

# **7th International Conference on Euro Asia Civil Engineering Forum 2019**

IOP Conference Series: Materials Science and Engineering  
Volume 615

Stuttgart, Germany  
30 September - 2 October 2019

Part 1 of 2

## **Editors:**

**Han Ay Lie  
Harald Garrecht**

**Akanshu Sharma  
Harianto Hardjasaputra**

ISBN: 978-1-5108-9822-6  
ISSN: 1757-8981

**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.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence. Licence details:  
<http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481

Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## PART 1

### CLIMATE CHANGE & DISASTER MANAGEMENT

<b>IMPLEMENTATION OF A DISASTER MANAGEMENT SYSTEM FOR LOCAL GOVERNMENTS IN JAPAN</b> .....	1
<i>T Goso, T Kakuzaki, S Kusayanagi</i>	
<b>A REVIEW: ADAPTATION OF ESCAPE ROUTE FOR A FRAMEWORK OF ROAD DISASTER RESILIENT</b> .....	11
<i>A A Redzuan, A N Anuar, R Zakaria, E Aminudin, N E Alias, M A M Yuzir, M R Alzahari</i>	
<b>THERMOELECTRIC DISTRICT SUPPLY CONCEPT INCLUDING E-MOBILITY</b> .....	20
<i>A Mack, L Lackovic, W Lisin, C Blatt, H Garrecht</i>	
<b>PERSPECTIVES OF CLIMATE CHANGE ADAPTATION OF BUILDING AREAS AGAINST HEAT WAVES</b> .....	28
<i>R Ortlepp, D Schiela</i>	

### CONCRETE ENGINEERING

<b>EFFECTS OF W/B RATIO, FLY ASH, AND CHLORIDE CONTENT ON CORROSION OF REINFORCING STEEL</b> .....	36
<i>D T V Phuong, P Sancharoen, P Klomjit, S Tangtermsirikul</i>	
<b>MIX DESIGN OF LOW-CEMENT CONCRETE WITH PARTICLE PACKING CONCEPT AND SUPERPLASTICIZER APPLICATION</b> .....	43
<i>A Antoni, E Hardi, R D Tandean, D Hardjito</i>	
<b>USING VISCOSITY-MODIFYING ADMIXTURE TO INCREASE THE COHESION OF LOW-CEMENT CONCRETE MIXTURE</b> .....	52
<i>A Antoni, A Andreas, E Christian, D Hardjito</i>	
<b>NEW METHOD FOR TESTING THE SEDIMENTATION STABILITY OF MODERN CONCRETES AT CONSTRUCTION SITES</b> .....	62
<i>A S Gecgel, C Baumert, H Garrecht</i>	
<b>STUDY OF MECHANICAL PROPERTIES OF FLY ASH-BASED GEOPOLYMER CONCRETE</b> .....	68
<i>H Hardjasaputra, M Cornelia, Y Gunawan, I V Surjaputra, H A Lie, Rachmansyah, G Pranata Ng</i>	
<b>QUANTITATIVE ASSESSMENT OF INTERFACIAL CONDITION OF COLD JOINT USING SURFACE WAVE GROUP VELOCITY PROFILE</b> .....	77
<i>Y-C Lin, C-C Cheng, C-H Chiang, K-T Hsu</i>	
<b>MODELLING CORROSION OF STEEL REINFORCEMENT IN CONCRETE</b> .....	85
<i>J Ožbolt, G Balabanic, F Oršanic</i>	
<b>NUMERICAL STUDY OF REINFORCED CONCRETE SLABS UNDER EXTREME LOADING CONDITIONS: IMPACT AND FIRE</b> .....	93
<i>J Ožbolt, D Ruta, B Irhan</i>	
<b>INTERACTION BETWEEN DAMAGE AND TIME-DEPENDENT DEFORMATION OF MORTAR IN CONCRETE: 3D FE STUDY AT MESO-SCALE</b> .....	101
<i>S Gambarelli, J Ožbolt</i>	
<b>EFFECT OF NICKEL SLAG AS A SAND REPLACEMENT IN STRENGTH AND WORKABILITY OF CONCRETE</b> .....	110
<i>R S Edwin, E Ngii, R Talanipa, F Masud, R Sriyani</i>	
<b>IMPACT OF THE PUMPING PROCESS ON THE PROPERTIES OF LIGHTWEIGHT CONCRETE</b> .....	116
<i>O Arkhipkina, B Schuler, M Stipetic</i>	
<b>USING CALCIUM CHLORIDE AS AN ACCELERATOR FOR PORTLAND POZZOLAN CEMENT CONCRETE COMPRESSIVE STRENGTH DEVELOPMENT</b> .....	125
<i>I M A K Salain</i>	
<b>ECO-DURABILITY INDEX OF SELF-COMPACTING CONCRETE INCORPORATING HIGH VOLUME FLY ASH</b> .....	132
<i>S A Kristiawan, S Sangadji, Sunarmasto</i>	

