



INTERNATIONAL CONFERENCE ON BIO-BASED BUILDING MATERIALS

Chp 1. Innovations in bio-based building materials

Natural materials

Influence of hemp retting on the hydration of ordinary Portland cement (OPC) and the properties of hemp wood-OPC concrete <i>L. C. Hoang, S. Sabio, N. Perez, A. Day, P. Bono</i>	12
Various methods of binding light agricultural byproducts <i>F. Bacoup, A. Mahieu, A. Vitaud, P. Drone, R. Gattin, N. Leblanc</i>	19
Characterisation of natural fibres for enhancement of concrete properties <i>A. C. Da Costa Santos, P. Archbold</i>	24
Re-baling straw for better insulation <i>S. L. Platt, P. Walker, D.I Maskell, A. Laborel-Préneron</i>	32
Study of different spruce strands and their effect on the properties of wood-cement composites <i>F. Gauvin, K. Kochova, V. Caprai, K. Schollbach, H. J. H. Brouwers</i>	37
Influence of origin and year of harvest on the performance of pith mortars <i>M. S. Abbas, F. McGregor, A. Fabbri, Y. M. Ferroukhi</i>	42

Material treatments

Development of sunflower-based insulation materials coated with glycerol esters to prevent microbial growth <i>T. Verdier, L. Balthazard, M. Montibus, C. Magniont, P. Evon, A. Bertron</i>	50
Performance evaluation of palm stems fibers in cement-based materials <i>Y. Zouaoui, A. Yahia, S. Metiche</i>	57
Comparative study of different linseed oil treatments on wood and hemp <i>A. Bouchikhi-Gérardin, A. Brizou, F. Becquart, N. E. Abriak, E. Garcia-Diaz</i>	65
Optimization of the linseed oil treatment of flax fibres: influence on fresh properties of fibre-reinforced mortars <i>J. Page, S. Amziane, M. Gomina</i>	73

**New and eco-friendly binders**

Effect of partial replacement of cement by MSWIBA on the properties of mortar <i>H. Ghanem, M. Machaka, J. Khatib, A. Elkordi, O. Baalbaki</i>	82
Dry pack mortars for self-levelling floor compounds based on β -hemihydrate and modified phosphogypsum binder <i>L. Dvorkin, N. Lushnikova, M. Sonebi</i>	90
Mechanical properties of geopolymer produced by rice husk ash calcined at low temperature <i>C.-T. Chen, C.-H. Chang</i>	97
Partial replacement of cement by combination of fly ash and metakaolin in bamboo bio-concretes <i>V. M. Andreola, M. Y. Rajiv da Gloria, D. O. Justo dos Santos, R. D. Toledo Filho</i>	102
Influence of fly ash on the compressive strength and young's modulus of concrete <i>P. R. Lustosa¹, M. S. Magalhães</i>	107
Some mechanical and thermal properties of vegetable aggregates cement composites : Evaluation of a new binder based on lime <i>C. Onésippe, R. V. Ratiarisoa, K. Bilba, H. S. Junior, M. A. Arsène</i>	112
Low clinker slag Portland cement of increased activity <i>L. Dvorkin, V. Zhitkovsky, Y. Stepasyuk, M. Sonebi</i>	120
Comparison between Portland cement concrete and geopolymer concrete based on metakaolin and granulated blast furnace slag with the same binder volume <i>A. Hasnaoui, E. Ghorbel, G. Wardeh</i>	127

Admixtures

Formulation of novel fire retardant additives for biobased insulation material <i>V. Colson, M. Bourebrab, M. Dalmais, O. Jadeau, C. Lanos</i>	134
Bio-based rheology modifying agents <i>M. Azima, A. G. Guldogan, Z.B. Bundur</i>	142
Properties of RCA concretes mixed with cement paste dissociation agent <i>S. Yang, H. Lee, I. Oh, H. Lee, I. Hwang</i>	149

Earth-based materials

Cast, compaction, vibro-compaction or extrusion: processing methods for optimizing the mechanical strength of raw earth-based materials <i>S. Guihéneuf, D. Rangeard, A. Perrot</i>	156
Strength and stress-strain characteristics of coir fibre reinforced cement stabilised rammed earth <i>R. S. B. Rathod, B. V. V. Reddy</i>	164



