THE NIGERIAN INSTITUTION OF PROFESSIONAL ENGINEERS AND SCIENTISTS

In collaboration with the

NATIONAL CENTRE FOR ENERGY, ENERGY COMMISSION OF NIGERIA

2nd

International CONFERENCE

THEME

EMERGING TRENDS IN SCIENCE AND ENGINEERING TOWARDS 4.0 REVOLUTION"

DATE: 15TH - 17TH FEBRUARY, 2023 | **TIME:** 9:00AM DAILY

VENUE: National Center For Energy And Environment, University Of Benin.

CHIEF HOST

PROF. D.I. IGBINOMWANHIA

DIRECTOR

NCEE (ENERGY COMMISSION OF NIGERIA)

UNIBEN, BENIN CITY.

HOST

DR. O.O. IGHODARO

CHIEF EXECUTIVE OFFICER NIPES

The Nigerian Institution of Professional Engineers and Scientists In collaboration with the National Centre for Energy, Energy Commission of Nigeria

2nd

THEME

International Conference

EMERGING TRENDS IN SCIENCE AND ENGINEERING TOWARDS 4.0 REVOLUTION"

THE NATIONAL ANTHEM

Arise, O compatriots, Nigeria's call obey
To serve our fatherland
With love and strength and faith
The labour of our heroes past Shall never be in vain
To serve with heart and might
One nation bound in freedom,

Peace and unity.

THE NATIONAL PLEDGE

I pledge to Nigeria, my country
To be faithful, loyal and honest,
To serve Nigeria with all my strength,
To defend her unity and uphold Her honor and glory.

So help me God

UNIBEN ANTHEM

1. All over the wide wide world
Our fruitful works unfurl; What we sow'd with joy and pride with good our common goal One heart and voice for all, we need the purple clarion call.

Refrain: *Arise mighty* ***UNIBEN***
Robed in your purple and gold clad
in your fertile green hem
Knowledge for service untold

2. Between blue sky and red soil
Excellent hard work endure
We groom man and nation in
Spirits of Unibest pure
Come through our opened gate
Where fair play and merit dictate.

Refrain: Arise mighty **UNIBEN .....**

3. God bless this our noble school
As we bid peace to reign
May we have no cause to mourn
But rejoice in gains achieved We hope for place man will Bring brain and brawn to build self still.

NIPES_NCEE CONFERENCE LOCAL ORGANISING COMMITTEE MEMBERS

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Dr. C. N. Emeribe - Secretary
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Mr. Peter Ndem
Miss T. Amanokhai

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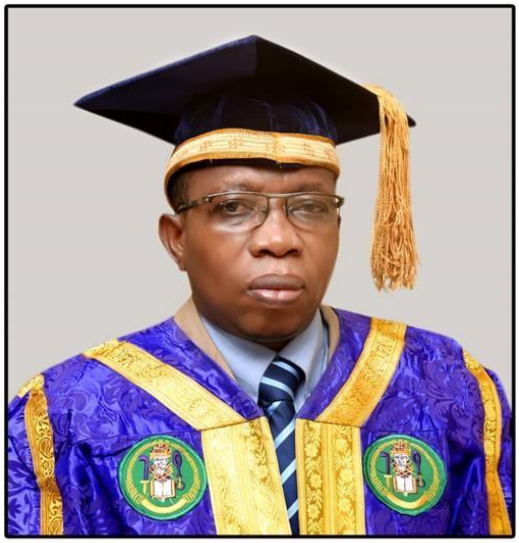
Vice Chancellor, University of Benin

PROF. CATHERINE U. UKPONMWAN.
DVC ADMIN
UNIVERSITY OF BENIN, BENIN CITY

PROF. RAYMOND I. OZOLUA
DVC ACAD
UNIVERSITY OF BENIN, BENIN CITY



PROF. BUNIYAMIN A. AYINDE
DVC EKEHUAN CAMPUS
UNIVERSITY OF BENIN,BENIN CITY.

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Prof. E.J. Bala
DG/CEO, Energy Commission of Nigeria, Abuja

Prof Dennis Iyeke Igbinomwanhia
Director, Natioal Centre for Energy and Environment

KEY NOTE SPEAKERS

Dr Shivan Chettey, (International Keynote Speaker)

Director, Biomedical Industrialisation & Globalisation Division, Wits Health Consortium, South Africa.

