

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Materials and Energy

Mortars with Phase Change Materials: Contribute to Sustainable Construction	
J. Aguiar, S. Cunha and M. Kheradmand	3
Cool Facades - Thermal Performance Assessment Using Infrared Thermography	
L. Matias, L. Gonçalves, A. Costa and C.P. Santos	14
Mortars with Phase Change Materials - Part I: Physical and Mechanical Characterization	
S. Cunha, J. Aguiar, V. Ferreira, A. Tadeu and A. Garbacz	22
Mortars with Phase Change Materials - Part II: Durability Evaluation	
S. Cunha, J.B. Aguiar, V. Ferreira, A. Tadeu and A. Garbacz	33
Water-Resistance of Mortars with Lightweight Aggregates	
A. Soares, M. Júlio, I. Flores-Colen, L. Ilharco, J. de Brito and J. Gaspar Martinho	46
Evaluation of High Reflective Products in Flat Roofs Rehabilitation – Experimental Study	
A. Costa and C. Pina dos Santos	54
Thermal Performance Characterization of a Modular System for Facade	
C. Cardoso and S. Jalali	62
Parabolic Solar Collector Coverage Made of High-Performance Concrete with Addition of Active Rice Husk Silica Integrated to a Biomass Thermoelectric Unit	
R.A. Conte, D.G. Pinatti, L.F.M. Marton, S. Ribeiro, T.W. Acosta, R.A.P.A. Cruz and H.F. Santiago	72

Chapter 2: Materials and Residues

Use of Waste Materials in the Production of Concrete	
J. Brito and R. Silva	85
Waste Management in the Reform and Adequacy of the Maracanã Stadium for the FIFA Football World Cup 2014	
M. Vinciguerra, E.P. Figueiredo, F. Drummond, C. Zaeyen, Í. Moreno and B. Malafaia	97
Durability Performance of Fly Ash Based One-Part Geopolymer Mortars	
Z. Abdollahnejad, F. Pacheco-Torgal, J.B. Aguiar and C. Jesus	113
Simultaneous Use of Two Catalytic Wastes to Cement in Sustainable Construction Materials	
M.B.M. Melchert, M.M. Viana and J. Dweck	121
Evaluating the Pozzolanic Activity of Spent Catalyst Partially Substituting Type II Portland Cement	
A.L.C. Cunha, J.P. Gonçalves and J. Dweck	131
Strength, ASR and Chloride Penetration of Mortar with Granite Waste Powder	
A. Matos, T. Ramos and J. Sousa-Coutinho	139
Influence of the Crushing Process of Recycled Aggregates on Concrete Properties	
D. Pedro, J. de Brito and L. Evangelista	151
Use of Sugarcane Bagasse for Particleboard Production	
R.F. Mendes, L.M. Mendes, S.L. Oliveira and T.P. Freire	163
Eco-Efficient Self-Compacting Concrete with Reduced Portland Cement Content and High Volume of Fly Ash and Metakaolin	
M.A.S. Anjos, A. Camões and C. Jesus	172
Adaptation of Rice Husk Ash for Use as Pozzolanic Material	
G.A. Kieling, A.M.C. Moraes, A.F. Brehm, D. Calheiro and P.M. Kulakowski	182
Performance of Concrete Made with Recycled Aggregates from Portuguese CDW Recycling Plants	
M. Bravo, J. de Brito, J. Pontes and L. Evangelista	193

Monitoring and Evaluation of Industrial Production of Fired-Clay Masonry Bricks with 2.5% of Phosphatization Sludge	206
M.P. Kulakowski, F.A. Brehm, C.A.M. Moraes, A. Pampanelli and V. Reckziegel	
Carbonation Front Progress in Mortars Containing Fly Ash Considering the Presence of Chloride Ions	214
R. Malheiro, A. Camões, R.M. Ferreira, G. Meira, M.T. Amorim and R. Rei	
Influence of Cellulose Pulp Waste in Plastering Mortar	222
L.M. Gomes, A. Aroche, M. Schafer, R. Erhart, C.A.M. Moraes, T.L.A. de Campos Rocha and F.A. Brehm	
Evaluation of the Mechanical and Environmental Behavior of Alkali-Activated Mortars Containing PU/EVA-Based Waste	235
F.A. Trein, A.S. Vargas, M.A.S. Rodrigues and J.P.C. Gomes	
Evaluation of Soil, Cement and Construction and Demolition Waste (CDW) Mixtures for Use in Road Pavement Base and Sub-Base Applications	247
J.H.C. Reis, S. Soares Silva, J.S. Ildefonso and J.K. Yshiba	
Mortar Effect of Rice Husk Ash Burning on Fluidized Flow and Sliding Grid	256
D.P. Righ, E.Y.B. Nakanishi, L.D. Kirchhof, G. Mohamad and M.R. Garcez	
Study of Timber and Concrete with Rubber Waste Composite Beams Applied to Bridges	266
L.H.B. Pinheiro, J.A. Matthiesen and J.L. Akasaki	
Evaluation of the Influence of PU/EVA Waste-Based Lightweight Aggregates on the Physical Properties of Alkali-Activated Mortars	278
F.A. Trein, A.S. Vargas, M.A.S. Rodrigues and J.P.C. Gomes	
Carbonation Resistance of High Volume Fly Ash Concrete	288
R. Reis, R. Malheiro, A. Camões and M. Ribeiro	
Stress-Strain Behavior of Mortar Mixtures Containing Construction and Demolition Waste as Fine Aggregate	300
J.C. Ferreira, T.M. Grabois, G.C.S. Calgado and R.D.T. Filho	
Leaching of Chromium in Red Ceramic Monolith by Immersion and Irrigation	307
L. Marielle, C.K. Emilie, P.K. Marlova and A.B. Feliciane	

