

Table of Contents

Preface

| | |
|---|-----|
| Mechanical Properties and Durability of Bamboo Fibers/Bamboo-Fiber-Mixed Spray Mortar for Slope Protection | |
| K. Fujiyoshi, T. Ueda, H. Takagi and M. Tsukagoshi | 1 |
| Experimental Investigation on Mechanical and Acoustic Performance of Miscanthus - Lime Composites | |
| F. Ntimugura, R. Vinai, A. Harper and P. Walker | 12 |
| An Experimental Investigation on Suitability of Using Sisal Fibers in Reinforced Concrete Composites | |
| J.K. Makunza and G.S. Kumaran | 24 |
| Analyse of the Evolution of the Hygrothermal Properties of the Hemp-Based Mortar within the Framework of the Total Weathering Protocol | |
| D. Kosiachevskyi, K. Abahri, A. Daubresse, E. Prat and M. Chaouche | 35 |
| Thermal Insulation Blocks Made of Sunflower Pith Particles and Polysaccharide-Based Binders: Influence of Binder Type and Content on Their Characteristics | |
| A. Laborel-Préneron, C. Ampe, L. Labonne, C. Magniont and P. Evon | 43 |
| Effects of 0-30% Wood Ashes as a Substitute of Cement on the Strength of Concretes | |
| T.G. Bikoko, J.C. Tchamba, V.Y. Katte and D.K. Deh | 51 |
| Influence of High Temperatures on the Mechanical Properties of Wood Bio-Concretes | |
| A.L.D. Aguiar, M.Y.R. da Gloria and R.D. Toledo Filho | 61 |
| Environmental Performance of Wood Bioconcretes with Different Wood Shavings Treatments | |
| A.L.D. Aguiar, C.G. Bezerra, L.R. Caldas, A.S. Bernstad and R.D. Toledo Filho | 69 |
| Comprehensive Characterization of Agricultural By-Products for Bio-Aggregate Based Concrete | |
| H.H. Ratsimbazafy, A. Laborel-Préneron, C. Magniont and P. Evon | 77 |
| Experimental Study on Restoration of Deteriorated Timber due to Termites by Resin Filling | |
| T. Yajima, K. Imamoto, C. Kiyohara and M. Yamada | 85 |
| Natural Fibers vs. Synthetic Fibers Reinforcement: Effect on Resistance of Mortars to Impact Loads | |
| M. Saad, V. Sabathier and A. Turatsinze | 95 |
| Effect of Natural and Polypropylene Fibers on early Age Cracking of Mortars | |
| M. Saad, V. Sabathier, A. Turatsinze and S. Geoffroy | 103 |
| Mechanical Properties of Rammed Earth Stabilized with Local Waste and Recycled Materials | |
| A.E. Losini, L. Lavrik, M. Caruso, M. Woloszyn, A.C. Grillet, G. Dotelli and P. Gallo Stampino | 113 |
| Life Cycle Assessment of Circular Bio-Based Construction | |
| V. Cascione, M. Roberts, S. Allen, B. Dams, D. Maskell and A. Shea | 124 |
| Water Sensitivity of Hemp-Foam Concrete | |
| A. Mohamad, F. Khadraoui, N. Sebaibi, M. Boutouil and D. Chateigner | 135 |
| Seashells and Oyster Shells: Biobased Fine Aggregates in Concrete Mixtures | |
| G. Scuderi | 146 |
| Experimental Analysis of the Behavior of Straw Biocomposite Exposed to High Temperature | |
| C. Achour, N. Belayachi and B. Ismail | 156 |
| Experimental Investigation of the Compatibility of Lime Coating with Insulation Straw Biocomposite | |
| O. Bahou, N. Belayachi and B. Ismail | 164 |
| Assessment of the Influence of the Type of Filler Materials on the Properties of Cement Grouts | |
| A. Abdalqader, M. Sonebi, N. Thornton and S. Taylor | 171 |
| Comparative Study of Metakaolin and Zeolite Tuff Influence on Properties of High-Strength Concrete | |
| L.I. Dvorkin, V. Zhitkovsky, N. Lushnikova and M. Sonebi | 179 |

| | |
|---|-----|
| Thermal and Moisture Buffering Properties of Novel Hemp-Lime Composites Integrated with Microencapsulated Phase Change Materials | 186 |
| Y. Abdellatef, M. Kavgi and R. Foruzanmehr | |
| Experimental and Numerical Study of Hygrothermal Behaviour of a Washing Fines Hemp Test Wall | 195 |
