

**7<sup>th</sup> BSSM International Conference on Advances in Experimental Mechanics**  
**7-9 September 2010**  
**Department of Engineering, University of Liverpool**

**Provisional Programme**

(WLT – Walker Lecture Theatre, HSLT – Hele Shaw Lecture Theatre)

Tuesday 7<sup>th</sup> September 2010

8.30 Registration [*The Street*]

9.25 Introduction and Welcome (Bob Mines) [*HSLT*]

9.30 **Keynote Lecture 1** (Chair: Bob Mines) [*HSLT*]

**Mechanical and Transport Properties of Concrete at High Temperatures**

J Eberhardsteiner (Austria)

**Session 1: Structural Health Monitoring** (Chair: Josef Eberhardsteiner) [*HSLT*]

10.15 **Detection of Cracking in Gear Teeth Using Acoustic Emission**

R Pullin, A Clarke, M J Eaton, K M Holford, S L Evans, J P McCory (UK)

10.35 **Active Sensor Arrays for Damage Detection**

P H Malinowski, T Wandowski, W Ostachowicz (Poland)

10.55 **Towards a Hybrid Infrared Approach for Damage Assessment**

R K Fruehmann, J M Dulieu-Barton, S Quinn (UK)

11.15 Refreshments [*The Street*]

**Session 2: Vibration** (Chair: Keith Worden) [*HSLT*]

11.45 **Designing a Hollow Langevin Transducer for Ultrasonic Coring**

P Harkness, A Cardoni, J Russell, M Lucas (UK)

12.05 **Experimental Modal Analysis of an Automotive Powertrain**

C Delprete, A Galeazzi, F Pregno (Italy)

12.25 **Investigation into the Damping and Stiffness Characteristics of an Elevator Car System**

I Herrera (Spain), H Su (UK), S Kaczmarczyk (UK)

12.45 **Analysis of Sensors for Vibration and Nip Forces Monitoring of Rubber Coated Rollers**

M C Voicu (Germany), R Schmidt (Germany), B Lammen (Germany), H H Hillbrand (Germany), I Maniu (Romania)

13.15 Lunch [*The Street*]

**Session 3A: Composite and Cellular Materials 1** (Chair: Geoff Turvey) [HSLT]

- 14.15 **Evaluation of Edge Cracks in Cross-Ply Laminates using Image Correlation and Thermoelastic Stress Analysis**  
G P Battams, J M Dulieu-Barton, S W Boyd (UK)
- 14.35 **Mechanical Behavior of Syntactic Foams for Deep Sea Thermally Insulated Pipeline**  
D Choqueuse, P Davies, D Perreux, L Sohier, J-Y Cognard (France)
- 14.55 **Analysis of the Strain and Stress Fields of Cardboard Box during Compression by 3D Digital Image Correlation**  
J Viguié, P J J Dumont, P Vacher, L Orgéas, I Desloges, E Mauret (France)
- 15.15 **Correlation between Full-Field Measurements and Numerical Simulation Results for Multiple Delamination Composite Specimens in Bending**  
C Devivier (UK), D Thompson (UK), F Pierron (France), M R Wisnom (UK)
- 15.35 **Towards a Planar Cruciform Specimen for Biaxial Characterisation of Polymer Matrix Composites**  
M R L Gower, R M Shaw (UK)

**Session 3B: Novel Sensor Technology** (Chair: Simon Quinn) [WLT]

- 14.15 **Measurement of Mechanical Strain using Chromatic Monitoring of Photoelasticity**  
C Garza, A G Deakin, G R Jones, J W Spencer, K K B Hon (UK)
- 14.35 **Development of a Methodology to Assess Mechanical Impulse Effects Resulting from Lightning Attachment to Lightweight Aircraft Structures**  
C A Featherston, M Eaton, S L Evans, K M Holford, R Pullin, M Cole (UK)
- 14.55 **A Laser Speckle Method for Measuring Displacement Field. Application to Resistance Heating Tensile Test on Steel**  
C Pradille, M Bellet, Y Chastel (France)
- 15.15 **Characterisation of Full-Field Deformation Behaviour using Digital Imaging Techniques**  
Y H Tai, M Zanganeh, D Asquith, J R Yates (UK)
- 15.35 **Digital Holographic Interferometry by using Long Wave Infrared Radiation (CO<sub>2</sub> Laser)**  
I Alexeenko (Germany), J-F Vandenrijt (Belgium), M Georges (Belgium), G Pedrini (Germany), T Cédric (Belgium), W Osten (Germany), B Vollheim (Germany)
- 15.55 Refreshments [*The Street*]

**Session 4: Civil Engineering** (Chair: Wieslaw Ostachowicz) [HSLT]

- 16.25 **Size of the Fracture Process Zone in High-Strength Concrete at a Wide Range of Loading Rates**  
R C Yu, X X Zhang, G Ruiz, M Tarifa, M Cámara (Spain)
- 16.45 **Practical In-Situ Applications of DIC for Large Structures**  
N J McCormick, J D Lord (UK)

