

12th International Structural Engineering and Construction Conference (ISEC-12)

Innovative Theory and Practices in
Structural Engineering and Construction

Chicago, Illinois, USA
14 - 18 August 2023

Volume 1 of 2

Editors:

A. Karatas

A. Iranmanesh

A. Gurgun

S. Yazdani

A. Singh

ISBN: 978-1-7138-7952-7

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© (2023) by The International Structural Engineering and Construction Society (ISEC)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact The International Structural Engineering and Construction Society (ISEC) at the address below.

ISEC PRESS
PO Box 1334
Fargo, North Dakota 58107
USA

isec.sec@gmail.com

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

VOLUME 1

CHAPTER 1: BIM AND DIGITAL TECHNOLOGY IN CONSTRUCTION

A CASE STUDY ON ORGANIZATIONAL STRUCTURE CHANGE TO SUPPORT BIM IMPLEMENTATION IN DESIGN FIRM.....	1
<i>Thi Kim Dung Vu, Shang-Hsien Hsieh</i>	
THE SUITABILITY OF EXISTING CONSTRUCTION CONTRACTS FORMS FOR BIM CONSTRUCTION PROJECTS	7
<i>Dominik Stellmacher, Matthias Kaufhold, Anica Meins-Becker, Manfred Helmus</i>	
CREATION OF DIGITAL BUILDING DOCUMENTATION BY THE BUILDING TRADE.....	13
<i>Dominik Stellmacher, Anica Meins-Becker, Agnes Kelm, Nils Koch To Krax, Stefanie Samtleben, Adrian Schroeder</i>	
RESEARCH PROJECT - DIGITAL AUTOMATED BUILDING DOCUMENTATION.....	19
<i>Andree Berg, Anica Meins-Becker, Agnes Kelm, Dominik Stellmacher, Ann-Kathrin Ibach</i>	
DEVELOPMENT OF A NORMATIVELY STANDARDIZED CONTENT STRUCTURE FOR THE HARMONIZATION OF BIM USE CASES	25
<i>Daiki John Feller, Matthias Kaufhold, Agnes Kelm, Anica Meins-Becker</i>	
BIM USE IN GREEN BUILDING CERTIFICATION PROCESSES	31
<i>Lesley Ly, Lydia Kiroff</i>	
RESEARCH ON DETERIORATION DIAGNOSIS SYSTEM FOR BUILDING EXTERIOR WALL USING BUILDING INFORMATION MODELING	37
<i>Chu-Tsen Liao, Nai-Wen Chi, Meng-Hsiu Chang, Ta-Chun Kao, Heui-Yung Chang, Chi-Ming Lai</i>	
TOWARDS THE INTEGRATED ADOPTION OF BLM AND DT IN AECO-FM SECTOR: A SCIENTOMETRIC APPROACH.....	43
<i>Meschini, Laura Pellegrini, Vincenzo Di Leo, Francesco Paleari, Giuseppe Martino Di Giuda</i>	
CHALLENGES IN INTEGRATING BIM INTO CONSTRUCTION SAFETY MANAGEMENT	49
<i>Ellen Piniano, Mitsuyasu Iwanami</i>	
THE APPLICATION OF BLOCKCHAIN TECHNOLOGY IN PROJECT MANAGEMENT	55
<i>Fajer Al Ali</i>	

CHAPTER 2: GREEN INFRASTRUCTURE AND SUSTAINABILITY

PIONEERING SUSTAINABLE GROWTH THROUGH HERITAGE CONSERVATION	61
<i>Silvia Mazzetto</i>	
COLORING ROOFS: A SOLUTION TO MITIGATION UHI AND REDUCING URBAN SURFACE HEATING	67
<i>Zainab Khalid</i>	

ENERGY DECARBONIZATION STRATEGIES IN RETROFITTED SINGLE-FAMILY HOMES IN CHICAGO, USA.....	73
<i>Peter Niemczak, Anna Stefańska, Eugeniusz Koda</i>	
POTENTIAL OF BLENDED PRECURSORS FOR THE DEVELOPMENT OF SUSTAINABLE BUILDING MATERIALS	79
<i>Jan Fort, Martin Mildner, Ayodele Afolayan</i>	
DESIGN-BUILT BAMBOO STRUCTURE USING MULTIPLE-MEMBER PRE-FABRICATED CONNECTORS	85
<i>Supreedee Rittironk</i>	
SEARCH FOR CULTURAL IDENTITY IN THE TRADITION OF FORTIFIED STRUCTURES.....	91
<i>Silvia Mazzetto</i>	
BUILDINGS AND URBAN HEAT ISLAND: A REVIEW OF PLANNING MITIGATION METHODS AND LESSONS	97
<i>Raghad Almashhour, Jerry Kolo</i>	
KEY BARRIERS TO THE ADOPTION OF GREEN BUILDING IN THE CONSTRUCTION SECTOR.....	103
<i>Yolandi De Beer, Kahilu Kajimo-Shakantu</i>	

CHAPTER 3: NOVEL HOUSING AND MANUFACTURING SYSTEMS

CHALLENGES CONFRONTING SOCIAL HOUSING DWELLERS	109
<i>Kahilu Kajimo-Shakantu, Christopher Amoah</i>	
DEVELOPMENT OF PORTABLE CONCRETE 3D PRINTER TO USE LOCALLY MANUFACTURED ADDITIVE	115
<i>Mohsin Usman Qureshi, Ghassan Al Kindi, Amira Al-Shizawi, Bushra Al-Sawafi, Yousuf Usman Al-Balushi</i>	
POTENTIAL BENEFITS OF FUTURISTIC BUILDING MATERIALS	120
<i>Olusegun Aanuoluwapo Oguntona, Opeoluwa Israel Akinradewo, Onalerona Mokono, Clinton Ohis Aigbavboa</i>	
BASIC REQUIRED PROGRAMS OF COMPACT HOUSE FOR ELDERLY WITH LOW INCOME	126
<i>Choomket Sawangjaroen</i>	
UNIVERSAL DESIGN HOUSE MODEL FOR ELDERLY WITH LOW INCOME.....	132
<i>Choomket Sawangjaroen</i>	

