

Contents

| | |
|----------------|---|
| <i>Preface</i> | v |
|----------------|---|

| | |
|----------------|----|
| <i>Préface</i> | vi |
|----------------|----|

| | |
|-----------------------------|----|
| <i>List of Contributors</i> | xv |
|-----------------------------|----|

Modelling, Simulation and Characterisation of Surfaces

| | |
|---|---|
| Characterisation and Quality Control of Surface Treatments and Coatings | 1 |
|---|---|

K. Stevens

| | |
|---|----|
| Microstructural Preparation and the Achievement of a Representative Surface | 14 |
|---|----|

I. A. Bucklow and P. Morrell

| | |
|---|----|
| Photothermal Reflectance Investigation of Implanted Silicon | 22 |
|---|----|

I. A. Vitkin, C. Christofides and A. Mandelis

| | |
|---|----|
| The Erosion-Corrosion of a Nitrocarburized Low Alloy Steel in a Simulated FBC Environment | 29 |
|---|----|

P. M. Rogers, I. M. Hutchings and J. A. Little

| | |
|---|----|
| Comparison of Fractal and Conventional Topographic Analysis of Electric Discharge Machined Ceramic Surfaces | 39 |
|---|----|

C. A. Brown, D. F. Dauw and G. Savary

Surface Preparation and Protection

| | |
|--|----|
| Corrosion Protection through Salt Bath Nitriding | 52 |
|--|----|

J. R. Easterday

| | |
|---|----|
| Protection of Surfaces of Natural Stone and Concrete through Polymers | 62 |
|---|----|

P. J. Koblischek

| | |
|---|-----|
| The Influence of Directivity of Machining Marks on Grindability and Wear of Honed Surfaces | 72 |
| A. F. Budzyński | |
| Wear Resistant Surfaces with a Hardphase Gradient | 82 |
| H. Berns, A. Fischer and Ch. v. Nguyen | |
| Adhesive Bonding and Bondface Characterisation | |
| Surface Characterization and High-Temperature Adhesive Bonding of Carbon Fiber-Polyimide Matrix Composites | 91 |
| D. J. D. Moyer and J. P. Wightman | |
| Contact Angles on Imperfect Solid Surfaces | 100 |
| J. Gaydos, C. J. Budziak, D. Li and A. W. Neumann | |
| Engineering the Interphase in Reinforced Plastics | 113 |
| A. Khelawan and M. R. Piggott | |
| Ferroelectric Thin Films from Metallo-organics: The Influence of Different Atmospheres during RTA Processing | 120 |
| Y. Shi, E. Sánchez-Carambot, W. Otaño, L. J. Martínez-Miranda and J. J. Santiago-Avilés | |
| Ultrasonic Verification of Surface Treatment Adequacy in Metal-to-Metal Adhesive Joints | 126 |
| P. Dickstein | |
| The Unidirectional Tensile Characteristics of Ion-Nitrided and Ion-Carbonitrided Surface Layer of 40CrNiMo | 136 |
| D. Guan, Z. Yu, H. Zhang and L. Yang | |
| Surface Effects on Implantation | |
| Friction and Metal Transfer in Sliding Aluminum against Ion-Implanted Steel | 146 |
| P. C. Nautiyal and J. A. Schey | |
| The Effect of Ion Implantation on the Fretting Fatigue Properties of Titanium Alloy Fan and Compressor Blades | 156 |
| J. E. Elder, R. Pishva, W. Doswell, G. Weatherly and W. Wallace | |
| Martensitic Transformation in 304 Stainless Steel after Implantation with Neon | 167 |
| J. Y. Xu, B. J. van Brussel, J. Noordhuis, P. M. Bronsveld and J. Th. M. de Hosson | |

