

# **1st International Conference on Sustainable Infrastructural Development (ICSID 2019)**

IOP Conference Series: Materials Science and Engineering  
Volume 640

Ota, Nigeria  
24 - 28 June 2019

Part 1 of 2

ISBN: 978-1-7138-0905-0  
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

### SUSTAINABLE HOUSING AND CONSTRUCTION

IMPACT OF SECURITY ON RENTAL PRICE OF RESIDENTIAL PROPERTIES: EVIDENCE FROM SOUTH AFRICA.....	1
<i>T B Odubiyi, O A Oguntona, O S Oshodi, C O Aigbavboa, W D Thwala</i>	
REVISITING CAUSATIVE FACTORS OF PROJECT COST OVERRUN IN BUILDING CONSTRUCTION PROJECTS IN NIGERIA.....	9
<i>O Akinradewo, C Aigbavboa, O Akinradewo</i>	
RESILIENT ARCHITECTURE; A DESIGN APPROACH TO COUNTER TERRORISM IN BUILDING FOR SAFETY OF OCCUPANTS .....	15
<i>F O Okeke, I G Chendo, C G Sam amobi</i>	
TOTAL QUALITY MANAGEMENT PRACTICES IN CONSTRUCTION PROJECT DELIVERY IN SOUTH AFRICA.....	31
<i>D Aghimien, C Aigbavboa, W Thwala, H Mothiba</i>	
CRITICAL DRIVERS FOR HEALTH AND SAFETY MANAGEMENT AMONG SMES IN THE ESWATINI CONSTRUCTION INDUSTRY .....	38
<i>D Aghimien, C Aigbavboa, G Thwala, W Thwala</i>	
CAPACITY OF PROFESSIONALS IN DELIVERING SUSTAINABLE CONSTRUCTION IN NIGERIA .....	47
<i>O Akinshipe, I B Oluleye, C Aigbavboa</i>	
BENEFITS OF HUMAN RESOURCE INFORMATION SYSTEMS IN A SOUTH AFRICAN CONSTRUCTION ORGANISATION .....	53
<i>L Ngwenya, C Aigbavboa, W Thwala</i>	
DESIGN ADAPTABILITY AS A TOOL FOR ACHIEVING AFFORDABLE HOUSING IN DEVELOPING ECONOMIES.....	59
<i>E K Anih, C Sam-Amobi, C E Okere, P E Odoh, N N Andy, I P Onubeze, C C Ugwu</i>	
HOUSING AFFORDABILITY AMONG LOW-INCOME EARNERS IN AKURE, NIGERIA .....	67
<i>O B Adegun, A Joseph, A M Adebusuyi</i>	
WHITHER THE COURTYARDS? UNDERSTANDING DISAPPEARANCE AND TRANSFORMATION OF COURTYARDS IN RESIDENTIAL BUILDINGS IN AKURE, NIGERIA .....	74
<i>O B Adegun, J M Adedeji, Y M D Adedeji</i>	
RESIDENTIAL HOUSING REDEVELOPMENT AND ITS IMPACT ON ASOKORO DISTRICT OF ABUJA, NIGERIA.....	83
<i>M O Unah</i>	
CRITICAL SUCCESS FACTORS (CSFS) INFLUENCING THE IMPLEMENTATION OF INDUSTRIALIZED BUILDING SYSTEMS (IBS) IN NIGERIA.....	94
<i>D O Nduka, O I Fagbenle, A Ogunde, A Afolabi</i>	

