

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 Air-liner to Darmstadt "Darmstadt-Hauptbahnhof".
Taxi from airport takes approximately 40 minutes.

More informations: www.rmv.de

INVITATION

3rd Symposium on Structural Durability in Darmstadt



May 26th - 27th, 2011
Darmstadt, Germany
MARITIM Konferenzhotel



TECHNISCHE
UNIVERSITÄT
DARMSTADT



Fraunhofer

LBF



INSTRON STRUCTURAL
TESTING SYSTEMS



→ Preface

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

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

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

Institute of Steel Construction
and Materials
Mechanics (IFSW)

Instron Structural Testing
Systems GmbH (IST)

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 order to pay tribute to the founders of the Darmstadt structural durability tradition the sessions have been titled: Kurt Klöppel, Ernst Gaßner and August Thum sessions. According to their main research focus, lectures predominantly dealing with materials mechanics are considered in the Klöppel-session, those dealing with variable amplitude loading in engineering structures are grouped in the Gaßner-session, and the Thum-session is concerned with the materials science and technology related aspects of structural durability.

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

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→ Who is who?



August Thum

In 1927 Professor August Thum (1881–1957) was appointed to hold the newly founded Chair of Materials at Darmstadt University of Technology in combination with the direction of the State Materials Testing Institute Darmstadt (founded in 1907). Within his professorship he was also doctor thesis supervisor of Ernst Gaßner in 1941.

In his basic teachings Professor Thum defined “Gestaltfestigkeit” (shape-related strength) generally as strength, which depends on loading conditions (level and type of load) as well as on material and engineering design. Other subjects of his research work include the effect of residual stresses on the fatigue strength, fatigue notch factors and notch sensitivities of different materials, creep behaviour of heat-resistant steels, fatigue of metals under corrosive conditions and strength of plastics. Furthermore, Thum studied the effects of impact loading and bolts with waisted shanks as an exemplary application for improved component properties. He investigated cast crank shafts as an alternative to forged crank shafts and methods for their surface hardening.

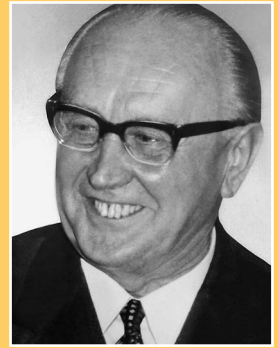
Together with his collaborators, Thum published numerous papers with important contributions to the basic fatigue behaviour of materials in general and more detailed to the fatigue behaviour of many special components such as axes, crank shafts, bolts, springs, gears and welded joints.

Kurt Klöppel

Professor Kurt Klöppel (1901–1985), was appointed full professor of statics and steel construction at the Technical University of Darmstadt in 1938. Around the same time, the introduction of the welding technology made new demands on the materials used and on the related knowledge, due to the danger of brittle failure and fatigue. Conclusions from several failures had to be drawn. Besides statics and steel construction, Kurt Klöppel’s research work ranged from the theory of stability to plasticity, composite structures, welding technology, and reliability. Moreover, he developed a special passion for “Betriebsfestigkeit” (Structural Durability) and was a member of the LBF Advisory Board during the directorship of Ernst Gaßner.

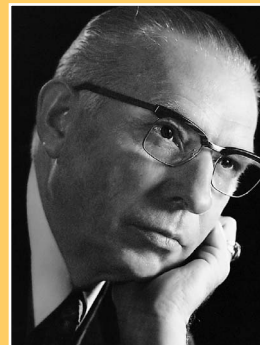
Based on results of experimental investigations, he started publishing allowable stresses for design details used especially in overhead cranes and railway bridges. In 1958 he postulated the durability analysis for variable amplitude loading as a major task for the future generation of engineers.

Furthermore, he strongly promoted the development of theories based on the mechanics of materials. Already in the early sixties he noticed the importance of cyclic plastic deformation at notches and performed studies on fatigue crack growth. Therefore, he can be seen as one of the early masterminds of today’s fatigue assessment concepts.



Ernst Gaßner

Professor Ernst Gaßner (1908–1988), one of the founders of LBF, lived and researched in Darmstadt. In the thirties, after his studies at the Technical University of Darmstadt and PhD work under the supervision of Professor August Thum, he coined 1941 the term “Betriebsfestigkeit” (Structural Durability).



