

NT2F10

Tenth International Conference

NEW TRENDS IN FATIGUE AND FRACTURE

**"Materials and structures design
against fatigue and fracture"**

METZ - France

August 30th-31st - September 1st, 2010



View of the gothic cathedral of Metz (12th century)

This Congress is placed under the auspices of



HISTORY OF NT2F CONGRESS

The Congress NT2F was founded in 2000 by the Laboratoire de Fiabilité Mécanique (Metz) as a annual meeting of the "Without Walls European Institute on Fatigue and Fracture" (WWIFF).

The congress held successively:

- NT2F1 Metz (France) April 2001
- NT2F2 Hammamet (Tunisia) May 2003
- NT2F3 Ningbo (China) November 2003
- NT2F4 Aleppo (Syria) May 2004
- NT2F5 Bari (Italy) May 2005
- NT2F6 Kranj (Slovenia) May 2006
- NT2F7 Miskolc (Hungary) May 2007
- NT2F8 Ankaran (Slovenia) October 2008
- NT2F9 Belgrade (Serbia) October 2009-11-06
- NT2F10 Metz (France) August 2010

NT2F10 OBJECTIVES

Fatigue and fracture initiation emanates generally from defects, which acts as stress concentrators. For conservative reasons and since Irwin, traditional fracture mechanics approach considers all defects as crack-like defects. In order to prevent any over conservatism, the trends is now to consider the actual geometry of a defect and particularly its acuity. From this point of view, a crack is considered as a special case of notch. This new approach, known as [Notch Fracture Mechanics](#), has received a new interest from scientists in the field of fatigue and fracture and is at present under constant development.

One of the answers to sustainable development is to use hydrogen as a energy vector. Transport and storage of hydrogen induce a series of severe problems of safety and reliability of equipment due to hydrogen embrittlement of materials under hydrogen diffusion, using of very high pressure for storage of the same equivalent energy for vehicles, and risk of ignition due to leak before break.

Fast development and extensive application of nano-structures and nano-technologies has made arising two new questions. The first one is "[how to assess safety and reliability of nano-structures](#)". The second one is "[whether theoretical approach of fracture mechanics based on an atomic model, can cover problems of crack tip, crack initiation and propagation in nano-materials](#)".

The question of transferring materials properties to actual structures is always an open question. New transferability parameters have been recently developed such as T stress or A3 parameter. A remaining question is to get an universal parameter, which is able to describe scale effects, constraint effect and loading mode.

Price of titanium and titanium alloys drastically reduced during the last decade. Now it is possible to use this material not only in weapons, aeronautics and space but also for ships, pressure vessels and prothesis. Specific codes and guidances for a large diffusion of this material are now necessary.

The exponential demand of energy has led to construction of numerous and very long oil and gas pipelines of larger diameter, working at higher service pressure and made with new class of high strength steels than it was formerly done. Traditional safety factors for safety and reliability of such a sensitive equipment need to be modified to take into account new working conditions.

TOPICS

A. Defects assessment

- at macro, micro, meso and nano level,
- non destructive testing,
- defect assessment (size, location).

B. Stress and strain analysis

- measurement, experimental methods,
- numerical analysis,
- Stress and strain distribution analysis.

C. Materials

- steel (structural, high-strength, alloyed),
- other metallic structural materials,
- plastics and composites,
- biomaterials,
- nano-materials.

D. Structure

- failure assessment,
- reliability and safety factors,
- environment effect,
- hydrogen embrittlement,
- welded joints behaviour,
- design codes and directives.

Approaches to topics can be theoretical, experimental, numerical, with attention paid to practical applications.

ORGANIZING COMMITTEE OF NT2F10

- Guy Pluinage, chairman
- Philippe Jodin, secretary
- Joseph Gilgert
- Christian Schmitt
- Julien Capelle
- Zitouni Azari

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INFORMATION

Venue and accommodation

The NT2F10 Conference will be held in Metz, capital of the Lorraine Province, located on the Mosel river, with exclusive scenery. The days in August in Lorraine are generally very pleasant, with a nice weather. NT2F10 will be organized at ENIM in cooperation with Université Paul Verlaine - Metz. Participants will be accommodated in hotels situated close to ENIM and UPVM.

Registration fees

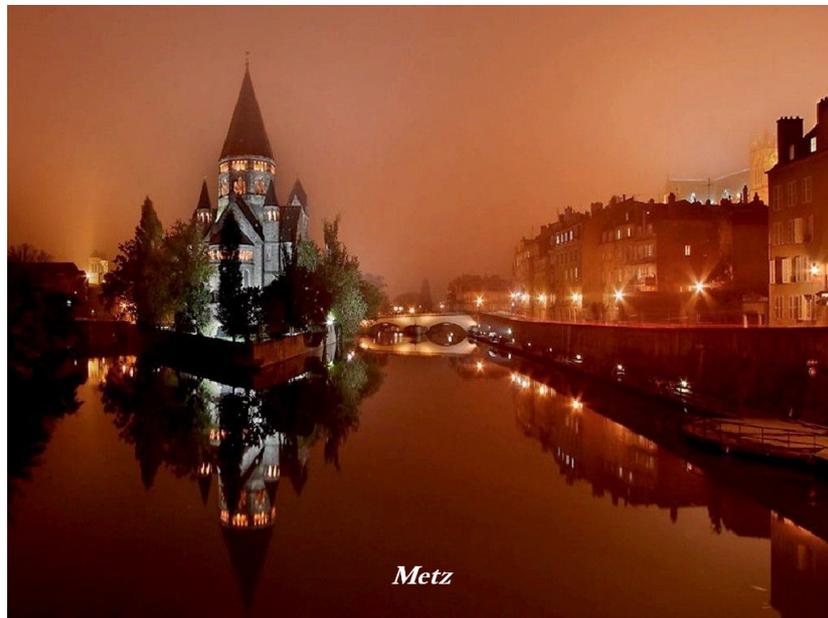
They are fixed at 350 € for each participant

Registration fees include participation to the sessions, CD with presented contributions, lunches and attendance to the Conference dinner.

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IMPORTANT DEADLINES

- **Registration:** June 1st, 2010
- **Fees payment:** July 1st, 2010
- **Full papers** for CD version: June 15th, 2010



Metz
The Old Palace

Registration form and addresses will be found on conference website:
www.lfm.univ-metz.fr/nt2f10/