INVESTIGATION OF DAY LIGHT LEVELS IN A ROOM WITHIN A BUILDING .....	105
<i>V Oguntosin, A Akindele, A Orimogunje</i>	
MAINTENANCE REQUIREMENTS OF STUDENTS' RESIDENTIAL FACILITY IN HIGHER EDUCATIONAL INSTITUTION (HEI) IN NIGERIA.....	113
<i>B F Ogunbayo, O C Aigbavboa</i>	
COMBATING GLOBAL WARMING/CLIMATE CHANGE VIA REDUCTION OF CO2 EMISSION OF BUILDINGS.....	124
<i>A M Basil, C Sam-Amobi, C C Ugwu, P E Odoh</i>	
ENHANCING ENERGY EFFICIENCY THROUGH PASSIVE DESIGN: A CASE STUDY OF HALLS OF RESIDENCE IN COVENANT UNIVERSITY, OGUN STATE.....	129
<i>O A Alagbe, M A Caiafas, B O Olayemi, O O Joel</i>	
MAPPING OUT RESEARCH FOCUS FOR EMOTIONAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT IN THE CONSTRUCTION INDUSTRY .....	139
<i>L Ngwenya, C Aigbavboa, W Thwala</i>	
APPRAISAL OF RISK CONTINGENCY PLANNING FOR CONSTRUCTION PROJECTS.....	149
<i>O Akinradewo, C Aigbavboa, A Oke, H Coffie</i>	
ADOPTING SUSTAINABLE CONSTRUCTION IN NIGERIA: MAJOR CONSTRAINTS .....	155
<i>O Akinshipe, I B Oluleye, C Aigbavboa</i>	
IDENTIFYING THE AWARENESS LEVEL OF THE USE OF SUSTAINABLE PROJECT MANAGEMENT IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY .....	160
<i>I Ohiomah, C Aigbavboa, B Mogasho, T Osunsanmi, W D Thwala</i>	
AN ASSESSMENT ON THE DRIVERS AND OBSTACLES OF SUSTAINABLE PROJECT MANAGEMENT IN SOUTH AFRICA: A CASE STUDY OF JOHANNESBURG .....	167
<i>I Ohiomah, C Aigbavboa, W D Thwala</i>	
ROLES AND EFFECTS OF UTILIZING RECENT TECHNOLOGIES ON MATERIAL MANAGEMENT FOR CONSTRUCTION WORK IN SOUTH AFRICA.....	174
<i>A E Oke, T B Odubiyi, C O Aigbavboa, W D Thwala, Z T Nelwamondo</i>	
EVALUATION OF THE USE OF MODERN TECHNOLOGIES FOR EFFECTIVE MATERIAL MANAGEMENT IN SOUTH AFRICAN CONSTRUCTION INDUSTRY.....	180
<i>T B Odubiyi, A E Oke, C O Aigbavboa, W D Thwala</i>	
INFORMATION AND COMMUNICATION TECHNOLOGY APPLICATION CHALLENGES IN THE CONSTRUCTION INDUSTRY: A NARRATIVE REVIEW .....	186
<i>T B Odubiyi, C O Aigbavboa, W D Thwala</i>	
AWARENESS, BENEFITS AND DRAWBACKS OF NET ZERO ENERGY BUILDING PRACTICES: CONSTRUCTION INDUSTRY PROFESSIONAL'S PERCEPTIONS .....	193
<i>D O Nduka, A N Ede, K D Oyeyemi, O M Olofinnade</i>	
OVERCOMING THE CHALLENGES ENCOUNTERED BY CONSTRUCTION INDUSTRY SMES IN USING INSURANCE .....	205
<i>O Akinradewo, C Aigbavboa, L Ngwenya</i>	
PREMATURE PROJECT CLOSURE: THE PART PLAYED BY CLIENTS.....	212
<i>O Akinshipe, C Aigbavboa, M Madidimalo, W D Thwala</i>	