<b>FIBER-REINFORCED LIGHTWEIGHT FOAMED CONCRETE PANELS SUITABLE FOR 3D PRINTING APPLICATIONS</b> .....	141
<i>D Falliano, A Sciarrone, D De Domenico, N Maugeri, P Longo, E Gugliandolo, G Ricciardi</i>	
<b>MAKING SENSE OF HIGH DIMENSIONAL CONCRETE DATA – A STATISTICAL APPROACH</b> .....	148
<i>A Manoj, K S Babu Narayan</i>	
<b>AXIAL TENSILE STRENGTHS OF UHPC AND UHPFRC</b> .....	155
<i>Y Kusumawardaningsih, E Fehling, H Hardjasaputra, Y Al-Ani, A A M Aboubakr</i>	
<b>EVALUATION ON FEASIBILITY OF FLY ASH CEMENT MORTAR AS ADHESIVE OF POST-INSTALLED REBAR</b> .....	164
<i>C P Wang, Y C Chuang, J X Lin</i>	
<b>SELF-HEALING OF HARDENED CEMENT PASTE AFFECTED BY ADDITIONAL CA<sup>2+</sup> AND CO<sub>3</sub><sup>2-</sup> IONS WITH TEMPERATURE CONTROL</b> .....	172
<i>H Choi, M Inoue</i>	
<b>STUDY ON THE OPTIMUM NANO-NATURAL POZZOLAN CONTENT IN THE CONCRETE BINDER</b> .....	181
<i>A M al-Swaidani, A Meziab</i>	

## **CONSTRUCTION & SAFETY MANAGEMENT**

<b>COMPARISON OF THE SUPERVISORY COST OF USING AN UNMANNED AERIAL SYSTEM AND CONVENTIONAL METHODS IN CONSTRUCTION PROJECTS</b> .....	191
<i>P F Kaming, G E Yonathan</i>	
<b>A CASE STUDY OF URBAN ROAD SUBSIDENCE INDUCED BY THE UNDERGROUND CONNECTION OF THE SHIELD TUNNELLING METHOD</b> .....	199
<i>Y H Chen, H H Pan</i>	
<b>A FRAMEWORK FOR ETHICAL PROCUREMENT OF CONSTRUCTION PROJECTS IN NIGERIAN FEDERAL UNIVERSITIES</b> .....	206
<i>N Z Abdullahi, N Gambo, S A Mohammad</i>	
<b>KNOWLEDGE REQUIREMENT THEORETICAL FRAMEWORK FOR CONSTRUCTION PROCUREMENT MANAGEMENT</b> .....	213
<i>A S Shehu, Y Ibrahim, I I Inuwa</i>	
<b>APPLICATION OF SEMIOTICS FOR HEALTH AND SAFETY SIGNS COMPREHENSION ON CONSTRUCTION SITES IN YOLA METROPOLIS, NIGERIA</b> .....	221
<i>S A Alara, I I Inuwa, N Gambo</i>	
<b>REVIEW: IDENTIFICATION OF ROADMAP OF FOURTH CONSTRUCTION INDUSTRIAL REVOLUTION</b> .....	229
<i>S E N Lau, R Zakaria, E Aminudin, C Chang Saar, N I A Abidin, A F Roslan, Z Abd Hamid, M Z Mohd Zain, E Lou</i>	
<b>KNOWLEDGE, SKILLS AND ATTITUDES OF CIVIL ENGINEERS IN INDONESIA</b> .....	240
<i>H Setiawan, F Raharjo</i>	
<b>EXPLORING THE KNOWLEDGE OF PREVENTION THROUGH DESIGN (PTD) AMONG MALAYSIAN CIVIL &amp; STRUCTURAL DESIGNERS</b> .....	247
<i>C K I Che Ibrahim, S Belayutham, E A Azmi, A Hussain</i>	
<b>CONSTRUCTION POLLUTION IN BRUNEI</b> .....	255
<i>M M Rahman, I B H M Yusof, R A Asli</i>	
<b>BENEFITS OF GREENING EXISTING BUILDINGS</b> .....	262
<i>M M Rahman</i>	
<b>MANAGERIAL FLEXIBILITY ROLE ON FINANCIAL INVESTMENT ANALYSIS: A CASE STUDY OF PUBLIC HOUSING</b> .....	270
<i>F Hermawan, A C Harsono, H Suliantoro</i>	
<b>LONG-TERM MONITORING OF SPILLWAY USING VARIOUS NDT TECHNIQUES-CASE STUDIES</b> .....	278
<i>K-T Hsu, C-C Cheng, C-H Chiang, Y-T Ke, J-S Cheng</i>	
<b>DETERMINING DURATION OF PERFORMANCE-BASED CONTRACTS BASED ON FAIR PAYOFF FOR THE GOVERNMENT AND CONTRACTORS</b> .....	285
<i>H T Tjendani, W Oetomo, IPA Wiguna, N Anwar</i>	
<b>RELATIONSHIP BETWEEN THE CONSTRUCTION COSTS AND THE RELIABILITY INDEX OF QUAY WALLS</b> .....	292
<i>R Wesstein, J G de Gijt, O M Heeres, A A Roubos</i>	
<b>THE ECONOMIC BENEFIT OF TOLL ROAD INVESTMENT ON THE PERFORMANCE OF THE INDUSTRY SECTORS IN WEST JAVA PROVINCE</b> .....	300
<i>I S Sembiring, R Anas</i>	