| N. Boumediene, F. Collet, S. Prétot, L. Ayed and S. Elaoud | |
| Evaluation of Bio-Based Earth Engineered Mortars for Low Energy and Carbon Buildings in Tropical and Subtropical Climates | 203 |
| R.d.L.M. Paiva, L.R. Caldas, P.B. Souza, G.F. Oliveira and R.D. Toledo Filho | |
| Physical, Thermal and Microstructural Characterization of Earth Mortars Stabilized with Incorporating Air Additive | 211 |
| R.d.L.M. Paiva, P.B. Sousa, C.d.B.L. Carreira, A.P.S. Martins and R.D. Toledo Filho | |
| First Step towards the Upscaling of the Production of Washing Fines - Hemp Composite. Study of Multiphysical Properties | 219 |
| F. Collet, S. Khaled, S. Prétot and M. Bart | |
| Mechanical Compression and Crushing Properties of a Straw-Lime Material | 227 |
| P. Parmo, J. Hanus, N. Belayachi and P. Bailly | |
| Erosion Behaviour of Bio-Stabilised Earthen Materials | 234 |
| M. Audren, S. Guihéneuf, D. Rangeard and A. Perrot | |
| Linseed Oil and Xanthan Gum: Promising Stabilisers for Earthen Building Materials | 245 |
| S. Guihéneuf, A. Perrot and D. Rangeard | |
| Bio-Stabilised Earthen Blocks: A Critical Study on Compression Tests of Immersed Samples | 255 |
| S. Guihéneuf, A. Perrot, D. Rangeard and M. Cocheteux | |
| Evaluation of a Marine Dredged Sediment as Raw Material Compared to Volcanic Scoria for the Development of Lime-Pozzolan Eco-Binders | 263 |
| S. KOURTAA, M. Chabannes, F. Becquart and N.E. Abriak | |
| Earth-Based Mortars: Mix Design, Mechanical Characterization and Environmental Performance Assessment | 271 |
| R.d.L.M. Paiva, A.P.S. Martins, L.R. Caldas, O.A.M. Reales and R.D. Toledo Filho | |
| How can a Climate-Neutral Building Look Like? | 279 |
| O.B. Carcassi, G. Habert, L.E. Malighetti and F. Pittau | |
| How Reliable is the Thermal Conductivity of Biobased Building Insulating Materials Measured with Hot Disk Device? | 287 |
| T. Colinart, M. Pajeot, T. Vinceslas, A. Hellouin de Méibus and T. Lecompte | |
| An Experimental Study on Clay and Sand Mixes to Develop a Non-Linear Homogenized Model for Earth Construction Materials | 293 |
| E. Anglade, A. Sellier, J. Aubert and A. Papon | |
| Research for Substantiation to Upscale Bio-Based Materials in the Construction Industry | 303 |
| F. van der Burgh and S. Verspeek | |
| Effect of Mix Proportions on Fresh and Rheological Properties of Cementitious Mixture Containing Natural Fibre: Modelling Using Factorial Design | 309 |
| S. Kaushik, M. Sonebi, G. Amato, A. Perrot and U.K. Das | |
| Mechanical Properties and Fracture Energy of Concrete Beams Reinforced with Basalt Fibres | 316 |
| A.C. Da Costa Santos and P. Archbold | |
| Experimental Investigation on the Fracture Energy and Mechanical Behaviour of Hemp and Flax Fibre FRC Compared to Polypropylene FRC | 326 |
| A.C. Da Costa Santos and P. Archbold | |
| Properties of <i>Phragmites australis</i> for Insulating Concrete Application | 332 |
| M. Honoré, T. Lecompte and S. Pimbert | |
| Self-Desiccation of a Vernacular CSA Binder | 339 |
| N.P. Martins, B. Cicek, C. Brumaud and G. Habert | |
| Experimental Out-of-Plane Behaviour of a Rammed Earth Sub-Assemblage Subjected to Seismic Inputs | 346 |
| A. Romanazzi, D.V. Oliveira, R.A. Silva, P.X. Candeias, A.C. Costa and A. Carvalho | |
| Customising Microstructural and Mineralogical Characteristics of Hydrated Lime Using Biopolymers | 353 |
| C. Pesce, G. Pesce, M. Molinari and A. Richardson | |

| | |
|--|-----|
| Study of the Impact of Rice Straw Particle Size on the Mechanical and Thermal Properties of Straw Lime Concretes | 361 |
| Y. El Moussi, L. Clerc and J. Benezet | |
