

International High-Performance Built Environment Conference (iHBE 2016)

A Sustainable Built Environment Conference 2016 Series
(SBE16)

Procedia Engineering Volume 180

Sydney, Australia
17 - 18 November 2016

Part 1 of 2

Editors:

Lan Ding
Francesco Fiorito
Paul Osmond

ISBN: 978-1-5108-4332-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

EDITORIAL	1
<i>Lan Ding, Francesco Fiorito, Paul Osmond</i>	
RESILIENCE BY DESIGN: CAN INNOVATIVE PROCESSES DELIVER MORE?	7
<i>Helen Lochhead</i>	
INNOVATION FOR A SUSTAINABLE LOW CARBON BUILT ENVIRONMENT	16
<i>Peter W. Newton</i>	
AIR TIGHTNESS OF NEW AUSTRALIAN RESIDENTIAL BUILDINGS	33
<i>Michael Ambrose, Mike Syme</i>	
GREEN FEATURES, SYMBOLIC VALUES AND RENTAL PREMIUM: SYSTEMATIC REVIEW AND META-ANALYSIS	41
<i>Sumin Kim, Benson T. H. Lim, Jinu Kim</i>	
THE LATEST DEMONSTRATED TECHNICAL INNOVATIONS IN SYDNEY CBD TALL BUILDING: CASE STUDY	49
<i>Lester Partridge, Eng Shin Gan</i>	
POTENTIAL OF UPGRADING FEDERAL BUILDINGS IN THE UNITED ARAB EMIRATES TO REDUCE ENERGY DEMAND	61
<i>Enas Alkhateeb, Bassam Abu Hijleh</i>	
MOTIVATION AND OWNER COMMITMENT FOR IMPROVING THE DELIVERY PERFORMANCE OF GREEN BUILDING PROJECTS: A RESEARCH FRAMEWORK	71
<i>Ayokunle Olubunmi Olanipekun, Bo(Paul) Xia, Hong-Trang Nguyen</i>	
PERFORMANCE OF EARTHQUAKE-RESISTANT RCC FRAME STRUCTURES UNDER BLAST EXPLOSIONS	82
<i>Zubair I. Syed, Osama A. Mohamed, Kumail Murad, Manish Kewalramani</i>	
EFFECT OF INSULATION GROUND ON ANTI-CONDENSATION IN RURAL RESIDENCE	91
<i>Huibo Qian, Mingfang Tang, Dong Wang, Jinzhong Fang</i>	
PERFORMANCE-BASED DESIGN OF TALL BUILDING ENVELOPES USING COMPETING WIND LOAD AND WIND FLOW CRITERIA	99
<i>Mohamed Khallaf, Julie Jupp</i>	
THERMAL COMFORT-CFD MAPS FOR ARCHITECTURAL INTERIOR DESIGN	110
<i>Emanuele Naboni, Daniel Sang-Hoon Lee, Kristian Fabbri</i>	
TOWARDS AN INTEGRATED APPROACH FOR EVALUATING BOTH THE LIFE CYCLE ENVIRONMENTAL AND FINANCIAL PERFORMANCE OF A BUILDING: A REVIEW	118
<i>Monique Fouche, Robert H. Crawford</i>	
THE IMPACT OF DIFFERENT INSULATION OPTIONS ON THE LIFE CYCLE ENERGY DEMANDS OF A HYPOTHETICAL RESIDENTIAL BUILDING	128
<i>Toktam Bashirzadeh Tabrizi, Glen Hill, Mathew Aitchison</i>	
INTEGRATED SUSTAINABILITY ASSESSMENT AND RENEWAL OF OLD INDUSTRIAL AREAS: A CASE STUDY ON CHANGZHOU	136
<i>Jianqiang Yang</i>	
DEVELOPING KEY SUSTAINABILITY INDICATORS FOR ASSESSING GREEN INFRASTRUCTURE PERFORMANCE	146
<i>Parisa Pakzad, Paul Osmond, Linda Corkery</i>	
TOWARDS AN AUTOMATED APPROACH FOR COMPILING HYBRID LIFE CYCLE INVENTORIES	157
<i>Robert H. Crawford, Paul-Antoine Bontinck, André Stephan, Thomas Wiedmann</i>	
COST-BENEFIT PREDICTION OF GREEN BUILDINGS: SWOT ANALYSIS OF RESEARCH METHODS AND RECENT APPLICATIONS	167
<i>M. Khoshbakht, Z. Gou, K. Dupre</i>	
REPLACEMENT SCENARIOS FOR CONSTRUCTION MATERIALS BASED ON ECONOMY-WIDE HYBRID LCA	179
<i>Soo Huey Teh, Thomas Wiedmann, Judith Schinabeck, Stephen Moore</i>	
4D BIM FOR ENVIRONMENTAL PLANNING AND MANAGEMENT	190
<i>Julie Jupp</i>	

