EGF Newsletter

Official Newsletter of the European Group on Fracture Nr. 6, Spring 1988

Standardization of Fracture Mechanics Testing

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Recommendations to the CEC by prof. R. G. Baker

In the 4-th (autumn 1987) issue of this Newsletter we mentioned that prof. R. G. Baker (UK) was asked by the Bureau de Communautaire de Reference (BCR) of CEC–DG XII to carry out a study with the objective of defining the metrological needs related to standardization in Fracture Mechanics testing. In the mean time prof. Baker has finished this study and has submitted his final report to the BCR. We asked him to summarize his experiences and his resulting recommendations for printing in this Newsletter. Below follows his prompt response.

"My study for the Bureau Communautaire de Reference (BCR) has been completed and I feel privileged to have been invited to summarize its major recommendations in the EGF Newsletter. Any merit they possess is mainly attributable to the enthusiastic cooperation of many EGF working group members in allowing me to draw upon their wisdom and expertise. I acknowledge a substantial debt of gratitude and thank them all most sincerely.

The EGF has proved itself to be an energetic and efficient forum for European standardization activities. I recommended Community support to ensure continuity without an unfair financial burden falling on individuals.

Many existing standards and papers are difficult for those unfamiliar with fracture mechanics to assimilate quickly without risk of error and delay. I recommended a series of explanatory guides comprehensible to busy industrialists, to overcome this serious barrier to more effective and rapid diffusion of fracture mechanics technology.

Turning to more basic work, many key initiatives involve costly finite element analyses. In my view, the need for improved standardization in approach is fundamental to progress in all such potential routes for the further development of fracture mechanics technology. I therefore recommended that resources be found to accelerate the work of the EGF Task Group 1 Working Party on Numerical Methods, with the objective of defining agreed standardized approach criteria.

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Ups and Downs

Everybody has his ups and downs. During my down periods doubts come over me whether all efforts put into EGF's business – in particular this Newsletter – can be justified, considering all the other duties to be fulfilled and which inevitably sometimes suffer under them. Reading prof. Baker's findings alongside really helped me to overcome such a down period. The fact that an independent consultant identifies EGF as "an energetic and efficient forum" kicked me out of the depths, and again convinced me that EGF is worth all efforts put into it – in spite of all worries it brings along.

However, the bow cannot always be bent, and so I decided to take an early holiday. By that, this Newsletter had to be finished earlier than originally planned. As a consequence you will miss the account of the recent meeting of the EGF Task Group on Polymers and Composites. You will find it in the Summer issue which will be mailed end August. Copy for this issue should reach us not later than August 1. If you have copy for it, please try to stick to this deadline, because we will also be busy with the preparations for the Council meeting in September.

I leave for my holiday now, and I hope that you will enjoy yours as much as I will enjoy mine.

the editor

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Cont'd from page 1

The unification of fracture mechanics testing standards for K, CTOD and J would have widespread benefits in reducing ambiguity, increasing acceptability and lowering the cost of testing.

The current BCR project based upon the methodology proposed by EGF is therefore timely and should be pursued to the point where an agreed procedure has been validated. As a corollary, agreement is necessary on initiation criteria and on requirements to minimize uncertainty. Measurement procedures aimed at reducing uncertainty in the measurement of the level and slope of J–Δa and CTOD–Δa curves should be developed, agreed and validated and of methods extending the range of validity and reducing uncertainty in J-R and CTOD-R curves in thin materials.

Inconsistencies in view concerning the relevance of fracture mechanics criteria to engineering practice are widespread and damaging. I thus recommended a collaborative project aimed at providing a European framework of recommendations for agreed alternative approaches to material selection and definition defect significance as a basis for reliability/risk analysis.

The increasing pressure to use single specimen techniques, prompted a recommendation for an initiative to define preferred and validated optional approaches and procedures with the associated uncertainties.

In dynamic testing, there seemed to me to be two overriding needs at present; the measurement of Kid unambiguously, as a function of temperature, and the calibration of drop weight and pendulum impact machines in a way which makes it possible to compare the results obtained by them unambiguously. The technology to accomplish both of these objectives appears to exist in the EC, for example at Ispra and FHG, Freiburg; and I recommended initiatives to reduce uncertainty and define recommended procedures.

Finally, I drew attention to the immense potential of the 'local approach.' I recommended that its potential benefits be made known to those in the Commission concerned with support for technological innovation, such as ECSC and BRITE, and that appropriate initiatives aimed at the standardization of approaches or methodologies, be launched at the appropriate times.

The potential benefits of applying existing fracture technology more effectively in the European Community could save up to 25B ECU annually. Improved metrological standardization will catalyse its wider diffusion.

Whilst the present study dealt with only a part of the overall fracture problem, it has permitted a much clearer definition of priorities in a most important area, and highlighted both the problems and the means to overcome them. The BCR are to be complimented on the timeliness of the study and I would like to thank Mr. Marchandise and Dr. Gould for giving me the opportunity to undertake it and for their enthusiastic support whilst it was in progress."