## **GEOTECHNICAL ENGINEERING**

<b>OVERWATER DEPTH INSPECTION ON A SUBMERGED PILE BENT</b> .....	308
<i>H Wang, C-H Hu, T V Nguyen, H-C Tsai, C-Y Wang</i>	
<b>A CASE STUDY OF SLOPE HAZARDOUS MITIGATION BY GROUND MONITORING SYSTEM</b> .....	314
<i>B H Yang, J Lai, C F Cheng</i>	
<b>THE COMPARISON OF ADDING FLY ASH AND SINABUNG ASH TO LIMESTONE TOWARDS THE SOIL IMPROVEMENT VIA CBR VALUE</b> .....	322
<i>I P Hastuty, Roesyanto, A F Rahman</i>	
<b>EFFECT OF CONFINING PRESSURES ON THE SHEAR MODULUS OF SAND TREATED WITH ENZYMATICALLY INDUCED CALCITE PRECIPITATION</b> .....	329
<i>M Simatupang, A S Sukri, Nasrul, Sulha, T S Putri</i>	
<b>GEOTECHNICAL BEHAVIOUR OF SOFT SOIL IN EAST JAVA, INDONESIA</b> .....	338
<i>Y Zaika, A Rachmansyah, Harimurti</i>	
<b>INFLUENCE OF MATERIAL SPATIAL VARIABILITY ON SLOPE STABILITY IN SOFT ROCK</b> .....	345
<i>S C Hsu, T P Hsieh, P H Tsai</i>	
<b>MICROBIALY INDUCE CALCITE PRECIPITATION AS BIO GROUTING BY BACILLUS SUBTILIS ON ITS SHEAR STRENGTH PARAMETER EFFECTS ON ORGANIC SOIL (PEAT) FROM SIAK REGENCY RIAU PROVINCE INDONESIA</b> .....	352
<i>F Syarif, M F Hardianto, G M Davino</i>	
<b>SLOPE STRUCTURAL HEALTH MONITORING METHOD AGAINST RAINFALL-INDUCED SHALLOW LANDSLIDE</b> .....	360
<i>K Koizumi, K Oda, M Komatsu, S Ito, H Tsutsumi</i>	
<b>PRESSURIZED CLAY INJECTION METHOD USING KAOLINITE FOR CONTROLLING GROUNDWATER OF A SATURATED SAND LAYER</b> .....	368
<i>M Komatsu, K Takahashi, K Takimoto</i>	
<b>CONSIDERATION OF COSTS AND FACTORS OF SAFETY FOR LANDSLIDE MITIGATION OF THE HOUSING INFRASTRUCTURE IN SAWAHLUNTO</b> .....	376
<i>B Istijono, A Hakam, D Hardiyansyah, M M Hape</i>	
<b>THE SHEAR STRENGTH ALTERATION ON CLAY SOIL CONSIDERING THE PLASTICITY INDEX AND THE PERCENTAGE OF FINE AGGREGATES IN TROPICAL CLIMATE REGIONS</b> .....	384
<i>D Tjandra, P S Wulandari</i>	
<b>THE POTENTIAL OF USING PERFORMANCE INFORMATION IN THE ASSESSMENT OF EXISTING QUAY WALLS</b> .....	393
<i>N den Adel, J G de Gijt, H J Wolters, T Schweckendiek</i>	
<b>RELIABILITY SENSITIVITY ANALYSIS WITH SUBSET SIMULATION: APPLICATION TO A CARBON DIOXIDE STORAGE PROBLEM</b> .....	401
<i>S Xiao, S Oladyshkin, W Nowak</i>	
<b>SOME LEARNING CASES IN THE PORT OF ROTTERDAM</b> .....	408
<i>J G de Gijt, H E Brassinga, A A Roubos</i>	
<b>REVITALIZATION OF HOT SPRING RESORTS IN JAPAN THROUGH PPP-BASED GEOTHERMAL POWER PROJECT</b> .....	421
<i>F Aono, T Goso, S Kato, K Nishida</i>	
<b>DETERMINING THE TRACK CONDITION USING SOIL PROPERTIES - PART 1</b> .....	428
<i>V Schuk, S Rapp, U Martin, B Wang</i>	
<b>DETERMINING THE TRACK CONDITION USING SOIL PROPERTIES - PART 2</b> .....	438
<i>V Schuk, S Rapp, U Martin, B Wang</i>	
<b>INVESTIGATION OF THE GRADATION EFFECT ON BALLAST MECHANICAL BEHAVIORS BY MEANS OF DISCRETE ELEMENT MODELING - PART 1</b> .....	447
<i>B Wang, U Martin, S Rapp, V Schuk</i>	
<b>INVESTIGATION OF THE GRADATION EFFECT ON BALLAST MECHANICAL BEHAVIORS BY MEANS OF DISCRETE ELEMENT MODELING - PART 2</b> .....	455
<i>B Wang, U Martin, S Rapp, V Schuk</i>	
<b>EFFECT OF ADDING NANO-CALCINED CLAY AND NANO-LIME ON THE GEOTECHNICAL PROPERTIES OF EXPANSIVE CLAYEY SOIL</b> .....	462
<i>A M al-Swaidani, I Hammoud, I al-Ghuraibi, A Meziab</i>	