AN INVESTIGATION OF CORPORATE APPROACHES TO SUSTAINABILITY IN THE CONSTRUCTION INDUSTRY	202
<i>Fatima Afzal, Benson Lim, Deo Prasad</i>	
THE CARBON FOOTPRINT OF AUSTRALIA'S CONSTRUCTION SECTOR.....	211
<i>Man Yu, Thomas Wiedmann, Robert Crawford, Catriona Tait</i>	
DEVELOPMENT OF A BUILDING PERFORMANCE ASSESSMENT AND DESIGN TOOL FOR RESIDENTIAL BUILDINGS IN NIGERIA.....	221
<i>Tamaraukuro Tammy Amasuomo, Jubril Atanda, George Baird</i>	
EVALUATING THE THERMAL PERFORMANCE OF RETROFITTED LIGHTWEIGHT GREEN ROOFS AND WALLS IN SYDNEY AND RIO DE JANEIRO.....	231
<i>Sara Wilkinson, Renato Castiglia Feitosa, Igor Tsuyoshi Kaga, Isabela Hachmann De Franceschi</i>	
UHI AND THERMAL PERFORMANCE OF OFFICE BUILDINGS IN BANGKOK.....	241
<i>Pattaranan Takkanon</i>	
THE STUDY ON THE EVALUATION OF THERMAL INSULATION EFFICIENCY WITH TYPICAL PLANT SPECIES OF ROOF GREENERY IN KAOHSIUNG	252
<i>Yen-Yi Li, Po-Ren Chung, Chen-Yu Chen, Chien-Chiao Chao, Fong-Yu Chiu, Ping-Chieh Tzeng</i>	
LOAD RESILIENCE IN HIGH PERFORMANCE BUILDINGS.....	261
<i>Paul Bannister, Hongsen Zhang</i>	
COST BENEFIT ANALYSIS OF SIMULATED THERMAL ENERGY IMPROVEMENTS MADE TO EXISTING OLDER SOUTH AUSTRALIAN HOUSES	272
<i>David M. Whaley, Timothy O'Leary, Bashar Al-Saedi</i>	
EVALUATION ON THE ENERGY CONSUMPTION AND THERMAL PERFORMANCE IN DIFFERENT RESIDENTIAL BUILDING TYPES DURING MID-SEASON IN HOT-SUMMER AND COLD-WINTER ZONE IN CHINA	282
<i>Haiqiang Liu, Shoichi Kojima</i>	
ADMITTANCE/FOURIER SERIES REVISITED: UNDERSTANDING PERIODIC HEAT FLOWS	292
<i>A. B. Sproul</i>	
THE NEW NABERS INDOOR ENVIRONMENT TOOL – THE NEXT FRONTIER FOR AUSTRALIAN BUILDINGS.....	303
<i>Caroline Residovic</i>	
LIFE CYCLE COST COMPARISON OF A HIGH NABERS PERFORMING COMMERCIAL BUILDING	311
<i>D. Lee, I. Dixon, T. Dunn, C. Donovan</i>	
ENABLING INNOVATION IN BUILDING SUSTAINABILITY: AUSTRALIA'S NATIONAL CONSTRUCTION CODE	320
<i>Alexander Armstrong, Clare Wright, Brian Ashe, Heather Nielsen</i>	
POST-OCCUPANCY ENERGY CONSUMPTION OF BASIX AFFECTED DWELLINGS IN THE SYDNEY METROPOLITAN AREA.....	331
<i>Anir Kumar Upadhyay, Lan Ding, Kevin W. K. Yee, Deo Prasad</i>	
MODELLING AND ANALYSIS OF POST-OCCUPANCY BEHAVIOUR IN RESIDENTIAL BUILDINGS TO INFORM BASIX SUSTAINABILITY ASSESSMENTS IN NSW	343
<i>Marini Samaratunga, Lan Ding, Kate Bishop, Deo Prasad, Kevin W. K. Yee</i>	
THE ROLE OF POST OCCUPATION EVALUATION IN ACHIEVING HIGH PERFORMANCE BUILDINGS THROUGH DIAGNOSTICS	356
<i>Krishna Munsami, Deo Prasad, Lan Ding</i>	
A POST-OCCUPANCY EVALUATION OF A MODULAR MULTI-RESIDENTIAL DEVELOPMENT IN MELBOURNE, AUSTRALIA	365
<i>Jin Woo</i>	
THERMAL ENVIRONMENT AND THERMAL SENSATIONS OF OCCUPANTS OF NURSING HOMES: A FIELD STUDY.....	373
<i>Federico Tartarini, Paul Cooper, Richard Fleming</i>	
GREEN DARNING CITY, TAKING THE TENTH CHINA (WUHAN) INTERNATIONAL GARDEN EXPO DESIGN AS EXAMPLES.....	383
<i>Xiao Wei, Zhang Si</i>	
INFLUENCE OF RAINFALL ON THE THERMAL AND ENERGY PERFORMANCE OF A LOW RISE BUILDING IN DIVERSE LOCATIONS OF THE HOT HUMID TROPICS.....	393
<i>Claudio Aurelio Diaz, Paul Osmond</i>	
A TECHNIQUE FOR QUANTIFYING THE REDUCTION OF SOLAR RADIATION DUE TO CLOUD AND TREE COVER.....	403
<i>J. Loveday, G. K. Loveday, J. Byrne, B. L. Ong, P. Newman</i>	
TOWARDS ZERO CARBON IN A HOT AND HUMID SUBTROPICAL CLIMATE	413
<i>Christopher To, Justin Li, Margaret Kam</i>	

