17th International Conference on

Fracture and Damage Mechanics

4-6 September 2018

Seville, Spain

Final Programme

Conference venue: NH Sevilla Plaza de Armas (Seville)
Marqués de Paradas, s/n. 41001 Seville - Spain

Instructions for Speakers

Speakers Guidelines

Each session will be allocated a Chairperson responsible for introducing the speaker, controlling the timing of the sessions and facilitating questions.

Prior to the Conference

Please ensure that you check the conference program carefully to confirm your presentation day and time.

Ensure overhead projections / power point slides contain minimal information and are in print large enough to read from all parts of the room. Body text should be at least 26 points, in a clear font with a background, which contrasts with the print. Avoid highly patterned backgrounds or overcrowding of charts or photographs.

Prior to your Presentation

10 minutes prior to your session commencing, we ask that you proceed to your allocated room to meet with your session Chairperson.

Audio Visual Setup

There will be a PC and Beamer in each room with Microsoft Powerpoint and Adobe Acrobat Reader.

On the desktop Folders are created for each session (i.e. Session 1, …Session 7 etc.). Please copy your file on to the appropriate folder on the desktop.

During Your Presentation

Presentations **are limited to 20 minutes** (which allows for 5 minutes for questions and answers). If your presentation exceeds the time limit you will be asked to stop because this will disrupt scheduling and encroach on the next speakers time slot (please be considerate).

Session Chairperson Guidelines

The Chairperson's role on the day is to:

- Meet each speaker in the room that you will be chairing 10 minutes prior to your session commencing.
- Introduce yourself to each speaker
- Keep a 'keen eye' on the agenda's timing and to keep the conference flowing and on schedule. **If a speaker is missing, please move on to the next paper.** In this case please allocate more time for questions.
- Thank each speaker at the conclusion of their speech.
- Invite questions to the speaker/s at the conclusion of their presentations (when time allows) and encourage discussion between audience and speaker/s. When necessary the Chairperson may exercise the 'Chairperson's prerogative' to ask questions.
- 'Field' questions in an orderly manner and repeat questions if necessary.
- Introduce yourself to each speaker.

Tuesday 4th September	
8.00 Registration	
8.45 Opening Address and Welcome	
9.00 Keynote Lecture: concepts on Fracture and Damage in Composites, Prof. Federico Paris	
Session A1 ***Chair: E. Correa***	**Session B1** ***Chair: A. González-Herrera***
9.30 Numerical Study of the Progression of the Micromechanical Debonding Damage in Composites M.L. Velasco, F. París and E. Correa	**9.30** Mechanical Properties and Fatigue Resistance of 3D Printed Inconel 718 in Comparison with Conventional Manufacture I. Černý, J. Kec, T. Vlasák, L. Remar, M. Jersák and M. Zetek
9.50 Convergence of the BEM Solution Applied to the CCFFM for LEBIM, M. Muñoz-Reja, L. Távara and V. Mantič	**9.50** The Role of Post Service Heat Treatment on the Contributions of Creep Deformation and Fracture to Service Life of AISI Type 316H Steel Components (Invited) A.D. Warren, B. Chen, I. Griffiths and P.E.J. Flewitt
10.10 On the Thickness Dependence of ILTS in Curved Composite Laminates P.L. Zumaquero, J. Justo and E. Graciani	**10.10** Measuring Wear in a Fretting Test with a Confocal Microscope,G. Jordano, C. Navarro, J. Vázquez and J. Domínguez
10.30	**Coffee Break**
Session A2 ***Chair: E. Correa***	**Session B2** ***Chair: M. Kotoul***
10.50 Analysis of 3D printed trapezoidal interfaces by means of a novel cohesive-based theoretical approach. *Lorenzo García-Guzmán, Luis Távara, José Reinoso, Jesús Justo, Federico París.*	**10.50** Stress Intensity Factors for Cracks Emanating from a Notch under Shear-Mode Loading J. Horníková, P. Šandera, S. Žák and J. Pokluda
11.10 Overview of Gc tests used to evaluate composite-composite adhesive joints José Cañas, Antonio Blázquez, Alejandro Estefani, Luis Távara	**11.10** Modelling Cracked Cross-Ply Laminates with Delamination Buckling A. Köllner, M. Kashtalyan, I. Guz and C. Völlmecke
11.30 Sequentially linear analysis used to model the symmetrical or not symmetrical character of the debond onset and propagation along a fibre-matrix interface. *Laura Moreno, Luis Távara, Elena Correa, Federico París*	**11.30** Determination of Mixed-Mode Cohesive Zone Failure Parameters Using Digital Volume Correlation and the Inverse Finite Element Method J.Y.S. Li-Mayer, M. Martinez, J. Lambros and M.N. Charalambides
11.50 Effect of Water Temperature on Interfacial Shear Strength of Resin Particles Added CFRTP H. Katogi, K. Takemura and M. Mochizuki	**11.50** A Quasi-Static Delamination Model with Rate-Dependent Interface Damage Exposed to Cyclic Loading R. Vodička and K. Krajníková
12.10 Evaluation of the Apparent Interfacial Shear Strength of Nanocellulose/PVA Composites J. Andersons, I. Filipova, M. Kirpluks and U. Cabulis	**12.10** Key Aspects in 3D Fatigue Crack Closure Numerical Modelling A. González-Herrera, D. Camas and J. Garcia-Manrique
12.30	**Lunch**
Session A3 ***Chair*: O.A. González-Estrada**	**Session B3** ***Chair: M. Martinez***
14.00 Accurate SIF Analysis of a Partially Cylindrical Side Crack Opened by Far-Field	**14.00** Investigation of the Biaxial Behaviour of 316 Stainless Steel Based on Critical Plane

