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ICFC9

**9th International Conference
on Fatigue of Composites**

Scientific Program



Department of Management and Engineering
University of Padua
Vicenza (ITALY) 21-23 June 2023

Sponsored by



9 T LABS



Day 1: June 21st, 2023

08:30	09:00	Opening Ceremony
09:00	10:40	Session 1.1: Experimental damage characterisation 1
09:00	09:20	ANALYSIS OF FATIGUE CRACK AND DELAMINATION GROWTH IN GFRP COMPOSITES IN TENSION AND COMPRESSION LOADING <i>G. Just, I. Koch*, G. Hacker, S. Scheffler, M. Gude, R. Rolfes</i>
09:20	09:40	DAMAGE CHARACTERIZATION OF MULTIDIRECTIONAL GLASS/POLYPROPYLENE COMPOSITES LAMINATES IN TENSION TENSION FATIGUE <i>J. Sommer, M. Hajikazemi, I. De Baere, W. Van Paepegem*</i>
09:40	10:00	FULL SCALE TIDAL FATIGUE TESTING USING FASTBLADE <i>S. Lopez Dubon*, C. Vogel, D. Garcia Cava, F. Cuthill, C. O'Bradaigh, E. McCarthy</i>
10:00	10:20	Fatigue damage evolution in woven laminates with different meso-structure <i>F. Lamon*, L. Maragoni, P.A. Carraro, M. Quaresimin</i>
10:20	10:40	Damage evolution in glass/epoxy laminates subjected to spectrum loadings <i>P.A. Carraro*, M. Simonetto, M. Quaresimin</i>
10:40	11:00	Coffee break
11:00	13:00	Session 1.2: Modelling 1
11:00	11:20	On historical development of fatigue damage modeling for composite materials <i>R. Talreja*</i>
11:20	11:40	EXPERIMENTAL AND NUMERICAL STUDY ON THE CRACK DENSITY EVOLUTION IN CARBON/EPOXY LAMINATED COMPOSITES SUBJECTED TO STATIC AND FATIGUE LOADINGS <i>S. Patti, M. Kaminski, J.-F. Maire, F. Laurin*, P. Maimi</i>
11:40	12:00	EVALUATION OF FATIGUE DEGRADATION OF LAMINATE STIFFNESS USING INTRA LAMINAR DAMAGE MODEL CONSIDERING PLY THICKNESS EFFECTS <i>R. Aoki*, R. Higuchi, T. Yokozeki, T. Aoki</i>
12:00	12:20	FATIGUE MODELING OF MATRIX CRACKING AND DELAMINATION IN MULTIDIRECTIONAL GLASS/POLYPROPYLENE COMPOSITE LAMINATES <i>M. Hajikazemi*, J. Sommer, W. Van Paepegem</i>
12:20	12:40	SIMULATION OF RESIDUAL PROPERTY AFTER FATIGUE IN CFRP LAMINATES MANUFACTURED BY FILAMENT WINDING USING INTRA LAMINAR DAMAGE MODELS. <i>T. Watanabe*, R. Aoki, T. Yokozeki, Y. Urushiyama</i>
12:40	13:00	Analysis of crack-induced delamination in composite laminates under tensile fatigue loadings <i>L. Maragoni*, P.A. Carraro, M. Simonetto, M. Quaresimin</i>
13:00	14:00	Lunch Break
14:00	15:00	Keynote lecture 1
14:00	15:00	MICROMECHANICAL MODEL FOR THE PREDICTION OF FATIGUE LIFE OF UNIDIRECTIONAL FIBER COMPOSITES <i>B. F. Sørensen - DTU</i>
15:00	16:00	Session 1.3: Fibre/matrix interface
15:00	15:20	CHARACTERIZATION OF INTERFACIAL FATIGUE STRENGTH BETWEEN CARBON FIBER AND MATRIX RESIN IN CFRP USING REPEATED PULSE LASER IRRADIATION <i>M. Arai*, R. Nakamura, A. Yoshimura, K. Goto</i>
15:20	15:40	INTERFACIAL FATIGUE BEHAVIOR OF CARBON FIBER/EPOXY MATRIX BASED ON IN-SITU OBSERVATION <i>K. Goto*, Y. Kitagawa, K. Sasaki, M. Arai, A. Yoshimura</i>
15:40	16:00	ANALYSIS OF SIZING AND INTERPHASE AGING ON FATIGUE LIFE OF UD GFRP COMPOSITES BY TAILORED FIBER PRE TREATMENT <i>D. GIBHARDT*, C. BUGGISCH, L. M. BLUME-WERRY, B. FIEDLER</i>
16:00	16:20	Coffee break
16:20	18:00	Session 1.4: Effect of process and environment
16:20	16:40	COMPRESSION MOLDING OF HYBRID CONTINUOUS AND DISCONTINUOUS FIBER REINFORCED THERMOPLASTICS FOR ENHANCING STRENGTH CHARACTERISTICS <i>E. Barocio, M. Eichenhofer, J. Kalman, L.M. Fjeld, J. Kirchoff, G. Kim, R. Byron Pipes</i>
16:40	17:00	EXPERIMENTAL CHARACTERIZATION OF FATIGUE CRACK GROWTH IN CROSS-PLY CFRP LAMINATES INITIATING FROM MICRODEFECTS <i>S. Oshima*, R. Higuchi, S. Kobayashi</i>
17:00	17:20	THE INFLUENCE OF MANUFACTURING TECHNOLOGY ON THE FATIGUE AND WEAR PERFORMANCE OF CFRP GEARS <i>Z. Bergant*, R. Šturm, D. Zorko and B. Černe</i>
17:20	17:40	INVESTIGATION OF PROCESS-STRUCTURE-PROPERTY RELATIONS FOR BUILDING DIGITAL TWINS OF FATIGUE LOADED SFRP STRUCTURES <i>K. Tittmann*, G. Just, I. Koch, M. Gude</i>
17:40	18:00	COMPARISON OF WEATHERING EFFECTS ON GLASS FIBER REINFORCED VINYLESTER AND EPOXY PIPES <i>A. Merah*</i>
19:30	22:30	Welcome cocktail

