

# Table of Contents

## Preface

## Chapter 1: Engineering Materials

|                                                                                                                                                                                                                                                                        |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Effect of Plating Thickness on Fatigue Strength of Galvanized Steel</b><br>K. Hasegawa, T. Hayashi, M. Morita and S. Motoda                                                                                                                                         | 3   |
| <b>Influence of Nano-Silica Dosage on Properties of Cement Paste Incorporating with High Calcium Fly Ash</b><br>T. Suwan, P. Jitsangiam and P. Chindaprasirt                                                                                                           | 9   |
| <b>Mechanical and Shrinkage Behaviors of Ductile Fiber-Reinforced Polymer Repair Mortar</b><br>G.Y. Han and J.L. Luo                                                                                                                                                   | 14  |
| <b>Development of a TAPE-Agar Liquid Gel Bandage</b><br>R.F.M. Bautista, M.R.H. Tam, K.A.D. Wong and T. Tumolva                                                                                                                                                        | 20  |
| <b>Frequent Start-Stop Test Study of Graphene Coatings on Journal Bearings</b><br>X.B. Wang, Y.F. Zhang and Z.W. Yin                                                                                                                                                   | 26  |
| <b>A New Technology to Prevent the Formation of Limescale in Hot Water Supply Systems</b><br>M. Jalilov, A. Jalilova, G. Feyziyeva and M. Azimova                                                                                                                      | 36  |
| <b>Development of a <math>\text{CuFe}_2\text{O}_4</math> - Reduced Graphene Oxide-Based Electrochemical Sensor for Malathion</b><br>G.A.T. Battad, J.G. Estacio, J.L.C. Indiongco and M.L. Mopon Jr.                                                                   | 41  |
| <b>Nano-Crystallization of Steel Surface by Slide-Burnishing</b><br>H. Kato, K. Yamamoto and K. Yasunaga                                                                                                                                                               | 48  |
| <b>Numerical Simulation of Material Plastic Deformation Using the Drawing Forming Process of Contoured Internal Surface Tubes</b><br>M. Necpal, E. Hodúlová and M. Martinkovič                                                                                         | 54  |
| <b>Solvent Absorption and Dissolution Kinetics Modelling for the Chemical Recycling of Waste Plastic Laminates</b><br>M.S.P. Deang, R.I.C. Alindayu, K.V.H. Escasa, G.M.G. Riña and T. Tumolva                                                                         | 59  |
| <b>Feasibility of Paper Production from Oil Palm Trunk Using Arrowroot Flour as a Binder</b><br>N. Phruksaphithak and J. Wangprayot                                                                                                                                    | 64  |
| <b>Study on Morphology Features and Mechanical Properties of Nanofibers Films Prepared by Different Composite Electrospinning Methods</b><br>C. He, H. Wang, L.X. Huang, P. Wang and W. Gao                                                                            | 70  |
| <b>Studying the Stability and Conductivity of the Composite Films via Electrospinning/Spray Process</b><br>L.X. Huang, H. Wang, F.Y. Fang, P. Wang and W. Gao                                                                                                          | 76  |
| <b>Electrospinning/Spray: The Interaction between Graphene Nanosheets and Different Nanofibers</b><br>Y.Z. Chen, H. Wang, F.Y. Fang, H. Mei and L. Wang                                                                                                                | 82  |
| <b>Tensile Properties of Cellulose-Filled Recycled Thermoplastic Composite Filaments for 3D Printing</b><br>M. Hyvärinen and T. Kärki                                                                                                                                  | 87  |
| <b>3D Reconstruction of Microstructure for Centrifugal Casting Babbitt Lining of Bimetallic Bearing Based on Mimics</b><br>Q. Dong, Z.W. Yin, H.L. Li, Y. Mao and G.Y. Gao                                                                                             | 94  |
| <b>X-Ray Powder Diffraction Data and Crystal Refinement of Ternary Compound <math>\text{Ti}_4\text{ZrSi}_3</math></b><br>L.Q. Liang, Y.Y. Wei and D.G. Li                                                                                                              | 99  |
| <b>The Green Preparation of Cellulose Fibrils from Oil Palm Leaf Stalk Fibers for Hydrogel Applications</b><br>N. Srirachya and A. Nido                                                                                                                                | 103 |
| <b>Evaluation of Recycled Aggregate (RAP) Presence Impact under Indirect Tensile Strength of Bitumen Stabilized Mix with Foamed Asphalt for a Base Layer</b><br>M.A.V. Guzmán, H.D. Alamilla, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García and R.R. Ruiz | 108 |