| Comparison of Numerical HMT Codes to Simulate MBV Test of Hemp-Earth Composites | 369 |
| S. Khaled, M. Bart, S. Moissette, F. Collet, S. Prétot and B. Mazhoud | |
| Water Stabilization of Clay Bricks with Improved Tannin and Iron Mixes | 377 |
| Y. Du, C. Brumaud and G. Habert | |
| Tackling Variability of Clay to Provide a Robust Binder | 382 |
| D. Ardent, C. Brumaud and G. Habert | |
| Microstructural Characterization of Prefabricated Hempcrete Blocks | 388 |
| C. Moletti, V. Arosio and G. Dotelli | |
| Reflections on the Environmental Impact of 'Vegetarian' Buildings, and on the Reliability of Databases | 395 |
| A. Bocco and M. Bocci | |
| Effect of Plant Fibres on the Variability of Cob Materials | 405 |
| J. Tchiotsop, N. Issaadi, P. Poullain and S. Bonnet | |
| Improved Magnesium Cement for Durable Hemp Composite Boards | 413 |
| J. Žorica, M. Sinka, G. Sahmenko and D. Bajare | |
| Micro-Macro Modelling Approach of Vegetal Wools Thermal Conductivity | 421 |
| C. Piégay, P. Glé, E. Gourlay, E. Gourdon and S. Marceau | |
| Development of GHG Emissions Curves for Bio-Concretes Specification: Case Study for Bamboo, Rice Husk, and Wood Shavings Considering the Context of Different Countries | 428 |
| L.R. Caldas, C.G. Bezerra, F. Pittau, A. Araujo, M. Franco, N. Hasparyk and R.D. Toledo Filho | |
| Life Cycle Assessment of a Wall Made of Prefabricated Hempcrete Blocks | 436 |
| V. Arosio, C. Moletti and G. Dotelli | |
| Starch Reinforcement of Raw Earth Constructions | 443 |
| J. Tourtelot, C. Fourdrin, J.B. d'Espinose de La Caillerie, A. Bourgès and E. Keita | |
| Successful Circular Bio-Based Construction Initiatives: Five Essentials from Case Studies | 448 |
| M. Koster and I. Schrottenboer | |
| Construction Field Monitoring of a COB Prototype Building | 458 |
| A. Azil, M. Le Guern, K. Touati, M. Gomina, N. Sebaibi, M. Boutouil, F. Streiff, S. Goodhew and H. Louahlia | |
| Earth Plastered Wall Heating as a Low-Emitting, Cost-Effective and Robust Energy System for Building Renovation | 466 |
| A. Galimshina, M. Moustapha, A. Hollberg, G. Wagner, P. Padey, S. Lasvaux, B. Sudret and G. Habert | |
| Substitution of Synthetic Fibers by Bio-Based Fibers in a Structural Mortar | 472 |
| M. Audouin, N. Philippe, F. Bernardeau, M. Chaussy, S. Pons Ribera, P. Bredy Tuffe, A. Gasparutto, F. Chalencon, L. Bessette and P. Bono | |
| Rheology, Mechanical Performance and Penetrability through Flax Nonwoven Fabrics of Lime Pastes | 480 |
| A. Rakhsh Mahpour, M. Ardanuy, H. Ventura, J.R. Rosell and J. Claramunt | |
| Effect of Viscosity Modifying Agent on the Performance of Hybrid Bio-Based Concrete | 491 |
| M. Sonebi, P. Thiele, A. Abdalqader, L.I. Dvorkin, N. Lushnikova and J. Khatib | |
| β-Cyclodextrin Substituted Polyoxyethylene in the Synthesize of Polycarboxylate Superplasticizers | 499 |
| B. Li and L. Wang | |
| Efficiency of Bio-Sourced Composites in Confining Recycled Aggregates Concrete | 505 |
| E. Ghorbel and M. Limaiem | |
| Recovery of Excavated Materials as an Alternative Solution to Earth Building Materials | 513 |
| M. Nouali, M. Saillio and E. Ghorbel | |
| Overcoming the Perceptual Gap: Worldwide Perceived Comfort Survey of Earthen Building Experts and Homeowners | 521 |
| L. Ben-Alon, V. Loftness, K.A. Harries and E. Cochran Hameen | |
| Biological Stabilisers in Earthen Construction: A Mechanistic Understanding of their Response to Water-Ingress | 529 |
| Y. Kulshreshtha, P.J. Vardon, Y. Du, G. Habert, A. Vissac, J. Morel, S.M. Rao, L. van Paassen, M.C.M. van Loosdrecht, N.J.A. Mota and H.M. Jonkers | |

| | |
|--|-----|