Potential organic binders to stabilize earth construction materials <i>K. A. J. Ouedraogo, J. E. Aubert, C. Tribout, G. Escadeillas</i>	170
Evaluation of different raw earthen plasters stabilized with lime for bio-building exploitation <i>A. E. Losini, P. Gallo Stampino, G. Dotelli, M. Bellotto, A. C. Grillet, M. Caruso, S. Sabbadini, J. Outin</i>	176
Addition of bio based reinforcement to improve workability, mechanical properties and water resistance of earth-based materials <i>S. Guihéneuf, D. Rangedard, A. Perrot</i>	184
Influence of fiber on unconfined compressive strength of raw earth material by mix design <i>S. Imanzadeh, A. Jarno, S. Taibi</i>	193
Hygrothermal properties of light earth insulation materials: evaluation of uncertainties and consequences <i>T. Vineslas, T. Colinart, H. Lenormand, A. Hellouin de Menibus, E. Hamard, T. Lecompte</i>	198
Adobe bricks of greenlandic fine-grained rock material <i>I. M. G. Bertelsen, L. J. Belmonte, L. M. Ottosen</i>	204
Towards field-oriented tests to evaluate the workability and cohesion of earth slips for building applications <i>T. Vineslas, T. Lecompte, H. Lenormand, A. Hellouin de Menibus, E. Hamard, T. Colinart</i>	210
Earth construction materials: From past to modern buildings <i>J. E. Aubert</i>	217

Innovative materials

Effects of Bacillus Subtilis on the compressive strength, porosity and rapid chloride permeability of concrete <i>T. H. Nguyen, E. Ghorbel</i>	223
Characterisation of light weight concrete impregnated with cement and charcoal <i>T. G. Bikoko, V. Y. Katte, G. N. Bawe, M. Fokou Dongmene, F. N. Okonta, J. C. Tchamba</i>	229
Regenerative hydrogel-based living microbial mortars: investigation of viability and strength in successive material generations <i>S. L. Williams, J. Artier, J. Qiu, C. Heveran, A. Nagarajan, M. Hubler, S. M. Cook, J. C. Cameron, W. V. Srubar III</i>	238
Adhesion and rheology of fresh mortar joints: effects of organic additions <i>R. Bouras, C. Si Hadj Mohand, M. Sonebi</i>	244
Rheological properties of 3D printing concrete containing sisal fibres <i>M. Bohuchval, M. Sonebi, S. Amziane, A. Perrot</i>	249
Mechanical properties of 3D bio-printing cement-based materials <i>M. Rubio, M. Sonebi, S. Amziane, A. Perrot</i>	256



Chp 2. Characterisation and modelling of bio-based material properties

Mechanical properties

Potential of oleaginous flax fibre as mortar reinforcement <i>M. Saad, V. Sabathier, A. Turatsinze, C. Magniont</i>	263
Assessing variability of hemp concrete properties during experimental tests: a focus to specimens' number <i>C. Niyigena, S. Amziane, A. Chateauneuf</i>	270
Selected properties of concrete containing palm fibers <i>M. Machaka, A. Elkordi, H. Ghanem, J. Khatib, O. Baalbaki</i>	279
The effect of hydraulic cements on the flexural behavior of wool reinforced mortars <i>A. P. Fantilli, D. Jóźwiak-Niedźwiedzka</i>	287
Lateral load carrying capacity of timber walls filled hemp concrete: experimental and numerical investigation <i>H. Wadi, S. Amziane, E. Toussaint, M. Taazount</i>	293
Effect of coconut fiber content on the mechanical properties of mortars <i>T. T. H. Bui, M. Boutouil, N. Sebaibi, D. Levacher</i>	300
Mechanical and physical properties of mortar of partially replaced fine aggregates with sawdust <i>O. Nanayakkara, J. Xia</i>	308
Tensile performance of lime-based natural-fibre composites as strengthening systems for masonry <i>N. Trochoutsou, M. Di Benedetti, K. Pilakoutas, M. Guadagnini</i>	314
Induced modification of flexural toughness of bio-lime based mortars by addition of giant reed fibers <i>D. Badagliacco, B. Megna, A. Valenza</i>	321

Thermal and acoustic properties

Effect of compaction on thermal and hygric properties of hemp composites <i>M. Viel, F. Collet, C. Lanos</i>	329
Influence of cork powder grainsize in thermal and mechanical properties of cork-NHL mortars <i>B. Megna, D. Badagliacco, C. Sanfilippo, A. Valenza</i>	334
Towards a better understanding and knowledge of biobased materials through a new acoustic database <i>P. Glé, T. Blinet, C. Guigou-Carter, T. Falwisanner, E. Kadri, F. Bou-Cherifi</i>	339