R.G. Baker
Slough, April 1988.

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PRODUCTION

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(see address section, page 2)
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Cont'd

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EGF Publication series
M.E.P.
P.O. Box 24, Northgate Avenue
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Suffolk IP32 6BW
UK

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Headington
Oxford OX3 0BW
UK

Proceedings ECF4/5/6/7
EMAS
339 Halesowen Road
Cradley Heath
Warley
West Midlands B64 6PH
UK

Task Group
Elastic-Plastic Fracture Mechanics

Minutes of the 16th Plenary Meeting
Paris (France), April 21-22, 1988

On April 21st, 1988 A. Pellissier-Tanon welcomed 60 participants who traveled from 11 countries to the Tour Generale Auditorium in the central plaza of Paris la Defense. A strong participation from France underlined the efforts of P. Soulat, secretary of the French Groupe Fragilité-Rupture, who helped in the organization. The support of F. Mudry was also recognized by D. Firrao in his inaugural address on behalf of the Task Group Chairmen.

Technical Program

14 Presentations dotted the 2 days meeting. They were grouped in three sessions devoted to:

- **Size Effects on Toughness Measurements;**
- **Local Criteria;**
- **Problems of Transferability for Assessment of Components.**

The sessions were aptly conducted by F. Mudry, A. Pineau and L. H. Larsson. Lively discussions clearly showed the interest in the presentations.

Working Parties

WP on Numerical FM – The continuation of the activities were illustrated by the new organizer W. Schmitt. He has sent out a letter (see separate article alongside) in which he proposes to write up recommendations and definitions for a new Round Robin.

F. Mudry asked for support for a proposition for a Round Robin program on local criteria - experiments and numerical simulations on notched tensile bars - having been illustrated by A. Fontaine in the technical program. After the positive vote it was decided on the following schedule:

- Mudry sends out proposed specification by May 15th.
- Replies and comments to him by July 1st.
- Final specifications sent out by Mudry by October 1st.
- Firm commitment by each participant by November 1st.

WP on Ductile Tearing Instability – L.G. Taylor reported on behalf of I. Milne.

An AEA Spinning Cylinder Test has been designed to demonstrate ductile tearing in contained yielding. Data have been collected and will be sent out to working party participants.

A meeting is planned for June in Leatherhead, U.K. to discuss ideas on a document for *"Guide-lines for structural integrity analysis"*. Those interested are asked to contact I. Milne.

WP on High Temperature Crack Growth – The report will be ready before the end of 1988. Preliminary results will be presented at ECF7 in Budapest.

WP on FM Testing Standards – The activities as illustrated by Cornec on behalf of Schwalbe, have been somewhat delayed and the deadline has undergone another postponement to November 30th, 1988.

Next Meeting

As already announced, the next meeting will be in the early spring of 1989. Venue has not been set and proposals may be sent to G. Angelino.

D. Firrao closed the meeting thanking the French organizers and in particular A. Pellissier-Tanon for having provided the opportunity for another successful meeting in a very sunny Paris. Too bad that the meeting was underground.....

Please send telefax numbers to Firrao for incorporation in the mailing list.

Task Group
Elastic-Plastic Fracture Mechanics
Working Party on Numerical FM

In 1986 the 3rd Numerical Round Robin on EPFM was completed. 20 participants contributed a total number of 104 solutions to the proposed problem (CT-like geometry, bi-linear stress-strain curve). The evaluation of the results was compiled in a draft report distributed to all participants by Dr. Larsson. At the last meeting of the Working Party in Delft, 1986, it was decided that a set of recommendations or guide-lines should be drafted by this group on how to perform a numerical elastic-plastic analysis of a cracked body. These guide-lines (small strains/small displacements) should address questions like, e.g.,

- **what minimum experience is required**
- **how the computer code can be adequately checked**
- **how to set up the mesh**
- **how to model the material law**
- **how to choose loading steps and convergence tolerances**
- **how to calculate J and CTOD**
- **how to check the results.**

Although in the meantime several among you have expressed their interest to participate, Dr. Larsson was not able to push these activities further due to his high work load at JRC and now at CEC/DG XII in Brussels. Recently, I have agreed to take over the organization of the working party. Dr. Larsson has offered his assistance for a limited period of time and especially to help in the starting phase of this activity.

The drafting of the recommendations depends heavily on your continued co-operation and assistance in this task. A practical way to proceed will be to divide the work among several groups each of which has to work out a draft for one or two problems in the above list. I should emphasize the fact that the participation of further organizations and also of other experienced persons from the old organizations could be very beneficial to this task.

So, please write Dr. Schmitt or Dr. Larsson whether you or somebody else in your organization is willing to participate and which of the problems you are interested in in the first stage. I will then put together appropriate groups which could start their work by written conversation. The starting data could be as early as May or June, 1988.