| What Makes Cow-Dung Stabilised Earthen Block Water-Resistant | |
| Y. Kulshreshtha, P.J. Vardon, G. Meesters, M.C.M. van Loosdrecht, N.J.A. Mota and H.M. Jonkers | 540 |
| Influence of the Variability of Limestone and Fly Ash on the Setting and Mechanical Properties of a Moroccan Composite Cement | |
| N. El Fami, H. Agourrame, N. Khachani, A. Boukhari and A. Diouri | 549 |
| Effect of Immersion/Freezing/Drying Cycles on the Hygrothermal and Mechanical Behaviour of Hemp Concrete | |
| F. Benmahiddine and R. Belarbi | 555 |
| Interactions of Biobased Rheology Modifying Agents with Superplasticizer in Cement Paste | |
| A. Mezhov, K. Zhang and W. Schmidt | 563 |
| Contribution on the Use of Household Waste as Bio-Admixture | |
| I.A. Bella, N. Bella, A. Asroun and S. Saddiki | 569 |
| Traditional Gypsum Pavements with Natural Aditives | |
| B. González Sánchez, A. Navarro, J. Ramírez-Casas and J.R. Rosell | 575 |
| A Dual-Scale Numerical Model for the Diffusive Behaviour Prediction of Biocomposites Based on Randomly Oriented Fibres | |
| M. Nouri and M. Tahlaïti | 584 |
| Risk for Mould Growth on Hemp-Lime at Different Relative Humidity | |
| S. Johansson, K. Balksten and P.B. Strandberg-de Bruijn | 588 |
| Organic Brick | |
| G. Grassi, A. Erken and I. Paoletti | 595 |
| Plant Biomass Used for Green Concrete: A Review of Treatment Methods | |
| M. Chaussy, M. Chabannes, A. Day, D. Bulteel, F. Becquart and B. Laidoudi | 601 |
| Variability Assessment of the Compressive and Tensile Strength of Fibred Earthen Composites | |
| P. Poullain, M. Barnaure and S. Bonnet | 612 |
| Synthesis of the Current Knowledge Concerning the Construction of French Traditional Cob Building for Giving Recommendations | |
| S. Bonnet, D. Alzeort and P. Poullain | 620 |
| Hygrothermal Behaviour of Air Lime Coatings with Mussel Shell Sand | |
| C. Martínez-García, B. González-Fonteboa, D. Carro-López, F. Martínez-Abella and P. Faria | 627 |
| Evaluation of GHG Emissions from the Production of Cross-Laminated Timber (CLT): Analysis of Different Life Cycle Inventories | |
| L.R. Caldas, J. Sierra-Pérez, R.D. Toledo Filho and M. Silvoso | 635 |
| Physical Properties and Hygrothermal Behavior of Mycelium-Based Composites as Foam-Like Wall Insulation Material | |
| F. Gauvin, V. Tsao, J. Vette and H.J.H. Brouwers | 643 |
| Mycelium Composites and their Biodegradability: An Exploration on the Disintegration of Mycelium-Based Materials in Soil | |
| A. Van Wylick, E. Elsacker, L.L. Yap, E. Peeters and L. de Laet | 652 |
| Performance of Alfa Fibres in Cementitious Materials Exposed to Diverse Surface Treatments | |
| S. Ajouguim, J. Page, C. Djelal, M. Waqif and L. Saadi | 660 |
| Stabilization of Dicalcium Silicate-Zn Composite Approaching Layered Double Hydroxide Structure for Bioactive Cement Applications | |
| H. Agourrame, A. Belafhaili, N. El Fami, N. Khachani, M. Alami Talbi, A. Boukhari and A. Diouri | 668 |
| Reed as a Thermal Insulation Material: Experimental Characterisation of the Physical and Thermal Properties | |
| R. Malheiro, A. Ansolin, C. Guarnier, J. Fernandes, L. Cosentino, S. Silva and R. Mateus | 676 |
| Investigation of Thermal, Mechanical and Acoustic Performance of Bio-Materials Based on Plaster-Gypsum and Cork | |
| S. Bouzit, F. Merli, M. Sonebi, S. Amziane, C. Buratti and M. Taha | 685 |
| Physico-Chemical Characterization of the Electric Arc Furnace Slag (EAFS) of the Sonasid-Jorf Steelworks - Morocco | |
| A. Hamama, M. Harrami, M. Saadi, A. Assani and A. Diouri | 691 |

| | |
|--|-----|
| Hydro-Mechanics Coupling on Rammed Earth Material: Drying Experiment at Structural Scale | 698 |