## **HYDRAULICS, HYDROLOGY & WATER ENGINEERING**

<b>CONSTRUCTING UNCERTAINTY BUDGET FOR A TWO-DIMENSIONAL HYDRAULIC MODEL</b> .....	474
<i>N Ozbey, U S Gül</i>	
<b>EFFECT OF NOISES REMOVAL AND SPATIAL RESOLUTIONS OF DIGITAL SURFACE MODEL (DSM) IN FLOOD INUNDATION MODEL</b> .....	482
<i>A Yunika, M Kok, J G de Gijt, J Huizinga, S Ginting</i>	
<b>AN EVALUATION OF THE FLOOD DIVERSION PROJECT DUE TO EXTREME RAINFALL EVENT IN TAIPEI CITY</b> .....	491
<i>S Wu, J Jang, T Wu, J Lin, B Li</i>	

## **PERFORMANCE BASED DESIGN**

<b>ROBUST COMPOSITE JOINTS</b> .....	500
<i>G Skarmoutsos, N Keller, U Kuhlmann</i>	
<b>A NEW ASSESSMENT APPROACH FOR POST-INSTALLED ANCHORS USED IN SEISMIC APPLICATIONS</b> .....	509
<i>E J Stehle, A Sharma</i>	
<b>BEHAVIOURAL AND FUNCTIONAL BASED DESIGN OF HIGH-RISE PUBLIC HOUSING PROJECT IN JAKARTA, INDONESIA</b> .....	518
<i>A K Djukardi, F Srinaga</i>	
<b>EXPERIMENTAL AND NUMERICAL INVESTIGATIONS ON THE CONCRETE EDGE FAILURE OF ANCHOR GROUPS OF ARBITRARY CONFIGURATIONS</b> .....	526
<i>B Bokor, A Sharma, J Hofmann</i>	

## **SANITATION & ENVIRONMENTAL ENGINEERING**

<b>THERMAL FLOW SIMULATION FOR AN ENERGY GARDEN BUILDING BLOCK</b> .....	535
<i>Z Ramadan, H Garrecht</i>	

