

# **Proceedings of the American Society for Composites 17<sup>th</sup> Technical Conference**

## **Table of Contents**

### **PLENARY LECTURES**

**Composite Materials for Commercial Transport - Issues and Future Research**

P. STICKLER

**Damage and Health Monitoring of Composite Structures in Smart Material and Structures System Program in Japan**

N. TAKEDA

### **SESSION MA1: JOINING**

**Application of the Shell/3D Modeling Technique for the Analysis of Skin Stiffener DeBond Specimens**

R. KRUEGER, T. K. O'BRIEN AND P. J. MINGUET

**Pull-off Tests and Analysis of Composite Skin and Frame T-Joint.**

J. LI

**The Prediction of Failure in In-Plane Shear Loaded Composite Bonded Joints**

J. LEE AND H. KIM

**A Hygrothermal Sensitivity Evaluation on the Clamp-up Torque of Bolted Composite Joint**

HUNG-SHYONG CHEN AND HUANG-KUANG KUNG

### **SESSION MA2: PROCESSING/MANUFACTURING—2**

**Monitoring the History of Shrinkage of Thermosetting Resins**

HOA S.V. AND P. OUELLETTE

**A Study on Similarity Analysis of Resin Flow in Liquid Molding Process**

M.-K. UM, J.-H. BYUN AND I. M. DANIEL

**Statistical Characterization of Permeability Values of Reinforcement Materials for the RTM Process—Why and How?.**

K. HOES, D. DINESCU, M. VANHEULE, A. CARDON AND H. SOL

**“Migration” of Voids in Thermal De-consolidation of Thermoplastic Matrix Composites**

M. LU AND L. YE

### **SESSION MB2: PROCESSING/MANUFACTURING—2**

**VARTM Process Modeling of Aerospace Composite Structures**

X. SONG, B. W. GRIMSLEY, P. HUBERT, R. J. CANO AND A. C. LOOS

**Numerical Investigation of Mold Filling of a Composite Part with Impermeable Core.**

B. MARKICEVIC, D. HEIDER, S. T. HOLMES, P. HANDEL, P. MINGUET, J. W. GILLESPIE, JR. AND S. G. ADVANI

**Uninterrupted Hoop- and Polar Fibre Paths on Cylindrical Pressure Vessels Using Non-Geodesic Trajectories**

S. KOUSSIOS AND O. K. BERGSMA

**The Fast Manufacturing Process of 4 Directional Reinforced Carbon-Carbon Composites for Plasma Facing Component.**

W. CHOI, S. PARK AND K. KIM

### **SESSION MC2: PROCESSING/MANUFACTURING—3**

**A New Instrument for Measuring Isotropic Stress Development and Reaction Kinetics for Thermosetting Resins.**

M. MERZLYAKOV, Y. MENG, S. L. SIMON, G. B. MCKENNA

**Cost-Effective Manufacture of Particulate Reinforced Titanium Matrix Composites**

X. ZHANG

**Design of Filament Wound Composite Pressure Tanks Using Finite Element Analyses.**

C.-U. KIM, J.-S. PARK, C.-S. HONG, C.-G. KIM

### **SESSION MA3: MICROMECHANICS**

**Fracture Toughness of Carbon Foam**

S. CHOI AND B. V. SANKAR

**Micromechanics Model for Open-Cell Foams Using an Energy Method Based on Castigliano's Second Theorem**

K. LI, X.-L. GAO AND A. K. ROY

**Microstress Prediction in Composite Laminate**

P. HUTAPEA, F.-G. YUAN AND N. J. PAGANO

**Micromechanical Models for Discontinuous Fiber Composites**

J. N. CRADDOCK AND E. SCHULTZ

**On a Unique Linkage Between Micro and Macro Fields** 140

A. S. D. WANG AND C. YAN

### **SESSION MB3: TEXTILES**

**Exploiting Periodicity and Symmetries in Micromechanics**

**Analysis of Textile Composites**

X. TANG AND J. D. WHITCOMB

**Multi-scale Analysis of Transient Moisture Diffusion Behavior in Woven Composites**

X. TANG, J. D. WHITCOMB, Y. LI AND H.-J. SUE

**Mechanical Characterization of Woven Composites with Different Parameters**

H. WANG, N. KIKUCHI AND F. ROSTAM-ABADI

**Micromechanical Model of Woven Fabric Composites under Large Deformation**

P. XUE, J. CAO AND J. CHEN

### **SESSION MC3: PROGRESSIVE DAMAGE**

**Modelling and Experimental Investigation of Progressive Damage in Notched Composites**

S. R. HALLETT AND M. R. WISNOM