CHAPTER 4: ENERGY EFFICIENCY

ARCTIC ARCHITECTURES: UNLEASHING ENERGY EFFICIENCY AND RESILIENCE IN EXTREME COLD REGIONS	138
<i>Hamed Khaleghi, Aslihan Karatas</i>	
ENERGY EFFICIENCY AND CONSERVATION PROGRAMS FOR LOW-INCOME AND MINORITY HOMES	144
<i>Anh D. Chau, Marianne Schmink, Nicholas W. Taylor, Lynn M. Jarrett</i>	

PREDICTING ENERGY USE INTENSITY OF US HOTEL BUILDINGS USING CBECS MICRODATA.....	150
<i>Hevar Palani, Juan Acosta-Sequeda, Sybil Derrible, Aslihan Karatas</i>	
BENEFICIAL IMPACTS OF EMERGING SMART SOLUTIONS FOR ENERGY EFFICIENCY IN THE BUILT ENVIRONMENT.....	156
<i>Olusegun Aanuoluwapo Oguntona, Opeoluwa Israel Akinradewo, Fikile Ngobeni, Clinton Ohis Aigbavboa</i>	
INFLUENCE OF ENERGY EFFICIENCY RENOVATION ON INDOOR CLIMATE.....	162
<i>Keovathana Run, Jean-François Dubé, Franck Cevaër</i>	

CHAPTER 5: DECISION MAKING AND NEURAL NETWORK MODELS IN CONSTRUCTION

A BAYESIAN DATA UPDATING MODEL FOR MANAGING BUILDING ENVELOPE INSPECTIONS	167
<i>Bora Jang, Jamshid Mohammadi</i>	
FUZZY EXPERT SYSTEM TO ESTIMATE THE COST OF QUALITY IN RESIDENTIAL CONSTRUCTION PROJECTS	173
<i>Shaza Omar Thabet, Atef Abdelmoghny Ragab, Nabil Abdelbadie Yehia</i>	
RULE-BASED DELAY ANALYSIS SELECTION SYSTEM.....	179
<i>Juneseok Yang, David Arditi, Dong-Eun Lee</i>	
DECISION SUPPORT SYSTEM OF PAVEMENT SELECTION	185
<i>Hiep T. Hoang, Anh D. Chau, Long D. Nguyen, Long Le-Hoai</i>	
IDENTIFYING THE CAUSES OF ARCHITECTURAL DESIGN PROCESS FAILURES	191
<i>Gulden Gumusburun Ayalp, Yusuf Berkay Metinal</i>	
MACHINE LEARNING ALGORITHM FOR OPTIMIZATION OF REINFORCED CONCRETE STRUCTURES SUBJECTED TO BLAST.....	197
<i>Girum Urgessa, Javad Esfandiari</i>	
FRAMEWORK FOR IDENTIFYING INFLUENCING FACTORS FOR FORMWORK SELECTION FOR RESIDENTIAL BUILDING CONSTRUCTION	203
<i>Vishal Bhardwaz, Uddeshya Kumar, Vishal H Lad, Kashyapkumar Arvindbhai Patel, Dilipkumar Arvindkumar Patel</i>	

CHAPTER 6: REHABILITATION AND RETROFITTING METHODS

DESIGN OF POLYNOMIAL FRICTION PENDULUM ISOLATORS CONSIDERING MULTIPLE PERFORMANCE OBJECTIVES.....	209
<i>Lyan-Ywan Lu, Natalia Nur Ramadhanti</i>	
PERFORMANCE EVALUATION OF BEAMS STRENGTHENED WITH MECHANICALLY ANCHORED CARBON FIBER REINFORCED CEMENTITIOUS MATRIX (FRCM).....	215
<i>Nikhil Holsamudrkar, Sauvik Banerjee, Asim Tewari</i>	
BOND RESISTANCE OF REPAIRED CRACKED-CONCRETE EMBEDDED WITH REBAR IN VARYING SIZE UNDER CYCLIC LOAD.....	221
<i>Yu-Cheng Kan, Kuang-Chih Pei</i>	

EXPERIMENTAL STUDY ON AXIAL STRENGTH AND PURE BENDING RESPONSE OF FWSCT-JACKETED SRC CIRCULAR COLUMNS.....	227
<i>Chung-Sheng Lee, Obed Adi Kusuma, Ren-Kang Su, Mhd. Rony Asshidiqie</i>	

ASSESSMENT OF THE INTEGRITY OF STEEL RAILROAD BRIDGES RENEWED WITH POLYMER CEMENT AFTER 10 YEARS.....	233
<i>Nozomu Taniguchi, Minoru Sekiguchi</i>	

A RETROFIT SOLUTION FOR UNCODED STEEL RAFTER TO CONCRETE RING BEAM CONNECTIONS.....	239
<i>Jovanca Smith, Alden Daniel</i>	

CHAPTER 7: MODELING IN CONSTRUCTION MANAGEMENT

INTERFACE OF QUANTUM COMPUTATION AND ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) INDUSTRY.....	245
<i>Hossein Naderi, Alireza Shojaei, Saeed Rokoei</i>	

MIXED REALITY APPLICATION FOR STAIRCASE INSPECTION	251
<i>Michelle Siu Zhi Lee, Nobuyoshi Yabuki, Tomohiro Fukuda</i>	