| T. Chitimbo, F. Abdul-Samad, N. Prime and O. Plé | |
| Influence of Palm Oil Fibers Length Variation on Mechanical Properties of Reinforced Crude Bricks | 707 |
| M. Hussain, D. Levacher, N. Leblanc, H. Zmamou, I.D. Maigre and A. Razakamanantsoa | |
| Impact of Biobased Surfactants on Hygrothermal Behaviour of Gypsum Foams | 715 |
| N. Mortada, A. Phelipot-Mardele and C. Lanos | |
| Flexural Behavior of Six Species of Italian Bamboo | 723 |
| S. Greco and L. Molari | |
| Shear Behavior of Bamboo Reinforced Concrete Beams | 730 |
| J. Khatib, A.H. Jahami, M. Sonebi and A. Elkordi | |
| Improving Performance of Thermal Modified Wood against Termites with Bicine and Tricine | 735 |
| D. Jones, L. Nunes and S. Duarte | |
| 3D Modelling of Hydric Transfers in Spruce Wood with Consideration of Sorption Hysteresis | 743 |
| M. Maaroufi, K. Abahri, A. Bourdot and C. El Hachem | |
| Development of Animal Fibres Composites for Construction Applications | 750 |
| A. Alfocea-Roig, S. Huete-Hernandez, A. Maldonado-Alameda, J. Giro-Paloma, J.M. Chimenos-Ribera and J. Formosa-Mitjans | |
| Use of Hemp Fibres in 3D Printed Concrete | 758 |
| N.Z. van Hierden, F. Gauvin, S.S. Lucas, T.A.M. Salet and H.J.H. Brouwers | |
| Effect of the Treatments of the Surface on Mechanical Performance of Concrete Containing Chemical Admixtures | 766 |
| C. Campbell, G. Jackson, M. Sonebi and S. Taylor | |
| Development of Airlaid Non-Woven Panels for Building's Thermal Insulation | 772 |
| M. Ayadi, R. Zouari, C. Ségovia, A. Baffoun, S. Msahli and N. Brosse | |
| Valorization of Vegetal Fibers in Anti-Fissuration Screed Mortar Formulation | 782 |
| S. Pons Ribera, R. Hamzaoui, J. Colin, B. Vasseur, L. Bessette, F. Bernardeau, P. Bredy Tuffe, P. Bono, A. Gasparutto and M. Audouin | |
| Fire Behavior of Raw Earth Bricks: Influence of Water Content and Cement Stabilization | 792 |
| R.I. Abdallah, C. Perlot, H. Carré, C. La Borderie and H. El Ghoche | |
| Link between Acoustic and Hygrothermal Behavior of Hemp Shiv and Pith Composites | 801 |
| M.S. Abbas, A. Fabbri, M.Y. Ferroukhi, P. Glé, E. Gourdon and F. McGregor | |
| Straw Material: End-of-Life Cycle Analysis Scenario | 812 |
| N. Tornay, L. Floissac, C. Garcia, D. Rollet and C. Aventin | |
| Influence of Fibre Treatment and Matrix Modification on Mechanical Properties of Flax Fibre Reinforced Mortars after Freeze/Thaw Cycles | 817 |
| B. Poletanovic, K. Kopecsko and I. Merta | |
| Mortar to Repair Rammed-Earth Walls' Surfaces: Do we still Need it? | 825 |
| H. Abuorf and S. Wafi | |
| Durability of Bamboo Bio-Concretes Exposed to Natural Aging | 834 |
| V.M. Andreola, M.Y.R. da Gloria and R.D. Toledo Filho | |
| Flax Fibers Composite Made up by 3D Printing | 842 |
| C. Anwar, A. Benamara and A. Kaci | |
| Experimental Investigation on Evaporation Rate for Enhancing Evaporative Cooling of Pervious Pavement Containing Recycled Rubber | 847 |
| K. Seifeddine, E. Toussaint and S. Amziane | |
| A Model for Assessment of Heat and Moisture Transfer Hollow a Hemp Concrete Wall Using Finite Element Method | 855 |
| S. Ouldboukhitine, S. Amziane and M. Benkhaled | |
| Sensitivity Study on the Parameters of a Hygrothermal Transfer Model of Air, Heat and Mass Transfer | 860 |
| S. Ouldboukhitine, S. Amziane and M. Benkhaled | |
| Compatibility of Plants with a Mineral Binder | 865 |
| S. Marceau, L. Lacour, D. Diafi and F. Farcas | |
| Bamboo Connection Technology for Lightweight Structures | 872 |
| R. Aguilar Larrinaga, L. Haurie Ibarra, A.M. Lacasta Palacio and M. Tous Coll | |