SIMULATION STUDY OF URBAN RESIDENTIAL DEVELOPMENT AND URBAN CLIMATE CHANGE IN XI'AN, CHINA	423
<i>Yupeng Wang, Dian Zhou</i>	
HOW CAN A MULTI-SCALE ANALYSIS GUIDE SMART URBAN ENERGY DEMAND MANAGEMENT? AN EXAMPLE FROM LONDON CITY WESTMINSTER BOROUGH	433
<i>P. Mouzourides, A. Kyprianou, R. Choudhary, J. Ching, M. K.-A. Neophytou</i>	
THE POLLUTANT REMOVAL CAPACITY OF AN URBAN STREET CANYON AND ITS LINK TO THE BREATHABILITY AND EXCHANGE VELOCITY	443
<i>A. Kubilay, M. K.-A. Neophytou, S. Matsentides, M. Loizou, J. Carmeliet</i>	
ENVIRONMENTAL PLANNING AND EVALUATION OF OFFICE WITH FUNNEL SHAPED VOID	452
<i>Hitoshi Kitamura, Tetsuya Hara, Takashi Shinojima</i>	
THE OBJECTIVE AND METHODOLOGY OF URBAN CLIMATE MAP FOR THE CITY OF XIAMEN	462
<i>Shuyu Liu, Daifeng Song, Bo Yu</i>	
A COMPARATIVE STUDY OF DESIGN STRATEGIES FOR LOBBY OF OUTPATIENT DEPARTMENT OF HOSPITAL BUILDINGS IN COLD CLIMATE REGION IN CHINA	471
<i>Yizhao Sun, Qiong Huang</i>	
ON THE STATIC AND DYNAMIC BEHAVIOR OF A PREHISTORIC STRUCTURE TYPICAL OF APULIA IN ITALY	480
<i>M. Venerito, D. Foti, M. Vitti</i>	
PROBABILISTIC LIFE CYCLE COST ANALYSIS OF BUILDING ENERGY EFFICIENCY MEASURES: SELECTION AND CHARACTERIZATION OF THE STOCHASTIC INPUTS THROUGH A CASE STUDY	491
<i>Elisa Di Giuseppe, Andrea Massi, Marco D'Orazio</i>	
PERFORMANCE ASSESSMENT OF EARTH CONSTRUCTIONS UNDER THE CHILEAN ENERGY RATING SYSTEM SOFTWARE	502
<i>María José Moreno, Francesco Fiorito</i>	
THERMAL PERFORMANCE OF 6 STAR RATED HOUSES IN THE HOT AND HUMID TROPICAL CLIMATE OF DARWIN	510
<i>Shokhida Safarova</i>	
SUSTAINABILITY ASSESSMENT THROUGH GREEN BIM FOR ENVIRONMENTAL, SOCIAL AND ECONOMIC EFFICIENCY	520
<i>Sebastiano Maltese, Lavinia C. Tagliabue, Fulvio Re Cecconi, Daniela Pasini, Massimiliano Manfredi, Angelo L. C. Ciribini</i>	
HOW SOCIALLY RESPONSIBLE IS CONSTRUCTION BUSINESS IN AUSTRALIA AND NEW ZEALAND?	531
<i>B. T. H. Lim, M. Loosemore</i>	
THE EFFECTS OF URBAN BLOCK FORMS ON THE PATTERNS OF WIND AND NATURAL VENTILATION	541
<i>Mohammad Mehdi Azizi, Komar Javanmardi</i>	
RESEARCH ON OPTIMIZATION AND BIOLOGICAL CHARACTERISTICS OF HARBIN TREES BASED ON THERMAL COMFORT IN SUMMER	550
<i>Xiaolong Zhao, Guojie Li, Tianyu Gao</i>	
BIOCLIMATIC DESIGN APPROACH IN DAYAK TRADITIONAL LONGHOUSE	562
<i>Janet Victoria, Siti Akhtar Mahayuddin, Wan Akmal Zahri Wan Zaharuddin, Siti Norlizaiha Harun, Balkhiz Ismail</i>	
OPTIMIZATION OF AN EXTERNAL PERFORATED SCREEN FOR IMPROVED DAYLIGHTING AND THERMAL PERFORMANCE OF AN OFFICE SPACE	571
<i>Cristian Lavin, Francesco Fiorito</i>	
AN EVOLUTIONARY APPROACH TO SINGLE-SIDED VENTILATED FAÇADE DESIGN	582
<i>Samin Marzban, Lan Ding, Francesco Fiorito</i>	
ASSESSING POTENTIAL FOR REDUCTION IN CARBON EMISSIONS IN A MULTI-UNIT OF RESIDENTIAL DEVELOPMENT IN SYDNEY	591
<i>Mitra Panahian, Sumita Ghosh, Grace Ding</i>	
AIRFLOW AND TEMPERATURE MODELLING OF SUSTAINABLE BUILDINGS AT THE DESIGN STAGE CAN PREVENT UNINTENDED CONSEQUENCES OF PASSIVE FEATURES	601
<i>Alemu T. Alemu, Wasim Saman, Martin Belusko</i>	
OPTIMIZATION OF WIND TOWER COOLING PERFORMANCE: A WIND TUNNEL STUDY OF INDOOR AIR MOVEMENT AND THERMAL COMFORT	611
<i>Mahsan Sadeghi, Richard De Dear, Bijan Samali, Graeme Wood</i>	