| | |
|---|-----|
| Elevated Temperature Ion Implantation: A New Direction for Surface Engineering | 177 |
| <i>F. J. Worzala, J. R. Conrad, R. A. Dodd, M. Madapura and K. Sridharan</i> | |
| Surface Modification Experiment by Intense Pulsed Ion Beam | 188 |
| <i>T. Takaai, T. Hatushika, T. Suzuki, K. Masugata and K. Yatsui</i> | |
| PSII Nitrogen Implanted M2 Tool Steel for Wear Resistance in Wood Machining Tools | 198 |
| <i>S. Raebel, F. J. Worzala and J. R. Conrad</i> | |
| Plasma Nitriding and Nitrocarburizing of Austempered S.G. Cast Iron | 208 |
| <i>R. Priestner and S. Korichi</i> | |
| Surface Integrity of Aerospace Alloys | |
| Techniques for Improved Surface Integrity of Aerospace Aluminum Alloys | 218 |
| <i>W. Wallace, M. D. Raizenne and A. Ankara</i> | |
| Duplex Hardening: An Advanced Surface Engineering Technique for Helicopter Transmissions | 228 |
| <i>D. P. Davies</i> | |
| Low Cycle Fatigue Fracture Behaviour of Conventional and Damage Tolerant Microstructures of Inconel 718 at 650°C | 238 |
| <i>B. Hong, Y. Xiao, P. Au, A. K. Koul and W. Wallace</i> | |
| Corrosion and Wear Protection of Compressor Blades by Aluminum Coatings and a New Method for Testing their Erosion Resistance | 252 |
| <i>Kh. G. Schmitt-Thomas and Th. Happel</i> | |
| Effects of Surface Finish on the Solid State Welding of High Strength Aircraft and Aerospace Aluminium Alloys | 260 |
| <i>H. M. Tensi and M. Wittmann</i> | |
| Laser Surface Treatment | |
| Surface Modifications of Zirconium Alloys by Laser Glazing | 270 |
| <i>K. F. Amouzouvi, L. J. Clegg and R. C. Styles</i> | |
| Laser Shock Hardening of Welded Maraging Steel | 280 |
| <i>G. Banas, F. V. Lawrence Jr, J. M. Rigsbee and H. E. Elsayed-Ali</i> | |

| | |
|--|-----|
| Laser Surface Heat Treatment Used for Induction of Residual Stresses into Circular Saw Blades for Better Working Behaviour | 291 |
| <i>H. K. Tönshoff and A. R. Rosenthal</i> | |
| Residual Stress Evaluation of Materials Manufactured by High-Energy Process | 303 |
| <i>J. F. Flavenot and J. Lu</i> | |
| Surface Integrity: Fatigue, Fretting, Corrosion and Wear | |
| Finite Element Analysis of Main Crack-Microcrack Interaction under Mode-I Loading | 313 |
| <i>S. A. Meguid, S. X. Gong and P. E. Gaultier</i> | |
| The Effect of Surface Treatments on the Fretting Wear of an Aluminium Alloy (RR58)/Steel (BS 970 080 M40) Couple | 325 |
| <i>R. B. Waterhouse</i> | |
| Degradation of a Biomedical Polyurethane: Surface Integrity and Fatigue Effects | 335 |
| <i>M. M. Sinnott and D. W. Hoepfner</i> | |
| Microstructural and Surface Effects on Fatigue of Ti-6Al-4V Alloy | 344 |
| <i>S. B. Young and W. J. Bratina</i> | |
| Corrosion and Wear Characteristics of Nickel Aluminide, NiAl, in NaCl Medium | 354 |
| <i>F. A. Elrefaei, H. A. Ahmed, M. M. I. Ahmed and K. E. Mohamed</i> | |
| The Study of Anticorrosion Technique for Natural Gas Processing Plants | 361 |
| <i>W. S. Yun and G. J. Lian</i> | |
| Surface Residual Stresses | |
| Shot Peening—Current Trends, Future Prospects | 371 |
| <i>J. J. Daly</i> | |
| Shot Peen Controls and Aircraft Engine Requirements | 379 |
| <i>P. G. Bailey and J. M. Whalen</i> | |
| Fatigue Fracture and Residual Stress Relaxation in Shot-Peened Components | 386 |
| <i>D. W. Hammond and S. A. Meguid</i> | |
| Some Theoretical Problems of Shot Peening | 393 |
| <i>P. Kuba and V. Sedláček</i> | |