QUALITY OF LOW-INCOME HOUSING PROJECTS IN SOUTH AFRICA .....	217
<i>C Aigbavboa, A Oke, O Akinradewo, D Aghimien, S Okgonne</i>	
IMPROVING THE EFFICACY OF COST CONTINGENCY PLANS FOR CONSTRUCTION PROJECTS IN SOUTH AFRICA.....	224
<i>O Akinradewo, L Ngwenya, C Aigbavboa, W Thwala, L Mphela</i>	
BENEFITS AND BARRIERS TO THE IMPLEMENTATION OF GREEN BUILDING STANDARDS IN UNIVERSITIES: WHAT ARE STUDENTS' VIEWS?.....	230
<i>A O Oluwunmi, O P Oladayo, B A Role, T O Afolabi</i>	
BENEFITS OF THE ADOPTION OF FACILITIES MANAGEMENT PRACTICES IN TERTIARY INSTITUTIONS: A CASE STUDY OF COVENANT UNIVERSITY .....	241
<i>J O Fadahunsi, J A Utom, M R Ochim, C A Ayedun, O C Oloke</i>	
USERS' PERCEPTION OF THE NEED FOR UNIVERSAL DESIGN ACCESSIBILITY AND CIRCULATION PROVISIONS IN SELECTED OLD PEOPLE'S HOME IN LAGOS STATE, NIGERIA .....	247
<i>B A Adewale, O A Fasae</i>	
ASSESSMENT OF DAYLIGHTING DESIGNS IN THE SELECTED MUSEUMS OF SOUTH- WEST NIGERIA: A FOCUS ON THE INTEGRATED RELEVANT ENERGY EFFICIENCY FEATURES.....	259
<i>P Aderonmu, A Adesipo, E Erebor, A Adeniji, O Ediae</i>	
USERS' PERCEPTION ON ACCESSIBILITY PROVISIONS IN SELECTED ART CENTRES IN LAGOS STATE NIGERIA .....	275
<i>O O Izobo-Martins, N Azoom</i>	
PERCEPTION OF PROFESSIONALS ON CAUSES OF STRUCTURAL CRACKS IN CONCRETE BUILDINGS .....	283
<i>O M Olofinnade, A A Busari, I I Akinwumi, P O Awoyera, J Ekanem</i>	
USE OF NON-DESTRUCTIVE TESTS FOR REINFORCED CONCRETE DAMAGE ASSESSMENT .....	292
<i>H Thomas, A Ede</i>	
ASSESSMENT OF ARCHITECTS' KNOWLEDGE OF PASSIVE DESIGN STRATEGIES IN TERMINAL BUILDINGS AMONG ARCHITECTURAL FIRMS IN LAGOS STATE .....	302
<i>E O Ibem, B E Udezi, O M Oti, O A Fakorede</i>	
CATALYSING A CONSTRUCTION PROJECT USING NOVEL SOFTWARE TECHNOLOGY .....	309
<i>Usiereobong Akpabio, Anthony.N. Ede, Joshua Ivie, Solomon Oyebisi</i>	
 <b><u>SUSTAINABLE CONSTRUCTION MATERIALS</u></b>	
USE OF NATURAL RESINS IN REPAIRING DAMAGED TIMBER BEAMS – AN EXPERIMENTAL INVESTIGATION.....	321
<i>A I Osofero, M Corradi, G Benedetti, A N Ede</i>	
THE EFFECT OF PARTIAL REPLACEMENT OF NIGERIAN PORTLAND LIMESTONE CEMENT WITH RICE HUSK ASH AGRICULTURAL WASTE IN CONCRETE.....	331
<i>U T Igba, S O Ehikhuenmen, J O Akinyele, M O Osaghale, S O Oyebisi</i>	

A COMPARATIVE STUDY ON THE STRENGTH CHARACTERISTICS OF GRADE 25 AND GRADE 30 RICE HUSK ASH BLENDED CEMENT CONCRETE.....	337
<i>UT Igba, JO Akinyele, SO Ehikhuenmen, SO Oyeibisi, PO Omotainse, BU Anyanwu</i>	
THE INFLUENCE OF CEMENT FINENESS ON THE STRUCTURAL CHARACTERISTICS OF NORMAL CONCRETE.....	343
<i>S O Ehikhuenmen, UT Igba, O O Balogun, S O Oyeibisi</i>	
STRENGTH AND DEFLECTION CHARACTERISTICS OF CONCRETE REINFORCED WITH STEEL SWARF .....	351
<i>A O Adetukasi</i>	
ON THE DYNAMIC PROPERTIES OF METAMATERIALS IN CIVIL ENGINEERING STRUCTURES .....	361
<i>A O Oyelade, O M Sadiq, O A Ogundalu, N K Ojoko</i>	
MECHANICAL PROPERTIES OF HIGH STRENGTH ECO-CONCRETE CONTAINING CRUSHED WASTE CLAY BRICK AGGREGATES AS REPLACEMENT FOR SAND .....	367
<i>O M Olofinnade, J I Ogara, I T Oyawoye, A N Ede, J M Ndambuki, K D Oyeyemi, D O Nduka</i>	
THE USE OF RECYCLED CONCRETE AGGREGATE FOR CONCRETE PRODUCTION INCORPORATING CALCINED CLAY AS POZZOLANIC ADMIXTURE.....	374
<i>O M Olofinnade, I T Oyawoye, J I Ogara, A N Ede, J M Ndambuki, I I Akinwumi, A M Ajao</i>	
PROPERTIES AND EFFECTS OF DORMANT AGGREGATES ON CONCRETE STRENGTH .....	381
<i>B F Ogunbayo, C O Aigbavboa</i>	
INVESTIGATION OF THE EFFECT OF ALKALI SILICA REACTION (ASR) ON PROPERTIES OF CONCRETE PAVEMENT ADMIXED WITH COW BONE ASH (CBA) BY ELECTRICAL RESISTIVITY TEST .....	388
<i>A Adanikin, F Falade, A O Olutaiwo, E T Faleye, A J Ajayi</i>	
SUSTAINABLE PERVIOUS CONCRETE INCORPORATING SORGHUM HUSK ASH AS CEMENT REPLACEMENT.....	397
<i>M A Tijani, W O Ajagbe, A A Ganiyu, O A Agbede</i>	
COST OPTIMISATION OF THE DESIGN OF REINFORCED CONCRETE FLAT SLAB TO BS8110 .....	407
<i>S O A Olawale, M A Tijani, M A Kareem, A M Ogungbire, O Alabi</i>	
UTILIZATION OF MARBLE DUST POWDER IN CONCRETE.....	421
<i>O M Ofuyatan, A M Olowofoyeku, J Obatoki, J Oluwafemi</i>	
EFFECT OF VARIOUS TYPES AND SIZES OF AGGREGATE ON SELF-COMPACTING CONCRETE.....	428
<i>A M Olowofoyeku, O M Ofuyatan, J Oluwafemi, O David</i>	
EFFECTS OF BASALT FIBER IN LIGHTWEIGHT EXPANDED CLAY CONCRETE ON COMPRESSIVE STRENGTH AND FLEXURAL STRENGTH OF LIGHTWEIGHT BASALT FIBER REINFORCED CONCRETE.....	436
<i>P C Chiadighikaobi</i>	
EFFECTS OF REST PERIOD ON THE STRENGTH PERFORMANCE OF GEOPOLYMER CONCRETE.....	445
<i>S Oyeibisi, A Ede, F Olutoge, T Igba, J Oluwafemi</i>	