Chapter 3: Natural Materials

Options for Chemical Modification of Wastes from a Brazilian Hardwood Species and Potential Applications	
L. Bufalino, L.A. Caixeta, T. de Paula Protásio, M.V. Scatolino, R.G. de Almeida Mesquita, L.M. Mendes, G.H. Tonoli and J.M. Marconcini	321
Recommendations for the Construction with Adobe Brick Based on Norm NTE E.080:2000 from Peru and the Technique Currently Used in the State of Bahia - Brazil	
M.C. Romero, S.F. César and R.D.A. Cunha	329
Bamboo as Sustainable Material Used in Design and Civil Construction: Species, Management, Characterization and Applications	
M.A. dos Reis Pereira and T.Q.F. Barata	339
Mechanical Properties of Adobe Made with Sugar Cane Bagasse and “Synthetic Termite Saliva” Incorporation	
A.A.R. Corrêa, T. de Paula Protásio, J.T. de Lima, G.D. Tonoli and L.M. Mendes	351
Ancient Materials and Techniques to Improve the Earthen Building Durability	
R. Eires, A. Camões and S. Jalali	357
Study in Real Conditions and in Laboratory of the Application of Expanded Agglomerated Cork as Exterior Wall Covering	
M. Roseta and C.P. dos Santos	367
Buckling of Masts of Bamboos Bundles	
F.J. Silva, F.C. Rodrigues and L.E. Moreira	379
Buckling of Bamboo Masts with Interposed Spacers	
F.J. Silva, B.F.S. Lana, F.C. Rodrigues and L.E. Moreira	389
A Study of the Nature of the Shear Strength of Soil-Waste Composites	
D.L. Cardoso, T.B. Kaminski, F.S. Goldoni, G.I. Venson and C.D. Cancelier	400
Effect of Treatment of Sisal Fiber on Morphology, Mechanical Properties and Fiber-Cement Bond Strength	
R. de Jesus Santos and P.R.L. Lima	410

Mechanical Behavior of Self-Compacting Soil-Cement-Sisal Fiber Composites	421
A.P.S. Martins, F.A. Silva and R.D. Toledo Filho	
Earth Construction and Sustainability	433
N.P. Barbosa and K. Ghavami	
Durability of Natural Fibers for Geotechnical Engineering	447
R. Carvalho, R. Fangueiro and J. Neves	
Acoustical Behavior of Hybrid Composite Sandwich Panels	455
S. Patinha, F. Cunha, R. Fangueiro, S. Rana and F. Prego	

Chapter 4: Materials and Repair

Mechanical and Physical Properties of Early Carbonated High Initial Strength Portland Cement Pastes	467
A. Neves Junior, R.D.T. Filho, J. Dweck and E. de Moraes Rego Fairbairn	
Natural Aging in Heat-Treated Medium-Density Fiberboard Panels	473
S.L. Oliveira, R.F. Mendes, T.P. Freire and L.M. Mendes	
Influence of Test Specimens Shape on Measurements of Electrical Resistivity of Concrete	479
R.A. Medeiros and M.G. Lima	
Characterization of Parameters to Predict the Structural Behaviour of Geopolymeric Mortar Plates Strengthened with Carbon Fiber Reinforced Polymer	485
A. Pappalardo, S. Jalali and F.J. Silva	
Results Comparison of Alkali-Reactivity Tests for Same Aggregates, Using a Kinetic Model	498
L.M. Gonzalez, A. Santos Silva and S. Jalali	
Kinetics Comparison of Alkali-Reactivity Tests for Aggregates	506
L.M. Gonzalez, A. Santos Silva and S. Jalali	
Effects of Anti-Graffiti Protection on Concrete Durability	517
E. Neto, A. Souto, A. Camões, A. Begonha and P. Cachim	
Polymer Composite Materials Modified with Nano-Oxides and Phosphinates Hybrid Flame Retardant Systems	527
S.P.B. Sousa, M.C.S. Ribeiro, P.R.O. Nóvoa, C.M. Pereira and A.J.M. Ferreira	
Use of PET Fibers in Reinforced Concrete Slabs Subjected to Flexure	537
R. Muñoz, R.H. Quintella, L.S. de Oliveira Carvalho, B.A. da Silva Leite and R.B. Velame	
Influence of Dimension Stones on the Increase of Radon Gas Levels Indoors	548
P.G.Q. Amaral, A.C. Artur, D.M. Bonotto and T.M.B. Galembeck	