## **PART 2**

<b>APPLICATIONS OF DENSITY FUNCTIONAL THEORY TO HEAVY METAL BINDING TO MAGNETIC-CORED DENDRIMER</b> .....	543
<i>H-R Kim, D W Boukhvalov, J-W Park</i>	
<b>ENVIRONMENTALLY FRIENDLY FOUNDATION FOR THE SUSTAINABILITY DEVELOPMENT OF INFRASTRUCTURES IN SWAMP AREA</b> .....	550
<i>A Hakam, S Srihandayani, F A Ismail, M S Asmirza, M M Hape</i>	
<b>DECISION MAKING TOOL FOR RETROFITTING OF EXISTING BUILDING FOR ENERGY REDUCTION IN HIGHER LEARNING INSTITUTION</b> .....	557
<i>N I A Abidin, R Zakaria, E Aminuddin, S M Shamsuddin, M Mustafa, J S Khan</i>	

## **STRUCTURAL & CONSTRUCTION ENGINEERING**

<b>PRECAST SEGMENTAL BAMBOO REINFORCED CONCRETE BEAMS WITH BOLTED CONNECTIONS SUBJECTED TO FLEXURAL LOADS: AN EXPERIMENTAL INVESTIGATION</b> .....	566
<i>Y Haryanto, H-T Hu, A L Han, N G Wariyatno, G H Sudibyo, B A Hidayat, K Naqiyah</i>	
<b>STRUCTURAL SYSTEM IDENTIFICATION OF PLANE FRAMES BASED ON FREQUENCY DOMAIN DECOMPOSITION-NATURAL EXCITATION TECHNIQUE (FDD-NEXT)</b> .....	573
<i>R Frans, Y Arfiadi</i>	
<b>PARAMETRIC STUDY OF FACTORS INFLUENCING THE THERMAL DISTRIBUTION AND LOAD-BEARING CAPACITY OF BONDED ANCHORS DIRECTLY EXPOSED TO FIRE</b> .....	582
<i>O Al-Mansouri, R Mege, N Pinoteau, M A Lahouar, T Guillet, S Rémond</i>	