RHEOLOGY OF SLAG-BASED GEOPOLYMER CONCRETE USING CORNCOB ASH AS A POZZOLANIC MATERIAL .....	454
<i>S Oyeibisi, A Ede, F Olutoge, T Igba, J Ramonu</i>	
EFFECT OF METALLIC FILLERS ON THE HARDNESS OF POLYSTYRENE COMPOSITES: AN EXPERIMENTAL INVESTIGATION .....	463
<i>S A Abdulkareem, M K Amosa, A G Adeniyi, M M Magaji, R A Ajibola</i>	
DEVELOPMENT OF NATURAL FIBRE REINFORCED POLYSTYRENE (NFRP) COMPOSITES: IMPACT RESISTANCE STUDY .....	478
<i>S A Abdulkareem, M K Amosa, A G Adeniyi, S A Adeoye, A K Ajayi</i>	
PERFORMANCE OF SELF COMPACTING CONCRETE INCORPORATING GROUND GRANULATED BLAST FURNACE SLAG AND METAKAOLIN .....	488
<i>O O Ofuyatan, A M Olowofoyeku, J Oluwafemi</i>	
RECYCLING OF CONCRETE DEMOLITION WASTE: PATHWAY TO SUSTAINABLE DEVELOPMENT .....	497
<i>J Oluwafemi, A Ede, O Ofuyatan, S Oyeibisi, D Bankole</i>	
EFFECT OF TEMPERATURE ON THE COMPRESSIVE STRENGTH AND SUSTAINABILITY OF EXPANDED CLAY LIGHTWEIGHT BASALT FIBER REINFORCED CONCRETE .....	503
<i>P C Chiadighikaobi, H A A Alaraza, D A Emiri, J E Eyo</i>	
A PRELIMINARY STUDY ON CHEMICAL AND PHYSICAL PROPERTIES OF COCONUT SHELL POWDER AS AN ENHANCER IN BUILDING CEILINGS FOR CONSTRUCTION INDUSTRY: A MINI REVIEW .....	508
<i>J O Dirisu, O S I Fayomi, S O Oyedepo, E T Akinlabi</i>	
IMPACT OF ACTIVATED-FLUX TUNGSTEN INERT GAS (A-TIG) WELDING ON WELD JOINT OF A METAL – REVIEW .....	516
<i>S A Afolalu, S B Soetan, S O Ongbali, A A Abioye, A S Oni</i>	
MORPHOLOGICAL CHARACTERIZATION AND PHYSIO-CHEMICAL PROPERTIES OF NANOPARTICLE - REVIEW .....	526
<i>S A Afolalu, S B Soetan, S O Ongbali, A A Abioye, A S Oni</i>	
REALIZATION OF AGRO WASTE FIBER-PARTICULATE FOR LOW COST ALUMINIUM BASED METAL MATRIX COMPOSITE: A REVIEW .....	537
<i>N E Udoye, O S I Fayomi, A O Inegbenebor</i>	
NANOCOMPOSITE AND ITS MORPHOLOGICAL CHARACTERIZATION -REVIEW .....	542
<i>S A Afolalu, S O Ongbali, O O Ajayi, O Ohwofa, A A Abioye</i>	
MICROSTRUCTURAL AND MECHANICAL PROPERTIES OF WELDED JOINTS IN TIG, MIG AND FRICTION STIR WELDING –REVIEW .....	551
<i>S A Afolalu, A O Ohwofa, S O Ongbali, O O Ajayi, A A Abioye</i>	
C7+ RESERVOIR FLUID CHARACTERISATION: MODIFICATION OF LOHRENZ SPLITTING CORRELATION .....	562
<i>K B Orodu, P A L Anawe, F A Omojola</i>	