Day 2: June 22nd, 2023

Session 2.1: Experimental damage characterisation 2		
08:30	10:10	MULTIAXIAL FATIGUE OF CFRP THIN-WALLED TUBE – EXPERIMENTAL AND NUMERICAL ANALYSIS
		<i>Sz. Duda*, G. Lesiuk, P. Stabla, M. Smolnicki, P. Zielonka, J. Warycha</i>
08:50	09:10	EXPERIMENTAL DETERMINED FIBER VOLUME FRACTION DEPENDENCY OF THE CONSTANT LIFETIME DIAGRAM OF GLASS FIBER COMPOSITES
		<i>L.P. Mikkelsen*, S. Rasmussen, A. Fraisse, T.L. Andersen</i>
09:10	09:30	Fatigue and constant life of Thin and Thick Ply composites
		<i>B. Fiedler*, J. Mittelhaus, J. Körbelin, F. Bittner, H.-J. Endres, B. Kötter</i>
09:30	09:50	On the scale effect phenomenon in cross-ply laminates with ultra-thin plies under T-T cyclic loading
		<i>M.L. Velasco*, S. Sánchez-Carmona, C. Sandino, E. Correa</i>
09:50	10:10	POST-IMPACT BEHAVIOUR OF QUASI-ISOTROPIC LAMINATES WITH ULTRA-THIN PLIES UNDER T-T CYCLIC LOADING
		<i>C. Sandino*, M.L. Velasco, S. Sánchez-Carmona and E. Correa</i>