MULTI-OBJECTIVE OPTIMIZATION AND PARAMETRIC ANALYSIS OF ENERGY SYSTEM DESIGNS FOR THE ALBANO UNIVERSITY CAMPUS IN STOCKHOLM	621
<i>Cong Wang, Siir Kilkis, Johan Tjernström, Jerker Nyblom, Ivo Martinac</i>	
MODULAR COORDINATION-BASED GENERATIVE ALGORITHM TO OPTIMIZE CONSTRUCTION WASTE	631
<i>Saeed Banhashemi, Amir Tabadkani, M. Reza Hosseini</i>	
ENVIRONMENTAL ASSESSMENT & RATING – HAVE WE LOST THE PLOT?	640
<i>Nigel Howard</i>	
CO-CREATING URBAN ENVIRONMENTS TO ENGAGE CITIZENS IN A LOW-CARBON FUTURE	651
<i>Aaron Davis, Jane Andrew</i>	
DEVELOPMENT OF A REGENERATIVE DESIGN MODEL FOR BUILDING RETROFITS	658
<i>W. Craft, L. Ding, D. Prasad, L. Partridge, D. Else</i>	
EFFECT OF BUILDING ROOF INSULATION MEASURES ON INDOOR COOLING AND ENERGY SAVING IN RURAL AREAS IN CHONGQING	669
<i>Jiandong Ran, Mingfang Tang, Lin Jiang, Xing Zheng</i>	
PERFORMANCE AND PERCEPTION IN PREFAB HOUSING: AN EXPLORATORY INDUSTRY SURVEY ON SUSTAINABILITY AND AFFORDABILITY	676
<i>Malay Dave, Bruce Watson, Deo Prasad</i>	
ENERGY-SAVING RENOVATION OF BAYU TRADITIONAL RESIDENCE: TAKING ANJU TOWN OF CHONGQING AS THE EXAMPLE	687
<i>Ke Xiong, Zhenjing Yang</i>	
ADDING MORE BY USING LESS: ADAPTIVE REUSE OF WOOLSTORES	697
<i>Shabnam Yazdani Mehr, Henry Skates, Gordon Holden</i>	
NANOMATERIALS AND SMART NANODEVICES FOR MODULAR DRY CONSTRUCTIONS: THE PROJECT “EASY HOUSE”	704
<i>Valeria De Matteis, Alessandro Cannavale, Armando Coppola, Francesco Fiorito</i>	
ASSESSMENT OF POTENTIAL ENERGY AND GREENHOUSE GAS SAVINGS IN THE COMMERCIAL BUILDING SECTOR BY USING SOLAR ENERGY FOR AIR-CONDITIONING PURPOSES	715
<i>Timothy Greenaway, Paul Kohlenbach</i>	
STRUCTURAL PATTERN'S GRANULARITY VARIATION TO OPTIMIZE A VERTICAL STRUCTURE	725
<i>Eunike Kristi Julistiono</i>	
A PRELIMINARY STUDY ON THE CLIMATE ADAPTIVE DESIGN OF GREEN RURAL HOUSES IN WEST CHINA	735
<i>Yu Liu, Jin Wang, Juan Ren, Qiubo Xiao, Juan Zhao</i>	
EXPLORING THE RELATIONSHIP BETWEEN STRUCTURALLY DEFINED GEOMETRICAL PARAMETERS OF REINFORCED CONCRETE BEAMS AND THE THERMAL COMFORT ON INDOOR ENVIRONMENT	741
<i>Daniel Sang-Hoon Lee, Emanuele Naboni</i>	
RECYCLED CONCRETE IN STRUCTURAL APPLICATIONS FOR SUSTAINABLE CONSTRUCTION PRACTICES IN AUSTRALIA	751
<i>Sepani Senaratne, Gregory Lambrousis, Olivia Mirza, Vivian W. Y. Tam, Won-Hee Kang</i>	
THE USE OF FACADE MOCKUPS IN LCA BASED ARCHITECTURAL DESIGN	759
<i>Emanuele Naboni</i>	
ENGINEERED CEMENTITIOUS COMPOSITES FOR MODERN CIVIL ENGINEERING STRUCTURES IN HOT ARID COASTAL CLIMATIC CONDITIONS	767
<i>Manish A. Kewalramani, Osama A. Mohamed, Zubair Imam Syed</i>	
INCLUDING STAKEHOLDER INTENT IN PRECINCT INFORMATION MODELS	775
<i>David Marchant, Jim Plume</i>	
BIM-BASED ITERATIVE TOOL FOR SUSTAINABLE BUILDING DESIGN: A CONCEPTUAL FRAMEWORK	782
<i>Tayyab Ahmad, Ajibade Aibinu, Muhammad Jamaluddin Thaheem</i>	
A CAUSAL MODEL OF BIM ADOPTION IN THE THAI ARCHITECTURAL AND ENGINEERING DESIGN INDUSTRY	793
<i>Grit Ngowtanawan</i>	
THE PROLIFERATION OF ICT AND DIGITAL TECHNOLOGY SYSTEMS AND THEIR INFLUENCE ON THE DYNAMIC CAPABILITIES OF CONSTRUCTION FIRMS	804
<i>James Redwood, Sasha Thelning, Abbas Elmualim, Stephen Pullen</i>	

MODELLING FRAMEWORK FOR SUSTAINABLE CO-MANAGEMENT OF MULTI-PURPOSE EXHIBITION SYSTEMS: THE “FIERA DEL LEVANTE” CASE	812
<i>Giuseppina Uva, Michele Dassisti, Francesco Iannone, Giuseppe Florio, Franco Maddalena, Michele Ruta, Alfredo Grieco, Ilaria Giannoccaro, Vito Albino, Mario Lezoche, Alexis Aubry, Antonio Giovannini, Alessandro Buscicchio, Yasamine Eslami, Valeria Leggieri</i>	
PROPOSAL FOR AN OPEN DATA MODEL SCHEMA FOR PRECINCT-SCALE INFORMATION MANAGEMENT	822
<i>Jim Plume, David Marchant, John Mitchell, Otto Newhouse</i>	
CHINESE INDUSTRIAL PARK PLANNING STRATEGIES INFORMED BY AMERICAN EDGE CITIES’ DEVELOPMENT PATH - CASE STUDY OF CHINA (CHONGZUO)-THAILAND INDUSTRIAL PARK	832
<i>Sidong Zhao, Xiaojia Bi, Yuan Zhong, Lin Li</i>	
NATURAL VENTILATION FOR PASSIVE COOLING BY MEANS OF OPTIMIZED CONTROL LOGICS	841
<i>Alessandro Rinaldi, Michele Roccotelli, Agostino Marcello Mangini, Maria Pia Fanti, Francesco Iannone</i>	
THE CONSTRUCTION OF BIM APPLICATION VALUE SYSTEM FOR RESIDENTIAL BUILDINGS’ DESIGN STAGE IN CHINA BASED ON TRADITIONAL DBB MODE	851
<i>Jing Jia, Jiayue Sun, Zhiqing Wang, Tongrui Xu</i>	
A MULTI-CRITERIA FRAMEWORK FOR DECISION PROCESS IN RETROFIT OPTIONEERING THROUGH INTERACTIVE DATA FLOW	859
<i>Fulvio Re Cecconi, Lavinia C. Tagliabue, Sebastiano Maltese, Martina Zuccaro</i>	
A SIMPLE METHOD FOR THE COMPARISON OF BIOCLIMATIC DESIGN STRATEGIES BASED ON DYNAMIC INDOOR THERMAL COMFORT ASSESSMENT FOR SCHOOL BUILDINGS	870
<i>Enrico De Angelis, Lavinia C. Tagliabue, Fulvio Re Cecconi, Andrea G. Mainini</i>	
ARE SOME FORMS OF RESILIENCE MORE SUSTAINABLE THAN OTHERS?	881
<i>Adriana X. Sanchez, Paul Osmond, Jeroen Van Der Heijden</i>	
CO-BENEFITS OF LOW CARBON POLICIES IN THE BUILT ENVIRONMENT: AN INVESTIGATION INTO THE ADOPTION OF CO-BENEFITS BY AUSTRALIAN LOCAL GOVERNMENT	890
<i>S. M. Karim, S. Thompson, P. Williams</i>	