Tension Y. Sonobe, T. Ino, A. Saimoto, T. Takase, A. Koyama and G. Shatil **14.20** Comparison of Fracture Tests Numerical Models Created with Real Material Properties J. Klon and J. Sobek **14.40** Numerical Analysis of the Failure Behavior of a C50/60 Brazilian Disc Test Specimen with a Central Notch P. Miarka, S. Seitl and W. de Corte **15.00** Prediction of the Critical Energy Release Rate of Nanostructured Solids Using the Laplacian Version of the Strain Gradient Elasticity Theory M. Kotoul, P. Skalka, T. Profant, M. Friák, P. Řehák and P. Šesták **15.20** Dynamic Fracture by Focusing on Flexural Wave, Valentin van Gemmeren	Method A.S. Cruces, P. Lopez-Crespo, B. Moreno, S. Bressan and T. Itoh **14.20** Bending Fatigue Behavior of 7075-Aluminum Alloy E.V. Arcieri, S. Baragetti and E. Borzini **14.40** Characterization of Adhesion Properties by Delamination of Ceramic-Metal Interfaces in Four Point Bending M. Lederer, A. Betzwar Kotas, G. Khatibi and H. Danninger **15.00** Structural Health Monitoring of Scarfed Repaired Composite Panels Using Inject-Printed Patterns D.G. Bekas, Z. Sharif Khodaei and F.M.H. Aliabadi **15.20** Investigation of Integral Composite T-Joints under Mixed Mode Loading F. Nolte, A. Hannig and P. Horst
15.40	**Coffee Break**
Session A4 ***Chair: J.Dominguez***	**Session B3** ***Chair*: *W. de Corte***
16.00 Trial Fabrication of Carbon Fiber-Reinforced Thermoplastic Honeycomb Sandwich Materials H. Takagi, K. Nishimura and A.N. Nakagaito **16.20** Investigation on Strength and Damage Test of Composite Blade for Vertical Axis Wind Turbine H.B. Park **16.40** Fatigue Assessment of a Slender Footbridge Based on an Updated Finite Element Model J. Pérez-Aracil, A.M. Hernandez-Díaz, J.F. Jiménez-Alonso and F.J. Puerta-Lopez **17.00** Prediction of Fatigue Life of Structural Steel S355-J2G3 with SK Critical Plane Model A.S. Cruces, P. Lopez-Crespo, S. Sandip and B. Moreno **17.20** Failure Analysis of the Restraining System of the Directional Rudder of an MD80 Aircraft J. Coronado, K. Mendoza and M. Martinez **17.40** Numerical Analysis of the Pivot Node in Fracture Problems J. Garcia-Manrique, D. Camas, A. Lima-Rodriguez and A. González-Herrera	**16.00** A Microstructural Model for Micro-Cracking in Piezoceramics I. Benedetti, V. Gulizzi and A. Milazzo **16.20** A Phase Field Staggered Algorithm for Fracture Modeling in Heterogeneous Microstructure K. Seleš, T. Lesičar, Z. Tonković and J. Sorić **16.40** A FEM Simulation of the Mechanical Interaction between Asphalt Mixture and Geogrid at Micro-Scale F. Suraci, M. Buonsanti, G. Leonardi and R. Palamara **17.00** Computational Analysis of Crack-Like Defects Influence on the Open Cell Ceramic Foam Tensile Strength O. Ševeček, Z. Majer, P. Marcián, L. Bertolla and M. Kotoul Finite Element Analysis for Palm Oil Bunches **17.20** A Computational Study on Crack Propagation in Bio-Inspired Lattices R. Manno, W. Gao and I. Benedetti
19.30	**Conference Reception**