**Damage Evolution and Analysis of a Unidirectional Composite Under Tensile Loading**

G. P. TANDON AND R. Y. KIM

**Progressive Damage in Mixed-Tow Hybrid Center-Notched Composite Tension Panels**

C. J. OSBORN AND J. M. KENNEDY

**Microcrack Progression in Internally Pressurized Elliptical Composite Cylinders**

M. W. HYER AND G. F. WOLFORD

**SESSION MA4: SANDWICH STRUCTURES—1**

**Analysis of Sandwich Panels with a Web-Reinforced Foam Core Subjected to Transverse Pressure.**

S. CARGILL AND V. BIRMAN

**Joining of Straight and Curved Sandwich Panels—High Order Analysis.**

A. LYCKEGAARD AND O. T. THOMSEN

**Modeling and Analysis of Tapered Sandwich Beams**

S. S. VEL, V. CACCESE AND H. ZHAO

**Numerical Simulation of the Impact Progressive Collapse of Polymer Composite Sandwich Beams Using LS-DYNA**

S. MCKOWN AND R. MINES

**Consideration of Through the Thickness Strains for a Sandwich Panel**

V. Y. PEREL AND A. N. PALAZOTTO

**SESSION MB4: SANDWICH STRUCTURES—2**

**Shear and Bending Stiffness of Single and Stacked Sandwich Beams.**

J. N. CRADDOCK AND M. EKENEL

**A Modified Analytical Model for Damage Propagation of A Low-Velocity Impacted Sandwich Panel**

Z.-H. XIE AND A. J. VIZZINI

**Cyclic Debonding of Composite Sandwich Structure**

C. K. BERKOWITZ, W. S. JOHNSON AND A. MAKEEV

**Study of Facesheet-from-Core Delamination for Honeycomb FRP Sandwich Panels**

W. WANG, J. F. DAVALOS AND P. QIAO

**SESSION MC4: SANDWICH STRUCTURES—3**

**Local Effects at the Junctions between Straight and Curved Sandwich Panels**

O. T. THOMSEN, E. BOZHEVOLNAYA, V. SKVORTSOV AND J. R. VINSON

**Compression Strength of Honeycomb FRP Core with Sinusoidal Geometry**

A. CHEN, J. F. DAVALOS AND J. D. PLUNKETT

**Honeycomb Fiber-Reinforced Polymer Sandwich Construction for Development and Implementation of Fish Raceway Systems**

A. VANTARAM, J. F. DAVALOS, J. ROBINSON AND J. D. PLUNKETT

**Face/Core Debond Toughness in Mid-Plane Asymmetric Sandwich Composites**

D. R. VEAZIE AND K. HILLMAN

**SESSION MA5: OFFSHORE STRUCTURES**

**Development of Thick-Wall APC-2/AS4 Thermoplastic Composite Pressure Vessels for Deep Ocean Applications by In-Situ Thermoplastic Composite Filament Winding/Tape Laying.**

A. YOUSEFPOUR AND M. N. GHASEMI NEJHAD

**Composites for Deepwater Applications**

M. M. SALAMA

**Static and Dynamic Characterization of Polymer Foams Under Shear Loads.**

K. KANNY, H. MAHFUZ, T. THOMAS AND S. JEELANI

**SESSION MB5: NIST/ATP HIGH RISK RESEARCH PROGRAMS—1**

**High-Risk Composites Research in The NIST Advanced Technology Program**

H. F. WU

**Nanocomposites from Carbon Nanofiber.**

M. L. LAKE, D. G. GLASGOW AND C. KWAG

**Development of Structural Health Monitoring Systems using SMART Layer® Technology**

M. LIN, S. J. BEARD, A. KUMAR AND X. QING

**SESSION MC5: NIST/ATP HIGH RISK RESEARCH PROGRAMS—2**

**Acoustic Model Calibration**

A. ROCK AND R. ZHANG

**Continuously Extruded Large Core Optical Fiber.**

J. M. DAVENPORT, B. DOUCET AND C. H. JENSON

**Mechanical Properties Testing for Database and Constitutive Modeling of CMC Composites**

M. A. BURKE, D. G. THOMPSON, J. MORRISON AND J. E. LANE

**SESSION MA6: SYMPOSIUM IN HONOR OF J. M. WHITNEY—1**

**Effect of Specimen Thickness on the Shear Behavior of Carbon Foam using Hollow Circular Specimen Configurations**

A. K. ROY

### **SESSION MA5: OFFSHORE STRUCTURES**

**Development of Thick-Wall APC-2/AS4 Thermoplastic Composite Pressure Vessels for Deep Ocean Applications by In-Situ Thermoplastic Composite Filament Winding/Tape Laying.**