|                                                                                                                                                       |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Scanning Electron Microscope in Rocks and their Comparison with Physical-Mechanical Properties</b>                                                 |     |
| M.A.N. Seras, F.J.D. Mota, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García, J.G. Tinoco Ruiz and J.A.G. Torres                             | 114 |
| <b>Natural Additive to Retard the Setting of a Mortar and Increase its Resistance</b>                                                                 |     |
| N. Díaz-González, L.A.G. Luna, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García and J.A.V. Perez                                            | 119 |
| <b>Electrochemical Synthesis of Hydroxyapatite Nanosheet-Assembled Porous Structures with Bipolar Membrane</b>                                        |     |
| A. Nur, A.W. Budiman, A. Jumari, Nazriati and F. Fajaroh                                                                                              | 124 |
| <b>The Comparison between Mechanical Properties of Laser-Welded Ultra-High-Strength Austenitic and Martensitic Steels</b>                             |     |
| M. Hietala, M. Keskitalo and A. Järvenpää                                                                                                             | 132 |
| <b>Mechanical Properties of Concrete Using Treated Recycled Concrete Aggregate in Marine Environment</b>                                              |     |
| S. Ismail and M. Ramli                                                                                                                                | 138 |
| <b>Failure Analysis of Spur Gears Used in Transmission System Applied on a Hand Tractor</b>                                                           |     |
| Husaini, D.M. Dawud, T.E. Putra and N. Ali                                                                                                            | 144 |
| <b>Biofuel Production from Jatropa Bio-Oil Derived Fast Pyrolysis: Effect of Catalysts Supported</b>                                                  |     |
| T. Rodseanglung, T. Ratana, M. Phongaksorn and S. Tungkamani                                                                                          | 150 |
| <b>Experimental Investigation and Modelling of Claystone from Mae Moh Coal Mine, Thailand</b>                                                         |     |
| P. Wongchana and P. Jitsangiam                                                                                                                        | 155 |
| <b>Preliminary Investigation of Crushed Rock-Based Geopolymer for Road Applications</b>                                                               |     |
| H. Thongchua, P. Jitsangiam, T. Suwan, D. Rinchumphu, S. Kwunjai and P. Chindaprasirt                                                                 | 161 |
| <b>Hemp Fiber Reinforced Geopolymer Composites: Effects of NaOH Concentration on Fiber Pre-Treatment Process</b>                                      |     |
| P. Maichin, T. Suwan, P. Jitsangiam and P. Chindaprasirt                                                                                              | 166 |
| <b>Crushed Rock Geopolymer as a Future Road Construction Material: An Evaluation on Strength Performance and Compaction Characteristics</b>           |     |
| S. Kwunjai, P. Jitsangiam, T. Suwan, D. Rinchumphu, H. Thongchua, P. Chindaprasirt and S. Sampattagul                                                 | 171 |
| <b>Response Behavior of Local Surface Failure due to Repetitive Impact of Stainless Steel</b>                                                         |     |
| M. Sukpat and T. Karuna                                                                                                                               | 177 |
| <b>Study of Properties of 3D Printed Short Carbon Fiber Composite</b>                                                                                 |     |
| N. Saithongkum and T. Karuna                                                                                                                          | 182 |
| <b>High Purity Lime as an Ecologic Alternative for Construction Mortars and Pastes</b>                                                                |     |
| E.G. Navarro-Mendoza, J.A. Bedolla-Arroyo, A. Sánchez-Calvillo, E.M. Alonso-Guzmán, V.H. Blancas-Herrera, W. Martínez-Molina and H.L. Chávez-García   | 188 |
| <b>Cemented Mortar Matrices Densified with Organic Additions</b>                                                                                      |     |
| L.C. Velázquez, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García, M.C.G. Chiquito and M.A. Sánchez                                          | 193 |
| <b>Evaluation of the Electrical Resistivity, Ultrasonic Pulse Velocity and Mechanical Properties in Portland Cement Pastes Type II</b>                |     |
| J.A.V. Perez, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García, I.T. Moreno and M.A. Sánchez                                                | 198 |
| <b>Characterization of Hydraulic Concrete with Polystyrene-Based Emulsion</b>                                                                         |     |
| M.C.G. Chiquito, E.M. Alonso-Guzmán, W. Martínez-Molina, H.L. Chávez-García and N. Díaz-González                                                      | 203 |
| <b>Preparation and Performance Study of Fluorosilicone Oligomer Anti-Sticking Coatings</b>                                                            |     |
| D.B. Guan, X.J. Zhai, Y.N. Biansai, B.J. Cao, Y.F. Zhu and J.L. Li                                                                                    | 209 |
| <b>The Effect of Alloying on the Fractional Composition, Shape and Grain Size Distribution of the Structure Alloy GAP the Fe-Nd-B System</b>          |     |
| V.A. Chaika, V.V. Savin, M. Sorokovikov and A. Marikhin                                                                                               | 214 |
| <b>Optimization of Methylene Blue Adsorption via Functionalized Activated Carbon Using Response Surface Methodology with Central Composite Design</b> |     |
| N. Saafie, M.F.R. Samsudin and S. Sufian                                                                                                              | 220 |