PART 2

THE EFFECT OF SOCIAL CAPITAL ON COMMUNITY CO-PRODUCTION: TOWARDS COMMUNITY-ORIENTED DEVELOPMENT IN POST-DISASTER RECOVERY	901
<i>Christopher Kim, Hitomi Nakanishi, Deborah Blackman, Ben Freyens, Angela M. Benson</i>	
EVIDENCE BASED PRACTICE FOR THE BUILT ENVIRONMENT: CAN SYSTEMATIC REVIEWS CLOSE THE RESEARCH - PRACTICE GAP?	912
<i>Samantha Hall, Philip Oldfield, Benjamin J. Mullins, Brett Pollard, Christian Criado-Perez</i>	
THERMAL COMFORT CONDITIONS AT THE PLATFORMS OF THE ATHENS METRO	925
<i>Margarita N. Assimakopoulos, George Katavoutas</i>	
A SUITABLE THERMAL STRESS INDEX FOR THE ELDERLY IN SUMMER TROPICAL CLIMATES	932
<i>Sumavalee Chindapol, John Blair, Paul Osmond, Deo Prasad</i>	
HEAT RESILIENCE IN PUBLIC SPACE AND ITS APPLICATIONS IN HEALTHY AND LOW CARBON CITIES	944
<i>E. Sharifi, J. Boland</i>	
SPATIAL AND ACTIVITY PREFERENCES DURING HEAT STRESS CONDITIONS IN ADELAIDE: TOWARDS INCREASED ADAPTATION CAPACITY OF THE BUILT ENVIRONMENT	955
<i>E. Sharifi, A. Sivam, J. Boland</i>	
FACTOR ANALYSIS OF BUILT ENVIRONMENT DESIGN AND MANAGEMENT OF RESIDENTIAL COMMUNITIES FOR ENHANCING THE WELLBEING OF ELDERLY PEOPLE	966
<i>Porntip Ruengtam</i>	
EFFECT OF SPATIAL AMBIENCE ON THERMAL ADAPTATION IN TROPICS: CASE OF FREE-RUNNING SHARED SPACES IN COASTAL HOTELS OF SRI LANKA	975
<i>I. Rajapaksha</i>	
STUDY OF PASSIVE EVAPORATIVE COOLING TECHNIQUE ON WATER-RETAINING ROOF BRICK	986
<i>Rubing Han, Zhimao Xu, Yutao Qing</i>	

A COMPARATIVE STUDY ON THE EFFECTIVENESS OF PASSIVE AND FREE COOLING APPLICATION METHODS OF PHASE CHANGE MATERIALS FOR ENERGY EFFICIENT RETROFITTING IN RESIDENTIAL BUILDINGS	993
<i>Morshed Alam, Jay Sanjayan, Patrick X. W. Zou, Sayanthan Ramakrishnan, John Wilson</i>	
TRANSFORMATION THROUGH RENOVATION: AN ENERGY EFFICIENT RETROFIT OF AN APARTMENT BUILDING IN ATHENS	1003
<i>Afroditi Synnefa, Konstantina Vasilakopoulou, Rosa Francesca De Masi, Georgios-Evrystheas Kyriakodis, Vasilis Londerfos, Elena Mastrapostoli, Theoni Karlessi, Mat Santamouris</i>	
ASSESSMENT OF BUILDING TYPOLOGY AND CONSTRUCTION METHOD OF TRADITIONAL LONGHOUSE	1015
<i>Siti Akhtar Mahayuddin, Wan Akmal Zahri Wan Zaharuddin, Siti Norlizaiha Harun, Balkhiz Ismail</i>	
RESILIENCE OF HISTORIC BUILT ENVIRONMENTS: INHERENT QUALITIES AND POTENTIAL STRATEGIES	1024
<i>Fabio Fatiguso, Mariella De Fino, Elena Cantatore, Viviana Caponio</i>	
DEVELOPMENT OF A TOOL FOR ASSESSING COMMERCIAL BUILDING RESILIENCE	1034
<i>Steve Burroughs</i>	
CHRISTCHURCH'S HIGH PERFORMANCE REBUILD	1044
<i>Jason Bretherton</i>	
IDENTIFICATION OF TECHNOLOGICAL AND INSTALLATION-RELATED PARAMETERS FOR A MULTI-CRITERIA APPROACH TO BUILDING RETROFIT	1056
<i>Elena Seghezzi, Gabriele Masera</i>	
TEMPERATE CLIMATES, WARMER HOUSES AND BUILT FABRIC CHALLENGES	1065
<i>Mark Dewsbury, Tim Law</i>	
SUITABILITY ANALYSES BETWEEN EXERCISE PATTERNS OF MORNING EXERCISE AND GREEN SPACE CHARACTERISTICS: A CASE STUDY OF ZHAOLIN PARK, CHINA	1075
<i>Xiaolong Zhao, Yunjing Hou, Jiajun Lv</i>	
TOWARDS ADAPTIVE RESIDENTIAL BUILDINGS TRADITIONAL AND CONTEMPORARY SCENARIOS IN BIOCLIMATIC DESIGN (THE CASE OF ALEPPO)	1083
<i>Hadya Salkini, Laura Greco, Roberta Lucente</i>	
BUILDING IN POST-WAR ENVIRONMENTS	1093
<i>Giovanni Tortorici, Francesco Fiorito</i>	
HISTORIC CITY – A CASE OF RESILIENT BUILT ENVIRONMENT	1103
<i>Anjali Krishan Sharma</i>	
ARCHITECTURE FOR REFUGEES, RESILIENCE SHELTER PROJECT: A CASE STUDY USING RECYCLED SKIS	1110
<i>Graziano Salvalai, Marco Imperadori, Federico Lumina, Elisa Mutti, Ilaria Polese</i>	
EXPLORING THE FEASIBILITY OF ALGAE BUILDING TECHNOLOGY IN NSW	1121
<i>Sara Wilkinson, Paul Stoller, Peter Ralph, Brenton Hamdorf, Laila Navarro Catana, Gabriela Santana Kuzava</i>	
RELATIONSHIP BETWEEN SUSTAINABLE TECHNOLOGY AND BUILDING AGE: EVIDENCE FROM AUSTRALIA	1131
<i>John Dadzie, Grace Ding, Goran Runeson</i>	
DEVELOPMENT OF A SUPER-INSULATING, AEROGEL-BASED TEXTILE WALLPAPER FOR THE INDOOR ENERGY RETROFIT OF EXISTING RESIDENTIAL BUILDINGS	1139
<i>Gabriele Masera, Karim Ghazi Wakili, Thomas Stahl, Samuel Brunner, Rosanna Galliano, Carol Monticelli, Stefano Aliprandi, Alessandra Zanelli, Amr Elesawy</i>	
MASS CUSTOMIZATION WITH ADDITIVE MANUFACTURING: NEW PERSPECTIVES FOR MULTI PERFORMATIVE BUILDING COMPONENTS IN ARCHITECTURE	1150
<i>Ingrid Paoletti</i>	
PREFABRICATION AS LARGE-SCALE EFFICIENT STRATEGY FOR THE ENERGY RETROFIT OF THE HOUSING STOCK: AN ITALIAN CASE STUDY	1160
<i>Francesco Pittau, Laura E. Malighetti, Giuliana Iannaccone, Gabriele Masera</i>	
THERMAL ENERGY STORAGE ENHANCEMENT OF LIGHTWEIGHT CEMENT MORTARS WITH THE APPLICATION OF PHASE CHANGE MATERIALS	1170
<i>Sayanthan Ramakrishnan, Xiaoming Wang, Jay Sanjayan, John Wilson</i>	
ENERGY PERFORMANCE OPTIMIZATION AS A GENERATIVE DESIGN TOOL FOR NEARLY ZERO ENERGY BUILDINGS	1178
<i>Eleftheria Touloupaki, Theodoros Theodosiou</i>	
THE POSSIBILITIES OF MODIFICATION OF CROP-BASED INSULATION MATERIALS APPLICABLE IN CIVIL ENGINEERING IN LOW-ENERGY AND PASSIVE HOUSES	1186
<i>Jitka Hroudová, Jiri Zach</i>	