In 1939 he first formulated a procedure for the experimental simulation of variable amplitude loadings: the historical 8 step blocked program test with a Gauss-like distribution. (The block program was replaced in the sixties by random loading, due to the development of servo-hydraulic testing facilities.)

Ernst Gaßner who headed the LBF from 1939 to 1973 defined structural durability as the ability of a structure or a component to withstand random cyclic loads that occur during service, taking into account the environmental conditions such as temperature or corrosion. Part of the spectrum can exceed the high-cycle constant amplitude fatigue strength in order to achieve light-weight design and the required service mission can still be fulfilled.

Gaßner’s knowledge decisively contributed to the science of light-weight fatigue design and to optimizing the durability of industrial products, thus earning him a high international reputation among experts that has continued up to this day.

→ Programme

Symposium on Structural Durability
in Darmstadt (SoSDiD), Germany,
May 26th–27th, 2011

Thursday, May 26th, 2011

7:30 Conference Registration

8:30 **Opening**

M. Oechsner

Opening Lecture

Chair: C. Berger, M. Vormwald

8:45 Durability of Advanced Fabricated Structures

G. Marquis

9:15 Awards for Outstanding Work
on Structural Durability

HBM/IST

9:30 Introduction of the Exhibitors / Posters

J. Grimm

9:45 Coffee Break

Kurt Klöppel Lectures

Chair: J. Samuelsson, D. Socie

10:15 Special Fatigue Aspects in Substructures of Wind
Turbines

P. Schaumann, S. Steppeler

10:40 Methods of Detailed Thermal Fatigue Evaluation of
Nuclear Power Plant Components

J. Rudolph, S. Bergholz, B. Heinz, R. Hilpert, A. Götz

11:05 Fatigue Resistance of Weld Ends

M. Kaffenberger, M. Vormwald

11:30 Coffee Break

12:00 Fatigue Crack Growth Simulations considering Cyclic
Plasticity

P. Zerres, M. Vormwald

12:25 On the Applicability of Macroscopic Mechanics to
Fatigue Life Prediction?

Y. Jiang

12:50 Lunch

Chair: E. Macha, P. Heuler

14:10 Design Review of Railway Axles:
Fatigue Damage versus Crack Propagation

S. Beretta

Ernst Gaßner Lectures

14:35 Safety of Axles for Japanese Bullet Train

H. Ishizuka, K. Makino, Y. Sato

15:00 Corrosion Fatigue of Welded Aluminium Vehicle Struc-
tures under Constant and Variable Amp. Loadings

C. M. Sonsino, C. Morgenstern, M. Streicher, H. Oppermann,
A. M. Schmid

15:25 Overload Effects on a Ferritic-Bainitic Steel and a Cast
Aluminium Alloy: Two very different Behaviours

T. Palin-Luc, N. Santier, C. el Dsoki, H. Kaufmann, C. Dumas,
F.-J. Völlmecke

15:50 Coffee Break

Chair: J. Dominguez, M. de Freitas

16:20 Microstructure Based Fatigue Analysis of Cast
Components under Variable Amplitude Loading

J. Eufinger, A. Heinrietz, T. Bruder

16:45 Notch Stress Concept for Assessing the Multiaxial
Fatigue Behaviour of Laserbeam Welded Aluminium
Joints under CA and VA Loading

J. Wiebesiek, C. M. Sonsino, H. Kaufmann

17:10 Electromobility – Challenges for Structural Durability

D. Martin, A. Hiebl, L. Krüger

17:35 To Hotels

18:45 Pick up at MARITIM Konferenzhotel and
transportation to Lichtenberghaus

19:00 Conference Dinner

23:00 Transportation to MARITIM Konferenzhotel

Friday, May 27th, 2011



Technical Visits

Friday, May 27th, 2011, 14:00 till 16:00

8:30 Welcome
M. Vormwald

Ernst Gaßner Lectures

Chair: W. Eichlseder, G. Savaidis

8:40 Durability Tests for Truck Fuel Tanks – Description of a Test Track Simulation on a Seven Axis Test Rig
A. Tobuschat

Thum Lectures

Chair: W. Eichlseder, G. Savaidis

9:05 Casting Defects and Fatigue Behaviour of Ductile Cast Iron for Wind Turbine Components:
A Comprehensive Study
M. Shirani, G. Härkegård

9:30 Aluminium Alloys Imposed to Borderline Solutions – A Methodology to Evaluate the Susceptibility to Corrosion Fatigue with Respect to Corrosive Deicers
T. Troßmann, L. Yu, K. Bauer, H. Kaufmann, J. Grimm