Since writing the recommendations will certainly take a lot of effort and time one might think that new Round Robin activities should not be started now. This was, at least, the consensus of the participants of the Delft meeting. On the other hand, writing the recommendations may attract other people in your organization than those actually performing the finite element work. Thus, it might be possible to start other activities parallel to the drafting of recommendations. One such activity has already been started by Prof. Mudry on problems of local approach, details of which will be communicated in separate letters and in the EGF- Newsletter. The working party will give administrative support. So, please indicate also what you think about new activities. So far, the problems "large strains/large displacements", "stable crack extension" and "dynamics" have been mentioned.

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Belgium

CRACK DYNAMICS IN METALLIC MATERIALS

Advanced School co-ordinated by J.R. Klepaczko, Université de Metz
Udine (Italy), September 5-9, 1988

Centre International des Sciences Mécaniques (CISM)

The course is devoted to such situations in fracture mechanics when rate sensitivity and inertia effects must be taken into account. Since techniques of fracture mechanics are proving to be of great value when used to assess the safety of engineering structures, the course will provide a fundamental knowledge of how to estimate fracture resistance of structural materials under a variety of loading rates and impact. During the last decade, a substantial progress has been achieved in development of experimental techniques as well as quality and number of results. The main purpose of the course is the presentation of a wide range of topics associated with dynamic crack initiation and fast crack propagation. Among other experimental techniques, an application of the Hopkinson bar concept to fracture dynamics will be demonstrated.The other topics will be: fundamentals of fracture mechanics; experimental methodology in crack initiation - the response curve method as applied to three point bend test and instrumented Charpy test; dynamics of crack propagation - mechanics of DCB specimen; caustics in reflected light as applied to elasto-plastic crack singularities; methodology of crack arrest during crack propagation; terminal crack velocity; some approaches in modelling of dynamics of crack initiation and crack propagation (the local approach); some results of numerical calculations.

The course is intended for postgraduate students,researchers and engineers who are interested in rate effects in fracture mechanics.

Lecturers

Dr. D.R. Curran – SRI International (USA)
Prof. J.F. Kalthoff – Ruhr Universität Bochum (FRG)
Prof. J.R. Klepaczko – Université de Metz (France)
Prof. F. Nilsson – Uppsala University, Uppsala (Sweden)

All lectures will be given in English. Lecture notes will be distributed by CISM to participants at the beginning of the course.

Subject List

- **Dynamics of crack propagation - mechanics of DCB specimens**
  caustics in reflected light as applied to elasto-plastic crack singularities; some analytical solutions in crack dynamics; numerical results in crack propagation.
- **Experimental methodology in crack dynamics - the response curve method**
  instrumented three point bending test; instrumented Charpy test; methodology of crack arrest during crack propagation; practical applications of experimental results.
- **Dynamic initiation of cracks - loading rate spectra in determination of K_{Ic} and J_{Ic} at high loading rates**
  experimental results; analytical models.
- **Numerical methods in crack dynamics - stress intensity factors as a function of crack velocity**
  experimental results vs. numerical calculations; terminal crack velocity.

Admission and Accomodation

The registration fee amounts to 650.000 Lire (450.000 Lire for participants on regular staff of Universities and Academies of Science).

Applicants should send their registration as early as possible indicating complete address, qualification and time of arrival/departure. The registration must be accompanied by the check or a copy of the receipt of the payment of the fee of 650.000 Lire (450.000 Lire resp).

A limited number of participants from Universities and Academies who are not supported by their own Institutions can be offered board and/or lodging in the University Residence (or a middle class hotel). **For this they should apply to the Secretariat of CISM by July 5, 1988** and enclose a letter from the Dean recommending them and confirming that the Institute has no funds for financing their participation. Preference will be given to applicants coming from countries which have adhered to CISM and contribute to its operating resources.

A list of hotels in Udine will be sent by CISM's Secretariat after receipt of the registration form or upon request. CISM may provide (to a limited number of early applicants) convenient lodging - in single or double rooms - at the University Residence at the price of approx. 12 US Dollars per person per night.

Centro Internazionale di Scienze Meccaniche (CISM)
Palazzo del Torso - Piazza Garibaldi, 18
33100 UDINE, Italy