<b>NONLINEAR FINITE ELEMENT ANALYSIS OF TRADITIONAL FLEXURAL STRENGTHENING USING BETUNG BAMBOO (DENDROCALAMUS ASPER) ON CONCRETE BEAMS</b> .....	590
<i>B A Hidayat, H-T Hu, A L Han, Y Haryanto, A Widyaningrum, G Pamudji</i>	
<b>DYNAMIC BEHAVIOUR OF STIFFENED ORTHOTROPIC PLATES SUBJECTED TO FRIEDLANDER BLAST LOAD</b> .....	598
<i>S W Alisjahbana, I Alisjahbana, B S Gan, Safrilah, J C P Putra</i>	
<b>EXPERIMENTAL STUDY OF CIRCULAR HOLLOW REINFORCED CONCRETE COLUMN STRENGTHENED WITH PARTIAL CARBON FIBRE REINFORCED POLYMER (CFRP) CONFINEMENT</b> .....	606
<i>R Ismail, R S M Rashid, F A A Zakwan, F Hejazi</i>	
<b>OPTIMUM AND PERFORMANCE OF ABSORBER WITH ZERO DAMPING</b> .....	614
<i>Y Arjadi, R Frans</i>	
<b>TRACING DEVELOPING DETERIORATION ZONES IN A DAMAGED DAM BY USING ELASTIC WAVE TOMOGRAPHY</b> .....	621
<i>H Wang, S-H Hsieh, C-H Hu, Y-C Tsai</i>	
<b>VELOCITY TOMOGRAPHY-BASED CONDITION INSPECTION ON CONCRETE PYLONS OF A PEDESTRIAN SUSPENSION BRIDGE</b> .....	630
<i>H Wang, C-H Hu, S H Hsieh, Y-C Tsai, M-H Chen, C-Y Wang</i>	
<b>ANALYSIS OF EARTHQUAKE STRUCTURE ON A TRADITIONAL WOODEN HOUSE OF MANDAILING</b> .....	638
<i>N N Irma, A Syahreza, A W Hari</i>	
<b>SEISMIC PERFORMANCE ANALYSIS OF MULTI-STORY RC FRAMES STRENGTHENED WITH RC INFILL WALL</b> .....	646
<i>M Sukrawa, I G A K Putra, I A M Budiwati, I M A K Salain, G A Susila, G Pringgana</i>	
<b>FREE VIBRATION OF ORTHOTROPIC LEVY-TYPE SOLUTION PLATES BY USING SEM</b> .....	654
<i>S Kiryu, S W Alisjahbana, I Alisjahbana, A L Han, B S Gan</i>	
<b>COMBINED RINGS AND HORIZONTAL STEEL PIPE AS HYSTERETIC DAMPERS</b> .....	662
<i>J Utomo, M Moestopo, A Surahman, D Kusumastuti</i>	
<b>STRENGTH CALCULATION METHOD OF REINFORCED CONCRETE STRUCTURES OF TASHKENT UNDERGROUND TUNNELS WITH DIFFERENT STAGES OF STRESS CONDITION</b> .....	670
<i>M Miralimov</i>	
<b>DETERMINING FRAGILITY OF URBAN LOW-TO-MID RISE MASONRY INFILLED BUILDING</b> .....	677
<i>S Sangadji, S A Kritiawan, S I Prastiwi</i>	
<b>EFFECT OF LOSS IN CONCRETE COVER DURING FIRE ON THE PREDICTED TEMPERATURE DISTRIBUTION</b> .....	687
<i>H Lakhani, J Hofmann</i>	
<b>APPLICATIONS OF HYSTERETIC STEEL DAMPERS FOR CONTROLLING THE SEISMIC DAMAGE IN STEEL FRAMES</b> .....	694
<i>D R Teruna</i>	
<b>SAFETY REDUCTION IN ANCHOR GROUPS DUE TO UNEVEN CRACK DISTRIBUTION</b> .....	703
<i>G Di Nunzio, G Muciaccia</i>	
<b>STRUCTURAL BEHAVIOUR OF REINFORCED CONCRETE (RC) COLUMNS UNDER FIRE</b> .....	712
<i>H Lakhani, J Ožbolt</i>	
<b>TENSION AND SHEAR PERFORMANCE OF ANCHOR CHANNELS WITH CHANNEL BOLTS CAST IN FIBRE REINFORCED CONCRETE (FRC)</b> .....	720
<i>C Mahrenholtz, M Ayoubi, S Müller, S Bachschmid</i>	
<b>EXPERIMENTAL STUDY AND NUMERICAL ANALYSIS OF FLEXURAL BEHAVIOUR OF POST-FIRE REINFORCED CONCRETE BEAM</b> .....	728
<i>R Suryanita, H Maizir, Ismeddiyanto, R Andriano, R Arditama</i>	
<b>TRUSS STRUCTURE OPTIMIZATION FOR TWO DESIGN VARIABLE ELEMENTS USING GENETIC ALGORITHM WITH STRESS AND FAILURE PROBABILITY CONSTRAINTS</b> .....	736
<i>Mahadi Kurniawan, Augusta Adha</i>	
<b>CREEP BEHAVIOUR OF TENSION LOADED ADHESIVE ANCHORS IN NON-CRACKED LOW STRENGTH CONCRETE</b> .....	744
<i>V Mahadik, J Hofmann</i>	
<b>LOCAL STRENGTHENING OF ANCHORAGES WITH POST-INSTALLED (SUPPLEMENTARY) REINFORCEMENT</b> .....	752
<i>N Vita, A Sharma, J Hofmann</i>	