REALITY-ENHANCED SYNTHETIC IMAGE TRAINING DATASET FOR COMPUTER VISION CONSTRUCTION MONITORING	257
<i>Juan Diego Nunez-Morales, Shun-Hsiang Hsu, Amir Ibrahim, Mani Golparvar-Fard</i>	

EXPLORING THE USE OF NLP TO AUTO-ALIGN MASTER SCHEDULES WITH SUPERINTENDENT’S LOOK-AHEAD IN CONSTRUCTION PROJECTS	263
<i>Yoonhwa Jung, Mani Golparvar-Fard</i>	

MODELING TRAFFIC OPERATIONS AT A TOLL PLAZA USING DISCRETE-EVENT SIMULATION.....	269
<i>Punyaanek Srisurin, Nattakarn Surangsrirout</i>	

MULTIMENSIONAL APPROACH TO CONSTRUCTION PROJECT PERFORMANCE EVALUATION: AN EMPIRICAL STUDY.....	275
<i>Vahid Khadjeh Anvary</i>	

EXPLORING SCIENTIFIC DOMAIN OF OCCUPANCY ANALYSIS, POE, AND DT IN AECO INDUSTRY: A SCIENTOMETRIC APPROACH	281
<i>Laura Pellegrini, Mirko Locatelli, Silvia Meschini, Marco Schievano, Giuseppe Martino Di Giuda</i>	

OPTIMIZATION OF SUSTAINABLE PROFIT IN THE CONSTRUCTION OF HALL STRUCTURES	287
<i>Stojan Kravanja, Tomaž Žula</i>	

AN EXPLORATORY STUDY ON THE BUILDING INFORMATION MODELING MATURITY LEVEL: A LITERATURE REVIEW	293
<i>Lama Abumoeilak, Salwa Beheiry</i>	

CHAPTER 8: PROJECT AND CONSTRUCTION MANAGEMENT

IMPACT FACTORS ON TIME AND COST IN PILE CONSTRUCTION.....	299
<i>Khalid S. Al-Gahtani, Naif M. Alsanabani</i>	

CONSTRUCTION LABOR SHORTAGE, CHALLENGES, AND SOLUTIONS: A SURVEY-BASED APPROACH.....	305
<i>Piyaruwan Kaluthantirige, Lahiru Silva, Kasun Hewage, Simrat Pal Kaur Gil, Aekamjot Gill</i>	
IMPACTS OF GOVERNANCE CONSTRAINTS ON ODA PROJECT QUALITY: EXPLORATORY STUDY	311
<i>Chau Ngoc Dang, Long D. Nguyen</i>	
REVAMPING FACILITY ASSET MANAGEMENT (FAM) FOR SMART MANUFACTURING: VARIABLES FOR THEORY AND IMPLEMENTATION.....	317
<i>Youngsoo Jung, Heewoo Lee, Zhenhui Jin, Sangbum Kim, Kyong Ju Kim</i>	
A STUDY ON THE ECONOMIC ANALYSIS FRAMEWORK OF THE ARCTIC ENERGY PLANT CONSTRUCTION PROJECT.....	323
<i>Seoungbeom Na, Woosik Jang, Jaewan Park</i>	
IDENTIFICATION OF DEFECTIVE CONSTRUCTION WORKS DURING BUILDING INSPECTIONS	328
<i>Hamdi Tekin, Ismail Cengiz Yilmaz, Kerim Koç, Senay Atabay, Asli Pelin Gürgün</i>	
TOWARDS SMART CONSTRUCTION SITES FOR EFFECTIVE PROJECT DELIVERY	333
<i>Matthew Ikuabe, Clinton Aigbavboa, Samuel Adekunle</i>	
PREDICTING CONSTRUCTION CREW PRODUCTIVITY FOR CONCRETE POURING OPERATIONS OF RC COLUMNS USING ANN	339
<i>Parth Patel, Dharmik V Patel, Vishal H Lad, Ankitkumar Patel, Kashyapkumar Arvindbhai Patel, Dilipkumar Arvindkumar Patel</i>	
EVALUATE THE RISK LEVEL OF FACTORS CONTRIBUTING TO MATERIAL WASTAGE GENERATION IN CONSTRUCTION PROJECTS.....	345
<i>Ghanim A Bakr</i>	
METHODS AND TOOLS USED FOR MANAGEMENT OF GEOTECHNICAL RISKS IN CONSTRUCTION PROJECTS	351
<i>Idil Calik, Asli Pelin Gürgün, Mehmet Ozcoban</i>	
COMPARISON OF THE PERFORMANCE OF ALTERNATIVE CONTRACTING METHODS OVER 10 YEARS IN A LARGE STATE TRANSPORTATION AGENCY	357
<i>Dev Shah, Edward Minchin, Ashish Asutosh</i>	
INNOVATION ENTERPRISE MECHANISMS IN DEEP TECHNOLOGY BUSINESSES	362
<i>Ahmad Talal Badereg, Ashraf El-Hamalawi</i>	
INDUSTRY SURVEYS REGARDING CONTINUING EDUCATION IN CONSTRUCTION MANAGEMENT	368
<i>R. Edward Minchin, Haekyung Im, Robert Ries, R. Raymond Issa, Ashish T. Asutosh</i>	
METHODS FOR ACCOUNTING FOR RISKS IN LONG-TERM PROJECTS	374
<i>Amr G. Mansour, Rana Khalla</i>	
 <u>CHAPTER 9: HEALTH AND SAFETY</u>	
CONSTRUCTION HEALTH AND SAFETY: A SCIENTOMETRIC ANALYSIS	380
<i>Samuel Adeniyi Adekunle, Clinton Aigbavboa, Matthew Ikuabe</i>	

