

## CONTENTS

PREFACE	ix
by G. C. Sih, S.-E. Hsu and T. Y. Wung	
SPONSORS	xi
CONFERENCE PHOTOGRAPHS	xiii
OPENING ADDRESS	xxi
by Minister K. T. Li	
OPENING REMARKS	xxiii
by G. C. Sih	
MESSAGE FROM THE PRESIDENT OF THE HOST SOCIETY	xxv
by S.-E. Hsu	
PLENARY LECTURES	
Overview on the mechanics of composite materials and structures	3
by G. C. Sih	
Research on special composites in CSIST, ROC	25
by S.-E. Hsu	
New experimental approaches to stress analysis of composite structures	45
by J. T. Pindera and M. J. Pindera	
Composite materials and repair	69
by R. Jones	
Recent developments in advanced composites research	87
by T.-W. Chou	
Acoustic emission and microfracture of a solid	99
by Y.-H. Pao	
Sliding ellipsoidal inhomogeneities under shear	113
by T. Mura, R. Furuhashi and T. Mori	
SECTION I PROCESSING AND MANUFACTURING	
Graphite fiber reinforced ceramics, $TiB_2/TiC/MoC$ by SHS process	125
by S.-E. Hsu, C.-I. Chen, C.-R. Lee and S.-J. Chen	
A study on the magnetic properties of two-component magnetic composites	135
by S.-E. Hsu, K.-L. Wang, T.-I. Hou and L.-C. Su	
Multi-directional carbon/carbon composites prepared by HIP and CVD processes	147
by K. Yang, T.-M. Wu and C.-P. Chang	
Characterization of PZT-polymer piezoelectric composites	163
by C.-S. Hao, C.-W. Hsieh, P.-C. Yao, S.-J. Yang and S.-E. Hsu	
Gas-permeability in graphite fiber composite as a result of CVD processing	173
by Y.-H. Lee	
Property-temperature relationship of TSTR polyimide/graphite fiber composites	187
by S.-W. Leu, W.-Y. Chen, S.-E. Hsu and L.-C. Hsu	
Effect of the microstructures and processings on the strength of carbon fiber	197
by S. C. Yu, Y. H. Yen, W. F. Chen and H. Y. Lin	

Rolling and forging characteristics of aluminum matrix filamentary composites by W. Wang and T. Erturk	211
Thermal annealing study of cold powder metallurgy processed Cu-Ni composites by Y. D. Yao	219
Effect of formaldehyde/phenol ratio, viscosity and catalyst type on the characteristics of casting phenolic resins by S.-L. Jwo and W.-Y. Chen	229
SECTION II THERMAL AND MOISTURE EFFECTS	
Mechanical behavior of SiC/2014 Al composite at high temperature by S.-C. Chou and J. L. Green	247
Flammability of epoxy by J.-F. Chang and W.-Y. Chen	259
Water and solvent effects on carbon fiber/epoxy composites by K. J. Chang and R. Y. Wu	271
Thermal and mechanical analysis of acid anhydrides cured epoxy resin systems by H.-T. Chiu and C.-B. Chen	279
Vibrations of hygrothermal elastic composite plates by L.-W. Chen and Y. M. Chen	293
Effects of fiber length distribution on elastic moduli of short fiber reinforced thermoplastic by W. K. Chin, H. T. Liu and Y. D. Lee	311
Characterization of Mode I delamination of composite laminates at elevated temperatures by S.-C. Yen and M. El-Zein	323
The effect of moisture absorption and physical aging on the physical and mechanical properties of composites by M.-F. Sheu, C.-S. Yeh, Y.-P. Bian and C.-L. Ong	335
Influence of moisture on the mechanical properties of graphite epoxy system by A. Ankara, D. Weisgerber and J. Vilsmeir	347
SECTION III FAILURE AND FATIGUE ANALYSIS	
Stability of a crack interacting with fibers by C. K. Chao	365
Local and global instability in fracture mechanics by A. Carpinteri	375
Failure trajectory initiating from an elliptical inclusion by R. C. Chu	397
Energy density redistribution caused by broken fiber by D. M. Chou	413
Influence of stacking sequence on the instability of layered composite by D. Y. Tzou	425
Fracture and strengthening mechanisms in discontinuous SiC reinforced aluminum composites by T. G. Nieh, J. Wadsworth and W. H. Kao	437
Acoustic emission analysis of composite failure mechanisms with special reference to the modelling of amplitude distributions using a personal computer by Y. H. Wu, M. H. Yang, J. Y. Kuo and S. P. Chang	453

Prediction of stiffness degradation of composite laminates under fatigue loading	467
by J. N. Yang, A. Meskini and S. H. Yang	
Inner materials degradation effects on stiffness and dynamic crack propagation in composites subjected to cyclic loading	479
by A. Kobayashi and N. Ohtani	
The fatigue residual strength in centrally notched composite materials	489
by M.-H. R. Jen	
SECTION IV COMPOSITE LAMINATES	
High speed asperity excitation over a layered medium	505
by F. D. Ju and J.-C. Liu	
Analysis of asymmetric laminates	517
by H. Chin, J. K. Chen and C. T. Sun	
The failure characteristics of a GR/EP laminate	529
by D.-G. Hwang and H. T. Hahn	
The improvement of notched strength prediction for laminated composites	559
by T.-H. G. Hu and D. G. Goetschel	
Free vibrations of elliptical laminated plates	573
by C.-C. Lin and S.-C. Lin	
The flexural analysis of laminated composites using a triangular plate bending element	587
by A.-D. Han, F.-Y. Shieh and C.-C. Lin	
Laminated composites of amorphous alloys for EMI shielding	599
by D.-R. Huang, P.-C. Yao and S.-E. Hsu	
Stress and strength analysis of finite composite laminates with unloaded fastener holes	611
by C.-C. Ko, C.-C. Lin and C.-L. Ong	
Free vibration and buckling analysis of thick initial stress laminate	623
by T.-Y. Ye and C.-L. Wu	
SECTION V STRESS/STRENGTH AND INSTABILITY ANALYSIS	
Analysis of stress singularities of the crack tip in the two-dimensional orthotropic elastic body	639
by Y. Fujitani	
Prediction of tensile behavior of strain softened composites by flexural test methods	647
by T.-J. Chuang and Y.-W. Mai	
Dynamic visco-elastic properties of glass fibre reinforced polypropylene	659
by L. W. Chen and P. H. Lin	
Generic buckling of specially orthotropic cylindrical shells	667
by I.-H. Yang and W.-S. Kuo	
High performance epoxy matrix: the properties of modified epoxies for graphite composites	677
by G. Lee and W.-Y. Chen	
SECTION VI JOINT AND STRUCTURE DESIGN	
Free and forced nonlinear dynamics of composite shell structures	693
by Y. C. Wu, T. Y. Yang and S. Saigal	
Response of orthotropic cylindrical shells subjected to impact loading	705
by C. C. Chao, T. P. Tung and S. C. Lee	
Evaluation on AT-3 composite speedbrake by static test and analysis	717
by R. C. Chu, L. J. Hsu and Y. J. Chiou	

A simple numerical method for analyzing elasto-plastic stress distribution and progressive failure in adhesive layer of bonded joints	727
by S. Amijima, T. Fujii and T. Tanaka	
Stress and strength analysis of single-lap adhesively bonded joints	741
by C.-C. Ko, C.-L. Ong and J. Q. Tarn	
Analytical modelling of composite sandwich panel	759
by C. H. Lee	
LIST OF PARTICIPANTS	771