

Invitation

4th Symposium on

STRUCTURAL DURABILITY



May 14th – 15th, 2014

Darmstadt
Germany

MARITIM Konferenzhotel





For more than a century, Darmstadt has been a centre of essential expertise in structural durability. Test and measurement equipment, computational methods and design philosophies have been developed. To illustrate the continuity of activities in this field several institutes and companies have grouped together to present the Symposium on Structural Durability in Darmstadt. The symposium is organised by

Fraunhofer Institute for
Structural Durability and
System Reliability (Fraunhofer LBF) /
System Reliability and Machine
Acoustics (SzM)

Zentrum für Konstruktionswerkstoffe
State Materials Testing Institute /
Chair and Institute for
Materials Technology (MPA/IfW)

Institute of Steel Construction
and Materials
Mechanics (IFSW)

Instron® Structural Testing
Systems GmbH (INSTRON)

Hottinger Baldwin
Messtechnik GmbH (HBM)

The objective of the Symposium on Structural Durability in Darmstadt (SoSDiD) is to present the current state of the art to the national and international fatigue community. Contributions have been gathered from German and international experts as well as Darmstadt research work in structural durability. The symposium is intended to supply a lively forum for discussing basic questions and current trends, bringing together scientists and engineers working in this field.

In the area of structural durability the *main subjects in 2014 will be welded and bolted joints, effects of corrosion, thermomechanical and low cycle fatigue, lightweight design as well as fatigue testing.*



Awards

The Instron Structural Testing Systems GmbH and the Hottinger Baldwin Messtechnik GmbH will present awards for outstanding work on structural durability among Darmstadt's young engineers and scientists. Both awards will be presented at the symposium.

Exhibition

Leading manufacturers of testing equipment will inform about structural and materials testing systems.

Proceedings

All papers will be published in the proceedings, which will be given out at the conference.

Advisory Board

B. Atzori, Univ. Padova (I), M. Bacher-Höchst, Bosch (D), S. Beretta, Politecnico Milano (I), F. Brennan, Cranfield Uni (UK), W. Eichlseder, Uni Leoben (A), A. Forsén, Scania (S), M. de Freitas, ICEMS (P), P. Heuler, Audi (D), L. Krüger, BMW (D), H.-P. Lieurade, CETIM (F), E. Macha, Uni Opole (PL), G. Marquis, Aalto Uni (FIN), J.C. Newman, Jr., Mississippi State Uni (USA), T. Palin-Luc, Uni Bordeaux (F), M. Sakane, Ritsumeikan Uni (J), G. Savaidis, Aristotle Uni (GR), D. Socie, Uni Illinois (USA), D. Vanderpitte, KU Leuven (B)

Local Organisation Committee

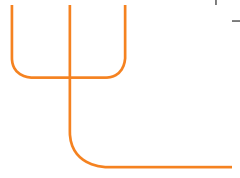
J. Baumgartner (Fraunhofer LBF), H. Th. Beier (IFSW), A. Clüsserath (IST), K.-H. Haase (HBM), T. Melz (Fraunhofer LBF), E.-A. Keil (MPA/IfW), M. Oechsner (MPA/IfW), E. Schmidt-Staubach (INSTRON), C.M. Sonsino (Fraunhofer LBF), M. Vormwald (IFSW), U. Wuttke (MPA/IfW), A. Zeidler-Finsel (Fraunhofer LBF)



Symposium on Structural Durability in Darmstadt (SoSDiD), Germany, May 14th–15th, 2014

Wednesday, May 14th, 2014

7:30	Conference Registration
8:30	Opening – Research in Darmstadt T. Melz Fraunhofer LBF, Germany
	Session 1 S. Beretta, G. Savaidis
8:45	Simulation of fatigue crack growth in welded joints H. Th. Beier ¹ , B. Schork ² , J. Bernhard ³ , T. Melz ³ , D. Tchoffo Ngoula ¹ , M. Vormwald ¹ , M. Oechsner ² <small>1 IFSW, TU Darmstadt, Germany 2 MPA/IfW, TU Darmstadt, Germany 3 SzM, TU Darmstadt, Germany</small>
9:15	Crack initiation and propagation analysis at welds R. Waterkotte ¹ , J. Baumgartner ² <small>1 Schaeffler Technologies GmbH & Co. KG 2 Fraunhofer LBF, Germany</small>
9:45	Introduction of the Exhibitors
10:15	Coffee Break
	Session 2 M. J. de Freitas, M. Bacher-Hoehst
10:45	Fatigue improvement of welded steel joints by high frequency mechanical impact treatment G. Marquis ^{1,2} , H. Yildirim ¹ <small>1 Aalto University, Finland 2 KTH – Royal Institute of Technology, Sweden</small>