- 17.05 **From the Inside, Out: Use of Optical Measuring Techniques for Wind Turbine Development**  
A Stanley (UK), M Klein (Germany)
- 17.25 **Details of Temperature Compensation for Strain Measurements on NPL Bridge - Demonstrator for SHM**  
E N Barton, B Zhang (UK)
- 17.45 **Effect of Loading Rate on the Fracture Behaviour of High-Strength Concrete**  
G Ruiz, X X Zhang, R C Yu, E Poveda, R Porras, J del Viso (Spain)
- 18.15 Drinks Reception [*The Street*]
- 19.30 Dinner at Egos, Hope Street (Pre-Registration Required – not included in conference delegate fee)

Wednesday 8<sup>th</sup> September 2010

**Session 5A: Non Linear Behaviour** (Chair : Margaret Lucas) [*HSLT*]

- 08.30 **Numerical Prediction of the Response of Metal-to-Metal Adhesive Joints with Ductile Adhesives**  
N G Tsouvalis, K N Anyfantis (Greece)
- 08.50 **Experimental Characterization of the Viscoplastic Material Behaviour of Thermosets and Thermoplastics**  
M Kästner, S Blobel, M Obst, K Thielsch, V Ulbricht (Germany)
- 09.10 **Strain Evolution Measurement at the Microscale of a Dual Phase Steel using Digital Image Correlation**  
H Ghadbeigi, C Pinna, S Celotto, J R Yates (UK)
- 09.30 **Biaxial Ratcheting Response of SS 316 Steel**  
R Suresh Kumar, C Lakshmana Rao, P Chellapandi (India)
- 09.50 **On the Mutual Interactions of Monotonic and Cyclic Loading and their Effect on the Strength of Aluminium Alloys**  
Z L Kowalewski, T Szymczak (Poland)

**Session 5B: Fracture and Damage** (Chair: Stefan Kaczmarczyk) [*WLT*]

- 08.30 **Validation of Acoustic Emission (AE) Crack Detection in Aerospace Grade Steels Using Digital Image Correlation**  
R Pullin, M J Eaton, J J Hensman, K M Holford, K Worden, S L Evans (UK)
- 08.50 **Towards the Derivation of Stress Intensity Factors by Parametric Modelling of Full-Field Thermoelastic Data**  
R I Hebb, J M Dulieu-Barton, K Worden, P Tatum (UK)

- 09.10 **A SEM-Based Study of Structural Impact Damage**  
M T H Sultan, A Hodzic, W J Staszewski, K Worden (UK)
- 09.30 **Application of Real-Time Photoelastic Analysis to Single Fibre Fragmentation Tests**  
S Blobel, K Thielsch, M Kästner, V Ulbricht (Germany)
- 09.50 **Characterization of Fiber Bridging in Mode II Fracture Growth of Laminated Composite Materials**  
K N Anyfantis, N G Tsouvalis (Greece)
- 10.10 Refreshments & Exhibition [*Floor 3, Active Learning Laboratory*]
- Session 6A: Residual Stresses** (Chair: Jerry Lord) [*HSLT*]
- 10.40 **Evaluation of the Impact of Residual Stresses in Crack Initiation with the Application of the Crack Compliance Method (Part I, Numerical Analysis)**  
G Urriolagoitia-Sosa, B Romero-Ángeles, L H Hernández-Gómez, G Urriolagoitia-Calderón, J A Beltrán-Fernández, C Torres-Torres (Mexico)
- 11.00 **Evaluation of the Impact of Residual Stresses in Crack Initiation with the Application of the Crack Compliance Method (Part II, Experimental Analysis)**  
G Urriolagoitia-Sosa, B Romero-Ángeles, L H Hernández-Gómez, G Urriolagoitia-Calderón, J A Beltrán-Fernández, C Torres-Torres (Mexico)
- 11.20 **Mapping Residual Stress Profiles at the Micron Scale using FIB Micro-Hole Drilling**  
B Winiarski, P J Withers (UK)
- Session 6B: Biomechanics** (Chair: Richard Burguete) [*WLT*]
- 10.40 **Acetabular Component Deformation under Rim Loading using Digital Image Correlation and Finite Element Method**  
H Everitt, S L Evans, C A Holt, R Bigsby, I Khan (UK)
- 11.00 **Skin Thermal Effect by FE Simulation and Experiment of Laser Ultrasonics**  
C Li, S Li, Z Huang, W Xu (UK)
- 11.20 **Biomechanics and Numerical Evaluation of Cervical Porcine Models Considering Compressive Loads using 2-D Classic Computer Tomography CT, 3-D Scanner and 3-D Computed Tomography**  
J A Beltran-Fernández, L H Hernández-Gómez, G Urriolagoitia-Calderón, A González-Rebatú, G Urriolagoitia-Sosa (Mexico)
- 11.40 **Exhibitors' Presentations** [*HSLT*]
- 12.40 Lunch & Exhibition [*Floor 3, Active Learning Laboratory*]
- 14.00 **BSSM Young Stress Analyst Competition** (Chair: Simon Quinn) [*HSLT*]
- 15.00 Refreshments & Exhibition [*Floor 3, Active Learning Laboratory*]