## PART 2

INNOVATION IN CONSTRUCTION MATERIALS-A REVIEW.....	580
<i>G O Bamigboye, I Davies, C Nwanko, T Michaels, G Adeyemi, O Ozuor</i>	
INFLUENCE OF SOME SELECTED SUPPLEMENTARY CEMENTITIOUS MATERIALS ON WORKABILITY AND COMPRESSIVE STRENGTH OF CONCRETE – A REVIEW .....	591
<i>O G Mark, A N Ede, O Olofinnade, G Bamigboye, C Okeke, S O Oyebisi, C Arum</i>	
HOUSING CRISIS: WASTE GLASS-STABILIZED CLAY FOR USE AS FIRED CLAY BRICKS .....	609
<i>I I Akinwumi, O O Ajayi, O Joshua, R Sani, O M Olofinnade, P O Awoyera, T O Ogundairo, D A Ogunwole, O D Afolayan</i>	
SUSTAINABLE USE OF RECYCLED WASTE GLASS AS AN ALTERNATIVE MATERIAL FOR BUILDING CONSTRUCTION – A REVIEW .....	619
<i>T O Ogundairo, D D Adegoke, I I Akinwumi, O M Olofinnade</i>	
NFRP STRENGTHENING OF REINFORCED CONCRETE BEAMS .....	631
<i>C O Nwankwo, A N Ede, O M Olofinnade, A I Osofero</i>	

## **ENVIRONMENT, TRANSPORTATION INFRASTRUCTURE, GEOTECHNICS AND WATER RESOURCES**

GEOTECHNICAL CHARACTERISTICS OF A SELECTED SHALLOW MARINE AREA CONSIDERED FOR QUAY WALL CONSTRUCTION .....	639
<i>D A Ogunwole, I I Akinwumi</i>	
A COMPARATIVE STUDY OF OPERATIONS AND MAINTENANCE OF IJU WATER WORKS .....	652
<i>A S Ogbiye, J O Ajiboye, I I Akinwumi, E Fagbenle, O O Onakunle</i>	
MOBILITY DYNAMICS OF THE ELDERLY: REVIEW OF LITERATURES .....	661
<i>A A Busari, D O Oluwafemi, S A Ojo, J O Oyedepo, A S Ogbiye, S A Ajayi, D D Adegoke, K O Daramola</i>	
GEOTECHNICAL PROPERTIES OF LATERITIC SOIL FROM NIMO AND NTEJE AREAS OF ANAMBRA STATE, SOUTHEASTERN NIGERIA .....	669
<i>F U Ogbuagu, C A U Okeke</i>	
RELIABILITY EVALUATION OF COMPACTED TROPICAL RED SOIL ADMIXED WITH WASTE WOOD ASH FOR USE AS ROAD CONSTRUCTION MATERIAL .....	679
<i>J R Oluremi, P Yohanna, K J Osinubi, A O Eberemu, T S Ijimdiya</i>	
CLAY SOIL STABILIZATION USING CEMENT KILN DUST .....	691
<i>E A Adeyanju, C A Okeke</i>	
UNCONFINED COMPRESSIVE STRENGTH OF LATERITIC SOIL TREATED WITH BACILLUS COAGULANS FOR USE AS LINER AND COVER MATERIAL IN WASTE CONTAINMENT SYSTEM .....	701
<i>K J Osinubi, P Yohanna, A O Eberemu, T S Ijimdiya</i>	