Hygroscopic behaviour

Hygric properties of materials used for isobio wall solution for new buildings <i>F. Collet, S. Prétot, V. Colson, C.R. Gamble, N. Reuge, C. Lanos</i>	349
A local kinetics of sorption model: theoretical background and application to the simulation of an ISOBIO demonstrator <i>N. Reuge, F. Collet, S. Moissette, M. Bart, S. Pretot, C. Lanos</i>	356
Moisture buffering capacity of clay-based plasters <i>A. Phelipot-Mardelé, F. Collet, Y. Jiang, C. Lanos, M. Lawrence, M. Lemke</i>	363
Durability and hygrothermal performance of bio-based materials in Northern European climate <i>M. Sinka, V. Obuka, D. Bajare, A. Jakovics</i>	371
Bio-based and recycled materials: characterisation and hygrothermal assessment for passive relative humidity management <i>A. Romano, A. Bras, S. Grammatikos, A. Shaw, M. Riley</i>	378

Durability

Pore structure and carbonation of hydrated lime mortar with mussel shell aggregate <i>C. Martínez-García, B. González-Fontebao, D. Carro-López, F. Martínez-Abella</i>	385
The effect of long term weathering on hemp and rapeseed straw concrete <i>J. Sheridan^{1*}, M. Sonebi¹, S. Taylor¹, S. Amziane</i>	392
Moisture- and freeze-thaw-induced deterioration of natural fiber composites with low fiber contents <i>K. Noonan, K. Hess, W. Srubar</i>	398
Behaviour of bio-based material in multilayer wall during fire test <i>M. Dalmais, V. Colson, T. Le Cunff, O. Jadeau, C. Lanos</i>	405
Natural fiber-reinforced plastics composites: long-term physico-structural performance in façades <i>D. Friedrich</i>	412
Durability of flax/bio-epoxy composites intended for strengthening applications in construction <i>K. Benzarti, R. Chlela, M. Quiertant, S. Zombre, L. Curtil, M. Michel</i>	420
Assessment of straw degradation inside straw bale walls in severe cold region of China <i>X. Yin, M. Lawrence, D. Maskell, C. Sun</i>	426
Comparison of physical and mechanical properties of cementitious mortars reinforced with natural and synthetic fibres prior and after wet/dry cycles <i>B. Poletanović, I. Merta, A. Šajna, A. Mauko Pranjčić, A. Mladenović</i>	433
Durability of bio-based building materials <i>R. D. Toledo Filho, M. Y. R. da Gloria, V. M. Andreola</i>	438



Microstructure and porosity

Potential of X-ray tomography for the exploration of vegetal concretes' porous structure <i>M. Lagouin, P. Sénéchal, P. Moonen, C. Magniont, J. E. Aubert, A. Laborel-Prénéron</i>	445
Thermo-structural behavior of soft wood under high X-ray tomography resolution <i>K. Abahri, D. Kosiachevskyi, A. Rima, C. El Hachem, M. Chaouche</i>	453
Micro-analysis on the internal structure of fibres-soil composite <i>H. Danso</i>	460
Water transport properties of cement mortars with mussel shell aggregate <i>C. Martínez-García, B. González-Fonteboá, D. Carro-López, F. Martínez-Abella</i>	467
Water-resistance study of linear friction-welded thermo-treated beech using tomography <i>P. Lu, E. Baldenberger, P. Perré</i>	474

Innovative testing methods

Characterisation of vegetal compounds responsible for the setting delays in hydraulic binders <i>R. Pellet, S. Marceau, D. Diafi, A. Tagnit-Hamou, F. Farcas</i>	479
Optimizing precipitation method of microbial carbonate precipitation on model recycled aggregate <i>W. Zeng, Y. Zhao, Z. Feng, Z. Lv, S. P. Shah</i>	485
Development of a method for assessing resistance to mold growth: application to bio-based composites <i>M. Viel, F. Collet, Y. Lecieux, M. François, V. Colson, C. Lanos, A. Hussain, M. Lawrence</i>	490



