

CONTENTS

<i>Preface</i>	v
Plenary Paper: Fibre reinforcements—past, present and future	5.1
A. R. BUNSELL (<i>Ecole Nationale Supérieure des Mines de Paris, Evry, France</i>)	
Plenary Paper: Composites—the way ahead	5.14
R. I. HARESCEUGH (<i>British Aerospace plc, Warton, UK</i>)	
Structural Analysis	
Stability of a Beck-type laminated column	5.38
YUEXI XIONG, TSUN-KUEI WANG (<i>Beijing Institute of Aeronautics and Astronautics, Beijing, PR China</i>)	
Compression buckling of anisotropic fibre-reinforced flat rectangular plates with central circular cut-outs	5.47
G. J. TURVEY, K. SADEGHPOUR (<i>University of Lancaster, UK</i>)	
Membrane stress distributions in post-buckled composite plates with circular holes	5.57
I. H. MARSHALL, W. LITTLE, M. M. EL-TAYEBY (<i>Paisley College of Technology, Scotland, UK</i>)	
Durability of graphite/epoxy stiffened panels under cyclic postbuckling compression loading	5.69
A. SEGAL, G. SITON (<i>Israel Aircraft Industries Ltd, Israel</i>), T. WELLER (<i>Israel Institute of Technology, Haifa, Israel</i>)	
Minimum weight composite truss core sandwich panels subjected to combined uniaxial compression and in-plane shear loads	5.79
J. R. VINSON (<i>University of Delaware, Newark, DE, USA</i>)	

Large amplitude vibration of geometrically imperfect symmetrically laminated shallow spherical shell with elastically restrained edges	5.90
C. Y. CHIA (<i>University of Calgary, Alberta, Canada</i>)	
Some basic problems in the analysis of instability for composite cylindrical shells	5.101
CHENG-TI ZHOU (<i>Dalian University, Dalian, PR China</i>)	
First-approximation geometrically nonlinear composite shell theory	5.113
I. F. OBRAZTSOV, V. V. VASIL'EV (<i>Moscow Institute of Aviation Technology, Moscow, USSR</i>)	
A design procedure for horizontal cylindrical GRP vessels supported on twin saddles	5.123
A. S. TOOTH, W. M. BANKS (<i>University of Strathclyde, Glasgow, Scotland, UK</i>), A. J. WARRENDER (<i>Paisley College of Technology, Scotland, UK</i>)	
Damping materials for spacecraft vibration control	5.134
J. FUJIMOTO, R. UGO, K. TODOME (<i>NEC Corporation, Kanagawa, Japan</i>), Y. YAMAMOTO (<i>Mitsui Petrochemical Industry Ltd, Chiba, Japan</i>)	
Frequency and flutter analysis of wing-type structures and the relevant optimal design	5.144
SHENG LIU (<i>Applied Mechanics Institute, Chengdu, PR China</i>), XIN QIAO (<i>Nanjing Aeronautical Institute, Nanjing, PR China</i>)	
The failure of composite cylindrical shells with circular holes under internal pressure	5.153
ZHANG XIGONG (<i>Beijing Institute of Aeronautics and Astronautics, Beijing, PR China</i>), J. W. MAR (<i>Massachusetts Institute of Technology, Cambridge, MA, USA</i>)	
Contact stress analysis of mechanical fastened joint in composite	5.160
YANG LING, LI XINGHUA (<i>Northwestern Polytechnical University, Xian, PR China</i>)	
Damage in and residual strength of bolted composite joints in tension or shear-out mode failure	5.173
F. K. CHANG, K. Y. CHANG (<i>Stanford University, CA, USA</i>)	

<i>Contents</i>	ix
-----------------	----

Finite element analysis and design of glass/epoxy composite rings for 25 MW generators	5.183
YONG-QIU JIANG, YUAN-RUO WANG, YUAN-CHONG ZHANG (<i>Xian Jiaotong University, Xian, PR China</i>)	
Response of composite plates to blast loading	5.192
V. BIRMAN (<i>University of New Orleans, LA, USA</i>), C. W. BERT (<i>University of Oklahoma, Norman, OK, USA</i>)	
Accuracy of the reduced bending stiffness representation of anti- symmetrically laminated composite plates	5.202
M. S. EWING (<i>US Air Force Academy, Colorado Springs, CO, USA</i>), A. W. LEISSA (<i>Ohio State University, Columbus, OH, USA</i>)	
3-D stress distribution: a finite element approach	5.211
T. B. JAKOBSEN, J. K. JENSEN (<i>University of Aalborg, Denmark</i>)	