15.30 **BSSM Measurements Lecture** (Chair : Judith Shackleton) [HSLT]

**Aspects of Uncertainty Analysis for Large Nonlinear Computational Models**  
K Worden (UK)

16.30 **BSSM Annual General Meeting** (for BSSM members only) [HSLT]

19.30 Reception & Conference Dinner, Merseyside Maritime Museum

Thursday 9<sup>th</sup> September 2010

09.00 **Keynote Lecture 2** (Chair: Fabrice Pierron) [HSLT]

**Experimental Characterisation of Parameters Controlling the Compressive Failure of Pultruded Unidirectional Carbon Fibre Composites**  
O T Thomsen (Denmark)

**Session 7: Manufacturing Processes** (Chair: Ole Thybo Thomsen) [HSLT]

09.45 **Spot Weld Strength Determination using the Wedge Test: In-situ Observations and Coupled Simulations**

R Lacroix, J Monatte, A Lens, G Kermouche, J-M Bergheau, H Klöcker (France)

10.05 **Improving Fatigue Performance of Alumino-Thermic Rail Welds**

M Jezzini-Aouad, P Flahaut, S Hariri, D Zakrzewski, L Winiar (France)

10.25 **The Effect of Ultrasonic Excitation in Metal Forming Tests**

S Abdul Aziz, M Lucas (UK)

10.45 **Modeling of Coating Stress of Plasma-sprayed Thermal Barrier Coatings**

M Arai (Japan)

11.05 Refreshments [*The Street*]

**Session 8A: Impact and Dynamics** (Chair: Gonzalo Ruiz) [HSLT]

11.25 **Tensile Properties of Die-Cast Magnesium Alloy AZ91D at High Strain Rates in the Range between 300<sup>s<sup>-1</sup></sup> and 1500<sup>s<sup>-1</sup></sup>**

I R Ahmad, S D Wei (Singapore)

11.45 **The Dynamic Buckling of Stiffened Panels – A Study using High Speed Digital Image Correlation**

C A Featherston, J Mortimer, M Eaton, R L Burguete, R Johns (UK)

12.05 **Finite Element Model Updating of a Thin Wall Enclosure under Impact Excitation**

O S David-West, J Wang, R Cooper (UK)

12.25 **What We Can Learn About Stick-Slip Dynamics**

F di Liberto, E Balzano, M Serpico, F Peruggi (Italy)

- 12.45 **Determination of High Strain-Rate Compressive Stress-Strain Loops of Selected Polymers**  
T Yokoyama, K Nakai (Japan)

**Session 8B: Identification** (Chair: Rhys Pullin) [WLT]

- 11.25 **Identification of the Shape of Curvilinear Beams and Fibers**  
M L M François, B Semin, H Auradou (France)
- 11.45 **Construction of Shape Features for the Representation of Full-Field Displacement/Strain Data**  
W Wang (UK), J E Mottershead (UK), A Patki (USA), E A Patterson (USA)
- 12.05 **An Innovative Own-Weight Cantilever Method for Measuring Young's Modulus in Flexible Thin Materials Based on Large Deflections**  
A Ohtsuki (Japan)
- 12.25 **Identification of the Mechanical Properties of Superconducting Windings using the Virtual Fields Method**  
J-H Kim, F Nunio, F Pierron, P Vedrine (France)
- 12.45 **Measuring the Static Modulus of Nuclear Graphite from Four-Point Flexural Strength Tests and DIC**  
J D Lord, N J McCormick, J M Urquhart, G M Klimaytys, I J Lingham (UK)

- 13.05 Lunch [*The Street*]

**Session 9: Composite and Cellular Materials 2** (Chair: Janice Barton) [HLT]

- 13.45 **Experimental and Numerical Buckling Analysis of Delaminated Hybrid Composite Beam Structures**  
M M Nasr Esfahani, H Ghasemnejad, P E Barrington (UK)
- 14.05 **Effects of Bonded Splice Joints on the Flexural Response of Pultruded Fibre Reinforced Polymer Beams**  
G J Turvey (UK)
- 14.25 **Assessment of Quasi-Static and Fatigue Loaded Notched GRP Laminates Using Digital Image Correlation**  
W R Broughton, M R L Gower, M J Lodeiro, G D Pilkington, R M Shaw (UK)
- 14.45 **Comparison of the Drop Weight Impact Performance of Sandwich Panels with Aluminium Honeycomb and Titanium Alloy Micro Lattice Cores**  
R Hasan, R Mines, E Shen, S Tsopanos, W Cantwell, W Brooks, C Sutcliffe (UK)
- 15.05 **Viscoelastic Characterization of Short Fibres Reinforced Thermoplastic in Tension and Shearing**  
A Andriyana (Malaysia), L Silva (France), N Billon (France)

**Session 10: Education** (Chair: Janice Barton) *[HLT]*

15.25 **The Role of Experimental Stress Analysis at Graduation and Post Graduation Courses - A Brazilian Case**

R J P C Miranda, P Domingues, L M Zamboni, J C Salamani (Brazil)

15.45 Refreshments and Finish *[The Street]*