|                                                                                                                                                                                                                           |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Rejection Rate Reduction of the Automotive Thermoplastic Parts in Injection Moulding Using Response Surface Methodology</b><br>H.R. Ong, I.M. Shah, W.M.E. Iskandar, M.M.R. Khan, S. Hong, R. Ramli and M.K.A. Mohamed | 225 |
| <b>Simulation of Gap Flow Field in EDM Process Used Oil-in-Water Working Fluid</b><br>W.J. Chang, Y.Y. Xi and H.W. Li                                                                                                     | 232 |
| <b>Synthesis, Preparation and Characterization of Amine-Induced Bacterial Cellulose-Poly(Vinyl Alcohol) Semi-Interpenetrating Network Hydrogel</b><br>J.E. Arikibe, R. Lata and D. Rohindra                               | 238 |
| <b>Effect of Substrate Temperature on the Electronic Properties of MgO Thin Films on Si (100) Grown by Electron Beam Evaporation</b><br>Y.R. Denny, T. Firmansyah, V. Gustiono and S.S. Lee                               | 243 |
| <b>Button of Hydroxyapatite Composite for Craniotomy Flap Fixation: Fabrication and Mechanical Properties</b><br>A. Raksujarit and S. Punyanitya                                                                          | 248 |
| <b>Analysis of Physical and Mechanical Properties of Backhoe's Bucket Repairment with Cladding Methode</b><br>Y. Purwaningrum, M. Hafiz and R. Suparyanto                                                                 | 254 |
| <b>Fabrication Study of Cu-C-Ni for EDM Electrode by a Sintering Technique</b><br>P. Janmanee, A. Muttamara, R. Saodaen and A. Rodchanarowan                                                                              | 259 |
| <b>Synthesis and Characterization of Active Biocarbon Material for Use in Cosmetics and Personal Care Products</b><br>S.A. Palsan, J.Y. Lim and A. Nor Asfaliza                                                           | 266 |
| <b>Characterization of Adsorbents Derived from Palm Fiber Waste and its Potential on Methylene Blue Adsorption</b><br>A. Zulkania, M. Iqbal and Syamsumarlin                                                              | 273 |
| <b>Potential Activity Evaluation of Phosphorus on CoMo/Al<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> Catalysts to Co-Processing Model</b><br>T. Rodseanglung and J. Paksamut                                                | 278 |
| <b>Investigation of the Tensile and Flexural Behavior of Polylactic Acid Based Jute Fiber Bio Composite</b><br>M. Aadithya, V.K. Kirubakar, T. Aakash and C. Sentharamaikkannan                                           | 283 |
| <b>Fatigue and Fracture Mechanism of Aluminum-Carbon Fiber Reinforced Hybrid Composites</b><br>S.M.M. Rahman and M.S. Ferdous                                                                                             | 288 |
| <b>Fatigue-Corrosion of High Strength Steels in Synthetic Seawater under Cathodic Protection</b><br>S. Lorenzi, C. Testa, M. Cabrini, F. Carugo, L. Coppola and T. Pastore                                                | 294 |
| <b>Effect of Cr and Si Contents on the Magnetic and Mechanical Properties of Fe-Cr-Si Alloys by MIM Process</b><br>M. Kimura, T. Shimizu and H. Watari                                                                    | 300 |
| <b>Microstructure and Mechanical Properties of Laser Welded 316L SLM Parts</b><br>T. Rautio, J. Mäkilängas, M. Jaskari, M. Keskitalo and A. Järvenpää                                                                     | 306 |
| <b>The Effect of Calcination Temperature on Metakaolin Characteristic Synthesized from Badau Belitung Kaolin</b><br>R. Ulfiati, D. Dhaneswara, J.F. Fatriansyah and S. Harjanto                                           | 312 |
| <b>Flavor Quality Changes of Turbot (<i>Psetta maxima</i>) Stored at -2 and 0°C</b><br>H.L. Zhao, Y.M. Yin, Y. Liu, Y.X. Xu, X.P. Li and J.R. Li                                                                          | 317 |
| <b>Investigation on Mechanical Behavior of Sisal Fiber Reinforced Polylactic Acid and Sisal/Epoxy Composites</b><br>S. Dhannush, S. Aushwin, A.R. Arunagiri and C. Sentharamaikkannan                                     | 322 |
| <b>Evaluation of Mechanical Properties of Sugarcane Reinforced Hybrid Natural Fibre Composites by Conventional Fabrication and Finite Element Method</b><br>R.D. S, P.N.B. Kumar, R.S. Kumar and B.V. Ramnath             | 327 |
| <b>Study of Deep Cryogenic Treatment Process Effect on Microstructure and Properties of CuBeZr Alloy</b><br>N. Wannaprawat and T. Karuna                                                                                  | 335 |
| <b>Casting of High Aluminum Content AM Series Magnesium Alloys by Using a Horizontal Twin Roll Caster</b><br>H. Tozuka, K. Seki, H. Watari and T. Haga                                                                    | 340 |

