

COMPTEST 2003 – FINAL PROGRAMME

Monday 27th January

16.00 - 18.00 Registration
18.00 - 20.00 Visit of City Centre

Tuesday 28th January

Morning

08.00 - 08.40 Registration
08.40 - 09.00 Conference opening
09.00 - 10.40 **Session 1**
10.40 - 11.10 Coffee Break
11.10 - 12.50 **Session 2**

12.50-14.30 Lunch

Afternoon

14.30 - 15.20 Invited lecture I
15.20 - 16.35 **Session 3**
16.35 - 18.30 **Poster session** (and coffee)

19.00 - 20.00 Cocktail party at the
City Hall of Châlons-en-Champagne

Wednesday 29th January

Morning

08.30 - 09.20 Invited lecture II
09.20 - 10.35 **Session 4**
10.35 - 11.05 Coffee Break
11.05 - 12.45 **Session 5**

12.50-14.30 Lunch

Afternoon

14.30 - 16.10 **Session 6**
16.10 - 16.40 Coffee Break
16.40 - 17.55 **Session 7**

19.00 Visit of the Joseph Perrier
Champagne Cellars and Conference Dinner

Thursday 30th January

Morning

08.30 - 09.20 Invited lecture III
09.20 - 10.35 **Session 8**
10.35 - 11.05 Coffee Break
11.05 - 12.45 **Session 9**

12.50 - 14.30 Lunch

Afternoon

14.30 - 16.35 **Session 10**
16.35 Conference closure

Invited lectures

I. Dr Richard BURGUETE, Airbus UK, Filton, UK

Industrial applications of full-field optical methods to composite materials
– session chair: **C. Soutis**

II. Professor Ron F. GIBSON, Wayne State University, USA

Analytical and experimental characterization of damping in composite materials and structures – session
chair: **F. Pierron**

III. Professor Michel GRÉDIAC, Blaise Pascal University, Clermont-Ferrand, France

Applying full-field measurements for composite materials characterization: interest and limitations –
session chair: **G. Nicoletto**

CompTest2003

28-30 January 2003 in Châlons en Champagne, France

Session 1: Damage and Failure (Chair: W.R. Broughton)

H.M.S Belmonte, S.L. Ogin, P.A. Smith, R. Lewin*

A physically-based model for the notched strength of woven quasi-isotropic CFRP laminates

School of Engineering, University of Surrey, UK

* *Rolls-Royce Plc, Derby, UK*

Z. Jendli, J. Fitoussi, F. Meraghni*, D. Baptiste

Micromechanical analysis of strain rate response on damage evolution in Sheet Moulding Compounds composites SMC-R

LM3 CNRS ESA 8006, ENSAM, Paris, France

* *LMPF Research Group, ENSAM, Châlons en Champagne, France*

G. Nicoletto, E. Riva

Failure mechanisms in twill weave laminates: FEM predictions vs experiments

Dipartimento di Ingegneria Industriale, Università di Parma, Italy

G. Hug, D. Baptiste, J. Fitoussi, P. Thévenet*

Damage analysis of carbon-fibre reinforced epoxy laminates under tensile load at intermediate strain rates

LM3 CNRS ESA 8006, ENSAM, Paris, France

* *EADS CCR, Suresnes, France*

Session 2: Mechanical Testing I (Chair: C.T. Sun)

G. Zhou, L.M. Sim, P. Brewster, A.R. Giles

Through-the-thickness mechanical properties of smart composite laminates

Department of Aeronautical and Automotive Engineering, Loughborough University, UK

Y. Masuko, M. Kawai

Application of a phenomenological viscoplasticity model to the stress relaxation behaviour of unidirectional and angle-ply laminates at high temperatures

Institute of Engineering Mechanics and Systems, University of Tsukuba, Japan

J. Harris, I. Bond, P. Weaver

Modelling and testing of designed fibre shapes in polymer composites

Department of Aerospace Engineering, University of Bristol, UK

J. Xavier, N. Garrido*, J. Morais, P. Camanho, F. Pierron*****

A comparison of shear characterization of *pinus pinaster ait.* with the Iosipescu and off-axis shear test methods

Departamento de Engenharias, CETAV/UTAD, Vila Real, Portugal

* *ESTV, Campus Politécnico, Viseu, Portugal*

** *DEMEGI/FEUP, Porto, Portugal*

*** *LMPF Research Group, ENSAM, Châlons en Champagne, France*

Session 3: Identification (Chair: A. Vautrin)