WORKFORCE MOTIVATIONAL FACTORS IN THE CONSTRUCTION INDUSTRY.....	386
<i>Christopher Amoah, Lukas Van Niekerk</i>	
INTEGRATED SAFETY MANAGEMENT SYSTEM: EMPOWERING WORKERS TO IMPROVE HEALTH AND SAFETY IN CONSTRUCTION	392
<i>Qais Amarkhil, George Brogmus</i>	

CHAPTER 10: DISPUTE RESOLUTION AND COVID-19

NLP AND SNA FOR UNDERSTANDING RENEGOTIATIONS OF TOLL ROAD PPPS AMID THE COVID-19 PANDEMIC	398
<i>Diego Rojas, Jose Guevara, Rana Khallaf, Alberto De Marco, Gabriel Castelblanco, John Salazar</i>	
CAUSES OF CONTRACTUAL DISPUTES IN CONSTRUCTION PROJECTS.....	404
<i>Alfredo Serpell, Ignacio Torres</i>	
IMPACT OF COVID-19 PANDEMIC ON COMPETITIVENESS OF TOURIST DESTINATION CITIES	410
<i>Nattapon Sang-Arun, Waralak Khongouan</i>	
EMPLOYEES RESPONSES TO WORKPLACE CHANGE DURING COVID-19.....	416
<i>Chaiwat Riratanaphong</i>	
POTENTIAL OF SEWAGE SURVEILLANCE IN EARLY DETECTION OF COVID-19	422
<i>Sanjeev Kumar, Yogesh Kumar</i>	

CHAPTER 11: INNOVATIVE MATERIALS FOR CONCRETE

A UNIFIED MACHINE LEARNING BASED MODEL TO PREDICT ULTIMATE TENSILE AND BOND CAPACITY OF FIBER-REINFORCED CEMENTITIOUS MATRIX.....	428
<i>Nikhil Holsamudrkar, Sauvik Banerjee, Asim Tewari</i>	
DURABILITY PERFORMANCE OF HPC INCORPORATING MK AND GGBS FOR MARINE ENVIRONMENT: A REVIEW	434
<i>Nynweph Gmawlue Jr, Pankaj Kumar</i>	
EXPERIMENTAL STUDY TO INVESTIGATE THE COMPRESSIVE STRENGTH OF CONCRETE-FILLED FRP TUBE CYLINDERS SUBJECTED TO DIRECT FIRE	440
<i>Ahmed Abouzied, Nourhan Madkor, Waleed Abdelfattah, Mohamed Hamdy</i>	
SHRINKAGE MITIGATING STRATEGIES ON HIGH-PERFORMANCE SELF- CONSOLIDATING CONCRETE.....	446
<i>Iraj Mamaghani, Reed Turner, Njiru Mwaura</i>	
POTENTIAL USE OF GLASS WASTE POWDER AS A CEMENT REPLACEMENT IN CEMENT-BASED MORTAR	452
<i>Gati Annisa Hayu, Wahyuniarsih Sutrisno, Kiki Dwi Wulandari, Candra Irawan, Priyo Suprobo</i>	
ENCAPSULATION OF GROUND BOTTOM ASH AS SUPPLEMENTARY CEMENTITIOUS MATERIALS FOR CEMENT MORTAR	458
<i>Kiki Dwi Wulandari, Wahyuniarsih Sutrisno, Gati Annisa Hayu, Harun Alrasyid, Priyo Suprobo</i>	

FLEXURAL PROPERTIES OF POLYPROPYLENE FIBER REINFORCED CONCRETE CONTAINING FLY ASH FOR NORMAL CONCRETE PAVEMENT	464
<i>Tsuneji Sasaki, Hiroshi Higashiyama, Mutsumi Mizukoshi, Akinori Fujimori, Ryouyusuke Takahara</i>	
FINITE ELEMENT ANALYSIS OF UHPFRC CYLINDERS CONFINED WITH CFRP SHEETS.....	470
<i>Mohammed A. Al-Osta</i>	
AN EXPERIMENTAL RESEARCH CONTRIBUTION TO THE USE OF CARBON NANOTUBES IN CEMENT COMPOSITES.....	476
<i>Abbas Ahmed Albu Shaqraa</i>	
DEVELOPMENT OF SHRINKAGE AND CREEP PREDICTION MODELS FOR HIGH PERFORMANCE CONCRETE BY FAST-ACCESS CLOUD-BASED DATABASE	482
<i>Wen-Cheng Liao, Jenn-Chuan Chern</i>	
THE EFFECT OF PALM OIL WASTE ON THE PROPERTIES OF GEOPOLYMER CONCRETE: A REVIEW	488
<i>Hussein Hamada, Farid Abed, Zaid Al-Sadoon</i>	
STRENGTHENING OF CORROSION-DAMAGED RC BEAMS USING UHPFC LAYERS	493
<i>Shamsad Ahmad, Mohammed A. Al-Huri, Mohammed A. Alosta</i>	

CHAPTER 12: ADVANCEMENTS IN CONCRETE TECHNOLOGY

APPLICATION OF MUMMIFIED TURK SALTY FIBER CONCRETE AS PROTECTION AGAINST SALTY DOMES AND DESERT INTRUSION FOR WATER RESOURCES	499
<i>Afshin Turk, Shabnam Ghanavatizadeh</i>	
COMPARISON OF THE MECHANICAL AND TRANSPORT BEHAVIOR OF CONCRETE PRODUCED WITH PIT SAND AND QUARRY DUST	505
<i>Mark Bediako, Eric Opoku Amankwah, Emmanuel Appiah-Kubi, Nelson Asante</i>	