Coffee break		
10:10	10:30	

Session 2.2: Modelling 2		
10:30	10:50	Prediction of the early damage formation in cross ply laminates including edge effect phenomenon
		<i>S. Sánchez-Carmona*, P.A. Carraro, A. Barroso, E. Correa, M. Quaresimin</i>
10:50	11:10	DATA REDUCTION AND TRANSFERABILITY ISSUES WITH RESPECT TO FATIGUE DAMAGE MODELING
		<i>C. Schuecker*, M. Gfrerrer, M. Drvoderic, G. Pinter</i>
11:10	11:30	REFINED STRUCTURAL THEORIES FOR DYNAMIC ANALYSIS OF COMPOSITE STRUCTURES SUBJECTED TO RANDOM EXCITATION
		<i>E. Tortorelli*, M. Filippi, A. Pagani, M. Petrolo, E. Carrera</i>
11:30	11:50	METHODOLOGY TO PREDICT TRANSVERSE CRACKING IN POLYMER COMPOSITES AT DIFFERENT FATIGUE STRESS LEVELS AND TEMPERATURES
		<i>V.R. Pakkam Gabriel*, P. Fernberg, J. Varna</i>
11:50	12:10	An Analytical Micro-Scale Modelling Framework for the Fracture of Ox-Ox CMC
		<i>A. Poyser*, G. Allegri, I.M. Edmonds</i>
12:10	12:30	A damage-based strategy to predict fatigue damage evolution in composite laminates
		<i>M. Quaresimin*, M. Zappalorto, P.A. Carraro, L. Maragoni</i>

Lunch Break		
12:30	13:30	

Session 2.3: Delamination		
13:30	13:50	COMPARISON OF GLOBAL AND LOCAL METHODS FOR EVALUATION OF THE MODE I ENERGY RELEASE RATE IN MULTI DIRECTIONAL COMPOSITE DCB SPECIMENS SUBJECTED TO CYCLIC LOADING
		<i>R. Amkies*, J. A. Pascoe, M. v.d. Panne, M. Mega</i>
13:50	14:10	INVESTIGATING COMPOSITE FATIGUE CRACK GROWTH WITH HIGH CONSTRAINT SPECIMENS
		<i>P. B. S. Bailey*</i>
14:10	14:30	Delamination in a Multi-Directional Laminate - Mixed Mode Fracture Toughness and Resistance
		<i>Mor Mega*, Leslie Banks-Sills</i>
14:30	14:50	Interlaminar crack propagation in additively manufactured continuous fibre composites
		<i>P. Cuccarollo*, M. Quaresimin</i>

Coffee break		
14:50	15:10	

Session 2.4: Certbond		
15:10	15:30	Surface pretreatment of aluminum alloy for mechanical improvement of adhesive bonding by maple assisted pulsed laser evaporation technique
		<i>O. Brincoveanu*, E. Rusen, V. Dincă, A. Diacon, G. Toader, A. Mocanu</i>
15:30	15:50	MECHANICAL PERFORMANCE OF ADHESIVES BASED ON POLYOLS FROM DEPOLYMERIZATION OF LIGNO CELLULOSE BIOMASS
		<i>E. Rusen, G. Toader, A. Diacon, F. Dîrloman, L. C. Matache, A. Mocanu*</i>
15:50	16:10	ENVIRONMENTAL DURABILITY OF KEVLAR COMPOSITES REINFORCED WITH TiO ₂ NANOPARTICLES
		<i>V. Obradović*, Petr Sejkot, Klára V. Machalická, Miroslav Vokáč</i>
16:10	16:30	An analytical strategy to assess the local stress fields at bimaterial corners
		<i>M. Pastrello*, P.A. Carraro, M. Zappalorto, A. Barroso</i>