Wednesday 5th September	
Session A5: **Chair: J. Varna**	**Session B5:** **Chair: *A. de Luca***
9.00 How Material Properties Affect the Thermal Distortion of a Mold for Continuous Casting of Steel L. Moro, J. Srnec Novak, D. Benasciutti and F. de Bona **9.20** Experimental Verification of Dents Effect on the Structural Integrity of Pipeline DN 300 J. Kec, I. Černý, J. Luštinec, M. Poupa, R. Pavelková and J. Janovec **9.40** Interrelationship between Creep Deformation and Damage for Advanced Creep-Resistant Steels V. Sklenička, K. Kuchařová, M. Kvapilová, L. Kloc, J. Dvorak and P. Král **10.00** High temperature combined fatigue tests on full-scale turbine blades (Invited Paper), Xiaojun Yan, Xiaoyu Qin, Dawei Huang **10.20** Effect of Water Immersion on Interfacial Strength of a Metal/Epoxy Joint Y. Yamazaki and K. Kudo	**9.00** A Thermodynamically Consistent CZM for Low-Cycle Fatigue Analysis F. Parrinello, I. Benedetti and G. Borino **9.20** Flexoelectric Effect for Cracks in Piezoelectric Solids J. Sladek, V. Sladek, M. Wünsche and C.L. Tan **9.40** Application of Singular Integral Equation to a Crack Moving near a Hole in a Two-Dimensional Infinite Plate M. Arai and K. Yoshida **10.00** Transfer Matrix Analysis for Curved Beam Structure S. Kuroda, M. Arai and K. Ito **10.20** A viscoplastic constitutive model for low cycle fatigue deformation behavior of FGH96 superalloy at high temperature, Miaodong Zhao, Dianyin Hu, Bin Zhang, Rongqiao Wang
10.40	**Coffee Break**
Session A6 ***Chair: Xiaojun Yan***	**Session B6** ***Chair: J. Horníková***
11.00 Characterization and Modelling of Multiple Intralaminar Cracking Initiation under Tensile Quasi-Static and Fatigue Loading H. Ben-Kahla and J. Varna **11.20** Influence of the Deformation Rate on the Delamination of Laminated Composite Materials C. López-Taboada, G. Castillo-López, H. Zabala, L. Aretxabaleta and F. García-Sánchez **11.40** Study on Nondestructive Inspection Method of Single-Lap Adhesive Joints to Eliminate the Influence of Inspector's Behavioral Characteristics G. Hotta, Y. Ohbuchi and H. Sakamoto **12.00** Strength Development Characteristic of Cementless Mortar for Repair of Concrete G.S. Ryu, K.T. Koh, G.H. An, H.Y. Kim and S. Choi **12.20** The Effect of Explosion in a Tunnel Tube on its Damage P.P. Prochazka and M.J. Válek	**11.00** Guided-Waves in a Low Velocity Impacted Composite Winglet A. de Luca, D. Perfetto, G. Petrone, A. de Fenza and F. Caputo **11.20** Optimization of Design Parameters of Fracture Resistant Piezoelectric Vibration Energy Harvester Z. Majer, O. Ševeček, Z. Machů, K. Štegnerová and M. Kotoul **11.40** An Effective Impact Detection Method for Composite Curved Panel A.H. Seno, Z. Sharif Khodaei and F.M.H. Aliabadi **12.00** Stress Sensitivity of the T(0,1) Mode Velocity for Cylindrical Waveguides J.E. Quiroga Mendez, O.A. González-Estrada and Y.R. Ordonez **12.20** Guided Wave Based Damage Detection in a Composite Plate with an Opening N.G. Ming and Z. Sharif Khodaei
12.40	**Lunch**