P. Feissel, O. Allix, P. Thévenet*

Identification of a delay-damage mesomodel for the localization and rupture of composites: feasibility and identification strategy

Laboratoire de Mécanique et Technologie, ENS Cachan, France

* *EADS CCR, Suresnes, France*

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M. Giton, P. Ienny*, R. Piques

Viscous hyper-elastic behaviour characterisation of a silicon-rubber by an inverse problem resolution: boundary conditions measurements by digital image correlation

Centre des Matériaux, Ecole des Mines de Paris, France

* *Centre des Matériaux de Grande Diffusion, Ecole des Mines d'Alès, France*

H. Chalal, F. Meraghni, F. Pierron, M. Grédiac

On the use of the virtual fields method for the identification of a phenomenological damage model for composite materials

LMPF Research Group, ENSAM, Châlons en Champagne, France

* *LERMES, Blaise Pascal University, Clermont-Ferrand, France*

Session 4: Fabrics (Chair: M. Kawai)

J.R. Lee, J. Molimard, Y. Surrel*, A. Vautrin

Digital phase-shifting grating shearography for experimental analysis of fabric lamina under tension

Mechanical and Materials Engineering Department, ENS des Mines de Saint-Etienne, France

* *National Institute of Metrology, CNAM, Paris, France*

B.H. Le-Page, F.J. Guild*, S.L. Ogin, P.A. Smith

Finite element simulation of woven fabric composites

School of Engineering, University of Surrey, UK

* *Department of Mechanical Engineering, University of Bristol, Bristol BS8 1TR, UK*

S.V. Lomov, I. Verpoest

Modelling the deformability of woven and braided fabrics: Compression, bi-axial tension, shear and deformed internal geometry

Department MTM, Katholieke Universiteit Leuven, Belgium

Session 5: Structures (Chair: M.R. Wisnom)

S. Avril, A. Vautrin, E. Ferrier*, P. Hamelin*, Y. Surrel**

Experimental analysis of reinforced-concrete beams repaired with CFRP sheets

Mechanical and Materials Engineering Department, ENS des Mines de Saint-Etienne, France

* *L2MS, Claude Bernard University, Lyon, France*

** *National Institute of Metrology, CNAM, Paris, France*

M. Muller, E. Toussaint, J.-F. Destrebecq, M. Grédiac

Bridging cracks with composite materials in concrete structures: Experimental study and modelling

LERMES, Blaise Pascal University, Clermont-Ferrand, France

C. Jones, P.J. Hopgood, A.B. Clarke, M.W. Jones*

The application of biaxial cruciform testing to understanding the performance of composite structures

QinetiQ, Farnborough, UK

* *Hurel Hispano, Burnley, UK*

M. Koundouros, B. Falzon, C. Soutis

Failure analysis of a composite wingbox with impact damage: - A fracture mechanics approach

Department of Aeronautics, Imperial College of Science, Technology and Medicine, London, UK

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Session 6: Viscoelasticity/Dynamic Testing (Chair: R.F. Gibson)

J. B. Kosmatka

Characterizing the dynamic properties of laminated composites with embedded electroviscoelastic materials

Department of Structural Engineering, University of California, La Jolla, USA

A. Giraudeau, F. Pierron

Simultaneous identification of anisotropic stiffness and damping properties of composites from full-field measurements: theory and simulations

LMPF Research Group, ENSAM, Châlons en Champagne, France

M. Lévesque, K. Derrien, D. Baptiste, M.D. Gilchrist

A micromechanical model for non-linear viscoelastic particle reinforced polymeric composite materials – undamaged state

LM3 CNRS ESA 8006, ENSAM, Paris, France

** Department of Mechanical Engineering, University College Dublin, Ireland*

C.T. Sun

Testing and modelling rate dependent properties of polymeric composites using off-axis specimens

School of Aeronautics and Astronautics, Purdue University, USA

Session 7: Manufacturing (Chair: S. Lomov)

P. Harrison, M.J. Clifford, A.C. Long, C.D. Rudd

A constitutive model based on meso and micro kinematics for impregnated woven continuous fibre reinforced composites

School of Mechanical, Materials, Manufacturing Engineering and Management, University of Nottingham, UK

M. Gigliotti, M.R. Wisnom*, K. Potter*

Residual curing stresses in thin [0/90] unsymmetric composite plates

Mechanical and Materials Engineering Department, ENS des Mines de Saint-Etienne, France

** Department of Aerospace Engineering, University of Bristol, UK*

A. Ragondet, F. Robitaille, A.C. Long, C.D. Rudd

Analysis of the flow enhancement medium used in the vacuum infusion process

School of Mechanical, Materials, Manufacturing Engineering and Management, University of Nottingham, UK

