing Detrimental Effects in Fatigue Design of Nuclear Components..***
LAURENT DE BAGLION, **STÉPHAN COURTIN** (AREVA NP SAS).
- 10:35 **COFFEE BREAK
POSTER SESSION**

May 23rd

Session 3 : Nuclear issues

19 10:45 ***Influence of mean stress and mean strain on fatigue lifetime of austenitic stainless steels.***

LUDOVIC VINCENT¹, JEAN-CHRISTOPHE LE ROUX², SAID TAHERI³ (¹CEA, DEN, SRMA, ²EDF, R&D, MMC, ³EDF, R&D, AMA)

20 11:10 ***Crack Initiation under equibiaxial fatigue, Development of a particular equibiaxial fatigue device..***

CÉDRIC GOURDIN¹, SOUMAYA BRADAI^{1,4}, STEPHAN COURTIN², JEAN-CHRISTOPHE LE ROUX³, CATHERINE GARDIN⁴ (¹CEA Saclay, ²AREVA NP SAS, ³EDF, ⁴Université de Poitiers ENSMA)

21 11:35 ***Cracking directions in high cycle thermal fatigue crazing.***

BAIMAO LEI³, VAN-XUAN TRAN^{1,2}, SAÏD TAHERI^{1,2}, LI WAN³, YU ZHOU³ (¹EDF R&D, Département AMA, ²Laboratoire de Mécanique des Structures Industrielles Durables (LaMSID), UMR EDF-CNRS-CEA 2832, Clamart, ³Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing).

12:00

LUNCH

May 23rd

Session 4 : *Low-cycle fatigue and fatigue crack growth*

- 22 13:15 **Keynote:**
Low cycle fatigue of high temperature components
LUC REMY (Centre des Matériaux, Mines ParisTech)
- 23 13:50 *Tests on real turbine blade under cyclic loading at high temperature.*
MÉLANIE LEROY, DAVID RYCKELYNCK, ALAIN KÖSTER,
LUC RÉMY (École des Mines de Paris)
- 24 14:15 *Verification of Thermal-Mechanical Fatigue Material Data and Lifetime by Testing a Near Service Loaded Specimen.*
ANSGAR HARNISCHMACHE, KARL-HEINZ LANG
(Karlsruhe Institute of Technology (KIT))
- 25 14:40 *Anisothermal Energetic Approach to Predict Thermomechanical Fatigue Lifetime on Exhaust Manifold.*
K. AMMAR¹, M. BERANGER², JM. FIARD² , S. QUILICI¹
(¹Renault SAS, Direction de la Mécanique, ²Mines ParisTech,
Centre des Matériaux (CNRS UMR 7633))
- 26 15:05 *Assessment of fatigue damage of a car alternator fan by EBSD.*
FLORIANE LEAUX¹, JÉRÉMIE BOUQUEREL¹, JEAN-
BERNARD VOGT¹, FRÉDÉRIC PALLESCHI² (¹Université
Lille1, ²Valeo).
- 15:30 **COFFEE BREAK
POSTER SESSION**

May 23rd

Session 4 : Low-cycle fatigue and fatigue crack growth

- 27 16:00 ***Experimental and numerical study of crack propagation under biaxial loading conditions at high temperature***
HUAIDONG WANG, VINCENT MAUREL, ALAIN KOSTER,
LUC REMY (Centre des Matériaux/Mines ParisTech)
- 28 16:25 ***On the evaluation of the cyclic J-integral ΔJ for temperature dependent elastic-plastic material behavior under non-isothermal conditions.***
KAI BAUERBACH, MICHAEL VORMWALD (FG
Werkstoffmechanik, Darmstadt)
- 29 16:50 ***Characterisation of Environmentally Assisted Small Crack Growth Rates.***
SHENGQI ZHOU, ALAN TURNBULL, MIKOLAJ
LUKASZEWICZ, NICK MCCORMICK (National Physical
Laboratory, Teddington)
- 30 17:15 ***Influence of temperature and long term ageing on the fatigue crack growth in a precipitation - hardened martensitic stainless steels 15-5PH.***
LOÏC DIMITHE ABOUMOU^{1,2}, GILBERT HENAFF¹,
MANDANA ARZAGHI¹, SYLVIE POMMIER ² (¹Institut
P/ENSMA, ²LMT CACHAN).

17:40

END OF THE JIP

POSTERS

- P50** *Fatigue from Defect under multiaxial loading: Defect Stress Gradient (DSG) approach using ellipsoidal Eshelby model.*

MATTHIEU VINCENT¹, CAROLE NADOT-MARTIN¹, YVES NADOT¹,
ANDRÉ DRAGON¹ (Pprime Institute)

- P51** *Local in-situ SEM fatigue testing of small scale weld samples.*

JOHANNES REISER, MICHAEL STOSCHKA, CHRISTOPH
GUSTER, MARTIN LEITNER, WILFRIED EICHLSEDER
(Montanuniversität Leoben, Chair of Mechanical Engineering)

- P52** *Thermal measurements on elastomeric materials: from the characterization of the dissipation gradients at low scales to the prediction of the fatigue properties.*

ISAURE MASQUELIER¹, YANN MARCO¹, VINCENT LE SAUX¹,
PIERRE CHARRIER², SYLVAIN CALLOCH¹ (1ENSTA Bretagne -
LBMS, 2Trelleborgvibracoustics)

- P53** *Micro-macro thermo-mechanical modeling of High Cycle Fatigue (HCF) for short glass fibre reinforced polyamide.*

KRAIRI ANOUAR, DOGHRI ISSAM (Université catholique de
Louvain)

- P54** *Specimen design for the fatigue lifetime evaluation of a forged material.*

PIERRE BAUDOIN^{1,4}, VINCENT MAGNIER^{2,4}, AHMED EL
BARTALI^{3,4}, JEAN-FRANÇOIS WITZ⁴, PHILIPPE DUFRENOY^{1,4},
ÉRIC CHARKALUK^{1,4}, FRANÇOIS DEMILLY⁵ (1Univ Lille Nord de
France, 2Université Lille I, 3École centrale de Lille, 4Laboratoire de
Mécanique de Lille CNRS, UMR 8107, 5GHH-Valdunes,
Valenciennes)

- P55** *Two-scale time homogenization for high-cycle fatigue simulation of coupled viscoelastic-viscoplastic homogeneous and isotropic solids.*

SARRA HAOUALA, ISSAM DOGHRI (Université catholique de
Louvain)

- P56** *Quantitative fracture surface analysis of fatigue fracture surfaces.*

MOHAN RANGANATHAN, FLORENT CHALON¹, PHILIPPE
FERAUD² (1LMR, Tours, 2AEF-SNCF, Vitry sur Seine).