**A. YOUSEFPOUR AND M. N. GHASEMI NEJHAD**

**Composites for Deepwater Applications**

**M. M. SALAMA**

**Static and Dynamic Characterization of Polymer Foams Under Shear Loads.**

**K. KANNY, H. MAHFUZ, T. THOMAS AND S. JEELANI**

### **SESSION MB5: NIST/ATP HIGH RISK RESEARCH PROGRAMS—1**

**High-Risk Composites Research in The NIST Advanced Technology Program**

**H. F. WU**

**Nanocomposites from Carbon Nanofiber.**

**M. L. LAKE, D. G. GLASGOW AND C. KWAG**

**Development of Structural Health Monitoring Systems using SMART Layer® Technology**

**M. LIN, S. J. BEARD, A. KUMAR AND X. QING**

### **SESSION MC5: NIST/ATP HIGH RISK RESEARCH PROGRAMS—2**

**Acoustic Model Calibration**

**A. ROCK AND R. ZHANG**

**Continuously Extruded Large Core Optical Fiber.**

**J. M. DAVENPORT, B. DOUCET AND C. H. JENSON**

**Mechanical Properties Testing for Database and Constitutive Modeling of CMC Composites**

**M. A. BURKE, D. G. THOMPSON, J. MORRISON, J. E. LANE, S. C. BUTNER, A. SZWEDA AND E. LARA-CURZIO**

### **SESSION MA6: SYMPOSIUM IN HONOR OF J.M. WHITNEY—1**

**Effect of Specimen Thickness on the Shear Behavior of Carbon Foam using Hollow Circular Specimen Configurations**

**A. K. ROY**

**Characterization of Compressive and Shear Properties of Carbon Foam and Its Core Application in Sandwich Construction**

**S. SIHN AND B. P. RICE**

**Three-Dimensional Spline-Based Stress Analysis of Bolted Composite Joints with Clamping**

**T. J. WHITNEY AND E. V. IARVE**

**Prediction and Measurement of Residual Strains for a Composite Bonded Joint**

G. A. SCHOEPPNER, D. H. MOLLENHAUER, E.V IARVE

**SESSION MB6: SYMPOSIUM IN HONOR OF J. M. WHITNEY—2**

**Deformations of Flat Unsymmetric Laminates Subjected to Inplane Loads.**

M. W. HYER, T. T. OCHINERO AND M. MAJEED

**Analysis of Cylindrically Orthotropic Plates**

J. CHO AND C. T. SUN

**Strength Prediction and Measurement in Model Multilayered Discontinuous Tow Reinforced Composites**

E. V. IARVE AND R. KIM

**SESSION MC6: SYMPOSIUM IN HONOR OF J. M. WHITNEY—3**

**Analysis of Mid-Plane Asymmetric Sandwich Truck Tanks Under Hydraulic Head Loadings**

S. XIAO AND J. R. VINSON

**Influence of Vapor-Grown Carbon Nanofibers on Thermomechanical Properties of Graphite-Epoxy Composites**

G. P. TANDON, R. Y. KIM AND B. P. RICE

**Compact Carbon/Carbon Single Flow Channel Heat Transfer Characteristics for Aerospace Vehicle Applications**

R. WATTS AND K. LAFDI

**SESSION TA1: NANOMATERIALS & NANOCOMPOSITES—1**

**Nanofiber Reinforcement of PMMA—The Hope and the Reality**

B. SALTYSIAK, W. S. JOHNSON, S. KUMAR AND J. ZENG

**Processing, Structure and Properties of Carbon Nanotube-Based Polymer Composites.**

E. T. THOSTENSON AND T.-W. CHOU

**Characterization of the Fracture Behavior of Epoxy Nanocomposites**

H. LU, S. ROY, P. SAMPATHKUMAR AND J. MA

**Graphite Nanoplatelet Based Nanocomposites by the Electrospinning Process**

J. MACK, L. VICULIS, A. ALI, R. LUOH, G. YANG, R. KANER, T. HAHN AND F. KO

**SESSION TB1: NANOMATERIALS & NANOCOMPOSITES—2**

**Self-Consistent Geometry, Density and Stiffness of Carbon Nanotubes.**

R. B. PIPES AND P. HUBERT

**Electrical Conductivity of PMMA/Expanded Graphite Nanocomposites**

S.-C. WONG AND W. ZHENG

### **SESSION TC1: NANOMATERIALS & NANOCOMPOSITIES—3**

**Thermal Properties of Epoxy/Clay Nanocomposites**

H. MIYAGAWA, M. J. RICH AND L.T. DRZAL

**Graphite Nanoplatelets as Reinforcements for Polymers: Structural and Electrical Properties**

H. FUKUSHIMA AND L. T. DRZAL

**Alumina/SiC Nanocomposites for Improved Surface Finish and Wear Resistance**

J. L. ORTIZ MERINO AND R. I. TODD

**S2-Glass/Vinyl ester Polymer Nanocomposites: Manufacturing, Structures, Thermal and Mechanical Properties**

A. HAQUE, F. HOSSAIN, D. DEAN AND M. SHAMSUZZOHA

### **SESSION TA2: MECHANICAL BEHAVIOR—1**

**On and Off Axis High Strain Rate Compression Characterization of Affordable Woven Carbon/Epoxy Composites**

M. V. HOSUR, J. ALEXANDER, U. K. VAIDYA, A. MAYER AND S. JEELANI

**Low Temperature Effects on the Ultimate Compressive Strength of IM7/977-3 Unidirectional Composites at High Strain Rates.**