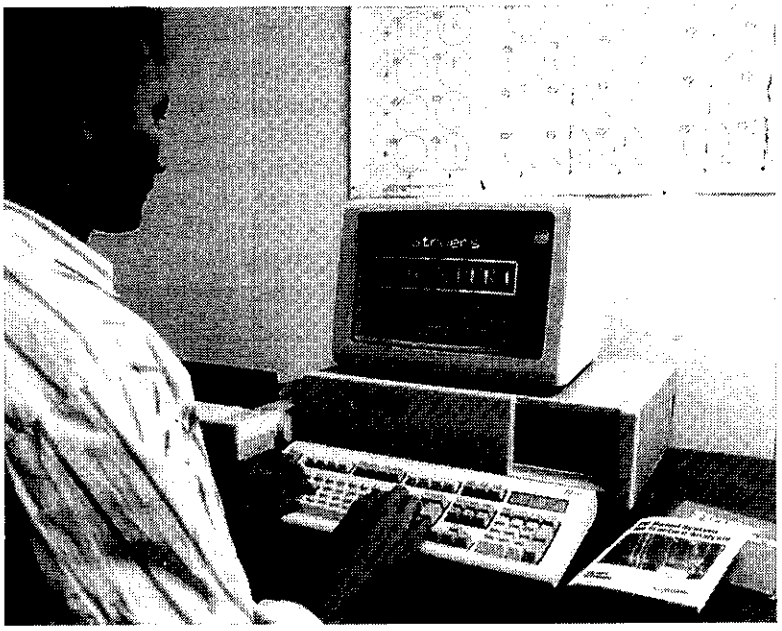
New Date and Site of

OMAE Europe '89

The OMAE (Offshore Mechanics and Arctic Engineering) Europe '89 Conference was first announced in the Agenda of the 5th (Winter 1987/1988) issue of this Newsletter to take place at Genoa (Italy) from April 2-7, 1989. In the mean time both site and date have been changed (see the Agenda for further information):

New Date : March 19-23, 1989
New Site : The Hague, the Netherlands

Computer-based Expert Systems for Materialographers



An expert system is a computer-disc, which by means of questions from the computer and replies of the operator leads to a suggestion for a solution or an explanation to a certain problem. In reality, it means systematizing the logic which any specialist is using when he/she is evaluating a situation or a case. Expert systems are known already, e.g. within the medical science.

Also in the field of materialography there are many possibilities of utilizing the idea. Struers A/S is now marketing the first three programs for metallographers in English: Frac-X-pert, Wear-X-pert and Exam-X-pert, all on PC-disc (PC = Personal Computer).

Quality control laboratories and damage analysis laboratories can use the X-pert systems to systematize evaluation and reporting. They can also use them to train new staff members.

Technical schools and universities can use the X-pert systems to give the students a more firm and objective (logic) teaching in a shorter time.

The following programs can be offered:

Frac-X-pert is an expert program for analysis of fracture and it has a menu which a.o. comprises types of fracture, causes of fracture and methods of examination, which can or should be used for fracture analysis.

Wear-X-pert is built-up as the above and is used to find types of wear and possible solutions to avoid the problems.

Exam-X-pert is a combination of Frac-and Wear-X-pert. The diagnosing considers both wear and fracture conditions, and there is special information concerning corrosion.

All three programs can be used on an IBM-compatible PC with graphic card and min. 320 kbytes RAM. For further information please contact:

Struers A/S
Valhøjs Allé 176
2610 Rødovre/København
Denmark

SYNOPSIS

D. P. G. Lidbury and E. Morland
"Review of Fracture Toughness Requirements and Data Relevant to LWR Reactor Pressure Vessels" – International Journal of Pressure Vessels and Piping, **29** (1987), pp 343-428.

A survey of current code requirements (ASME and RCC-M) relating to the fracture toughness properties of the ferritic materials used in the fabrication of PWR reactor pressure vessels is presented, together with supporting test data published in the period 1970 to 1985. These fracture toughness properties are discussed in relation to the critical sizes of defect applicable to particular regions of a PWR primary vessel for given design basis transient conditions.

The review is based on a report prepared during 1986 for the Industrial Advisory Committee on Fracture Avoidance (IACFA) under a contract funded by the Department of Trade and Industry.

Northern Research Laboratories (Risley)
United Kingdom Atomic Energy Authority
Risley, Warrington, Cheshire WA3 6AT
Great Britain.

WELDTECH 88
International Convention for Welding Technologists

WELDTECH 88, which is being organized by The Welding Institute, will be held in London during 22-25 November 1988.

The format of the Convention will be dramatically different from that used traditionally for the Institute's annual Autumn Conference.

> *"The idea is to make the Convention modular in format so that delegates can enrol on just those modules of direct interest to them. We believe this flexible approach will have greater appeal and will help to ensure that there is something for everyone"*
>
> says Tim Jessop, the Convention's Manager.

The seven main ingredients of WELDTECH 88 will be:

- **International Conference on Weld Failures** (encompassing fatigue, fracture, corrosion, inspection, product liability, lessons from past failures)
- **Symposium on the Structural Significance of Local Brittle Zones**
- **Forum for Research and Professional Members of the Welding Institute**
- **Exhibition of products and services pertinent to the theme of the International Conference**
- **The Richard Weck Lecture - to be given by Dr, T. R. Gurney, The Welding Institute**
- **Reception given by officers of The Welding Institute**
- **Spouses programme.**

Further information is available from: Gillian Selves
The Welding Institute
Abington Hall
Abington, Cambridge CB1 6AL
United Kingdom

ANNOUNCEMENT AND CALL FOR PAPERS

3rd International Conference on

STRUCTURAL FAILURE, PRODUCT LIABILITY AND TECHNICAL INSURANCE

Vienna, Austria, July 10-12, 1989

Technical University Vienna

The Third International Conference on "**Structural Failure, Product Liability and Technical Insurance**" organized by the Technical University Vienna during July 10-12, 1989, focuses on the impact and influence of fracture research, damage preventions and failure mechanics on modern advanced technology, product liability, law and technical insurance.