Session A7 ***Chair:* H. Biscaia**	**Session B7** ***Chair: O.A. González-Estrada***
14.00 Elastic Properties and Failure Behavior of Tiled Laminate Composites W. de Corte, A. Jansseune, W. van Paepegem and J. Peeters **14.20** Proposal of Strain-Based Acceptance Criteria for Structural Integrity Assessment of Nuclear Safety Class 1 Piping under Beyond-Design Basis Earthquake, Jong-Sung Kim **14.40** An optimization method of turbine disk welded joint performance base on material microstructure analysis, Shaojing Dong, Xiuli Shen, Kun Gao **15.00** Thermo-Mechanical Behaviour of a Composite Stiffened Panel Undergoing the Tail-Pipe Fire Event A. Riccio, A. Sellitto, S. Saputo, G. Conte and M. Zarrelli **15.20** Influence of Thickness on Tensile Property of Copper Foil T. Fujii, K. Tohgo, Y. Noda, T. Yamada and Y. Shimamura	**14.00** Effect of Press Condition on the Mechanical Properties of GFRTP Molded by the Melted Thermoplastic-Resin Transfer Molding K. Tanaka, A. Hirata and T. Katayama **14.20** Effect of CNT Grafting on Carbon Fibers on Impact Properties of CFRTP Laminate K. Tanaka, K. Uzumasa and T. Katayama **14.40** Effect of High Temperature Environment on the Tensile Strength of Carbon Fiber/Highly Heat Resistant Polyamide Resin K. Tanaka, T. Takei and T. Katayama **15.00** Development of Gun Bullet Protect Board - Gun Bullet Experiment and Analysis - S. Fukuzaki, Y. Ohbuchi, K. Gotoh, H. Hata, T. Katayama, E. Nakamachi and H. Sakamoto **15.20** Compression-Loaded Cracked Cylinder - Stress Intensity Factor Evaluation P. Dlhý, J. Poduška, L. Náhlík, M. Berer, A. Gosch, G. Pinter and P. Hutař
15.40	**Coffee Break**
Session A8 **Ch*air:* A.Selitto**	**Session B8** ***Chair*: F. García-Sánchez**
16.00 Cohesive Zone Modeling of Stable Crack Propagation in Highly Ductile Steel A. Burgold, S. Roth and M. Kuna **16.20** Comprehensive Numerical Simulation of Stress and Damage Fields under Thermo-Mechanical Loading for TBC-Coated Ni-Based Superalloy H. Katori, M. Arai and K. Ito **16.40** Strain Injection Techniques for Modeling 3D Crack Propagation I.F. Dias, J. Oliver and O. Lloberas-Valls **17.00** An Approach to Predict Creep Strain and Rupture Life of Heat Resistant Steels Based on ZC Parameter J. Zhao, T.S. Cao, X.Y. Liu and C.Q. Cheng **17.20** Statistical Inference of the Equivalent Initial Flaw Size Distribution Using the Boundary Element Method under Multiple Sources of Uncertainty L. Morse, Z. Sharif Khodaei and F.M.H. Aliabadi **17.40** A NURBS-BEM Application in Continuum Damage Mechanics V. Mallardo, E. Ruocco and G. Beer	**16.00** Bending Properties of CFRTP Laminate Using CNT Grafted Carbon Fiber K. Tanaka, M. Kawabe and T. Katayama **16.20** Application of Embedded Element in the Short Fiber Reinforced Composite J.H. Gao, X.X. Yang and L.H. Huang **16.40** Creep D amage Mechanisms in Cast Cobalt Superalloys for Applications in Glass Industry M. Kvapilová, B. Podhorná, J. Dvorak, P. Král, J. Zýka, K. Hrbáček and V. Sklenička **17.00** Shortening the Long Creep Strength Evaluation Period with the Assistant of Stress Relaxation Behavior T.S. Cao, C.Q. Cheng and J. Zhao **17.20** Study on Compression Creep Properties of Metal Rubber, Yanhong Ma, Bo Li, Jie Hong **17.40** Investigation on Damage and Failure of Vinyl Composite Plate under Tensile Load Z.L. Chang, Y.L. Li and G.P. Zou
20.30	**Conference Banquet**