S. SONG AND J. R. VINSON

**Dynamic Properties of Balanced Angle-Ply Composites**

A. JADHAV, E. WOLDESENBET AND L. CLARK

**Thermoplastic Materials for Rigidizable Space Systems**

A. PAESANO, G. R. PALMESE AND D. R. COHEE

**Deformation Theory In The Mechanics Of Granular Media.**

I. V. SHIRKO, D. S. KONDRATYEV AND P. V. STETSENKO

### **SESSION TC2: MECHANICAL BEHAVIOR—3**

**Influence of Processing Methods on the Tensile Properties of Advanced Polymer Matrix Composites**

M. RAMULU, P. B. STICKLER AND I. P. DATAR

**Effect of Radius Ratio Parameter of Cenospheres on the Compressive Properties of the Syntactic Foams.**

N. GUPTA AND E. WOLDESENBET

**The Effect of Fiber Waviness on Elastic Behavior of Composite Materials.**

H. G. RAI, E. V. HONEIN, M. I. NAJJAR AND S. N. ABU ANTOUN

**Compression Testing of High-Strength Composite Laminates**

Z. C. XI, A. PAESANO, T. A. BOGETTI, C. P. R. HOPPEL, A. YIOURNAS,

I. W. HALL, J. W. GILLESPIE, JR.

### **SESSION TB2: MECHANICAL BEHAVIOR—2**

**Evaluation of Interfacial Degradation in GFRP under Acid Condition.**

M. MIZOGUCHI, M. SHIBAYA AND H. HAMADA

**A Strategy for the Life Prediction of Polymer Matrix**

**Construction Components: Strain–Stiffness Evolution or Strength-Damage Development?**

A. H. CARDON AND P. J. P. BOUQUET

**Mechanical Behavior of Triax Composites using Special Finite Elements**

S. V. HOA, Q. ZHAO AND P. OUELLETTE

**Stiffness and Failure Behavior of Model Hybrid Composites**

D. HUNSTON AND W. MCDONOUGH

**SESSION TA3: TEST METHODS—1**

**The Use of Doublers in Delamination Toughness Testing.**

J. R. REEDER, K. DEMARCO AND K. S. WHITLEY

**Peel Testing of Thermoplastic Composite/Steel Bolted Joints**

J. R. BOWEN, I. MISKIOGLU, J. B. LIGON AND R. L. WHIPPLE

**Thermoplastic Materials for Rigidizable Space Systems**

A. PAESANO, G. R. PALMESE AND D. R. COHEE

**Deformation Theory In The Mechanics Of Granular Media.**

I. V. SHIRKO, D. S. KONDRATYEV AND P. V. STETSENKO

**SESSION TB2: MECHANICAL BEHAVIOR—2**

**Evaluation of Interfacial Degradation in GFRP under Acid Condition.**

M. MIZOGUCHI, M. SHIBAYA AND H. HAMADA

**A Strategy for the Life Prediction of Polymer Matrix**

**Construction Components: Strain–Stiffness Evolution or Strength-Damage Development?**

A. H. CARDON AND P. J. P. BOUQUET

**Mechanical Behavior of Triax Composites using Special Finite Elements**

S. V. HOA, Q. ZHAO AND P. OUELLETTE

**Stiffness and Failure Behavior of Model Hybrid Composites**

D. HUNSTON AND W. MCDONOUGH

**SESSION TC2: MECHANICAL BEHAVIOR—3**

**Influence of Processing Methods on the Tensile Properties of Advanced Polymer Matrix Composites**

M. RAMULU, P. B. STICKLER AND I. P. DATAR

**Effect of Radius Ratio Parameter of Cenospheres on the Compressive Properties of the Syntactic Foams.**

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**The Effect of FiberWaviness on Elastic Behavior of Composite Materials.**

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**Compression Testing of High-Strength Composite Laminates**