PERFORMANCE EVALUATION OF HOT MIX ASPHALTIC CONCRETE INCORPORATING COW BONE ASH (CBA) AS PARTIAL REPLACEMENT FOR FILLER .....	712
<i>A E Modupe, T M A Olayanju, O D Atoyebi, S J Aladegboye, T F Awolusi, A A Busari, P O Aderemi, O C Modupe</i>	
ASSESSMENT OF THE IMPACT OF ABATTOIR ACTIVITIES ON THE PHYSICOCHEMICAL PROPERTIES OF SOILS WITHIN A RESIDENTIAL AREA OF OMU-ARAN, NIGERIA .....	730
<i>O O Elemile, O D Raphael, D O Omole, O E Oluwatuyi, E O Ajayi, O Umukoro, M G Elemile</i>	
EFFECTS OF CONTINUOUS LEACHING ON ENGINEERING PROPERTIES OF LIME-STABILIZED LATERITIC SOILS .....	739
<i>C A U Okeke, A O Johnson, F U Ogbuagu, J O Akinmusuru</i>	
STABILIZATION OF LATERITIC SOIL WITH CEMENT – OIL PALM EMPTY FRUIT BUNCH ASH BLEND FOR CALIFORNIA BEARING RATIO BASE COURSE REQUIREMENT .....	748
<i>O O Komolafe, K J Osinubi</i>	
OIL PALM EMPTY FRUIT BUNCH ASH AS A SUSTAINABLE STABILIZER FOR LATERITE SUB-BASE OF HIGHWAY PAVEMENTS .....	759
<i>J A Oke, K J Osinubi</i>	
REFRACTIVITY GRADIENT OF THE FIRST 1KM OF THE TROPOSPHERE FOR SOME SELECTED STATIONS IN SIX GEO-POLITICAL ZONES IN NIGERIA .....	770
<i>O O Fashade, T V Omotosho, S A Akinwumi, K P Olorunyomi</i>	
IMPACT OF CLIMATE CHANGE ON THE RAINFALL PATTERN OF KLIP RIVER CATCHMENT IN LADYSMITH, KWAZULU NATAL, SOUTH AFRICA .....	778
<i>D T Chabalala, J M Ndambuki, R W Salim, S S Rwanda</i>	
COMPARATIVE ANALYSIS OF MICROBIAL LOADS OF MOLECULAR POTENTIAL CHAIN DISINTEGRATOR (MPCD) AND POTASSIUM PERMANGANATE (PP) IN REMEDIATION OF HYDROCARBON CONTAMINATED SOIL/GROUNDWATER IN THREE DIMENSIONAL (3D) LABORATORY SAND TANK MODEL .....	787
<i>O G Fadugba, O F Olukunle, S A Ola, O O Ojuri</i>	
PETROLEUM HYDROCARBON CONTAMINATED GROUNDWATER REMEDIATION USING 21ST CENTURY TECHNOLOGY: BARUWA COMMUNITY, LAGOS STATE NIGERIA AS A CASE STUDY .....	795
<i>S A Ola, O G Fadugba, J A Adekoya, J O Babatola, O O Ajayi, O O Ojuri, S B Akinde</i>	
ENVIRONMENTAL ASSESSMENT OF MUNICIPAL SOLID WASTE (MSW) DISPOSAL OPTIONS: A CASE STUDY OF OLUSHOSUN LANDFILL, LAGOS STATE.....	803
<i>R M Balogun-Adeleye, E O Longe, K O Aiyesimoju</i>	
AN INVESTIGATION INTO SOME CROP RESIDUES GENERATION FROM FARMING ACTIVITIES AND INHERENT ENERGY POTENTIALS IN KWARA STATE, NIGERIA.....	811
<i>E A Alhassan, J O Olaoye, T M A Olayanju, C E Okonkwo</i>	
DANGEROUS ORGANIC CHEMICALS IDENTIFIED IN INHALABLE PARTICULATE MATTER AIR POLLUTION .....	821
<i>T O Etchie, A T Etchie, S Sivanesan, G O Adewuyi, K Krishnamurthi, A Pillarisetti, K V George, P S Rao</i>	
HEALTH IMPLICATIONS OF ECONOMIC GROWTH: THE ROLE OF AIR POLLUTION .....	831
<i>A Afolabi, E Urhie, T Ogunbiyi, F Ogundiran, A Afolabi</i>	