RELATIONSHIP MODEL OF THE MOMENT CAPACITY OF GFRP SHEET STRENGTHENED RC BEAMS TO THE DURATION OF SEA WATER EXPOSURE	1195
<i>Rudy Djamaluddin, Rita Irmawaty</i>	
COMPRESSED STABILIZED EARTH BLOCKS USING IRON MINE SPOIL WASTE - AN EXPLORATIVE STUDY	1203
<i>H. B. Nagaraj, C. Shreyasvi</i>	
UPGRADED MINERAL SAND FRACTION FROM MSWI BOTTOM ASH: AN ALTERNATIVE SOLUTION FOR THE SUBSTITUTION OF NATURAL AGGREGATES IN CONCRETE APPLICATIONS	1213
<i>Jacques Rémy Minane, Frédéric Becquart, Nor Edine Abriak, Christophe Deboffe</i>	
OPTIMAL DRIVING PATTERN OF ON-ROAD CONSTRUCTION EQUIPMENT FOR EMISSIONS REDUCTION	1221
<i>Khalegh Barati, Xuesong Shen</i>	
THE IMPROVEMENT OF THE POZZOLANIC PROPERTIES OF RECYCLED GLASS DURING THE PRODUCTION OF BLENDED PORTLAND CEMENTS	1229
<i>Karel Dvorák, Dušan Dolák, Petr Dobrovolný</i>	
A SCANNER TECHNOLOGY ACCEPTANCE MODEL FOR CONSTRUCTION PROJECTS	1237
<i>Samad M. E. Sepasgozaar, Sara Shirowzhan, Cynthia (Changxin) Wang</i>	
SIMULATION PERFORMANCE OF BUILDING WALL WITH VACUUM INSULATION PANEL	1247
<i>Jin-Hee Kim, Sang-Myung Kim, Jun-Tae Kim</i>	
WATER ABSORPTION COEFFICIENT AS A PERFORMANCE CHARACTERISTIC OF BUILDING MIXES CONTAINING FINE PARTICLES OF SELECTED RECYCLED MATERIALS	1256
<i>Alena Sicakova, Martina Draganovska, Marek Kovac</i>	
EFFECT OF TREATMENTS ON PROPERTIES OF CEMENT-FIBER BRICKS UTILIZING RICE HUSK, CORNCOB AND COCONUT COIR	1266
<i>A. C. Abdullah, C. C. Lee</i>	
ADAPTIVE FACADES, DEVELOPED WITH INNOVATIVE NANOMATERIALS, FOR A SUSTAINABLE ARCHITECTURE IN THE MEDITERRANEAN AREA	1274
<i>Paola Gallo, Rosa Romano</i>	
CONCRETE CONTAINING RECYCLED CONCRETE AGGREGATE WITH MODIFIED SURFACE	1284
<i>Jozef Junak, Alena Sicakova</i>	
RECYCLING OF RESERVOIR SEDIMENT MATERIAL AS A BINDER IN CONCRETE	1292
<i>Natalia Junakova, Jozef Junak</i>	
THE POTENTIAL USE OF THE FBC ASH FOR THE PREPARATION OF BLENDED CEMENTS	1298
<i>Dominik Gazdic, Marcela Fridrichová, Karel Kulisek, Ludmila Vehovská</i>	
A METHODOLOGICAL FRAMEWORK TO ASSESS THE THERMAL PERFORMANCE OF GREEN INFRASTRUCTURE THROUGH AIRBORNE REMOTE SENSING	1306
<i>Carlos Bartesaghi Koc, Paul Osmond, Alan Peters, Matthias Irger</i>	
THE CONCEPT OF SMART AND NZEB BUILDINGS AND THE INTEGRATED DESIGN APPROACH	1316
<i>Theoni Karlessi, Nikos Kampelis, Denia Kolokotsa, Mat Santamouris, Laura Standardi, D. Isidori, C. Cristalli</i>	
THE EFFECT OF BUILDING FACADES ON OUTDOOR MICROCLIMATE –DEPENDENCE MODEL DEVELOPMENT USING TERRESTRIAL THERMOGRAPHY AND MULTIVARIATE ANALYSIS	1326
<i>Jonathan Fox, Natalya De Pooter</i>	
AERIAL SURVEY AND IN-SITU MEASUREMENTS OF MATERIALS AND VEGETATION IN THE URBAN FABRIC	1335
<i>Niki Gaitani, Ingunn Burud, Thomas Thiis, Mat Santamouris</i>	
DETERMINATION OF OPTIMAL PARAMETERS FOR WIND DRIVEN RAIN CFD SIMULATION FOR BUILDING DESIGN IN THE TROPICS	1345
<i>Venugopalan S. G. Raghavan, Poh Hee Joo, Chiu Pao-Hsiung, Aytac Kubilay, Jonas Allegrini</i>	
INTERACTIVE BUILDING ENVIRONMENTS: A CASE STUDY UNIVERSITY BUILDING IN UAE	1355
<i>Mahbouba Karima, Hasim Altan</i>	
A PRELIMINARY EXPLORATION OF THE BARRIERS OF SUSTAINABLE REFURBISHMENT FOR COMMERCIAL BUILDING PROJECTS IN MALAYSIA	1363
<i>Md Asrul Nasid Masrom, Mohd Hilmi Izwan Abd Rahim, Siow Chan Ann, Sulzakimin Mohamed, Kai Chen Goh</i>	
DEVELOPMENT OF CHEMICAL REACTION KINETICS OF VOC OZONATION	1372
<i>Balaji Mohan, Xin Cui, Kian Jon Chua</i>	