Z. C. XI, A. PAESANO, T. A. BOGETTI, C. P. R. HOPPEL, A. YIOURNAS,

I. W. HALL, J. W. GILLESPIE, JR.



### **SESSION TA3: TEST METHODS—1**

**The Use of Doublers in Delamination Toughness Testing.**

J. R. REEDER, K. DEMARCO AND K. S. WHITLEY

**Peel Testing of Thermoplastic Composite/Steel Bolted Joints**

J. R. BOWEN, I. MISKIOGLU, J. B. LIGON AND R. L. WHIPPLE

**DCB and ELS Tests for Interlaminar Fracture Toughness of**

**Carbon Fiber Composites by Electric Resistance Method**

K. KUNOO, N. UDA, K. ONO AND T. NAGAYASU

**Effect of Crack Length Measurement Technique and Data**

**Reduction Procedures on the Perceived Toughness from**

**Four-Point Bend End-Notched Flexure Tests**

A. J. VINCIQUERRA AND B. D. DAVIDSON

**Round Robin Assessment Of The Single Fiber**

**Fragmentation Test**

M. J. RICH, L. T. DRZAL, D. HUNSTON, G. HOLMES

AND W. MCDONOUGH

### **SESSION TB3: TEST METHODS—2**

**A Novel Creep Rupture Fixture for Testing Automotive Composite Materials.**

V. LOMBART, J. HENSHAW AND D. HOUSTON

**Crushing of Flat Graphite/Epoxy Laminates using a Column Specimen**

D. C. FLEMING AND F. NICOT

**Static and Dynamic Strength of Brittle Materials Under**

**Self-induced Confining Stress Produced Using FilamentWound**

**Advanced Composites**

D. S. ADAMS AND C. T. SUN

### **SESSION TC3: DELAMINATION**

**Delamination in Tapered Laminates under Tension with Ply Drops Skewed at an Angle to the Load**

M. R. WISNOM AND M. GUSTAFSSON

**Interlaminar Fracture Behavior of Internally Tapered Composite Laminates**

R. GANESAN, K. HE AND S. V. HOA

**Delamination Behavior in Composite Structures with Consideration for Residual Thermal Stress Effects**

T. E. TAY, F. SHEN AND K. H. LEE

**Strain Energy Release Rate Associated with Off-axis Ply Cracking in Unbalanced Laminates**

C. SOUTIS AND M. KASHTALYAN

**Fracture Mechanics Approach to Forecast**

**Delamination Life-time**

A. AL KHANBASHI, A. E. HAMDY, A. MOET AND C. PETIAU

#### **SESSION TA4: FATIGUE**

**Damage Mechanisms in Notched Graphite/Epoxy Laminates**

F. AYMERICH, M. MANNU AND P. PRIOLO

**Fiber Composite Thermomechanical Fatigue Damage Evolution Via Progressive Ply Decomposition and Analysis Software.**

L. MINNETYAN AND C. C. CHAMIS

**Waveform, Load Ratio and Frequency Effects on Fatigue Crack Propagation Rate of FRP-Wood Bonded Interfaces.**

J. F. DAVALOS AND J. JIA

**The Effect of Stitching on Damage Tolerance of Stiffened Composite Panel**

S. S. SUH, N. HAN, J.-M. YANG AND H. T. HAHN

**Analysis and Design Study of Piezoelectric Twist Actuation of Smart Fins.**

O. RABINOVITCH AND J. R. VINSON

#### **SESSION TB4: STRUCTURAL ANALYSIS—1**

**Vibration Analysis of Variable-Thickness Composite Beams Using Hierarchical Finite Elements**

R. GANESAN AND A. K. NIGAM

**Exact Solution for the Cylindrical Bending Vibration of Functionally Graded Plates**

S. S. VEL AND R. C. BATRA

**Evaluation of Transverse Stresses in Geometrically Nonlinear Composite Panels under Dynamic Loadings.**

H. PARK, K. LEE AND S. W. LEE

**A Radial Point Interpolation Method for Static and Free Vibration Analysis of Shear-deformable Thick Laminated Composite Plates.**