Original contributed papers from scientists, engineers, lawyers, managers and technical insurers of different nationalities are called for on recent advances in failure research and fracture mechanics and the impact of this technology on product liability. Contributions concerning legal and insurance aspects of engineering products are welcome. Particular emphasis will be placed on the correlation between failure preventive design and manufacturing methodology and legal and insurance aspects of product liability. The official language will be English.

The main themes of the conference will be **FAILURE ANALYSIS** and **LEGAL LIABILITY** with special emphasis on:

Materials science in the high- and low-temperature range
Vehicle damage and safety, accidents transport
Electricity generating equipment, energy conversion, etc.
Bio-technology, gen-technology
Medical engineering, dental engineering
Quality control
Liability and authorization of laboratories and testing agencies
Electronics, home-electronics
Computer and software, faults and liability
Safety, packaging, instructions, etc.
Forensic engineering, role of experts, etc.
Failure analysis and legal liability
National and international handling of structural safety and products liability
Technical insurance, risk management, quality insurance.

Law-oriented presentations and discussions will reflect continental, Anglo-American and international law practice. All the proceedings of full length papers will be published in a separate volume.

Authors are requested to submit a 300-1000 word **abstract before October 31, 1988** and the **manuscript before March 31, 1989** to the conference chairman:

Univ.Doz.Dr. H. P. Rossmanith
Institute of Mechanics
Technical University Vienna
Wiedner Hauptstrasse 8-10/325, A-1040 Vienna
Austria.

REVISED EDITION

Multilingual Collection of Terms for Welding and Allied Processes (MCT) Section 1 "General Terms"

Within the scope of the Multilingual Collection of Terms for Welding and Allied Processes (MCT), a revised edition of **Section 1 "GENERAL TERMS"** was published in twenty languages.

The revised edition had been prepared by Commission VI "Terminology" of the International Institute of Welding (IIS/IIW) and by the IIW national welding committees.

Section 1 will, in the years to come, be followed by other revised Sections of the MCT, e.g. 4 "Resistance Welding", 3 "Arc Welding" etc.

STRUCTURE

The Section consists of:

1) A methodical multilingual list of terms in a logical order. Each of these terms is given a number which is the same for all languages. In this revised edition a considerable number of terms are explained by definitions in English and French.
2) Some pages of figures illustrating terms.
3) An alphabetical index for each language where each term is followed by its number in the methodical list.

LANGUAGES

Czech, Danish, Dutch, English, Finnish, French, German, Hungarian, Italian, Macedonian, Norwegian, Polish, Portuguese, Rumanian, Russian, Serbo-Croate, Slovak, Slovene, Spanish, Swedish.

CONTENTS

- General terms for welding and allied techniques, forms of welded joints and types of welded assemblies;
- Weld preparation, joint preparation;
- Types of welds;
- Characteristics for calculations of welds;
- Welding operation, welding work;
- Welding techniques;
- Welding processes;
- Welding facilities;
- Industrial safety;
- Thermal and physical effects
- Distortion;
- Fatigue and fracture mechanics;
- Defects;
- Quality control.

Price : CHF 83 for Europe (postage included); **CHF 89** for overseas (postage included.

Other Sections available

	Price
Part 2: Gas Welding, 1982	CHF 30
Part 4: Resistance Welding, 1961	CHF 25
Part 5: Thermal Cutting, 1968	CHF 25
Part 6: Thermal Spraying, 1968	CHF 25
Part 7: Brazing, Soldering and Braze Welding, 1971	CHF 25
Part 9: Special Welding Processes, 1981	CHF 25

All the above can be obtained from: **INSTITUT ZA VARILSTVO**
(Welding Institute)
Ptujska 19
61000 Ljubljana
Yugoslavia

CALL FOR PAPERS

European Symposium on Elastic-Plastic Fracture Mechanics: *Elements of Defect Assessment*

October 9-11, 1989
Freiburg, FRG

The European Symposium on Elastic-Plastic Fracture Mechanics: Elements of Defect Assessment, will be organized by Deutscher Verband für Materialprüfung and sponsored by the **European Group on Fracture (EGF)**, Deutsche Forschungsgemeinschaft and others.