USING PARAMETRIC MODELLING IN FORM-BASED CODE DESIGN FOR HIGH-DENSE CITIES	1379
<i>Marc Aurel Schnabel, Yingyi Zhang, Serdar Aydin</i>	
DEVELOPMENT OF NET ZERO ENERGY SETTLEMENTS USING ADVANCED ENERGY TECHNOLOGIES	1388
<i>Afroditi Synnefa, Marina Laskari, Rajat Gupta, Anna Laura Pisello, Mat Santamouris</i>	
DATA FLOW REQUIREMENTS FOR INTEGRATING SMART BUILDINGS AND A SMART GRID THROUGH MODEL PREDICTIVE CONTROL	1402
<i>Thomas M. Lawrence, Richard T. Watson, Marie-Claude Boudreau, Javad Mohammadpour</i>	
EXAMINING THE EFFECTS OF TRANSPORT POLICY ON MODAL SHIFT FROM PRIVATE CAR TO PUBLIC BUS	1413
<i>A. H. M. Mehbub Anwar, Jie Yang</i>	
INNOVATIVE CIVIC ENGAGEMENT AND DIGITAL URBAN INFRASTRUCTURE: LESSONS FROM 100 SMART CITIES MISSION IN INDIA	1423
<i>Sarbeswar Praharaj, Jung Hoon Han, Scott Hawken</i>	
SOLAR TOWN FUCHU – PLAN AND PERFORMANCE	1433
<i>Nobuyuki Sunaga, Hiroko Onodera, Eiko Kumakura, Ikuya Nakano, Hyunwoo Roh</i>	
FROM THE BUILDING LEVEL ENERGY PERFORMANCE ASSESSMENT TO THE NATIONAL LEVEL: HOW ARE UNCERTAINTIES HANDLED IN BUILDING STOCK MODELS	1443
<i>Elias Naber, Rebekka Volk, Frank Schultmann</i>	
BUILDING CLASSIFICATION FROM LIDAR DATA FOR SPATIO-TEMPORAL ASSESSMENT OF 3D URBAN DEVELOPMENTS	1453
<i>Sara Shirowzhan, John Trinder</i>	
ASSESSMENT OF URBAN ENERGY PERFORMANCE THROUGH INTEGRATION OF BIM AND GIS FOR SMART CITY PLANNING	1462
<i>Shinji Yamamura, Liyang Fan, Yoshiyasu Suzuki</i>	
COMPUTATIONAL DESIGN AND PARAMETRIC OPTIMIZATION APPROACH WITH GENETIC ALGORITHMS OF AN INNOVATIVE CONCRETE SHADING DEVICE SYSTEM	1473
<i>Andrea Zani, Michele Andaloro, Luca Deblasio, Pierpaolo Ruttico, Andrea G. Mainini</i>	
TRACKING USERS’ BEHAVIORS THROUGH REAL-TIME INFORMATION IN BIMS: WORKFLOW FOR INTERCONNECTION IN THE BRESCIA SMART CAMPUS DEMONSTRATOR	1484
<i>Angelo L. C. Ciribini, Daniela Pasini, Lavinia C. Tagliabue, Massimiliano Manfren, Bruno Daniotti, Stefano Rinaldi, Enrico De Angelis</i>	
OCCUPANCY PROFILE VARIATION ANALYZED THROUGH GENERATIVE MODELLING TO CONTROL BUILDING ENERGY BEHAVIOR	1495
<i>Andrea Zani, Lavinia C. Tagliabue, Tiziana Poli, Angelo L. C. Ciribini, Enrico De Angelis, Massimiliano Manfren</i>	
LIGHT AND HEAVY ENERGY REFURBISHMENTS OF MEDITERRANEAN OFFICES. PART I: ENERGY AUDIT OF AN INSTITUTIONAL BUILDING ON THE NAPLES COAST	1506
<i>Fabrizio Ascione, Nicola Bianco, Rosa Francesca De Masi, Teresa Perone, Silvia Ruggiero, Paolo Strangio, Giuseppe Peter Vanoli</i>	
LIGHT AND HEAVY ENERGY REFURBISHMENTS OF MEDITERRANEAN OFFICES. PART II: COST-OPTIMAL ENERGY RENOVATION OF AN INSTITUTIONAL BUILDING	1518
<i>Fabrizio Ascione, Nicola Bianco, Rosa Francesca De Masi, Teresa Perone, Silvia Ruggiero, Paolo Strangio, Giuseppe Peter Vanoli</i>	
FULLY EXPLORING TRADITIONAL CHINESE CULTURE AND PROMOTING ORGANIC DEVELOPMENT OF GREEN CITY	1531
<i>Xiao Wei, Zhang Si</i>	
CARBON REDUCTION PROGRAMS AND LOWER INCOME HOUSEHOLDS IN AUSTRALIAN CITIES	1541
<i>Edgar Liu, Bruce Judd, Sarath Mataraarachchi</i>	
TENANTS’ DECISION TO OR NOT TO LEASE GREEN & NON-GREEN BUILDINGS: A CONCEPTUAL FRAMEWORK	1551
<i>Sumin Kim, Benson T. H. Lim, Jinu Kim</i>	
RETROFIT OR BEHAVIOUR CHANGE? WHICH HAS THE GREATER IMPACT ON ENERGY CONSUMPTION IN LOW INCOME HOUSEHOLDS?	1558
<i>Melissa James, Michael Ambrose</i>	
VERIFIED CLIMATE CALCULATION OF CONTRACTORS’ DESIGN	1568
<i>Larissa Strömberg</i>	
CSR AND SUSTAINABILITY IN FM: EVOLVING PRACTICES AND AN INTEGRATED INDEX	1577
<i>Abbas Elmualim</i>	