- 11:15 **Assessment of welded joints by fracture mechanics – IBESS Procedure**
U. Zerbst
Bundesanstalt für Materialforschung und -prüfung, Germany
-
- 11:45 **Fatigue assessment of joints using the local stress field**
H. Schmidt, J. Baumgartner, T. Melz
Fraunhofer LBF, Germany
-
- 12:15 **Experimental investigation and numerical simulation of high temperature fatigue of seam welds**
K. Langschwager¹, A. Bosch², E. Lang²,
A. Scholz¹, M. Vormwald², M. Oechsner¹
1 MPA/IfW, TU Darmstadt, Germany
2 IFSW, TU Darmstadt, Germany
-
- 12:45 **Lunch**
-
- Session 3**
D. Socie, G. Marquis
-
- 14:00 **Assessment of screws with local concepts**
D. Olveda², D. Panic¹, H. Th. Beier¹,
U. Wuttke, M. Vormwald¹, M. Oechsner²
1 IFSW, TU Darmstadt, Germany
2 MPA/IfW, TU Darmstadt, Germany
-
- 14:30 **Low cycle thermal fatigue – from macro-scale to micro-scale**
H. Sehitoglu
University of Illinois, USA
-



- 15:00 **Probabilistic Schmid factors and the scatter of LCF life**
Hanno Gottschalk¹, S. Schmitz²,
T. Seibold³, G. Rollmann², R. Krause⁴
and T. Beck^{3,5}
1 Uni Wuppertal, Germany
2 Siemens Energy, Germany
3 FZ Jülich, Germany
4 ICS Lugano, Italy
5 RWTH Aachen, Germany
-
- 15:30 **Awards for Outstanding Work on Structural Durability**
HBM / IST
-
- 15:45 **Coffee Break**
-
- Session 4**
E. Macha, H. Sehitoglu
-
- 16:15 **Numerical simulation and experimental characterisation of fatigue crack growth under thermocyclic loading**
T. Schlitzer¹, K. Bauerbach¹, H. Th. Beier¹,
M. Fischaleck², K. Langschwager²,
M. Oechsner², J. Rudolph³, A. Scholz²,
M. Vormwald¹, A. Willuweit³
1 IFSW, TU Darmstadt, Germany
2 MPA/IfW, TU Darmstadt, Germany
3 AREVA GmbH, PEEA-G, Erlangen, Germany
-
- 16:45 **Innovative material testing to improve the reliability of drilling equipment in challenging applications**
H. Sarmiento-Klapper
Baker Hughes, Germany
-
- 17:15 **Significance of the superposition of cyclic mechanical and corrosive loadings in the qualification process of aluminium alloys**
K. Bauer-Troßmann¹, L. Yu², T. Melz³,
M. Oechsner², H. Kaufmann¹
1 Fraunhofer LBF, Germany
2 IFSW, TU Darmstadt, Germany
3 SzM, TU Darmstadt, Germany
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17:45	To Hotels
19:00	Pick-up at MARITIM Konferenzhotel and transportation to Lichtenberghaus
19:15	Conference Dinner
23:15	Transportation to MARITIM Konferenzhotel

Thursday, May 15th, 2014

8:30	Welcome M. Oechsner MPA / IfW, TU Darmstadt, Germany
	Session 5 T. Palin-Luc, A. Fatemi
8:45	A Fatigue design concept for metal injection molded components of 100Cr6 H. Lindel ¹ , M. Hahn ¹ , M. Bacher-Höchst ¹ , S. Issler ¹ , D. Eifler ² , M. Klein ² ¹ Robert Bosch GmbH, Germany ² Technical University Kaiserslautern, Germany
9:15	Mechanisms of hydrogen-induced cracking at high-strength screws O. Golenishcheva, C. Krauß, G. Andersohn, M. Oechsner MPA/IfW, TU Darmstadt, Germany
9:45	FasTest – Fatigue related application specific testing-solutions C. Lanz ¹ , R. Wagener ² , T. Melz ² ¹ isys, adaptive solutions, Germany ² Fraunhofer LBF, Germany
10:15	Coffee Break
10:45	Fatigue assessment of fiber bragg grating sensors F. Walther, G. Frieling WPT, TU Dortmund University, Germany
	Session 6 A. Forsén, R. Heim