Session 8: Physical Properties (Chair: P. Smith)

T. Huber, A. Mohammed, H.P. Degischer

Thermal expansion behaviour of metal matrix composites

Institute of Materials Science and Testing, Vienna University of Technology, Austria

R. Sweeting, X.L. Liu

Measurement of thermal conductivity for fibre reinforced composites

Co-operative Research Centre for Advanced Composite Structures Limited, Victoria, Australia

L. Guillaumat, J.C. Batsale*, D. Mourand**

Real time infra-red image processing for the detection of delamination in composite plates

LAMEFIP-ENSAM, Talence, France

** LEPT-ENSAM (**Cellule Thermicar) UMR CNRS 8508, Talence, France*

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Session 9: Mechanical Testing II (Chair: J. Neumeister)

F. Dubois

Modelling of crack growth initiation in wood timber: an approach by the $G\theta_v$ integral

Laboratoire de Mécanique et Modélisation des Mat. et Struct. du Génie Civil, Université de Limoges, Egletons, France

C. Kyriazoglou, F. J. Guild

Crack detection in composite laminates

Department of Mechanical Engineering, University of Bristol, UK

M. Kawai

A new strength parameter and a damage mechanics model for off-axis fatigue of unidirectional composites under different stress ratios

Institute of Engineering Mechanics and Systems, University of Tsukuba, Japan

J.M. Neumeister, K.B. Petterson

Analysis of the inclined double notch shear test for composite interlaminar shear properties

Department of Solid Mechanics, Royal Institute of Technology, Stockholm, Sweden

Session 10: Applications of Optical Techniques (Chair: J. Botsis)

J.R. Lee, J. Molimard, Y. Surrel*, A. Vautrin

Application of grating shearography and speckle pattern shearography to mechanical analysis of composites

Mechanical and Materials Engineering Department, ENS des Mines de Saint-Etienne, France

** National Institute of Metrology, CNAM, Paris, France*

K.B. Petterson, J.M. Neumeister

Experimental evaluation of the inclined double notch shear test and three other interlaminar shear tests

Department of Solid Mechanics, Royal Institute of Technology, Stockholm, Sweden

J.-N. Périé, S. Calloch, C. Cluzel, F. Hild

Analysis of a shear test on a C/C composite by using digital image correlation and a damage model

Laboratoire de Mécanique et Technologie, ENS Cachan, France

R.B. Bucinell

Investigation of the state of strain at the nodal intersection of thermoplastic isogrids using speckle image photogrammetry

Department of Mechanical Engineering, Union College, Schenectady, USA

F. Bosia, J. Botsis, T. Gmür, M.A. Mostafa, L. Humbert

Experimental and numerical studies on the deformation behavior of polymer based composite plates subjected to bending

Department of Mechanical Engineering, Swiss Federal Institute of Technology, Lausanne, Switzerland

Poster Session

- P1. A. Limare, P. Dole, C. Joly, Y. Liu, B. Kurek**
Mechanics of natural fibres: characterisation of thermomechanical properties of cell wall polymers
UMR INRA/URCA FARE, Reims University, France
- P2. O. Vitrac**
Identification of diffusion coefficients from time dependent 2D concentration images in composite food packaging materials measured by UV-microscopy
Laboratory of Biotechnology of Polymer and Food Safety, UMR INRA/URCA FARE, Reims University, France
- P3. E. Riva, G. Nicoletto**
Monitoring damage in woven in woven composite laminates with the D.C. electrical method
Dipartimento di Ingegneria Industriale, Universita di Parma, Italy
- P4. P. Davies, D. Choqueuse, B. Forest, J. Sargent*, P. Casari****
Image analysis from material characterization to structural testing
Materials & Structures group, IFREMER Brest, France
* *BAE Systems, UK*
** *Laboratoire de Génie Civil de Nantes Saint-Nazaire, Nantes University, France*
- P5. R. Bouzidi**
Non-homogeneous tests for characterization of the orthotropic membrane behaviour
Laboratoire de Génie Civil de Nantes Saint-Nazaire, Nantes University, France
- P6. F. Kavicka**
A numerical model of the temperature field of the cast and solidified ceramic material EUCOR
Faculty of Mechanical Engineering, TU of Brno, Czech Republic
- P7. L. Guillaumat, D. Belin, J. Bouquet, J.C. Batsale***
A new thermal method for the crack detection in damaged composite plates-application of flash method and infrared thermography
LAMEFIP-ENSAM, Talence, France
* *LEPT-ENSAM, UMR CNRS 8508, Talence, France*
- P8. S. Feih, J. Wei, P. Kingshott**
Combined chemical and surface analysis of commercial glass fibre sizings: identification of the role of sizing composition on composite properties
Materials Research Department, Risø National Laboratory, Roskilde, Denmark
- P9. Z. Aboura, Y. Lamaa*, M.L. Benzeggagh***
On the effect of the nature of three-dimensional preforms on the mechanical properties of the CFRP
ERBEM IUT de Tremblay en France, France
* *Laboratoire Roberval de Mécanique UMR CNRS 6066, UTC, Compiègne, France*