K. Y. DAI, G. R. LIU AND K. M. LIM

#### **SESSION TC4: STRUCTURAL ANALYSIS—2**

**Composite Skin-Stringer Assembly: Innovative Manufacturing and Stability Analysis**

P. MAJUMDAR, H. MAHFUZ, M. SAHA, F. SHAMERY, S. JEELANI AND M. M. THOMAS

**Unit Cell Approach to a Grid Stiffened Composite Cylinder Buckling Problem**

S. KIDANE AND E. WOLDESENBET

**Buckling Analysis of Delaminated Rectangular Composite Laminates under In-Plane Shear Load.**

M. A. KOUCHAKZADEH

**Homogenization Modeling for Mechanical Properties of Composite Conductor with Cooling Channels.**

W. SUN AND J. T. TZENG

**A Simple Analytical Method for Analyzing Laminated Composites Elliptical Tubes.**  
C. Y. LIN AND W. S. CHAN

**SESSION TA5: COMPOSITES FOR MARINE STRUCTURES—1**

**Failure Plane Orientations for Fiber Composites**

R. M. CHRISTENSEN AND S. J. DETERESA

**Dynamic Behavior of S2-Glass/Epoxy Fiber Reinforced Composites.**

M. VURAL AND G. RAVICHANDRAN

**Measurement of Through-the-Thickness Mechanical Properties of Woven Fabric Composites**

J. L. ABOT AND I. M. DANIEL

**Dynamics Materials Characterization of Marine Composites**

M. L. PETERSON, M. SUN, A. SENAN, K. HORTON, D. RADFORD AND L. THOMPSON

**SESSION TB5: COMPOSITES FOR MARINE STRUCTURES—2**

**Fabrication and Characterization of Graphite Particle Reinforced Epoxy Composites**

A. YASMIN AND I. M. DANIEL

**The Effect of Platelet Dispersion on The Load Transfer Efficiency in Nanoclay Composites**

J. TSAI AND C. T. SUN

**Electromagnetic Propagation and Radative Transport in Fibrous Composites: Dependent Scattering Effects**

B.-C. CHERN, T. J. MOON, AND J. R. HOWELL

**Effects of Sea Water on Foam Cored Composite Sandwich Structure**

Y. J. WEITSMAN AND X. LI

**SESSION TC5: COMPOSITES FOR MARINE STRUCTURES—3**

**Characterization of Constitutive Behavior of Satin-Weave Fabric Composite.**

A. J. JACOBSEN, J. J. LUO AND I. M. DANIEL

**Fatigue Analysis of Sandwich Beams Using a Wear-Out Model**

J. DAI AND H. T. HAHN

**Influence of Core Density and Facesheet Properties on Debond Fracture Strength of Foam Core Sandwich Composites.**

K. N. SHIVAKUMAR AND S. A. SMITH

**On the Use of Composite Material Sandwich Structures for Naval Double-Hull Construction**

J. R. VINSON

**Static and Dynamic Characterization of Polymer Foams Under Shear Loads.**

K. KANNY, H. MAHFUZ, T. THOMAS AND S. JEELANI

**SESSION TA6: COMPOSITES IN RECREATION**

**Thermoplastic Composite Materials: Their Design & Use in Golf Shafts**

M. BUCK, D. PARK AND D. STUBBS

**Development of a Carbon Composite Driver for Golf**

S. M. EHLERS

**Benchmarking Composite Golf Shafts for Design Purposes.**

T. MASE

**Increased Composite Performance in Production Boatbuilding.**

J. PARKER

**Electromagnetic Propagation and Radiative Transport in Fibrous Composites: Dependent Scattering Effects**

BIH-CHERNG CHERN, TESS J. MOON, AND JOHN R. HOWELL

**Effects of Sea Water on Foam Cored Composite**

**Sandwich Structure**

Y. J. WEITSMAN AND X. LI

**SESSION TC5: COMPOSITES FOR MARINE STRUCTURES—3**

**Characterization of Constitutive Behavior of Satin-Weave Fabric Composite.**

A. J. JACOBSEN, J. J. LUO AND I. M. DANIEL

**Fatigue Analysis of Sandwich Beams Using a Wear-Out Model**

J. DAI AND H. T. HAHN

**Influence of Core Density and Facesheet Properties on Debond Fracture Strength of Foam Core Sandwich Composites.**

K. N. SHIVAKUMAR AND S. A. SMITH

**On the Use of Composite Material Sandwich Structures for Naval Double-Hull Construction**

J. R. VINSON

**High Strain Compression of Cellular Foam Core Sandwich Composites at Sub-ambient Temperatures**

T. THOMAS, H. MAHFUZ, K. KANNY AND S. JEELANI

**SESSION TA6: COMPOSITES IN RECREATION**

**Thermoplastic Composite Materials: Their Design & Use in Golf Shafts**

M. BUCK, D. PARK AND D. STUBBS

**Development of a Carbon Composite Driver for Golf**

S. M. EHLERS

**Benchmarking Composite Golf Shafts for Design Purposes.**

T. MASE

**Increased Composite Performance in**

**Production Boatbuilding.**  
J. PARKER

**SESSION TB6: EDUCATION IN COMPOSITES—1**

**An Undergraduate Curriculum in Composite  
Materials Engineering**

B. ABDEL-MAGID, K. DENNEHY, M. GRAMI AND F. PARSI

**The Use of Composites in Radio-Controlled Cargo Airplanes  
Designed for Student SAE Aero Design Competitions.**

J. H. LUMKES, JR. AND V. C. CESAREO

**Rationale for Bio-Composite Materials Education For the  
New Millennium**

A. K. MOHANTY, L. T. DRZAL AND M. MISRA

**WorldWideWeb Resources for Composite Materials.**

S. ABRATE

**SESSION TC6: EDUCATION IN COMPOSITES—2**

**An Introductory Composites Course for Undergraduate  
Engineering Students.**

W. E. HOWARD