Interlaminar Stresses

Analysis of suppression of free-edge delamination by introducing adhesive layer	5.219
S. R. SONI (<i>AdTech Systems Research Inc., Fairborn, OH, USA</i>), R. Y. KIM (<i>University of Dayton Research Institute, OH, USA</i>)	
Efficient 3-D finite element failure analysis of compression loaded angle- ply plates with holes	5.231
S. W. BURNS, C. T. HERAKOVICH (<i>Virginia Polytechnic Institute and State University, Blacksburg, VA, USA</i>), J. G. WILLIAMS (<i>Conoco Inc., Ponca City, OK, USA</i>)	
A simplified approach for interlaminar stresses around a hole in $[\phi/-\phi]_s$ laminates	5.241
KAI-DA ZHANG (<i>Northwestern Polytechnical University, Xian, PR China</i>), C. E. S. UENG (<i>Georgia Institute of Technology, Atlanta, GA, USA</i>)	
The analysis of deformations and strains in composites by moire Interferometry	5.251
D. POST (<i>Virginia Polytechnic Institute and State University, Blacksburg, VA, USA</i>)	

Studies of delamination growth and final failure under tensile loading P. A. LAGACE, J. C. BREWER (<i>Massachusetts Institute of Technology, Cambridge, MA, USA</i>)	5.262
---	-------

Failure criteria for composite materials—governed by matrix and interface ZHANG RUGUANG, XU SHOUBO (<i>Shanghai GRP Research Institute, Shanghai, PR China</i>)	5.274
---	-------

Abrasion and Wear

A critical review of the tribology of polymer composites B. J. BRISCOE, P. J. TWEEDALE (<i>Imperial College, London, UK</i>)	5.282
---	-------

The wear behavior of continuous fiber polymer composites M. CIRINO, R. B. PIPES (<i>University of Delaware, Newark, DE, USA</i>), K. FRIEDRICH (<i>Technical University of Hamburg, FR Germany</i>)	5.302
--	-------

The effect of fiber orientation on the wear behavior of graphite–epoxy composite materials A. A. FAHMY, H. A. WEST (<i>North Carolina State University, Raleigh, NC, USA</i>)	5.311
---	-------

Fretting fatigue of carbon fibre reinforced laminates K. SCHULTE (<i>DFVLR, Cologne, FR Germany</i>), K. FRIEDRICH (<i>Technical University of Hamburg, FR Germany</i>), S. KUTTER (<i>Ruhr- Universität Bochum, FR Germany</i>)	5.324
--	-------

Mechanical and tribological properties of SiC whisker/silicon nitride composite H. ISHIGAKI, R. NAGATA (<i>University of Osaka, Japan</i>), M. IWASA, N. TAMARI, I., KONDO (<i>Government Industrial Research Institute, Osaka, Japan</i>)	5.336
---	-------

Surface characterisation of Kevlar by inverse gas chromatography P. J. C. CHAPPELL (<i>Polymer Research Group, Victoria, Australia</i>), D. R. WILLIAMS (<i>Imperial College, London, UK</i>)	5.346
---	-------

Abrasive processes of composite materials B. LAMY, Y. RÉMOND (<i>Institut de Recherche Polytechnique, Mulhouse, France</i>)	5.356
--	-------

Fibres

Recent advances in aramid fiber and composite technology	5.362
P. G. RIEWALD, A. K. DHINGRA (<i>E. I. du Pont de Nemours & Co., Wilmington, DE, USA</i>), T. S. CHERN (<i>E. I. du Pont de Nemours & Co., Richmond, VA, USA</i>)	
A new alumina fibre for advanced composites	5.371
M. H. STACEY, M. D. TAYLOR, A. M. WALKER (<i>ICI plc, New Science Group, Runcorn, UK</i>)	
The influence of a polymer matrix and polymer coatings on the strength of silicon carbide reinforcing fibres	5.382
D. A. CLARKE, M. G. BADER (<i>University of Surrey, Guildford, UK</i>)	
Evaluation of electropolymerization treatment of carbon fiber surfaces	5.393
BAI SHUZHEN, LU ZHAIPING (<i>Beijing Institute of Aeronautics and Astronautics, Beijing, PR China</i>)	
Thermomechanical characterisation of fibre finish	5.401
G. MAIER, K.-H. BIEHL (<i>Wehrwissenschaftliches Institut für Materialuntersuchungen, Erding, FR Germany</i>)	