VOLUME 2

CORROSION RATE OF REINFORCED CONCRETE WITH COMBINED DETERIORATION BY CHLORIDE ATTACK AND ASR	511
<i>Shinichi Miyazato, Norihiro Sugawara</i>	
SELF-COMPACTING CONCRETE WITH GROUND FERRONICKEL SLAG AS SUPPLEMENTARY CEMENTITIOUS MATERIAL	517
<i>Md Nuruzzaman, Prabir Kumar Sarker</i>	
TREATED SEA COMPONENTS CONCRETE	523
<i>Ahmad Nassef</i>	
USE OF WASTE GLASS AS AN ALKALINE ACTIVATOR AND FLY ASH AS PRECURSOR IN GEOPOLYMER CONCRETE	529
<i>Pranshoo Solanki, Guang Jin</i>	
EVALUATION OF SELF-HEATING AND ENERGY HARVESTING POTENTIAL OF MULTIFUNCTIONAL ALKALI-ACTIVATED METASHALE MORTARS	535
<i>Lukáš Fiala, Petr Hotek, Wei-Ting Lin, Robert Cerný, Adam Pivák</i>	

INFLUENCE OF FINENESS MODULUS AND PREHEATED SAND ON COMPRESSIVE STRENGTH OF ALKALI ACTIVATED GEOPOLYMER MORTAR.....	541
<i>Mohammad Rizwan Bhina, John-Eric Hsin Yu Hu, Kuang-Yen Liu, Chih-Ta Tsai</i>	
FLEXURAL STRENGTH OF KEVLAR-EPOXY COMPOSITE WITH DIFFERENT FIBER ORIENTATION.....	547
<i>Gargi Danda De, Souren Mitra, Soumya Sarkar, Anindya Deb</i>	
NUMERICAL MODELING OF HIGH-PERFORMANCE FIBER-REINFORCED CONCRETE SHEAR PANEL	553
<i>Bambang Pisceca, Mudji Irmawan, Faimun Faimun, Pujo Aji, Wimpie Agoeng Noegroho Aspar, Agus Dwi Purnomo, Djoko Prijo Utomo</i>	
NONLINEAR FINITE ELEMENT ANALYSIS OF FULL-SCALE EXTERNAL POST-TENSIONED CONCRETE BOX GIRDER AT JACKING AND SERVICE	559
<i>Candra Irawan, Bambang Pisceca, Asdam Tambusay, Sidiq Purnomo, Gatut Subagiono, Priyo Suprobo</i>	
ANALYSIS OF SOLDIER ANT MOUND FOR CONCRETE APPLICATION	565
<i>Adesola O. Adetukasi, Olaolu G. Fadugba, Hafiz A. Alaka, Jeffrey Hamachi</i>	
<u>CHAPTER 13: INFRASTRUCTURE ENGINEERING MANAGEMENT</u>	
INFRASTRUCTURAL FEASIBILITY INVESTIGATION FOR IMPLEMENTING AUTONOMOUS VEHICLES.....	571
<i>Soujanya Pillala, Kasim Armagan Korkmaz</i>	
RAILWAY EMBANKMENT CONSTRUCTED ON SOFT DELTAIC DEPOSIT: LONG-TERM BEHAVIOR AND EFFECT OF TREATMENT	577
<i>Joya Rani Mallick, Shamontee Aziz, Iram Lamiya Hoque, Tamanna-E-Hafiz Maisha, S. M. Tahsan Ul Haq, Afm Saiful Amin</i>	
EVALUATION OF STRATEGIES FOR THE REDUCTION OF WATER CONSUMPTION IN REAL ESTATE PROJECTS.....	583
<i>Maria Ximena Valenzuela Blanco, Jose Guevara, John Salazar, Gabriel Castelblanco</i>	
LIGHTING MAINTENANCE MANAGEMENT THROUGH IOT-BASED AUTOMATED FAULT DIAGNOSTICS	589
<i>Paolo Piantanida, Stefania Siccardi, Khurshid Aliev, Valentina Villa</i>	
EVALUATING STRUCTURAL RESILIENCY OF PUBLIC SCHOOLS AS EMERGENCY SHELTERS IN NATURAL DISASTERS.....	594
<i>Amanda Bao, Zico Arachie, Adriana Rodriguez</i>	
SEA LEVEL RISE POSE CHALLENGES TO FOUNDATION CONSTRUCTION	600
<i>Syed Ahmad</i>	
INVESTIGATING DIVERSE TRIP PURPOSES AND RELATED PROBLEMS OF COMMUTERS IN URBAN PERIPHERAL AREA	606
<i>I-Soon Raungratanaamporn, Pawinee Iamtrakul, Jirawan Klaylee</i>	
CHALLENGES TO JORDAN'S ADOPTION OF THE BOT CONTRACTS SYSTEM FOR INFRASTRUCTURE DEVELOPMENT	612
<i>Ghanim Abdulrahman Bakr</i>	

VEHICLE PLATOONING SIMULATION TO AVOID COLLISIONS WITH PEDESTRIANS	618
<i>Eisuke Kita, Nozomi Murai, Tatsuhiro Tamaki</i>	
PRIVATE FINANCE INITIATIVE AS A TOOL FOR BRIDGING THE INFRASTRUCTURAL DEFICIT IN DEVELOPING ECONOMIES	624
<i>Matthew Ikuabe, Clinton Aigbavboa, Ntebo Ngcobo</i>	
INVESTIGATION OF HYDRODYNAMICS AND SCOUR AROUND BRIDGE PIERS UNDER THE COMBINED WAVE AND CURRENT EFFECTS	630
<i>Thekkilakkattu Iype Eldho, Gaurav Misuriya</i>	