BARRIERS AND DRIVERS OF MALAYSIAN BIPV APPLICATION: PERSPECTIVE OF DEVELOPERS	1585
<i>Kai Chen Goh, Hui Hwang Goh, Aaron Boon Kian Yap, Md Asrul Nasid Masrom, Sulzakimin Mohamed</i>	
CFD METHODOLOGY DEVELOPMENT FOR SINGAPORE GREEN MARK BUILDING APPLICATION	1596
<i>Pao-Hsiung Chiu, Venugopalan S. G. Raghavan, Hee Joo Poh, Erna Tan, Osrithalita Gabriela, Nyuk-Hien Wong, T. Van Hooff, B. Blocken, Ruixin Li, Su Ming Leong-Kok</i>	
SUPPLY CHAIN RISK TO REWARD: RESPONSIBLE PROCUREMENT AND THE ROLE OF ECOLABELS	1603
<i>Kate Harris, Shaila Divakarla</i>	
EVERYDAY GOVERNANCE OF DOMESTIC ENERGY SYSTEMS	1612
<i>W. Glad</i>	
ANALYSIS OF HOMEOWNERS' BEHAVIOURS IN HOUSING MAINTENANCE	1622
<i>Abdullateef Olanrewaju, Seon Yeow Tan, Lee Lim Tat, Naoto Mine</i>	
IDENTIFYING THE ARCHITECTURAL TEXTURE OF THE FORMER BRITISH CONCESSION OF HANKOU	1633
<i>Song Yang, He Yi</i>	
SUSTAINABLE REUSE OF DISUSED RAILWAY	1643
<i>Giacomo Di Ruocco, Enrico Sicignano, Pierfrancesco Fiore, Emanuela D'Andria</i>	
INTEGRATED METHODOLOGIES ENERGY EFFICIENCY OF HISTORIC BUILDINGS	1653
<i>Giacomo Di Ruocco, Claudia Sicignano, Anna Sessa</i>	
STRATEGY OF SUSTAINABLE DEVELOPMENT OF AN INDUSTRIAL ARCHAEOLOGY	1664
<i>Giacomo Di Ruocco, Enrico Sicignano, Italo Galizia</i>	
ANALYZING EMBODIED ENERGY, GLOBAL WARMING AND ACIDIFICATION POTENTIALS OF MATERIALS IN RESIDENTIAL BUILDINGS	1675
<i>Adriana Estokova, Silvia Vilcekova, Milan Porhincak</i>	
MAPPING FOR THE FUTURE: BUSINESS INTELLIGENCE TOOL TO MAP REGIONAL HOUSING STOCK	1684
<i>Murad Safadi, Jun Ma, Rohan Wickramasuriya, Daniel Daly, Pascal Perez, Georgios Kokogiannakis</i>	
THE EFFECTS OF HIGH-RISE RESIDENTIAL CONSTRUCTION ON SUSTAINABILITY OF HOUSING SYSTEMS	1695
<i>Tayyab Ahmad, Ajibade Aibinu, Muhammad Jamaluddin Thaheem</i>	
INDUSTRY, GOVERNMENT & ACADEMIA – A RELATIONSHIP PARADIGM FIT FOR THE FUTURE OF TRANSPORT INFRASTRUCTURE ASSETS	1705
<i>Mark Smith</i>	
GREENING RAIL INFRASTRUCTURE FOR CARBON BENEFITS	1716
<i>John Blair, Cielo Roldan, Sumita Ghosh, Shih-Hsien Yung</i>	
IF LIVING LABS ARE THE ANSWER – WHAT'S THE QUESTION? A REVIEW OF THE LITERATURE	1725
<i>Mike Burbridge</i>	
CHALLENGES IN ALIGNING THE ARCHITECTURE PROFESSION IN INDONESIA FOR CLIMATE CHANGE AND SUSTAINABILITY	1733
<i>Usha Iyer-Raniga, Tony Dalton</i>	
SERIOUS GAMES FOR INTEGRAL SUSTAINABLE DESIGN: LEVEL 1	1744
<i>Jules Moloney, Anastasia Globa, Rui Wang, Astrid Roetzel</i>	
FIELD INVESTIGATION ON INDOOR THERMAL ENVIRONMENT OF A HIGH-RISE CONDOMINIUM IN HOT-HUMID CLIMATE OF BANGKOK, THAILAND	1754
<i>Parinee Srisuwan, Kojima Shoichi</i>	
COLLABORATION ACHIEVES EFFECTIVE WASTE MANAGEMENT DESIGN AT BROOKFIELD PLACE PERTH, WESTERN AUSTRALIA	1763
<i>Margaret Gollagher, Jenny Campbell, Anne-Marie Bremner</i>	
LEARNING FOR LOW CARBON LIVING: THE POTENTIAL OF MOBILE LEARNING APPLICATIONS FOR BUILT ENVIRONMENT TRADES AND PROFESSIONALS IN AUSTRALIA	1773
<i>Tomí Winfree, Paul Goldacre, Mohammadhossein Sherkat, Peter Graham, Antonette Mendoza, Tim Miller</i>	
Author Index	