9:55 Hydrogen Embrittlement on Ultra-High-Strength Steels
T. Göbel

10:20 Coffee Break

Chair: M. Sakane, A. R. Shanyavskiy

11:00 On the Fatigue-Behaviour of Glass Fibre Reinforced Plastics – Causes and Improvements
H. Schümann

11:25 Multiaxial Fatigue Behaviour of Short-Fibre Reinforced Polyamides – Experiments and Calculations
E. Moosbrugger, M. de Monte, K. Jaschek, A. Büter

11:50 Lightweight – Composites – Fatigue Life Assessment
P. Heyes

12:15 Future Perspectives – Closing Remarks
H. Hanselka

12:40 Lunch

14:00-16:00 Visit of Laboratories LBF, MPA/IfW, HBM

16:00 END

Fraunhofer Institute for Structural Durability and System Reliability LBF

Bartningstraße 47, 64289 Darmstadt

“Innovative for sure!": Fraunhofer LBF focuses on structural durability for more than 70 years. The institute plays a major role in many decisive developments for the industry. You may get insights in the world of complex fatigue testing, manufacturing of composites and the adaptronic laboratory for reliability simulation.

Hottinger Baldwin Messtechnik GmbH

Im Tiefen See 45, 64293 Darmstadt

“Measurement with confidence": HBM is a global market leader in weighing, test and measurement technology. HBM provides complete solutions – from sensor to software – for industrial and laboratory application. The factory visit includes topics on strain gauge and measurement technology.

State Materials Testing Institute Darmstadt/ Institute for Materials Technology (MPA/IfW)

Grafenstraße 2, 64283 Darmstadt

“Complex testing and simulation": The visit will include the departments high temperature behaviour, strength of components as well as surface technology and corrosion.

Bus transfer from MARITIM Konferenzhotel



Get-together

Wednesday, May 25th, 2011, 19:00 “Braustüb'l", opposite Conference Location, traditional brewery of Darmstadt.

Goebelstraße 7, 64293 Darmstadt,

phone +49 (0) 6151/87 65 87

www.braustuebl.net

Food and beverages sponsored by “Instron Structural Testing Systems IST" and “Hottinger Baldwin Messtechnik GmbH HBM".

Thursday, May 26th, 2011, 19:00 Conference Dinner, “Lichtenberghaus", Dieburgerstr. 241, 64287 Darmstadt. Bus transfer from MARITIM Konferenzhotel at 18:45

Conference Location

MARITIM Konferenzhotel Darmstadt
Rheinstr. 105, 64295 Darmstadt
Phone +49 (0) 6151 878-0, Fax +49 (0) 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 fares:
From airport /Frankfurt Main Station (approx. 45-60 €)

Busses and trams:
From airport: every 30 minutes
Airliner-Bus to stop "Hauptbahnhof" (approx. 8 €)
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
www.proregio-darmstadt.de

Registration Fee

Before February 21st: 490,- €, Postgraduate: 200,- €
Retiree: 100,- €, Students: 50,- €

After February 21st: 530,- €, Postgraduate: 220,- €
Retiree: 110,- €, Students: 60,- €

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

Registration and Payment Information

The closing date for registration is April 1st, 2011. Acceptance after this date is dependent on the availability of places. Registration form see enclosure. Payments should be made by transfer order to:

Technische Universität Darmstadt, Germany,
Sparkasse Darmstadt, BLZ 508 501 50, Account: 704 300,
IBAN: DE 36 5085 0150 0000 7043 00

Please add SoSDiD 58200227 and name of delegate.

Cancellation

Refund of fee, less 20% administration charge, may be applied for until April 1st, 2011. 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.

Accreditation and Certification

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

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.

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- MARITIM Konferenzhotel Darmstadt
www.maritim.de
Fax: +49 (0)6151/87802169
Special rate: 90,- € / night incl. breakfast
Deadline for reservation: March 31st, 2011

 - Commundo Tagungshotel Darmstadt
www.commundo-tagungshotels.de/darmstadt/darmstadt.html
Fax: +49 (0)6151/1521746
Fax: 008000 8330 331
Approx. 71,- € / night

 - Hotel Ibis Darmstadt
www.ibishotel.com, Fax: +49 (0)6151/3970123
Approx. 67,- € / night
Breakfast: 9,- € / person
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