Thursday 6th September	
Session A9: ***Chair:* J.E. Quiroga Mendez**	**Session B9:** ***Chair: I. Benedetti***
9.00 Effect of the Type of Silica Fume and Filler on Mechanical Properties of Ultra High Performance Concrete K.T. Koh, S.H. Park, G.S. Ryu, G.H. An and B.S. Kim **9.20** An Influence of Tightening Torque Stored in Tightening Process on Fatigue Strength of Aluminum Bolts S. Hashimura, T. Nutahara and K. Kamibeppu **9.40** Disappearance of Martensitic Strengthened-Micro-Texture in Modified 9Cr-1Mo Steel Caused by Stress-Induced Acceleration of Atomic Diffusion at Elevated Temperatures, T. Shinozaki, K. Suzuki and H. Miura **10.00** Research on Strength Design of Channel Clips for Suspended Ceilings S. Enoki, Y. Shibayama, M. Saito, J. Ito, Y. Nakamura and T. Ohata **10.20** Cold-Drawn Pearlitic Steels as Hierarchically Structured Materials: An Approach to Johann Sebastian Bach J. Toribio	**9.00** Mechanical Response and Damage of Woven Composite Materials Reinforced with Fique O.A. González-Estrada, G. Díaz and J.E. Quiroga Mendez **9.20** Cyclic Loading Behaviour of Double Strap Bonded Joints with CFRP and Aluminium H. Biscaia, R. Micaelo, C. Chastre and J. Cardoso **9.40** Damage in Fibreglass Composite Laminates Used for Pipes J.S.B. León, O.A. González-Estrada and A. Pertuz **10.00** Evaluation of Tensile Properties and Damage of Continuous Fibre Reinforced 3D-Printed Parts O.A. González-Estrada, A. Pertuz and J.E. Quiroga Mendez **10.20** Analysis of the Analytical and Numerical Studies for Crack Widening in Lamellar Metal-Ceramic Composites R. Piat and P.A. Happ
10.40	***Coffee Break***
Session A10: **Chair:*J.Toribio***	**Session B10** ***Chair: R. Piat***
11.00 Damage Assessment of Spinal Bones due to Prostate Cancer ,S.A.A. Parra, O.A. González-Estrada and J.E. Quiroga Mendez **11.20** Modeling, Simulation, and Experimentation of Fatigue Behavior in Amorphous Solids T. Barriere, G. Cheng and S. Holopainen **11.40** An optimization method of turbine disk welded joint performance base on material microstructure analysis, Shaojing Dong, Xiuli Shen, Kun Gao **12.00** Thermo-Mechanical Analysis of the Exhaust Manifold of a High Performance Turbocharged Engine M. Lorenzini, M. Giacopini and S.G. Barbieri **12.20** Glass Bottle Fracture Behavior by Underwater Shock-Wave - Effect of Micro-Bubble on the Fracture Behavior - Y. Ohbuchi, S. Sugahara, S. Tanaka, S. Enoki, G. Hotta and H. Sakamoto	**11.00** Optimization of Dynamic Cornering Fatigue Test Process of Aluminum Alloy Wheels A. Pastirmaci, A. Kara and C. Kalender **11.20** Modelling the Mechanical Response of Adobe Components under Uniaxial Loading T.L. Piani, J. Weerheijm, L. Koene and L.J. Sluys **11.40** Crack Surface Frictional Contact Modelling in Piezoelectric Materials L. Rodríguez-Tembleque, F. García-Sánchez and A. Sáez **12.00** Design Methodology for Gear Design of a Formula One Racing Car: A Modelling Procedure Based on Finite Element S. Mantovani, F. Calacci, S. Fanelli and M. Parlamento
12.40	**Lunch**