Fibre/Matrix Interface

A micromechanical and chemical study of the interfacial bond in carbon fibre composites	5.411
P. DENISON, F. R. JONES (<i>University of Sheffield, UK</i>), A. BROWN, P. HUMPHREY (<i>UMIST, Manchester, UK</i>), J. F. WATTS (<i>University of Surrey, Guildford, UK</i>)	
The adhesion of carbon fibers to thermoplastic polymers	5.424
W. D. BASCOM (<i>University of Utah, Salt Lake City, UT, USA</i>), R. M. JENSEN, L. W. CORDNER (<i>Hercules Inc., Magna, UT, USA</i>)	
The role of fibre-matrix adhesion in continuous carbon fibre reinforced thermoplastic composites: a microstructural study	5.439
B. FIFE, J. A. PEACOCK (<i>ICI plc International Materials Centre, Wilton, UK</i>), C. Y. BARLOW (<i>University of Cambridge, UK</i>)	
Interfacial adhesion in a carbon fibre-polyimide composite	5.448
Y. SAWADA, A. SHINDO, Y. NAKANISHI (<i>Government Industrial Research Institute, Osaka, Japan</i>)	

Influence of fibre/matrix interactions on the damage tolerance behaviour of composites	5.458
--	-------

M. L. C. E. VERBRUGGEN (*Akzo Research BV, Arnhem, The Netherlands*)

Determination of the interfacial shear strength by fibre fragmentation in resin systems with a small rupture strain	5.471
---	-------

D. JACQUES, J. P. FAVRE (*ONERA, Châtillon, France*)

Statistical Effects

Probabilistic models for hybrid composites	5.481
--	-------

M. G. BADER, R. L. SMITH, M. J. PITKETHLY (*University of Surrey, Guildford, UK*)

Probability analysis for tensile strength of unidirectional hybrid composites	5.496
---	-------

V. TAMUŽS, J. GUTANS (*Institute of Polymer Mechanics, Riga, Latvian SSR, USSR*)

Strength distribution of ceramic fibers including defects on interfacial reaction layer	5.507
---	-------

K. GODA, H. FUKUNAGA (*Hiroshima University, Higashi-Hiroshima, Japan*)

Ultimate properties of polymeric fibres and whiskers: a study of size effects	5.517
---	-------

H. D. WAGNER (*Weizmann Institute of Science, Rehovot, Israel*)

A reliability analysis of laminated composites and cylindrical shells	5.525
---	-------

A. E. BOGDANOVICH, S. P. YUSHANOV (*Institute of Polymer Mechanics, Riga, Latvian SSR, USSR*)

Mechanical properties of particulate reinforced composites predicted using finite element analysis and spatial statistical techniques	5.536
---	-------

F. J. GUILD (*Queen Mary College, London, UK*), P. J. DAVY (*University of Bath, UK*), R. J. YOUNG (*UMIST, Manchester, UK*)

Miscellaneous

Veils, mats and tissues for non-structural applications	5.547
---	-------

N. J. WALKER (*Fibertec, Kendal, UK*)

Late Submissions

Plenary Paper: High performance composites—matrix property/composite property relationships (Abstract)	5.557
N. J. JOHNSTON (<i>NASA Langley Research Center, Hampton, VA, USA</i>)	
Finite element analysis for the large deformation of laminated composite plates	5.558
L. ZHANG (<i>Shanghai Jiaotong University, Shanghai, PR China</i>)	
On the finite element calculation of failure modes in laminated CFRP specimens—an engineering approach	5.569
J. ARGYRIS, K. ICKERT (<i>ICA, University of Stuttgart, FR Germany</i>)	
Performance maps of textile structural composites	5.579
JENN-MING YANG, TSU-WEI CHOU (<i>University of Delaware, Newark, DE, USA</i>)	