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P10. W.R. Broughton, M.J. Lodeiro

Fatigue testing of unidirectional and cross-ply laminates
NPL Materials Centre, National Physical Laboratory, Teddington, UK

P11. J. Cugnioni, Th. Gmür, A. Schorderet

Modal identification of composite structures modelled with FSDT and HSDT laminated shell finite elements
School of Engineering, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland

P12. H. Randriambololona, F. Dubois, C. Petit

Modelling of creep behaviour of wood material subjected to environmental variation
Laboratoire de Mécanique et Modélisation des Mat. et Struct. du Génie Civil, Univ. de Limoges, Egletons, France

P13. A.R. Rashid, M.R. Wisnom, K. Potter, R. Burguete*, N. Gaugé**

Investigation of the through-thickness displacement fields by Electronic Speckle Pattern Interferometry (ESPI)
Department of Aerospace Engineering, University of Bristol, UK
** Airbus UK, Bristol, UK*
*** LMPF Research Group, ENSAM, Châlons en Champagne, France*

P14. P. Casari, A. Nordez

Field measurement of strains and displacements on a skiff composite oar during bending and navigation tests
*** Laboratoire de Génie Civil de Nantes Saint-Nazaire, Nantes University, France*

P15. H. Mizoguchi, K. Okubo, T. Fujii

Effect of water absorption on tensile properties of jute fiber reinforced plastics
Department of Mechanical Engineering, Doshisha University, Kyoto, Japan

P16. J. Wiggers, A.C. Long, C.D. Rudd

Forming characterisation of non-crimp fabrics
School of Mechanical, Materials, Manufacturing Engineering and Management, University of Nottingham, UK

P17. R. El Guerjouma, J.C. Baboux, P. Franciosi

Ultrasonic strain-stress field at large wave length for the identification of the effective elastic properties and damage evaluation of composites materials
GEMPPM, UMR CNRS 5510, INSA de Lyon, Villeurbanne, France

P18. D.D.R. Cartié, M. Troulis, S. Eberhard*, I.K. Partridge, F. Pierron*

Effects of Z-Fiber® pinning on the shear modulus of composite laminates
Advanced Materials Department, Cranfield University, UK
** LMPF Research Group, ENSAM, Châlons en Champagne, France*

P19. M. Smaali, Ch. Jochum, J.C. Grandidier*

Experimental study of fibres waviness phenomenon occurring during the cure of long fibre composites
Laboratoire de Mécanique des Structures Navales, ENSIETA, Brest, France
** Laboratoire de Mécanique et de Physique des Matériaux, UMR CNRS 6617, ENSMA, Poitiers, France*

P20. P. Ghidossi, M. El Mansori, F. Pierron

Edge machining effects on the failure of polymer matrix composite coupons
LMPF Research Group, ENSAM, Châlons en Champagne, France

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P21. M. Chaplain, G. Valentin

Modelling delayed fracture of wood beams by fracture mechanics. Application to a wood-based composite: the LVL

Laboratoire de Rhéologie du Bois de Bordeaux (LRBB), Université de Bordeaux I, France

P22. F. Pierron, Y. Poirette*, A. Vautrin**

Moisture diffusion in thick polymer composites: identification procedure and experimental results

LMPF Research Group, ENSAM, Châlons en Champagne, France

** Institut Français du Pétrole, Rueil Malmaison, France*

*** Mechanical and Materials Engineering Department, ENS des Mines de Saint-Etienne, France*

P23. J. Niklewicz, A.J. Curley

The fatigue behaviour of bonded aerospace carbon-fibre/ epoxy composite joints

Engineering School, Kingston University, London, UK

P24. J. Lee, G.A.O. Davies, C. Soutis

Modelling of low velocity impact damage and CAI of composite laminates

Department of Aeronautics, Imperial College of Science, Technology and Medicine, London, UK