<b>FLEXURAL PERFORMANCE OF FULL AND PARTIALLY STEEL FIBRE REINFORCED SELF-COMPACTING CONCRETE (SCFRC) RIBBED SLAB .....</b>	<b>763</b>
<i>H Ahmad, M H M Hashim, A A Bakar, F A Rahman</i>	
<b>TESTING SETUP TO EXAMINE PUNCHING SHEAR STRENGTH IN SELF-COMPACTING FIBRE REINFORCED CONCRETE (SCFRC) RIBBED SLABS .....</b>	<b>771</b>
<i>N H M Fodzi, M H Mohd Hashim, M S Mhd Radzi</i>	
<b>INFLUENCE OF CONCRETE DAMAGE ON REINFORCEMENT CORROSION .....</b>	<b>779</b>
<i>M Kušter Maric, J Ožbolt, A Mandic Ivankovic, A Vlašić, J Bleiziffer, M Srbic, D Skokandic, J Bošnjak, L Lackovic</i>	
<b>APPLICATION OF THE 3D CHEMO-HYGRO-THERMO MECHANICAL MODEL ON EXISTING BRIDGES EXPOSED TO CHLORIDES AND MECHANICAL DAMAGES .....</b>	<b>787</b>
<i>M Kušter Maric, J Ožbolt, G Balabanic</i>	
<b>STRUCTURAL RELIABILITY OF RC ELEMENTS WITH ELECTRIC ARC FURNACE SLAG AS RECYCLED AGGREGATES .....</b>	<b>795</b>
<i>M A Zanini, E De Stefani, F Faleschini, C Pellegrino</i>	
<b>INFLUENCE OF CONCRETE HUMIDITY ON THE TEMPERATURE DEVELOPMENT UNDER FATIGUE COMPRESSIVE LOADING .....</b>	<b>803</b>
<i>M Markert, V Birtel, H Garrecht</i>	
<b>CRACK INTENSITY OF THE DAMAGED RC BEAM REPAIRED WITH EPOXY INJECTION USING ACOUSTIC EMISSION TECHNIQUE .....</b>	<b>810</b>
<i>M N Soffian Noor, M N Noorsuhada, K Nizam, M M M Ariffaizad, A R Noorhazlinda</i>	
<b>PERFORMANCE OF DISTRIBUTED OPTICAL FIBER SENSORS (DOFS) AND DIGITAL IMAGE CORRELATION (DIC) IN THE MONITORING OF RC STRUCTURES .....</b>	<b>818</b>
<i>M F Bado, G Kaklauskas, J R Casas</i>	
<b>EXPERIMENTAL AND NUMERICAL COMPARISON OF BIO-BASED AND CONVENTIONAL PHASE CHANGE MATERIALS FOR THERMAL STORAGE APPLICATIONS .....</b>	<b>826</b>
<i>L Lackovic, H Garrecht</i>	
<b>ECOLOGICAL CONSTRUCTION METHOD BY THE DEPLOYABLE BRIDGE .....</b>	<b>834</b>
<i>K Chanthamanivong, I Ario, Y Yokotani</i>	
<b>SEISMIC HAZARD ANALYSIS FOR EAST MALAYSIA; BASED ON A PROPOSED GROUND MOTION PREDICTION EQUATION .....</b>	<b>843</b>
<i>N S H Harith, F Tongkul, A Adnan, A V Shoushtari</i>	
<b>STUDY ON PERFORMANCE OF LIGHTWEIGHT CONCRETE BRICKS WITH A RATIO OF SAND AND CEMENT COMPOSITION .....</b>	<b>850</b>
<i>H Maizir, R Suryanita, R Arditama</i>	
<b>SEISMIC VULNERABILITY ASSESSMENT OF BRIDGES USING ANALYTICAL HIERARCHY PROCESS .....</b>	<b>858</b>
<i>M C Djemai, M Bensaibi, K Zellat</i>	
<b>ULTRA-LOW-POWER WIRELESS ANCHOR LOAD MONITORING SYSTEM BASED ON INTERNET OF THINGS TECHNOLOGY .....</b>	<b>866</b>
<i>J Tong, T H Lee, Y Lin</i>	

## **SUSTAINABLE CONSTRUCTION MATERIALS 1**

<b>FEASIBILITY OF FORECASTING ECOLOGICAL PERFORMANCES OF PRODUCTS IN EARLY DEVELOPMENT PHASES .....</b>	<b>874</b>
<i>H L Hein, J Schwarte</i>	
<b>TREATMENT OF UNCERTAINTIES IN GREEN ENGINEERING .....</b>	<b>884</b>
<i>J Schwarte, H L Hein</i>	
<b>LOW HEAT CONCRETE HYDRATION THERMAL REDUCTION WITH BIOCONC .....</b>	<b>891</b>
<i>M Basoeki, Koespiadi, J J Ekaputri</i>	
<b>EFFECTIVENESS OF USING POZZOLANIC MATERIAL FOR CONCRETE CANAL BLOCKS IN TROPICAL PEATLAND .....</b>	<b>903</b>
<i>M Olivia, I R Sitompul, E Saputra, S Sutikno, K Yamamoto</i>	
<b>MECHANICAL PROPERTIES OF CRUMB RUBBER-RICE HUSK ASH CONCRETE AS A RIGID PAVEMENT MATERIAL .....</b>	<b>912</b>
<i>H Abdurrahman, G Wibisono, M Qoryati, I R Sitompul, M Olivia</i>	
<b>THE EFFECT OF REINFORCEMENT RATIO CANTULA FIBER (AGAVE CANTULA ROXB) ON TENSILE STRENGTH OF TEXTILE REINFORCED CONCRETE .....</b>	<b>920</b>
<i>E Purwanto, S A Kristiawan, E Safitri, A N Sasmito</i>	