**Active Learning of Composite Materials of  
Civil Engineering.**

J. F. DAVALOS AND P. QIAO

**Applications of Spreadsheet Programs in Impact  
Dynamics Analyses.**

S. ABRATE

**SESSION WA1: FRACTURE/FAILURE—1**

**Modeling of Opening Displacement of Transverse Cracks in  
Graphite-Epoxy Laminates Using Shear Lag Analysis**

S. ROY AND M. BENJAMIN

**Propellant Leakage through Laminated Structures.**

T. AOKI, H. KUMAZAWA AND I. SUSUKI

**Microcapsule Induced Toughening in a Self-Healing  
Polymer Composite**

E. N. BROWN, N. R. SOTTOS AND S. R. WHITE

**Damage Mechanism of Rubber-Toughened Epoxy Resin  
Around a Crack in Thin adhesive Layer Constrained**

**by Hard Adherends**

T. IKEDA, D.-B. LEE, J. MANO, N. MIYAZAKI AND N.-S. CHOI

**Crack Propagation Behavior in glass Cloth Reinforced Vinylester  
Composite with Functional Interphase.**

M. MIZOGUCHI, M. YAMANOUCI, M. SHIBAYA AND H. HAMADA

**SESSION WB1: FRACTURE/FAILURE—2**

**Failure of Tapered Composite Beams Loaded in Torsion,**

### **Experimental Results**

P. VALSGAARD, A. J. VIZZINI AND O. T. THOMSEN

**Effect of Fiber Orientation on Fracture Toughness of CFRP.**

H. MIYAGAWA, C. SATO AND K. IKEGAMI

**Statistical Strength Prediction of Cross-ply Laminates of Glass and Carbon Fiber Reinforced Plastics**

J. NODA, T. OKABE, N. TAKEDA AND M. SHIMIZU

**Probabilistic Failure Issues in Creep Buckling and Delaminations of Viscoelastic Composite Columns and Plates with Piezoelectric Controls**

H. H. HILTON

**Modeling the Boundary Effects on the Dynamic Failure on Deep Ceramic Beam.**

G. MA, B. A. GAMA AND J. W. GILLESPIE, JR.

### **SESSION WA2: STRESS ANALYSIS/MODELING—1**

**Mechanisms and Structural Parameters Affecting the Interlaminar Stress Field in Laminates with Ply Dropoffs**

D.-J. SHIM AND P. A. LAGACE

**Probabilistic Teleopic/Tunneling Mechanics for Composites**

C. C. CHAMIS

**Fuzzy Set Approach to FPF and Fracture Analysis of Axially Compressed Cylindrical Panels.**

A. MUC

**Matrix Cracking in Cross Ply Laminates under Bending**

S. KURIAKOSE AND R. TALREJA

**Stiffness Reduction Factors for Laminates Containing Ply Cracks**

J. M. WHITNEY

### **SESSION WB2: STRESS ANALYSIS/MODELING—2**

**Sheet Hydroforming for Woven FRT Composites: Non-Orthogonal Constitutive Equation Considering Undulation of Woven Structure**

W. R. YU, M. ZAMPALONI, F. POURBOGHRAAT, K. CHUNG AND T. J. KANG

**Discrete Optimization of 2-D Composite Structures**

A. MUC

**Material Property Investigation of a Bio-Inspired Composite**

P. A. SARMA, R. M. PIDAPARTI AND R. A. MEISS

**Computer-Aided Design Modeling for Heterogeneous Bone Structure**

W. SUN, B. STARLY, A. LAU, D. LIM, R. SELIKTAR, W. LAU, A. YOUSSEF, T. BRADBURY AND C. GAYLO

### **SESSION WA3: IMPACT—1**

**Effects of Thickness and Temperature on the Residual Compressive Strength of Polyester S2 Glass Laminates Subjected to Low Energy Impact**

E. J. RIGAS AND S. PETRIE

**A Multiscale/Cohesive Zone Model for Composite Laminate Impact Damage**

T. TIPPETTS, I. J. BEYERLEIN AND T. O. WILLIAMS

**Low Velocity Impact and Vibration Response of Multi-Functional Sandwich Plates**

U. VAIDYA, S. PILLAY, C. ULVEN, G. JANOWSKI AND M. HOSUR

**Analysis of Delamination in Composite Laminates under Impact Loading**

K. MINNAAR AND M. ZHOU

**Ballistic Impact Resistance of Monolithic, Hybrid and Nano Composites of PC and PMMA**

J. W. SONG AND A. J. HSIEH

### **SESSION WB3: IMPACT—2**

**Load-Displacement Curves of Glass/Epoxy Laminates Subjected to Low-Velocity Impact**

D. LIU AND B. B. RAJU

**Material and Low-Velocity Impact Characterizations of Textile Composite Plates.**

S. J. KIM AND K. H. JI

**Tailoring of Wave Propagation Characteristics in Periodic Structures with Multilayer Unit Cells**

M. I. HUSSEIN, G. M. HULBERT AND R. A. SCOTT

**Modeling of Ballistic Impact on Composite Laminates using a Meshless Method.**

Q. ZENG AND C. T. SUN

### **SESSION WA4: HEALTH MONITORING/NDE—1**

**Embedded MEMS Sensors for Structural Health Monitoring of Composite Materials**

M. UL HOQUE AND A. TAYEBI

**Non-Destructive Evaluation of Armor Inserts.**

K. JUZENAS, A. DOMINAUSKAS, D. HEIDER AND J. W. GILLESPIE, JR.

**A Smart Patch for Monitoring Crack Growth in Metallic Structures Underneath Bonded Composite Repair Patches**

J.-B. IHN AND F.-K. CHANG

**Damage Detection of CFRP Composites Using the Anisotropy of the Electrical Conductivity**

J. B. PARK, T. OKABE, A. YOSHIMURA AND N. TAKEDA

**Phased Transducer Arrays for Structural Diagnostics through Beamforming.**

S. SUNDARARAMAN AND D. E. ADAMS

**Mechanics of Failure of Embedded Fiber Optic Sensor Composite Laminates Under Tension And Compression Loads**  
K. SHIVAKUMAR AND L. EMMANWORI