CHAPTER 14: EDUCATION AND PROFESSIONAL ETHICS

DETERMINING THE SUCCESS FACTORS OF DISTANCE EDUCATION SYSTEMS IN ARCHITECTURAL EDUCATION	636
<i>Yusuf Berkay Metinal, Gulden Gumusburun Ayalp</i>	
CONSTRUCTION STUDENTS' PERCEPTIONS OF THE CIRCADIAN RHYTHM.....	642
<i>Saeed Rokooei, Alireza Shojaei, Samira Rokooei</i>	
THE BEE CONCEPT IN THE PUBLIC PROCUREMENT SYSTEM: THE PERSPECTIVE OF CONSTRUCTION PROFESSIONALS	648
<i>Christopher Amoah</i>	
APPLICATION OF NEURAL NETWORK IN PREDICTING THE OUTCOME OF CONSTRUCTION DISPUTES.....	654
<i>Rutvik Amitbhai Patel, Mukul Binu Patel, Kashyapkumar Arvindbhai Patel, Dilipkumar Arvindkumar Patel</i>	

CHAPTER 15: BRIDGES

SEISMIC RETROFIT OF SUBSTANDARD RC BRIDGES USING CONTEMPORARY MITIGATION MEASURES	660
<i>Jumana Hasina, Aman Mwafy, Anas Issa</i>	
FATIGUE REAL SCALE TEST COMPARISON WITH ACTUAL BRIDGE MONITORING.....	666
<i>Hans De Backer, Amelie Outtier, Gilles Van Staen</i>	
SIMPLIFIED MODELING OF V-SHAPED BRIDGE PIERS	672
<i>Hans De Backer, Amelie Outtier</i>	
DYNAMIC ANALYSIS OF THE FOOTBRIDGE EXPOSED TO PEDESTRIAN LOADING.....	678
<i>Vladimír Šána, Jiri Litoš, Michal Polák, Tomáš Plachý</i>	
EXPLORATORY STUDY OF CLIMATE CONDITIONS ON BRIDGE USEFUL LIFE	684
<i>Thach Phi Hung, Long D. Nguyen, Nguyen Thanh Viet</i>	
FRAMEWORK FOR IDENTIFYING INFLUENCING FACTORS FOR STAY-IN-PLACE FORMWORK IN BRIDGE CONSTRUCTION.....	690
<i>Dharmik V Patel, Jaymeen H Patel, Vishal H Lad, Kashyapkumar Arvindbhai Patel, Dilipkumar Arvindkumar Patel</i>	
COMPARISON OF SCALED HYBRID SIMULATIONS AND SHAKING TABLE TESTS ON A 2-SPAN REINFORCED CONCRETE BRIDGE	696
<i>Amirhossein Iranmanesh, Mahsa Panahi, Farhad Ansar</i>	

CHAPTER 16: CONCRETE STRUCTURES

ANALYSIS OF ULTRA HIGH PERFORMANCE CONCRETE (UHPC) BEAMS REINFORCED WITH GFRP BARS	702
<i>Farid Abed, Zeinah Elnassar, Zin Mehaini</i>	
FLEXURAL PERFORMANCE OF RC BEAMS BONDED WITH UV-GFRPR SHEETS	708
<i>Hiroshi Higashiyama, Haruki Mitsukuchi, Nobuhiro Mitsukawa, Osamu Takahashi, Toshiyuki Ishikawa</i>	
EFFECT OF PARTIAL GEO-GRID CONFINEMENT ON REINFORCED CIRCULAR SHORT COLUMNS UNDER AXIAL LOADING.....	714
<i>Pavitar Singh, A. B. Danie Roy</i>	
FINITE ELEMENT ANALYSIS OF EXISTING RC BEAM-COLUMN JOINTS STRENGTHENED BY PRESS-JOINT WITH ADDITIONAL RC MEMBERS	720
<i>Yusuke Maida, Hiroyasu Sakata</i>	
CONFINED REINFORCED CONCRETE VERTICAL ELEMENT DUCTILITY UNDER LATERAL LOAD: INFERENCE FROM TEST RESULTS	726
<i>Asm Nuruzzaman, K. Matsukawa, Afm Saiful Amin</i>	
NONLINEAR FINITE ELEMENT ANALYSIS OF REINFORCED CONCRETE SHEAR WALLS.....	732
<i>Asdam Tambusay, Benny Suryanto, Priyo Suprobo, Fillbert Hanselly Njoko</i>	
EFFECT OF REINFORCEMENT CORROSION ON THE PUNCHING SHEAR OF RC SLABS INCORPORATING MACRO SYNTHETIC FIBERS.....	738
<i>Salah Altoubat, Mohamad Alhalabi, Mohamed Maalej, Samer Barakat, Ibrahim Fattouh</i>	
EVALUATION OF CONCRETE INJECTED WITH CO ₂ AND EXPOSED TO COASTAL ENVIRONMENT.....	744
<i>Abbas Ahmed Albu Shaqraa</i>	
DURABILITY PERFORMANCE OF HPC INCORPORATING MK AND GGBS FOR MARINE ENVIRONMENT: A REVIEW	750
<i>Thomas Nynweph Gmawlue Jr, Pankaj Kumar</i>	
SPECIFIC BENDING STIFFNESS COMPARISON OF SPHERICALLY VOIDED BIAXIAL CONCRETE SLABS AND SOLID SLABS	756
<i>Girum Urgessa, Homa Haghighi</i>	
PREDICTING THE COMPRESSIVE STRENGTH OF PALM KERNEL SHELL CONCRETE USING FULL FACTORIAL EXPERIMENTAL DESIGN.....	762
<i>Adesola O. Adetukasi, Jeffrey Mahachi, Adeoye M. Olowofoyeku, Oluwapehumi O. Ojuri</i>	