ADSORPTION AND DESORPTION EFFICIENCY OF A SUGARCANE BAGASSE IN THE REMOVAL OF FE <sup>2+</sup> FROM A GALVANIZING INDUSTRY .....	842
<i>A O Akanni, A S Ogbiye, E O Oyekanmi, O O Onakunle</i>	
OVERVIEW OF INDUSTRIAL POLLUTION ACTIVITIES AND ITS CURBING MECHANISMS .....	850
<i>G U Fayomi, S E Mini, O S I Fayomi, O Oyeleke, D O Omole, I I Akinwumi</i>	
POLLUTION EMISSION EVOLUTION FROM COMPOSITE AND METAL FORMATION IN FOUNDRY INDUSTRY .....	859
<i>O S I Fayomi, A A Ayoola, J Morounfoluwa, I I Akinwumi</i>	
ASSESSMENT OF ROAD INFRASTRUCTURE USING REMOTE SENSING AND GIS METHODOLOGY FOR MONITORING THE CONDITION OF PAVED AND UNPAVED ROADS .....	864
<i>S A Ojo, J O Olusina, B U Ngene, A A Busari, J Adediran, A Eletu</i>	
ECOLOGICAL RISK ESTIMATION OF HEAVY METAL POLLUTION IN ROADSIDE DUST OF ADO-ODO OTA, SOUTHWESTERN NIGERIA .....	875
<i>C P Emenike, E J Okwuonu, I T Tenebe, D O Omole, M Nwani, O D Afolayan, B I Oniemayin</i>	
INTEGRATED WATER RESOURCES MANAGEMENT IN NIGERIA: IMPLICATIONS FOR SUSTAINABLE NATIONAL DEVELOPMENT .....	885
<i>B U Ngene, C O Nwafor, G O Bamigboye, A S Ogbiye, J O Ogundare, V E Akpan</i>	
FAILURE TREND OF TRANSPORT INFRASTRUCTURE IN DEVELOPING NATIONS: CASES OF BRIDGE COLLAPSE IN NIGERIA .....	892
<i>A Ede, C Nwankwo, S Oyebisi, O Olofinnade, A Okeke, A Busari</i>	
THE STABILITY ANALYSIS OF A HIGHWAY EMBANKMENT FOUNDED ON LIME- STABILIZED SOFT SOILS IN CALABAR, SOUTHEAST NIGERIA .....	905
<i>C A U Okeke, C Ifediniru, E Adeyanju, A N Ede</i>	
MECHANISMS OF RIVERBANK FAILURE AND CHANNEL INSTABILITY ON THE NKISI RIVER, SOUTHEAST NIGERIA .....	913
<i>C A U Okeke, A N Ede</i>	
MONITORING OF RIVERBANK STABILITY AND SEEPAGE UNDERCUTTING MECHANISMS ON THE IJU (ATUWARA) RIVER, SOUTHWEST NIGERIA .....	922
<i>C A U Okeke, A N Ede, T Kogure</i>	
RADIATION PROTECTION STRATEGIES IN MEDICAL DIAGNOSTIC CENTERS IN LAGOS STATE, NIGERIA .....	931
<i>A R Adeniji, I C Ezema, P A Aderonmu, A O Adesipo</i>	
INFLUENCE OF BENTONITE ON CLAYEY SOIL AS A LANDFILL BASELINER MATERIALS .....	949
<i>R A Olaoye, O D Afolayan, V O Oladeji, R O Sani</i>	
THE PLACE OF GEOINFORMATICS IN WASTE MANAGEMENT, SANITATION AND HEALTH RISKS PREVENTION IN ADO-ODO/OTA LOCAL GOVERNMENT AREA .....	958
<i>G A Adeyemi, D Onimowo, B I Oniemayin, A A Eletu</i>	