**SESSION WB4: HEALTH MONITORING/NDE—2**

**Acousto-Ultrasonics: A Tool for Nondestructive Evaluation of Multi-layer Composites**

V. F. GODÍNEZ-AZCUAGA, R. D. FINLAYSON AND R. K. MILLER  
**LambWave Evaluation and Localization of Ply Cracks in Composite Laminates**

T. OKABE, N. TOYAMA AND N. TAKEDA

**A Polymer-Metal Composite Surface Stress Sensor**

J. THAYSEN, O. HANSEN AND A. MENON

**Characteristics of Vibration Suppression for SMA/CF and SMA/GF Hybrid Composites**

Y. AOKI AND G. BEN (O. BYON)

**SESSION WA5: CARBON-CARBON COMPOSITES**

**Manufacture of Functionally Gradient Carbon-Carbon Composites.**

A. FATZ, T. CORDELL, F. DILLON, M. LA FOREST, P. BRAUNISCH, T. SIEGMUND, R. CIPRA, J. LIAKUS, W. STRIEDER, S. UPADHYAYULA AND S. SADDAWI

**A Combined Experimental-Numerical Investigation of Crack Growth in C-C Composites**

J. HAN AND T. SIEGMUND

**A Thermomechanical Crack Bridging Model**

A. HATTIANGADI AND T. SIEGMUND

**Friction and Wear Behavior of Carbon-Carbon Composites.**

H. K. SHIN, W. C. CHOI, S. H. PARK, J. H. PARK AND K. S. KIM

**SESSION WB5: INFRASTRUCTURE**

**Experimental and Analytical Evaluation of Shear Stud Type Connectors for FRP Bridge Decks to Steel Stringers**

J. RIGHMAN, K. BARTH AND J. DAVALOS

**Stress-Strain Relationship of Compressed Elements from Polymer Concrete with Polybutadiene Matrix.**

O. FIGOVSKY, Y. POTAPOV, Y. BORISOV AND D. BEILIN

**Modeling of Debond Growth at FRP-Concrete Interface in Aggressive Environments**

S. ROY, F.-W. SHIUE, S. PARK AND K. M. LIECHTI

**The CFRP-Concrete Interface Subjected to Sodium -Sulfate and -Hydroxide Attack**

D. M. BOYAJIAN, J. F. DAVALOS, I. RAY AND S. KODKANI

**SESSION WA6: AUTOMOTIVE/APPLICATIONS—1**



**Effect of Impact Damage on the Specific Energy Absorption of Glass/Polyester Composites**

M. RIBEAUX AND N. A. WARRIOR

**Dynamic Axial Crush of Automotive Rail-Sized Composite Tubes Part 1: Tubes with Woven Reinforcements (Carbon, Kevlar®, and Glass) and Non-Plug Crush Initiators.**

A. L. BROWNE AND S. A. IOBST

**Geometric and Loading Rate Effects on the Energy Absorption of Triaxially Braided Carbon Vinyl Ester Tubes**

R. FERNIE, M. J. DUCKETT AND N. A. WARRIOR

**Axial Crush Resistance of Aluminum-Composite Hybrid Tubes.**

J. M. BABBAGE AND P. K. MALLICK

**Analytical and Computational Models for Cord-Reinforced Composites**

H. HASSIS, S. KOCAK AND R. M. PIDAPARTI

**SESSION WB6: AUTOMOTIVE/APPLICATIONS—2**

**Development of Thermoplastic Matrix Composite Tubes for Automotive Applications**

G. JANDALI, D. KANAWADE AND P. K. MALLICK

**Crush Analysis of Structural Foams Inside a Hollow Steel Tube Under Low-Velocity Uni-axial Compressive Loading.**

R. MANN, P. R. MANTENA AND C. MULLEN

**Design of Integrated FRP Energy Absorber with Bolted Joint**

H. HAMADA, K. SUGIMOTO, H. SAITO AND R. INAI

**Design and Performance of Composite Multifunctional Structure-Battery Materials**

M. A. QIDWAI, J. P. THOMAS AND P. MATIC

**Eco Friendly Sustainable Bio-Composites From Natural Fibers and Cellulosic Plastics for Automotive Applications**

L. T. DRZAL, A. K. MOHANTY, A. WILBOWO AND M. MISRA