|                                                                                                                                                               |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Estimation of Cold Roll Forming Characteristics of Wrought Magnesium Alloy with Tension-Compression Asymmetry</b><br>H. Kobayashi, H. Tozuka and H. Watari | 346 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|

## **Chapter 2: Materials Properties and Application**

|                                                                                                                                                                                                   |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Analogy of Non-Destructive Tests for the Detection of Defectologies in Aluminium Cylinder Heads</b><br>S.S. Valencia, L.C. Galárraga, H.C. Terán and O. Arteaga                                | 355 |
| <b>Surface Roughness Prediction Based on Acoustic Emission Signals in High-Precision Diamond Turning of Rapidly Solidified Optical Aluminum Grade (RSA443)</b><br>Z. Hweju and K. Abou-El-Hossein | 363 |
| <b>Flow Field Analysis and Experimental Investigation of Electrochemical Etching</b><br>Y.L. Chen, C.H. Guo, P.X. Chen, Z. Liu and A.S. Lv                                                        | 369 |
| <b>3D FEM Study of the Flow Uniformity of Flat Polypropylene Film/Sheet Extrusion Dies</b><br>D. Igali, A. Perveen, D. Wei, D.C. Zhang and A. Mentbayeva                                          | 375 |
| <b>Prediction of the Fatigue Life of the SAE 5160 Carbon Steel Coil Spring Based on Strain-Life Approach</b><br>T.E. Putra, Husaini and H. Prakasa                                                | 381 |
| <b>Design and Optimization of Die Body for Polymer Extrusion</b><br>T. Saparov, U. Belgibay, D.C. Zhang, D. Wei, C.N. Sun, A. Mentbayeva and A. Perveen                                           | 387 |