## **SUSTAINABLE INFRASTRUCTURE AND COMPUTATIONAL MODELLING**

MEASUREMENT OF TRAIN-INDUCED VIBRATION FOR TRACK PARAMETER IDENTIFICATION: BAYESIAN PROBABILISTIC APPROACH .....	963
<i>S A Alabi, T A Alabi</i>	
ANALYSIS OF EULER BEAM AND BAR AS NEGATIVE STIFFNESS MECHANISM IN VIBRATING STRUCTURES.....	974
<i>A O Oyelade, O M Sadiq</i>	
INSIGHT REVIEW ON IMPACT OF INFRASTRUCTURAL DEVELOPMENT IN DRIVING THE SDGS IN DEVELOPING NATIONS: A CASE STUDY OF NIGERIA.....	982
<i>I E E Davies, C O Nwankwo, O M Olofinnade, T A Michaels</i>	
NONLINEAR DYNAMIC BEHAVIOUR OF FUNCTIONALLY GRADED CIRCULAR PLATES RESTING ON TWO-PARAMETERS FOUNDATION USING DIFFERENTIAL TRANSFORM METHOD.....	991
<i>O M Sadiq, M G Sobamowo, S A Salawu</i>	
SAFETY ISSUES CAUSED BY HUMAN FACTORS IN THE NIGERIAN TELECOMMUNICATION INDUSTRY .....	1011
<i>O Kukoyi, C Aigbavboa</i>	
FROBENIUS METHOD FOR THE SOLUTION OF KLEIN-GORDON-FOCK EQUATION WITH EQUAL SCALAR AND VECTOR OSCILLATOR PLUS POTENTIAL.....	1016
<i>T A Anake, S O Edeki, J G Oghonyon, O P Ogundile</i>	
HE'S POLYNOMIALS METHOD FOR ANALYTICAL SOLUTIONS OF TELEGRAPH EQUATION .....	1021
<i>S O Edeki, O M Ofuyatan, G O Akinlabi</i>	
PING-PONG REDUCTION FOR HANDOVER PROCESS USING ADAPTIVE HYSTERESIS MARGIN: A METHODOLOGICAL APPROACH .....	1028
<i>A A Adewale, E E Ekong, F A Ibikunle, A Orimogunje, J Abolade</i>	
MODIFIED ALMOST UNBIASED TWO-PARAMETER ESTIMATOR IN LINEAR REGRESSION MODEL .....	1040
<i>A F Lukman, E Adewuyi, N Oladejo, A Olukayode</i>	
ERGODIC AND NON-ERGODIC VARIOGRAM UNCERTAINTY IN AGBABU BITUMEN FIELD POROSITY DATA .....	1056
<i>O O Mosobalaje, M V Ajia, O D Orodu, D O Ogbe</i>	

## **SOCIAL DEVELOPMENT ISSUES**

THE NEED FOR THE INCLUSION OF ENTREPRENEURSHIP IN OUR NIGERIAN ARCHITECTURAL EDUCATION.....	1080
<i>R C Nnaemeka-Okeke, C C Ugwu, C N Okafor</i>	
SALES AND SUPPLY CHAIN RISKS MITIGATION: A STUDY OF SOME COMPANIES AT THE PEAK OF BOKO HARAM INSURGENCY IN NORTH EAST, NIGERIA.....	1091
<i>S Aigbavboa, F Ojadi</i>	

INFOPRENEURSHIP IN A DEVELOPING COUNTRY: OPPORTUNITIES AND CHALLENGES.....	1106
<i>A Aregbesola, T Van der Walt, S Owolabi, J Idiegbeyan-ose, F Okocha, T Eyiolorunsh</i>	
CONCEPTUAL ISSUES IN OUTDOOR ADVERTISING BILLBOARD VALUATION – LESSONS FOR NIGERIA.....	1111
<i>A S Oni, S A Oloyede, D O Durodola, A O Oluwunmi</i>	
ACCESS TO INFORMATION AS A VERITABLE STRATEGY FOR SUCCESSFUL ENTREPRENEURSHIP IN A DEVELOPING COUNTRY.....	1120
<i>F Okocha, T Eyiolorunsh, J Idiegbeyan-ose, A Aregbesola, S Owolabi</i>	
GOING THE EXTRA MILE: VITAL THIRD PARTY LOGISTICS SERVICE PROVIDERS' PRE-SELECTION ACTIVITIES BY PHARMACEUTICAL ORGANIZATIONS.....	1125
<i>S Aigbavboa, C Mbohwa</i>	
WOMEN IN BANKING: CAREER CHOICE AND ADVANCEMENT.....	1134
<i>M U Orbih, D Imhonopi</i>	
WORK-FAMILY CONFLICT AND BURNOUT AMONG FEMALE MEDICAL DOCTORS IN SELECTED HOSPITALS ABUJA.....	1149
<i>G S Ajet, R E Offong, M P Ajayi, T C Iruonagbe, E O Amoo</i>	
IMPLICATIONS OF OCCUPATIONAL HAZARDS ON ATTAINMENT OF THE SUSTAINABLE DEVELOPMENT GOALS IN THE NIGERIAN CONSTRUCTION INDUSTRY.....	1158
<i>P F Tunji-Olayeni, A O Afolabi, E I Olowookere, O I Okpalamoka, A O Oluwatobi</i>	
PROSPECTS OF QUANTITY SURVEYORS IN A DYNAMIC WORLD OF CLIMATE CHANGE, DIGITALIZATION AND ECONOMIC RECESSION.....	1165
<i>PF Tunji-Olayeni, OO Oyeyipo, EE Nnadi</i>	

**Author Index**