- 11:15 **Integration of structural health monitoring sensors with aerospace, composite materials and structures**
P.D. Foote
Cranfield University, Cranfield, UK
-
- 11:45 **Fatigue behaviour of polymers for automotive applications**
A. Fatemi
University of Toledo, USA
-
- 12:15 **Life estimation methodology for short fiber reinforced polymers under thermo-mechanical loading in automotive applications**
A. Schaaf¹, M. De Monte¹, E. Moosbrugger¹,
M. Vormwald², M. Quaresimin³
1 Robert Bosch GmbH, Germany
2 IFSW, TU Darmstadt, Germany
3 University of Padova, Italy
-
- 12:45 **Future Perspectives – Closing Remarks**
M. Vormwald
IFSW, TU Darmstadt, Germany
-
- 13:00 **Lunch**
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- 14:15 **Cultural programme (optional)**
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We are glad to introduce you to a cultural programme in 2014.
You have the choice between visiting:

The famous “Jugendstil“-area of Darmstadt, the Darmstadt Artists’ Colony. This important centre of Jugendstil (Art Nouveau) refers both to a group of artists as well as to the buildings at Mathildenhöhe in Darmstadt in which these artists worked and lived. Walk through this unique area and you have the possibility to go to its museum and enter some of the artists houses.

World wide known GSI Helmholtzzentrum für Schwerionenforschung GmbH. This centre operates a unique large-scale accelerator for heavy ions. Scientists from all over the world use this facility for experimenting in basic research. In addition, the centre continually develops new and impressive applications. The guided tour will bring you into the test laboratories.
<https://www.gsi.de/en.htm>

In both cases: Transfer by bus from and back to hotel.
Duration about 3 hours.



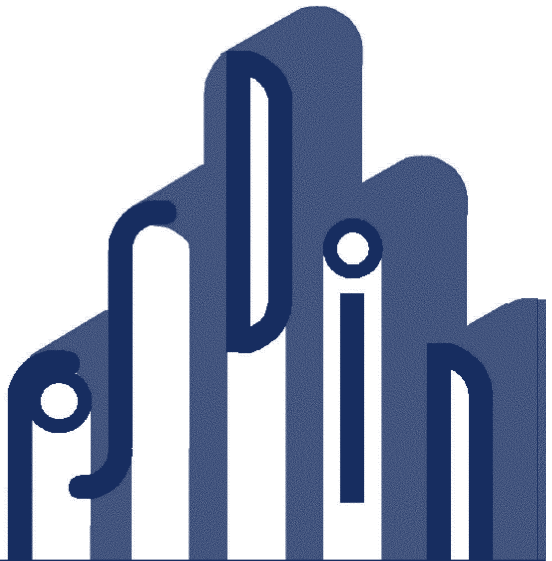
Tuesday, May 13th, 2014, 19:00

“Braustüb`l” opposite Conference Location,
traditional brewery of Darmstadt.
Goebelstr. 7 · 64293 Darmstadt,
Phone +49 6151/87 65 87
www.braustuebl.net

Food and beverages sponsored by “Instron Structural Testing Systems” and “Hottinger Baldwin Messtechnik GmbH”.

Wednesday, May 14th, 2014, 19:00

Conference Dinner
„Lichtenberghaus” · Dieburgerstr. 241 · 64287 Darmstadt.
Bus transfer from MARITIM Konferenzhotel at 18:45.



Contact:

www.sosdid.de,
info@sosdid.de

Main Office:

Fraunhofer Institute for Structural Durability
and System Reliability LBF · Bartningstrasse 47
64289 Darmstadt · Germany



Conference Location

MARITIM Konferenzhotel Darmstadt
Rheinstr. 105 · 64295 Darmstadt
Phone +49 6151 878-0 · Fax +49 6151 878-2169
info.dar@maritim.de · www.maritim.de

Public transportation

There are excellent train connections from Frankfurt (about 20 minutes).

The conference location is in walking distance of Darmstadt Main Station.

Taxi:

From airport/Frankfurt Main Darmstadt, Hauptbahnhof Station (approx. 45–60 min)

Busses and trams:

From airport: every 30 minutes
Airliner-Bus to stop Darmstadt, Hauptbahnhof (approx. 8 min)
Further information can be found at www.rmv.de

Conference Language

The conference language is English. All presentations and discussions as well as the proceedings will be in English language.

Information about Darmstadt

www.darmstadt.de

Registration Fee in Euro

Until February 28th, 2014: 490,- , Postgraduate: 200,-
Retiree: 150,- , Students: 75,-
After February 28th, 2014: 590,- , Postgraduate: 240,-
Retiree: 180,- , Students: 120,-

Members of the Advisory Board, Speakers and Organisers are free. The fees include lunches and banquet as well as the proceedings and the cultural visits.