CHAPTER 17: STEEL STRUCTURES

EVALUATING MESOSCALE STRAIN LIMIT FOR TRANSVERSE PLATE-TO-RHS X JOINTS INCLUDING GRADE 700 STEEL	768
<i>Ihyun Ryu, Cheolho Lee, Seonhu Kim</i>	
STRENGTH AND DUCTILITY EVALUATION OF TUBULAR THIN-WALLED STEEL BRIDGE PIERS UNDER CYCLIC LOADING	774
<i>Iraj H. P. Mamaghani, Njiru Mwaura</i>	

EFFECT OF CHORD PRELOADING AND BRACE INCLINATION ON AXIAL RESISTANCE OF FULL-WIDTH RHS X-JOINT INCLUDING HIGH STRENGTH STEEL.....	780
<i>Sihyeong Park, Cheolho Lee, Seonhu Kim</i>	
POST-FIRE DAMAGE ASSESSMENT OF SLIP-CRITICAL CONNECTIONS	786
<i>Heui-Yung Chang, Chi Wei Li, Chutsen Liao, Ker-Chun Lin, Chi-Ming Lai, Sheng-Jhih Jhuang</i>	
DETERMINATION OF THE RIB-TO-CROSSBEAM STRESSES IN ORTHOTROPIC STEEL DECKS.....	791
<i>Hans De Backer, Amelie Outtier</i>	
NUMERICAL BUCKLING BEHAVIOR OF PERFECT AND IMPERFECT STEEL CYLINDERS UNDER EXTERNAL PRESSURE.....	797
<i>Fnu Tabish, Iraj Hossein Pouli Mamaghani</i>	
DAMAGE DETECTION IN A STEEL BEAM USING VIBRATION RESPONSE	803
<i>Akm Anwarul Islam, Utshree Sharma</i>	
NUMERICAL ANALYSIS OF SEISMIC RESPONSE OF STEEL CYLINDRICAL LNG STORAGE TANKS.....	809
<i>Iraj Hossein Pouli Mamaghani, Shafqat Ullah</i>	
BUCKLING BEHAVIOR OF RING STIFFENED-ALUMINUM CYLINDERS SUBJECTED TO EXTERNAL PRESSURE	815
<i>Fnu Tabish, Iraj H. P. Mamaghani</i>	
STRESS CONCENTRATION DUE TO SHEAR LAG IN BOX GIRDER UNDER DISTRIBUTED LOAD.....	821
<i>Eiki Yamaguchi, Naoto Kittaka</i>	
 <u>CHAPTER 18: COMPOSITE SYSTEMS</u>	
FLEXURAL CAPACITY OF COMPOSITE BEAMS WITH AN INCREASED AREA OF BONDED STEEL PLATE.....	827
<i>Carl Pieter Bruwer</i>	
COMPARATIVE STUDY ON TUNNEL LINING CONCRETE STRENGTHENED WITH CARBON-FIBER COMPOSITE CABLES AND SHEETS	833
<i>Isamu Yoshitake, Shingo Morimoto, Shinji Ueno, Hisahi Hayashi</i>	
EVALUATION OF RETROFIT EFFECTIVENESS AND COST IMPLICATIONS OF MRF STRUCTURES USING DIFFERENT FRCM COMPOSITE SYSTEMS.....	839
<i>Roshen Joseph, Aman Mwafy, Shahria Alam</i>	
STUDY ON THE DEVELOPMENT OF THE WOODEN HYBRID STRUCTURAL SYSTEM WITH LAG-SCREW BOLTS	845
<i>Yo Kuratomi, Tatsuo Inada, Junichi Sakai</i>	
EFFECTS OF CIRCULAR HOLES DRILLED IN WOOD JOISTS	851
<i>Akm Anwarul Islam, Joshua Thomas</i>	
STUDY ON DEFLECTION CONTROL OF COMPOSITE SLABS STRENGTHENED WITH BONDED STEEL PLATES	856
<i>Carl Pieter Bruwer</i>	

MECHANICAL AND DURABILITY STUDY ON STEEL AND GLASS FIBERS BASED CEMENTITIOUS COMPOSITE	861
<i>Yogesh Kumar, Sanjeev Kumar</i>	

CHAPTER 19: STRUCTURAL MEASUREMENTS AND COMPUTATIONAL METHODS

CRACK OBSERVATION OF RC-WALL EXPERIMENTS USING IMAGE MEASUREMENT	867
<i>Yuan-Sen Yang, Shyh-Jiann Hwang</i>	
OPTICAL DYNAMIC DISPLACEMENT MEASUREMENT OF SPECIMEN FOR SHAKING TABLE TEST UTILIZING DRONE.....	873
<i>Yusuke Maida, Takasuke Saito, Koki Kishimoto, Hiroyuki Miyauchi, Koichi Kusunoki, Hiroyasu Sakata</i>	
ASSESSMENT OF CORROSION IN A PARKING DECK USING GPR	879
<i>Akm Anwarul Islam, Garima Neupane</i>	
CALCULATION METHOD OF LATERAL STIFFNESS OF PVC CAVITY PARTITION WALL WITH DIFFERENT CONNECTION FORMS.....	885
<i>Biao Zhang, Hetao Hou, Fuhang Yang, Yibo Wang</i>	
TOMOGRAPHIC IMAGING FOR CONCRETE DEFECTS DETECTION IN MESOSCALE CFST MEMBERS USING STRESS WAVE MEASUREMENT	891
<i>Bin Xu, Jiang Wang, Qian Liu</i>	