The objectives of the Symposium is to review recent theoretical and experimental developments in elastic-plastic fracture mechanics for structural assessment. On the various elements needed for structural assessment, the following topics will be particularly addressed:

- **Crack tip constraint; size and geometry effects on elastic-plastic fracture;**
- **Ductile to brittle transition: - microstructural,**
  - mechanical,
  - statistical aspects;
- **Theoretical treatment of stationary and growing cracks using J or CTOD;**
- **Flaw assessment concepts and verification.**

Particular emphasis should be placed on comparison of experiment with analysis.

The symposium will consist of invited lectures and original contributions. Prospective authors are requested to submit a 500 word abstract with one or two key illustrations to either of the Symposium chairmen by

October 1, 1988

A Symposium Committee – formed by the Symposium co-chairmen J. G. Blauel and K.-H. Schwalbe, and G. Angelino, A. Bakker, H. Clausmeyer, W. Dahl, D. François, J. Gudas, G. Irwin, J. Merkle, A. Wells and others – will decide on the acceptance for presentation and publication in the proceedings. Authors will be informed of acceptance for presentation by

January 15, 1989

For more information contact the Symposium co-chairmen:

J. G. Blauel
Fraunhofer Institut für Werkstoffmechanik
Wöhlerstraße 11
D-7800 Freiburg, FRG
phone : (0)761/5142-101
telex : 17761159 fhiwmfr d
telefax : (0)761/5142-147

K.-H. Schwalbe
GKSS-Forschungszentrum Geesthacht
Max-Planck-Straße
D-2054 Geesthacht, FRG
phone : (0)4152/87-2500/2501
telex : 0218712 gkssg
telefax : (0)4152/87-1618

Proceedings based on this Symposium are anticipated by EGF. Deadline for all manuscripts is

September 1, 1989

Papers not submitted by the deadline will not be accepted for the Proceedings. Papers submitted after the deadline will be forwarded to the EGF Journal

Fatigue and Fracture of Engineering Materials and Structures

to be considered for publication. Please contact one of the Symposium co-chairmen if you cannot meet the deadline.

AGENDA of Fatigue and Fracture Events

Agenda items are placed free of charge. Inform the editor about any fatigue and/or fracture related meeting of interest for the readers of this Newsletter.

June 8, 1988
12. Sitzung der SVMT-Fachgruppe Bruchmechanik und Ermüdung
Location : Ecole Polytechnique Fédérale de Lausanne, Switzerland
Organizer : SVMT
Language : German and French, others ask dr. Prodan
Deadlines : May 1, 1988 - announcements of contributions and registration
Inquiries : Dr. M. Prodan
Gebr. Sulzer AG
Abt. 1502
8401 Winterthur, Switzerland

June 13-15, 1988
International Conference on Life Assessment and Life Extension of Thermal Plants
Location : The Hague, the Netherlands
Organizer : NIL, the Netherlands
Sponsor : KEMA, VGB, EPRI, CRIEPI
Deadlines : to be announced later
Inquiries : NIL
Laan van Meerdervoort 2b
2517 AJ The Hague
The Netherlands
Tel. (31)70-600937

June 15-17, 1988
Third International Spring Meeting on FATIGUE CRACK GROWTH UNDER VARIABLE AMPLITUDE LOADING
Location : Paris, France
Organizer : Fatigue Commission of the French Metallurgical Society
Sponsors : ASTM et al.
Inquiries : Dr. J. Petit
ENSMA
86034 POITIERS Cedex
France

June 28-30, 1988
21st National Symposium on Fracture
Location : Annapolis MD, USA
Sponsor : ASTM Committee E24
Deadlines : August 1, 1987 - Abstracts (300-500 words)
Nov. 1, 1987 - Acceptance notice
April 1, 1988 - Final manuscripts
Inquiries : Dr. J. P. Gudas
David Tayler Naval Ship R&D Center
Metals and Welding Division, Code 281
Annapolis, MD 21402-5067
USA, Tel. (1)301/267-2841

July 4-6, 1988
International Conference on Fracture and Damage of Concrete and Rock and Special Seminar on Large Concrete Dam Structures
Location : Vienna, Austria
Organizer : TU Vienna, Institute of Mechanics
Deadlines : Nov. 30, 1987 - Abstracts (300 words)
March 31, 1988 - Full Papers
Inquiries : Doz. Dr. H. P. Rossmanith
Institute of Mechanics
Technical University Vienna
Karlsplatz 13
1040 Vienna, Austria
Tel. (43) 222-58801-3121,Telex 3 222 467 tuw

September 5-9, 1988
Advanced School on CRACK DYNAMICS IN METALLIC MATERIALS
Location : Udine (Italy)
Organizer : CISM
Inquiries : CISM
Palazzo del Torso, Piazza Garibaldi, 18
33100 Udine, Italy
Tel. (0432) 294989/501523

September 6-8, 1988
VIII. Symposium on Deformation and Fracture
Location : Magdeburg, G.D.R.
Organizer : Univ. of Technology "Otto von Guericke"
Language : German, English, Russian
Inquiries : Prof. H. Blumenauer
Tech. Universität "Otto von Guericke"
PSF 124
3010 MAGDEBURG, DDR