<b>THE EFFECT OF ALKALI CONCENTRATION ON CHLORIDE PENETRATION IN GEOPOLYMER CONCRETE</b> .....	928
<i>J J Ekaputri, H A Lie, C Fujiyama, M Shovitri, N H Alami, D H E Setiamarga</i>	
<b>UNIT PROCESSES IDENTIFICATION OF MAINTENANCE ON RIGID AND FLEXIBLE PAVEMENT OF LOCAL ROAD</b> .....	940
<i>F S Handayani, F P Pramesti, A Setyawan</i>	
<b>EFFECT OF SODIUM SILICATE AS ACTIVATOR ON THE FRESH AND HARDENED PROPERTIES OF CEMENT-SLAG BLENDED PASTE</b> .....	947
<i>A Thymotie, T-P Chang, H-A Nguyen</i>	
<b>SUSTAINABLE STEEL AND COMPOSITE BRIDGES THROUGH INCREASED LIFETIME BY FATIGUE TREATMENT</b> .....	954
<i>L Gözl, S Breunig, U Kuhlmann</i>	
<b>EFFECT OF SUSTAINABLE BUILDING MATERIAL SUBSTITUTES WITH REGARD TO EARTHQUAKE SAFETY</b> .....	962
<i>R Ortlepp</i>	
<b>THE USE OF CRUMB RUBBER FOR REPLACING FINE AGGREGATE IN COLD MIXTURE ASPHALT</b> .....	970
<i>P S Wulandari, D Tjandra</i>	
<b>CHARACTERISTICS OF GEOPOLYMER HYBRID CONCRETE IN PEAT WATER</b> .....	976
<i>M F Wijaya, M Olivia, G Wibisono, E Saputra, S Wang</i>	

## **TRANSPORTATION ENGINEERING**

<b>RECOGNITION OF TRACK DEFECTS THROUGH MEASURED ACCELERATION - PART 1</b> .....	985
<i>S Bahamon-Blanco, S Rapp, C Rupp, J Liu, U Martin</i>	
<b>RECOGNITION OF TRACK DEFECTS THROUGH MEASURED ACCELERATION - PART 2</b> .....	993
<i>S Bahamon-Blanco, S Rapp, C Rupp, J Liu, U Martin</i>	
<b>THE BEHAVIOUR OF PRESTRESSED CONCRETE SLEEPER (PCS) SITTING ON RAILWAY TRACK</b> .....	1001
<i>M I F Rozli, C M C J M H Safiuddin, M Harun, J Ahmad, N M Amin, A G Kay Dora</i>	
<b>ICT IMPLEMENTATION OF BUS PUBLIC TRANSPORTATION TOWARDS GREEN ENGINEERING IN INDONESIA</b> .....	1008
<i>A C Sutandi, Y Suriansyah, Y K Kusliansjah</i>	
<b>MOTORCYCLISTS' AWARENESS AND UNDERSTANDING OF TRAFFIC SIGNS FOR TRAFFIC SAFETY IN YOGYAKARTA</b> .....	1016
<i>P Purnamasari</i>	
<b>A STUDY OF CONTAINER TRUCK MOVEMENT IN TANJUNG PRIOK PORT, JAKARTA, INDONESIA</b> .....	1024
<i>R Anas, I S Sembiring</i>	
<b>DEVELOPING INFORMATION SYSTEM TO IMPROVE HINTERLAND PRODUCTIVITY AND RUBBER MULTIMODAL TRANSPORTATION IN SOUTH SUMATERA INDONESIA</b> .....	1031
<i>E Buchari, E Sattar, I Sumantri, R Novelo</i>	
<b>SUSTAINABLE OPERATION AND MAINTENANCE CRITERIA FOR NON-TOLL ROAD GREEN RATING SYSTEM</b> .....	1040
<i>J A Adzar, R Zakaria, E Aminudin, M H S Abd Rashid, V Munikanan, S M Shamsudin, S Z Sooria, M M Hassan</i>	
<b>RESILIENT MODULUS VALUES OF WESTERN AUSTRALIA ASPHALT PAVEMENT</b> .....	1049
<i>G Wibisono, H R Nikraz</i>	
<b>THE USE OF DEFLECTION BOWL PARAMETERS TO REPRESENT THE CARRYING CAPACITY OF PAVEMENT STRUCTURES</b> .....	1056
<i>B H Setiadji, Supriyono</i>	
<b>ADJUSTED SATURATION FLOW OF SOME SIGNALIZED INTERSECTION IN SEMARANG, INDONESIA</b> .....	1064
<i>A K Indriastuti, E E Y Priyono, L A Widowati, A S Zuhri</i>	
<b>DETERMINING STIFFNESS MODULUS BY MEANS OF DIFFERENT MECHANICAL TESTING</b> .....	1074
<i>F P Pramesti, M R Poot, M F C Van de Ven, A A A Molenaar</i>	
<b>Author Index</b>	