Session A11 ***Chair: Ferri Aliabadi***	**Session B11** ***Chair: L. Rodríguez-Tembleque***
14.00 Numerical Modelling of Cylindrical Specimen under Mixed-Mode Loading Conditions O. Slávik, P. Hutař, M. Berer, A. Gosch, F. Arbeiter, G. Pinter and L. Náhlík **14.20** Mixed-Mode Stress Intensity Factors for Tubes under Pure Torsion Loading J.G.D. Rodríguez, L.F.N. Marques and R.E. Guzmán **14.40** Cutting of a Thick Glass Plate by Using Hot Wire Y. Miyashita, Y. Kurabe, T. Hiromoto and Y. Otsuka **15.00** A Model for High-Cycle Fatigue in Polycrystals I. Benedetti and V. Gulizzi **15.20** Press Shaft Fractured in Service O. Bohórquez, S.A.A. Parra, A. Pertuz and O.A. González-Estrada **15.40** A Simple Analytical Approach for Creep Analysis of EB-FRP Systems, H. Biscaia and C. Chastre	**14.00** Cutting of a Thick Glass Plate by Using Hot Wire Y. Miyashita, Y. Kurabe, T. Hiromoto and Y. Otsuka **14.20** Corrosivity Evaluation of Steel Members near the Air-Liquid Interface Using a Ground Corrosion Sensor S. Kainuma and M.Y. Yang **14.40** A Nonaffine Molecular Chain Network Model for Elastomeric Gel I. Riku, M. Ueda, T. Sawada and K. Mimura **15.00** Simulation of Inner Rim Compression Test of Aluminum Alloy Wheels A. Kara and O. Daysal **15.20** SEM Study of the Influence of Microstructure on Low Cycle Fatigue Crack Growth in Martensitic Steel I T. Eterashvili, T. Dzigrashvili and M. Vardosanidze
16.00	**Coffee Break**

16.20 Poster Sessions

- A Numerical Study on Multi-Terrain Impacts of an Aeronautical Fuselage Section; Riccio, S. Saputo, R. Cristiano and A. Sellitto
- Meshfree Continuum Damage Model for Twill Composites; L. Li, et al
- Robust and Reliability-Based Design Optimization of a Composite Floor Beam, F. Sbaraglia, et al
- Stressed Cylinder Dispersion Curves Based on Effective Elastic Constants and SAFE; Method J.E. Quiroga Mendez, O.A. González-Estrada and D.F. Villegas
- Mixed-Mode Stress Intensity Factors in a Homogeneous Orthotropic Medium Loaded by a Frictional Sliding Rigid Flat Stamp K.B. Yilmaz, M.A. Güler and B. Yildirim
- A Study on the Fracture Mechanics of Support Structure of Excavation Puddle by LPG Explosion Using AUTODYN C.K. Chae and E.S. Kim
- Effect of Stress Ratio on Stress Intensity Factor of Type I Crack in A7N01 Aluminum Alloy Y.T. Li, Y.D. Wang and L. Yang
- Theoretical Model to Adhesion Failure in Granular Materials , M. Buonsanti, G. Leonardi, F. Scopelliti and F. Suraci

Tuesday 4th September

19:30--> Conference Reception: Old Royal Tobacco Factory

Location: Calle San Fernando, 4, 41004 (Sevilla).
https://goo.gl/maps/3smTHNuYdkx

Wednesday 5th September

20:30--> Conference Banquet: Rio Grande Restaurant

Location: Calle Betis, 69, 41010 (Sevilla)
https://goo.gl/maps/z6fBXNz2GQM2

http://riogrande-sevilla.com/