Visit to the laboratories		
16:30	18:00	

Conference dinner		
20:30	23:30	

Day 3: June 23rd, 2023

Session 3.1: Experimental damage characterisation 3		
08:30	10:30	
08:30	08:50	EVALUATION OF TRANSVERSE CRACK INITIATION IN CFRP LAMINATES UNDER VERY HIGH CYCLE FATIGUE
		<i>A. Hosoi*, M. Shima, Y. Nishi, H. Saito, H. Kawada</i>
08:50	09:10	How to define failure or run out for CFRPs in the very high cycle regime?
		<i>A. Premanand*, F. Balle</i>
09:10	09:30	VERY HIGH CYCLE AXIAL FATIGUE PROPERTY OF CFRP LAMINATES EVALUATED BY USING ULTRASONIC FATIGUE TESTING MACHINE
		<i>Y. Shimamura*, D. Kawashima, T. Hashimoto, T. Fujii, A. Hosoi, H. Kawada</i>
09:30	09:50	PRESENTATION OF AN EXPERIMENTAL SETUP FOR THE CREATION OF A CORRELATION BETWEEN THE FATIGUE OF GFRP AND NEAR INFRARED SPECTRA
		<i>D. Esse*, WV. Liebig</i>
09:50	10:10	FATIGUE INVESTIGATION OF A FLAX-BIOEPOXY COMPOSITE WITH IN-SITU MONITORING OF THE DYNAMIC AND THERMOMECHANICAL MATERIAL BEHAVIOR
		<i>A. Žerovnik*, T. Kek, R. Kunc, R. Šturm, B. Černe, Z. Bergant</i>
10:10	10:30	ASSESSMENT OF 4 POINT BENDING FATIGUE PERFORMANCE OF COMPOSITE SANDWICHES WITH REDUCED CARBON FOOTPRINT
		<i>Y. Wu*, P. Casari, M.-L.Pastor, M. Perrin, X. Gong</i>

Coffee break		
10:30	10:50	

Keynote lecture 2		
10:50	11:50	
10:50	11:50	PREDICTION OF DAMAGE INITIATION FOR FULL SCALE FATIGUE TESTING OF A WIND ROTOR BLADE STRUCTURE
		<i>A. Krimmer - TPI Composites</i>

Session 3.2: Notched laminates		
11:50	12:50	
11:50	12:10	Fatigue crack initiation in notched laminates
		<i>M. Simonetto*, P.A. Carraro, L. Maragoni, M. Quaresimin</i>
12:10	12:30	Study of cold expansion process on open hole composites
		<i>G. Yuan, Z. Sun*</i>
12:30	12:50	PROGRESSIVE DAMAGE ANALYSIS OF OPEN-HOLE COMPOSITE LAMINATES UNDER FATIGUE LOADING
		<i>Z. Liu, L. Yan, Z. Wu, J. Zhou, X. Zheng*, M. Quaresimin</i>
12:50	13:50	

Session 3.3: Short fibre		
13:50	15:10	
13:50	14:10	A NEW METHOD FOR INVESTIGATING CYCLIC CRACK PROPAGATION IN SHORT FIBER REINFORCED POLYMERS
		<i>R. Afsharnia*, G. Stadler, G. Pinter</i>
14:10	14:30	INFLUENCE OF PROCESS PARAMETERS ON THE FATIGUE BEHAVIOUR OF SHORT FIBRE REINFORCED POLYMERS
		<i>D. Kaylani*, G. Stadler, G. Pinter</i>
14:30	14:50	CREEP FATIGUE INTERACTION ON SHORT FIBRE REINFORCED PEEK
		<i>G. Stadler*, G. Pinter</i>
14:50	15:10	Prediction of fatigue crack initiation in short fibre reinforced composites in the presence of notches
		<i>P.A. Carraro*, M. Zappalorto, M. Quaresimin</i>

Coffee break		
15:10	15:30	

Session 3.4: Joints/SHM/Multiphysics		
15:30	17:10	
15:30	15:50	Fatigue performance of z-pinned stepped composite joints
		<i>G. Loi*, R. El Mothadi, F. Aymerich</i>
15:50	16:10	SCARF JOINT REPAIRS UNDER FATIGUE LOADING INVESTIGATED FOR SANDWICH SHELL APPLICATIONS
		<i>V. Trappe*, C. Ghafarian</i>
16:10	16:30	EFFECT OF TENSILE FATIGUE LOAD ON CAPACITANCE OF STRUCTURED CAPACITORS MADE OF CFRP
		<i>K. Miura*, K. Obunai, K. Okubo</i>
16:30	16:50	Structural health monitoring of bonded joints under cyclic loadings
		<i>A. Pontefisso*, P.A. Carraro, M. Zappalorto, M. Quaresimin</i>
16:50	17:10	Damage assessment in CNT modified glass fiber/epoxy laminates via electrical measurements
		<i>M. Zappalorto*, Gazzola A, Carraro PA, Quaresimin M, Fiedler B, Gibhardt D</i>
17:10	17:30	

Closing Ceremony		
17:10	17:30	