CHAPTER 20: INNOVATIONS IN STRUCTURAL ANALYSIS AND DESIGN

EFFECTS OF ROOF SHAPES ON WIND PRESSURE DISTRIBUTION OF MULTI-SPAN LOW-RISE BUILDINGS.....	897
<i>Deepak Sharma, Ritu Raj, Shilpa Pal</i>	
BUCKLING STRENGTH OF COLUMNS IN LOW-RISE MULTI-SPAN FRAMES EVALUATED BY THE STABILITY INDEX	903
<i>Takuma Nishimura, Masae Kido, Keigo Tsuda</i>	
INVENTION OF FLOATING GATES BASED ON ARTIFICIAL INTELLIGENCE DESIGNING FOR A DAM AND WATERWAY	909
<i>Afshin Turk, Bahram Mombeni, Shabnam Ghanavatzadeh</i>	
NUMERICAL SIMULATION OF SNOW DRIFTING AROUND SNOW FENCES.....	915
<i>Prattasha Saha, Mijia Yang</i>	
EVALUATION AND STRUCTURAL MODELING OF 200 M3 CIRCULAR TANK SUPPORTED WITH SOFTWARE APPLICATION.....	921
<i>Willy Miguel Huanacuni-Mamani, Edilberto Huaquisto-Ramos, Roberto Alfaro-Alejo, German Belizario-Quispe</i>	
ANALYSIS OF THE CAUSES OF DEGRADATION IN PRESTRESSED REINFORCED CONCRETE RAILWAY SLEEPERS	927
<i>Samo Lubej, Andrej Ivanič, Gregor Kravanja, Sebastian Toplak, Marjan Lep</i>	
SUGGESTIONS FOR IMPROVEMENTS IN TIMBER PORTAL FRAME DESIGN WITH SEMI-RIGID KNEE JOINTS.....	933
<i>Lilita Ozola, Janis Fabriciuss</i>	

CHAPTER 21: VIBRATION ANALYSIS AND EARTHQUAKE ENGINEERING

ANALYSIS OF FREQUENCY CONTENT AND STATISTICAL RELATIONSHIP AMONG EARTHQUAKE PARAMETERS OF SEISMIC DATA	939
<i>Rafid Umayyer Murshed, Md. Anu Zakaria, Kazi Noshin, Md. Forkan Uddin, Mohammed Eunos Ali, Afm Saiful Amin</i>	
VIBRATION REDUCTION AND ENERGY HARVESTING OF BUILDING STRUCTURES USING ELECTROMAGNETIC MULTIPLE TUNED MASS DAMPERS.....	945
<i>Ging-Long Lin, Chi-Chang Lin, Yu-Jing Chen, Ta-Chih Hung</i>	
EFFECTS OF NEAR-FAULT ON DYNAMIC RESPONSE OF A STRUCTURE EXCITED BY EARTHQUAKE WAVES	951
<i>Abdul Hayir, Rohat Inatci</i>	
DETERMINING THE OPTIMUM LOCATION OF TWO FLEXIBLE OUTRIGGER SYSTEMS IN TALL BUILDINGS USING ENERGY METHOD.....	957
<i>Peyman Rahgozar, Aaron Costin, Ian Flood</i>	
AN INTELLIGENT ISOLATION SYSTEM BASED ON LONG SHORT-TERM MEMORY MODULE MODEL FOR GROUND MOTION CHARACTERISTICS PREDICTION.....	963
<i>Tzu Kang Lin, Lyan-Ywan Lu, Chi-Ying Lin</i>	
ANALYSIS OF MULTISTORY HIGH-RISE BUILDINGS IN HIGH SEISMIC ZONE	969
<i>Saddam Hussain, Shifa Moiz, Chiara Bedon</i>	
HORIZONTAL ACCELERATION OF FLOOR-MOUNTED NONSTRUCTURAL COMPONENTS UNDER ROCKING MOTION	975
<i>Chang-Jun Bae, Cheol-Ho Lee, Su-Chan Jun</i>	
EFFECT OF EPISTEMIC UNCERTAINTY ON SEISMIC FRAGILITY OF BASE-ISOLATED RC BUILDING FRAME USING THE INCREMENTAL DYNAMIC ANALYSIS	981
<i>Kaushik Gondaliya , Sandip Vasanwala , Atul Desai , Ritika Jain , Vishisht Bhaiya</i>	
SEISMIC VULNERABILITY ASSESSMENT OF BASE-ISOLATED RC FRAME BUILDING USING DDBD METHOD	987
<i>Ritika Jain, Kaushik Gondaliya, Twinsy Palsanawala, Sandeep Vasanwala, Vishisht Bhaiya</i>	

CHAPTER 22: GEOTECHNICAL ENGINEERING

GEOTECHNICAL EVALUATION OF SELF-BUILT HOUSING SETTLEMENTS NEAR THE SHORE.....	993
<i>Alex Enrique Espinoza-Mamani, Roberto Alfaro-Alejo, German Belizario-Quispe, Isidro Alberto Pilaes-Hualpa</i>	
PREDICTION OF SLOPES SAFETY FACTOR USING ANN AND TREE-BASED MODELS	999
<i>Sonam Ladol, Satyendra Mittal, Mark Brian Jaksa, Kamal Jain</i>	
INFLUENCE OF SOIL FABRIC ON DYNAMIC PROPERTIES OF SAND: AN EXPERIMENTAL STUDY	1005
<i>Arpit Jain, Satyendra Mittal, Sanjay Kumar Shukla</i>	
DESIGN OF BASAL REINFORCED EMBANKMENTS SUPPORTED BY GEOTHERMAL ENERGY PILES	1011
<i>Primož Jelušič, Bojan Žlender</i>	