September 6-9, 1988
Fourth Int. Symposium on Spacecraft Materials in Space Environment
Location : Toulouse, France
Organizer : CERT, CNES, ESA
Deadlines : Feb 1, 1988 - abstracts (300 w)
Mar 21, 1988 - notification
Sep 6, 1988 - camera readey man.
Inquiries : Centre d'Études et de Recherches de Toulouse, Symposium Secr.
Ghyslaine PICCHI
B.P. 4025, 31055 Toulouse Cedex, France
Fax 61557172, Telex 521596 f

September 11-15, 1988
Sixth International Conference on Pressure Vessel Technology, ICPVT-6
Location : Beijing, China
Organizer : Chinese Pressure Vessel Inst.
Sponsor : Int. Council for Pressure Vessel Technology
Deadlines : Feb 2, 1987 - Abstracts
Sep 5, 1987 - Full papers
Inquiries : Mr. C.B. Corbett
Manager Process Ind. Devision
Inst. of Mechanical Engineers
1 Birdcage Walk, Westminster
London SW1H 9JJ, UK

AGENDA cont'd

September 19-24, 1988
Seventh European Conference on Fracture, ECF7
Location : Budapest, Hungary
Organizer : Scientific Society of Mechanical Engineers (GTE), Hungary
Sponsor : European Group on Fracture (EGF)
Deadlines : Sep. 30, 1987 - Abstracts (500 words)
Dec. 31, 1987 - Acceptance notice
March 31, 1988 - Full papers
Inquiries : Dr. E. Czoboly
Technical University Budapest
Inst. for Mechanical Technology and Materials Science
P.O. Box 451
1372 Budapest, Hungary

September 19-22, 1988
Second International Symposium on Brittle Matrix Composites
Location : near Warsaw, Poland
Deadlines : Dec. 31, 1987 - Abstracts (500 words)
Apr. 31, 1988 - Final draft of papers
Inquiries : Prof. Dr. A. M. Brandt
Polish Academy of Sciences
Inst. of Fundamental Technological Research
Swietokrzyska 21
00 049 Warsaw, Poland
or
Dr. I. H. Marshall
Paisley College of Technology
Dept. of Mechanical and Production Engineering
Highstreet
Paisley PA1 2BE, Scotland

September 26-30, 1988
20th Europhysics Conference on Macromolecular Physics
3rd Lausanne Polymer Meeting
Physical Mechanisms in Polymer Failure
Location : Lausanne, Switzerland
Organizer : European Physical Society
Section of Macromolecular Physics *et al.*
Deadlines : Dec 31, 1987 - preregistration
Inquiries : Prof. H. H. Kausch
Laboratoire de Polymères
32, chemin de Bellerive
1007 Lausanne, Switzerland
Tel. (021) 472847,Telex 450676

September 29, 1988
Symposium on Contact Fatigue
Location : Cambridge, UK
Sponsors : Cambridge Univ. Eng. Dept.
Int. Journal on Fatigue
Inquiries : Mr. A. Burrows
Int. Journal of Fatigue
Butterworth Scientific Ltd.
P.O. Box 63, Bury Street
Guildford, Surrey GU2 5BH, UK
Tel. (0463)300966 Fax (0463)301563
Telex 839556 scitegg

November 22-25, 1988
WELDTECH 88
Location : Ramada Inn, West London, UK
Organizer : The Welding Institute, Cambridge, UK
Deadlines : Dec 18, 1987 - Abstracts (500 words)
June 17, 1988 - Final manuscripts
Inquiries : Gillian Selves
The Welding Institute, Abington Hall
Abington, Cambridge CB1 6AL, UK
Tel. 0223 891162 Telex 81183 weldex g
Telefax 0223 892588

November 1988
Symposium on Evaluation and Techniques in Fractography
Location : Atlanta, Georgia, USA
Sponsor : ASTM Comm. E-9 & E-24
Deadlines : Nov 15, 1987 - abstracts (300-500 w)
Oct 1, 1988 - final manuscripts
Inquiries : Mr. Bernard M. Strauss
Teledyne, Engineering Services
130 Second Avenue
Waltham, Massechusets 02254, USA
Tel. 617/890-3350

November 1988
Symposium on Thermal and Mechanical Behaviour of Ceramic and Metal Matrix Composites
Location : Atlanta, Georgia, USA
Sponsor : ASTM Comm. D-30 & E-24
Deadlines : April 15, 1988 - abstracts (300-500 w)
Sep 1, 1988 - full papers
Inquiries : Dr. J. M. Kennedy
Dept. of Mech. Engineering
Clemson Univ.
Clemson, SC 29634-0921, USA
Tel. (803)656-5632