| | |
|---|-----|
| Fatigue Damage Evaluation of Shot Peened High Strength Aluminum Alloy | 404 |
| <i>Y. Oshida and J. Daly</i> | |
| Effect of Shot Peening Process Controls on Consistent Treatment | 417 |
| <i>J. S. Eckersley</i> | |
| Effect of Pre- and Post-Processing upon Shot-Peening Residual Stresses | 428 |
| <i>T. Rasul</i> | |
| Techniques in Surface Engineering | |
| Surface Kinetics of Hydrogen Entry into Zirconium Films | 443 |
| <i>C. A. Ward, M. B. Elmoselhi, L. Pataki and B. D. Warr</i> | |
| Abrasive Flow Machining for Automatic Surface Finishing and Capacitance Technology for In-Process Surface and Dimensional Metrology | 456 |
| <i>L. J. Rhoades</i> | |
| Evolution du Dommage Surfacique au Cours d'un Essai de Fatigue Oligocyclique: Comparaison avec des Mesures de Dommage Volumique | 468 |
| <i>J. Charrier, R. Roux et C. Gasc</i> | |
| The Influence of Fine Structure, Morphology and Composition of Alloy and Oxide on the Growth of Cr ₂ O ₃ Scales | 478 |
| <i>M. Hirbod</i> | |
| Effect of Surface Texture Geometry on the Dynamic Performance of Hydrostatic Bearings | 490 |
| <i>Z. S. Safar, M. O. A. Mokhtar and T. A. Osman</i> | |
| Developments in Surface Engineering | |
| Study of Tools for Hot Rolling of Steel Alloy Tubes | 504 |
| <i>S. Uchida, I. Masuda and K. Watanabe</i> | |
| Quality of Surface Coating by Submerged Arc Welding | 516 |
| <i>R. Kejžar</i> | |
| Surface Degradation and Stress Corrosion Cracking of Bronze in Moist Oil | 528 |
| <i>E. Lunarska, S. H. Shim and Z. Szklarska-Smialowska</i> | |

- On Magnetron Sputtered Gradient and Multilayer Coatings 538
O. Knotek, F. Jungblut and F. Löffler

Trends in Surface Engineering

- Hydrophobic Reorientation of Glow-Discharge Treated Polyethylene as Measured by Contact Angles 548
H. C. van der Mei, I. Stokroos, J. M. Schakenraad and H. J. Busscher

- Hall Effect and Resistance Measurements on Implanted and Annealed Silicon Layers 555
C. Christofides

- Diffusion of Carbon in Carbon Steels and Graphitic Cast Irons Heat Treated by Concentrated Energy Sources 562
V. Sedlacek, J. Horyna and J. Zamecnik

- Influence of Electrochemical Honing Methods on Load Capacity of Surfaces 572
A. F. Budzyński and J. Kozak

- Evaluation of Acid Rain Resistant Clear Coatings for Stone Structures 582
B. S. Sitaramam and V. R. Puttagunta

- Computer Modelling of the Abrasive Flow Machining Process 592
A. J. Fletcher, J. B. Hull, J. Mackie and S. A. Trengove

- Theoretical and Practical Study of On-Line Identification for the Grinding Burn 602
R. Huang, Z. Li, X. Shi, R. Ding and Y. Mao

Advances in Surface Engineering

- Sand Erosion and Cavitation Behaviour of Hydraulic Turbine Runner Materials 615
A. S. Rao and D. Kung

- Improvement of Fatigue Resistance of Steel Parts after Various Surface Treatments 625
J. Barralis and L. Castex

- Relationship between Ductility and Wear Resistance of High Mn-Steels 640
N. A. A. Rahim Aly and M. R. El-Koussy

| | |
|--|-----|
| The Use of Shot Peening as a Surface Preparation Treatment for the Electrodeposited Chromium Plating | 652 |
| <i>J. Lu, J. Reby, J. F. Flavenot, G. Vasseur and B. Sutter</i> | |
| Analytical Solutions of Crack Developing at Rail Joint Due to Impacting | 662 |
| <i>J. Fan and C.-S. Tsai</i> | |
| An Investigation into Surface Generation during Machining High Strength Low Alloy Steel | 668 |
| <i>A. Basu, T. Chandra and R. Rudziejewski</i> | |
| Development of Finish Turning Inserts: Present Trends and Future Prospects | 678 |
| <i>I. S. Jawahir, N. Uddin and C. K. Jun</i> | |
| Machining Residual Stresses | 688 |
| <i>T. Rasul</i> | |
| Effect of Cold Deformation in Boronizing Processes and Wear Behavior of Low Carbon Steel 1020 | 700 |
| <i>B. L. Jiang, W. Liu and T. C. Lei</i> | |
| <i>Index of Contributors</i> | 711 |