Chp 3. Applications of bio-based building materials

Valorization of mineral and recycled materials

The development of cellular lightweight concrete made from oil palm fiber and biochar <i>P. Sangkeaw, W. Pansuk, R. Wattanapornprom</i>	499
Biochar-concrete composite: manufacturing, characterization and performance evaluation at elevated temperature <i>S. Gupta, H. W. Kua, S. D. Pang</i>	507
Use of natural minerals as protective barriers of bacteria for self-healing mortar <i>M. M. Tezer, Z. B. Bundur</i>	514
Preliminary studies of hemp and recycled aggregate concrete <i>S. Ghosn, N. Cherkawi, B. Hamad</i>	520
Characterization of mussel shells as a bio-based building insulation material <i>C. Martínez-García, B. González-Fonteboa, D. Carro-López, F. Martínez-Abella, J. L. Pérez Ordóñez</i>	525
Properties of concrete made of fine aggregates partially replaced by incinerated municipal solid waste bottom ash <i>O. Baalbaki, A. Elkordi, H. Ghanem, M. Machaka, J. Khatib</i>	532
Waste glass reuse in geopolymer binder prepared with metakaolin <i>A. Bouchikhi, M. Benzerzour, N.-E. Abriak, W. Maherzi, Y. Mamindy-Pajany</i>	539
Effect of recycled PET fibers inclusion on the shrinkage of adobe brick <i>G. R. L. Tavares, M. S. Magalhães</i>	545
Predition of deflection in reinforced concrete beams containing plastic waste <i>A. Jahami, J. Khatib, O. Baalbaki, M. Sonebi</i>	551

Agro by-products

Experimental investigation on the use of alpha fibres as reinforcement of cementitious materials <i>S. Ajouguim, C. Djelal, J. Page, M. Waqif, K. Abdelouahdi, L. Saâdi</i>	557
Formulation of lime mortars based on natural fibers and waste materials for more sustainable buildings <i>B. Megna, D. Badagliacco, C. Sanfilippo, T. La Mantia, L. Ercoli, A. Valenza</i>	564
Comparison of crimson fountaingrass and diss fibers as aggregates for cement mortars <i>A. Valenza, D. Badagliacco, T. La Mantia, L. Ercoli, B. Megna</i>	570
Use of alternative aggregate for lightweight concrete production <i>M. Silveira, L. Menali, M. da Gloria, R. D. Toledo Filho, S. Ferreira</i>	576
Recycling of raw wheat husk to manufacture magnesia cement based lightweight building materials <i>V. Barbieri, M. Lassinantti Gualtieri, C. Siligardi</i>	583

**Life cycle and environmental assessment**

Dynamic life cycle carbon assessment of three bamboo bio-concretes in Brazil <i>L. Caldas, F. Pittau, V. Andreola, G. Habert, A. Saraiva, R. D. Toledo Filho</i>	593
Life cycle sustainability assessment of enzyme-induced carbonate precipitation (EICP) for fugitive dust control <i>A. J. Raymond, C. Purdy, T. Fox, A. Kendall, J. T. DeJong, E. Kavazanjian Jr., M. Woolley, K. Martin</i>	600
Opportunities for reducing greenhouse gas emissions of insulation materials in Canada after cannabis legalization <i>A. Arrigoni, D. K. Panesar</i>	608
Theoretical and experimental modeling of the energy and environmental behavior of bio-based building materials <i>M. Benhaled, S. E. Ouldboukhitine, S. Amziane</i>	614

Social issues

What is a sustainable or low impact concrete? <i>O. Kinnane, R. O'Hegarty, A. Reilly</i>	621
The coriander straw, an original agricultural by-product for the production of building insulation materials <i>E. Uitterhaegen, L. Labonne, S. Ballas, T. Véronèse, P. Evon</i>	627
A picture on bio-based building materials as thermal insulation for sustainable buildings <i>Z. F. El Faridy, A. Trabelsi, F. Kuznik</i>	634
Performance of bio-based building materials - Products meeting expectations <i>D. Jones</i>	642

Case studies

Agrobloc project: bio-based concrete masonry blocks <i>S. Le Thierry, J. Rasori</i>	651
Research development of glued laminated bamboo (glubam) and cross-laminated bamboo and timber (CLBT) <i>Y. Xiao</i>	658
Case study: Development and evaluation methods for bio-based construction realized with paper-based building materials <i>E. Kanli, R. Bach, R. Götzinger, N. Kiziltoprak, U. Knaack, S. Schabel, J. Schneider</i>	664
Development of interactive facade elements on base of waste materials of water companies <i>W. Böttger, W. van Olphen, J. Sluis, M. Lepelaar</i>	672
Performance of biobased facade panels <i>S. Verspeek, F. Van der Burgh</i>	678
Application of hemp-lime renders to improve the insulating capacity of building walls <i>J. McGinn, S. Pavia, O. Kinnane</i>	684