Accreditation and Certification

On request, participants will receive a confirmation of participation for accreditation and certification purposes.



Registration and Payment Information

The closing date for registration is April 1st, 2014.
Acceptance after this date is dependent on the availability of places. Registration form see enclosure.
Payments should be made in Euro and by transfer order to:

Deutsche Bank · München
Account 752193300 BLZ 700 700 10
IBAN DE86 7007 0010 0752 1933 00
BIC (SWIFT-Code) DEUTDEMM | V.A.T. Ident No.
DE129515865
Tax Number 143/215/20392

Please add **SoSDiD 900184** and name of **delegate**.

Cancellation

Refund of fee, less 20 % administration charge, may be applied for until April 1st, 2014. After this date, fees can no longer be refunded. Receipt of a registration form is regarded as a firm booking and acceptance of the conditions stated above. If for any reason a delegate is unable to attend, payment of fees must still be honoured.

Accommodation

Attendees will be responsible for making their own hotel reservations at the following hotel with code **"SoSDiD"**.
To guarantee the special rates, please observe the deadline for reservation.

MARITIM Konferenzhotel Darmstadt
www.maritim.de · Fax: +49 6151/303161
Special rate: 118,-/night incl. breakfast
Deadline for reservation: April 10th, 2014

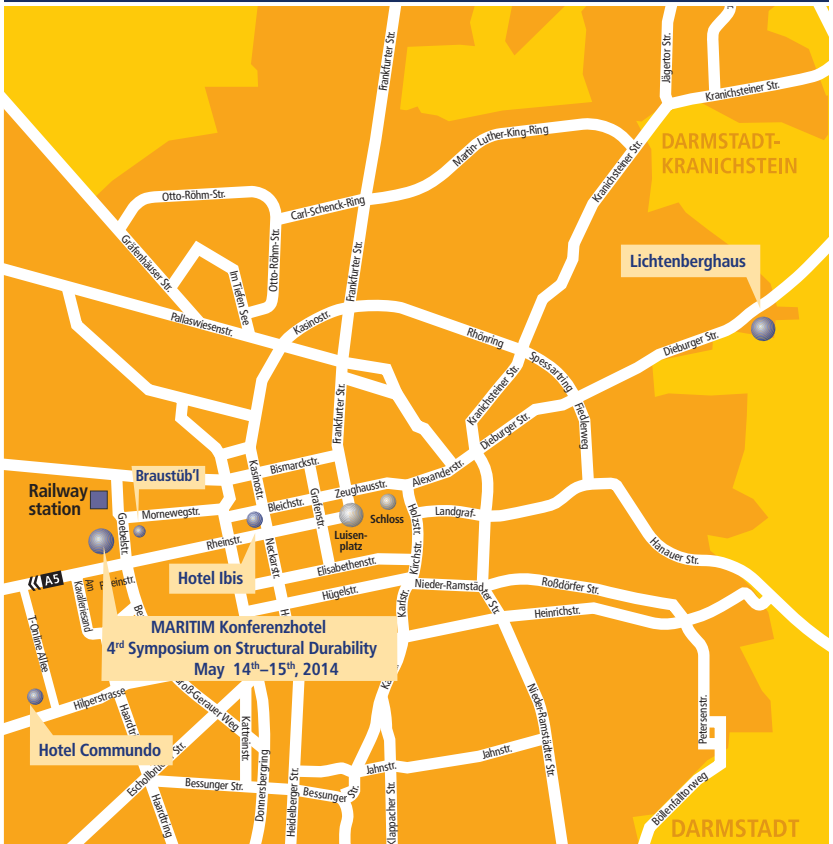
Commundo Tagungshotel Darmstadt
www.commundo-tagungshotels.de/darmstadt/darmstadt.html
Fax: +49 6151/1521746 · Fax: 008000 8330 331
Approx. 80,-/night until April 30th, 2014

Hotel Ibis Darmstadt
www.ibishotel.com · Fax: +49 6151/3970123
Approx. 71,-/night · Breakfast: 10,-/person



By car: take the highway/motorway A5 to the exit for Darmstadt-Stadtmitte/Griesheim. From here continue straight on along Rheinstraße. The MARITIM Konferenzhotel is located at the left hand side right after crossing the railway bridge (near main station).

By train: Darmstadt, Hauptbahnhof (main station). The MARITIM Konferenzhotel is in walking distance of the main station.



By air: Frankfurt International Airport, train connection to Darmstadt, Hauptbahnhof (main station), or terminal 1/2 bus Airliner to Darmstadt Hauptbahnhof. Taxi from airport takes approximately 40 minutes.

More information: www.rmv.de