March 16-18, 1989
ICF7 Satellite Workshop on Advanced Composites
Location : Beach Hotel, Santa Barbara
California, USA
Organizer : Univ. of California, Santa Barbara
Sponsor : The Int. Congress on Fracture
Inquiries : Prof. A. G. Evans
Materials Department, Univ. of California
Santa Barbara, Ca 93106, USA

March 19-23, 1989
8th Int. Conference and Exhibit on Offshore Mechanics and Arctic Engineering - OMAE Europe 1989:
- **8th Offshore Mechanics and Arctic Eng. Symposium**
- **2nd OMAE Materials Technology Symposium**
- **2nd OMAE Pipeline Symposium**
- **2nd OMAE Computer Symposium**

Location : The Hague, The Netherlands
Organizer : OMAE Conf. Committee
Sponsor : ASME OMAE Division
Deadlines : June 1, 1988 - abstracts (300-400w)
June 15, 1988 - Tentative acc.
Aug 15, 1988 - Manuscripts
Dec 1, 1988 - Final acceptance
Inquiries : Prof. Jin S. Chung
Int. OMAE Conf. Committee
c/o. Colorado School of Mines
1500 Illinois Street
Golden, Colorado 80401, USA
Tel. (303) 420-8114

AGENDA cont'd

March 20-22, 1989
Fourth International Conference on Mechanical Properties of Materials at High Rates of Strain
Location : Oxford, UK
Organizer : University of Oxford, UK
Deadlines : June 1, 1988 - synopsis (500 w)
Aug 1988 - acceptance notice
Dec 1, 1988 - final manuscripts
Feb 15, 1989 - deadline registration
Inquiries Dr. J. Harding
Dept. of Engineering Science
Parks Road
Oxford OX1 3PJ, UK

March 20-24, 1989
Seventh International Conference on Fracture, ICF7
Location : University of Houston, Texas, USA
Organizer : University of Houston
Sponsor : The Int. Congress on Fracture
Deadlines : May 1, 1988 - Full papers (±8 p.)
Aug 1, 1988 - acceptance not.
Oct 1, 1988 - Camera ready man.
Inquiries : Dr. Kamel Salama
Mechanical Engineering Dept.
Un. of Houston, University Park
Houston, Texas 77004, USA
Tel. (713)749-4455 Telex 556475

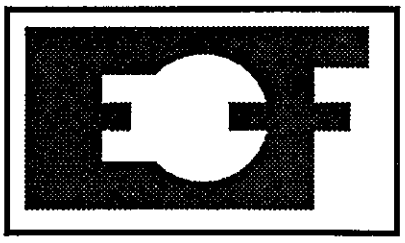
May 23-24, 1989
Symposium on The Application of Automation Technology to Fatigue and Fracture Testing
Location : Kansas City, Missouri, USA
Sponsor : ASTM Committees E-9 and E-24
Deadlines : Aug 1, 1988 - abstract (300-500 words)
Feb 1, 1989 - complete manuscripts
Inquiries : Arthur A. Braun
MTS Systems Corporation
Box 24012
Materials Testing Division
Minneapolis, MN 55424, USA
Tel. (612) 937-4045

May 25-26, 1989
Symposium on Quantitative Methods in the Assessment of Structural Defects
Location : Kansas City, Missouri, USA
Sponsor : ASTM Committees E-9 and E-24
Deadlines : Aug 1, 1988 - abstract (500 words)
Feb 1, 1989 - complete manuscripts
Inquiries : A. P. Berens
University of Dayton
Research Institute
Dayton, Ohio 45469, USA
Tel. (513) 229-4475

July 10-12, 1989
Third International Conference on STRUCTURAL FAILURE. PRODUCT LIABILITY AND TECHNICAL INSURANCE
Location : Vienna, Austria
Organizer : TU Vienna, Austria
Deadlines : Oct 1, 1988 - abstract (300-1000w)
May 31, 1989 - full papers
Inquiries : Doz. Dr. H. P. Rossmanith
Institute of Mechanics
Technical University Vienna
Wiedner Hauptstraße 8-10/325
1040 Vienna, Austria

October 9-11, 1989
European Symposium on Elastic-Plastic Fracture Mechanics: Elements of Defect Assessment
Location : Freiburg, FRG
Organizer : DVM
Sponsors : European Group on Fracture *et al.*
Deadlines : Oct 1, 1988 - Abstracts (500 words)
Jan 15, 1989 - Acceptance notice
Sep 1, 1989 - Manuscripts for proceedings
Inquiries : J. G. Blauel
Fraunhofer Institut für Werkstofmechanik
Wöhlerstraße 11
D-7800 Freiburg, FRG
phone (0)761/5142-101, telex 17761159 fhiwmfr
fax (0)761/5142-147
or
K.-H. Schwalbe
GKSS-Forschungszentrum Geesthacht
Max-Planckstraße
D-2054 Geesthacht, FRG
phone (0)4152/12-979, telex 0218712 gkssg
fax (0)4152/12-618

PLEASE HELP US with keeping this Agenda up-to-date



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