Dr Shivan is trained as a biologist and specialized in Biomedical Sciences. He obtained a masters in Virology focusing on HIV/TB co-infection and focused on reconstitution of dysregulated disease specific immune responses in HIV/TB co-infected patient derived T cells using PD-1 and IL-10 receptor blockade. Dr. Shivan completed his Ph.D at the Institute of Infectious Diseases and Molecular Medicine and his research focused on the development of dual HIV/TB vaccines utilizing AERAS provided recombinant BCG strains as a vaccine vector in a heterologous prime boost strategy. His postdoctoral resulted to the establishment of the first continental immunotherapy/immuno-oncology research infrastructure in Africa. Dr Shivan is a recipient of the Carnegie Corporation 'Next Generation Scientist' Fellowship during his Ph.D research. He is also a recipient of the Fogarty Fellowship by the Columbia University/AITRIP program to undertake work at The Ragon Institute of Harvard Medical School, MIT and Massachusetts General Hospital. Dr. Shivan was the Head of Research Strategy and Innovation leading the local and international expansion of the infrastructure's footprint and project portfolio. He is currently the director of the Biomedical Industrialisation and Globalisation division at Wits Health Consortium. Here his work focuses on the use and accessibility of leading technologies for LMIC disease specific markets. Shivan has worked with innovation systems and policy extensively. He is an alumnus of the Brightest Young Minds as well as the Falling Walls programs. Since 2017, Dr Shivan has been a lead consultant for the BRICS Biomedicine working group. He currently serves on the National Advisory Committee for Innovation (NACI) focused on innovation to industrialization. Dr Shivan is the founder of Nautilus Bioscience, a leading life science translational advisory which has since assisted dozens of scientist and researchers commercialize their products and expand into emerging markets. (https://nautilusbioscience.co.za/). In 2022, together with his team, Dr Shivan co-founded the Full Circle Biotechnology. He now works to provide per capita food and healthcare security globally in conjunction with leading corporate, private equity firms, NGOs and regulatory bodies. (https://www.fullcirclebio.tech/).

Prof Ikuobase Emovon, (National Keynote Speaker)

Dean, College of Engineering, Federal University of Petroleum Resources, Effurun, Delta State.

EMOVON, Ikuobase is a Professor of Mechanical Engineering (Production Option) in the Department of Mechanical Engineering, Federal University of Petroleum Resources, Effurun. He holds a Ph.D. from Newcastle University, United Kingdom (2016). He was the Head of Mechanical Engineering Department (2018 - 2020) and Sub Dean (20202021). He is currently the Dean College of Engineering and Technology. His research focuses on the application of operation research tools such as Multi-criteria Decision Making (MCDM), Artificial Neural Network (ANN), and Adaptive Neuro-Fuzzy Inference System (ANFIS) in the design, fabrication, and optimal maintenance of marine, mechanical systems, and power systems. He had published his research outputs in several reputable international journals such as applied energy, applied ocean research, and ocean engineering and a reviewer of several journals. His email address is emovon.ikuobase@fupre.edu.ng. His telephone number is 08119

CITATION OF PROSPECTIVE FELLOWS

Birgitta Eno Okodugha,

Permanent Secretary, Information, Communication and Technology Agency, Edo State Governor's Office

Mrs Birgitta Eno Okodugha was born on 19 February, 1964 at Okuta, Ebelle, Igueben Local Government Area of Edo State. She obtained a Bachelor of Science (Education), Mathematics from the Delta State University, Abraka. She started her career in 1988 with the Post-Primary Education Board (PPEB) in the then Bendel State as a Mathematics teacher. **Birgitta** is seasoned educational strategist with extensive experience in teaching, school administration, curriculum, and instructional material development both in Nigeria and outside the country. She has a record of uninterrupted excellence in teaching and administration. She is an advocate of the 21st Century Learning and Teaching Competencies. Birgitta's efforts and dedication to teaching Mathematics has led to her students 'winning laurels at State, National and International levels in mathematics. In 2014, her School, Asoro Grammar School Senior, earned the award of the Overall Best School in Senior Mathematics in Edo State by the National Mathematical Centre, Abuja, courtesy of her resourcefulness. In her quest for Professional development and skills, she has participated and made scientific presentations at National and International Conferences. She was a delegate at the International Conferences of the National Council of Teachers of Mathematics (NCTM.) Denver, 2013 Colorado USA, 2014 New Orleans, Louisiana, USA 2015 Boston, Massachusetts, USA 2016 San Francisco, California. She has been a regular delegate at the Mathematical Association of Nigeria from 2007 to 2022. Birgitta is a recipient of Fullbright Teaching Excellence and Achievement Program TEA, University of Nevada, Reno, USA Due to her interest, love and diligence exhibited in STEM, she has received various awards amongst which are: Edo State Governor Com. Adams A. Oshiomohole Cash Award for outstanding Performance of Asoro Grammar School, Senior Students in Mathematics, 2016; Certificate of Participation in the World Largest Mathematics Class by Guinness World Book of Records, 2014; Governor Godwin Obaseki Cash Award for Outstanding Performance Asoro Grammar School Students in Mathematics in 2017; Fellow of the Mathematical Association of Nigeria (FMAN), 2017; Fellow of the Teaching Excellence and Achievement Programme (TEA), Irex and US Department of State, USA., 2015; The Maltina Teacher of the Year, 2018 Edo State Champion, etc. She was appointed Permanent Secretary by Mr. Godwin Nogheghase Obaseki, Edo State Governor, on 16th May 2019, and posted to the Ministry of Digital Economy, Science and Technology, formerly Ministry of Science and Technology, Edo State. Under her supervision as Permanent Secretary, Ministry of Digital Economy, Science and Technology, the Edo State Government won the National Science award, Technology and Innovation Expo of the Federal Ministry of Science Award and the Overall Best State in E-Government Implementation in Nigeria by the Federal Ministry of Communication and Digital Economy amongst others. She is currently serving in Information Communication Technology Agency, ICTA as Permanent Secretary. Birgitta has distinguished herself as a resource person in many seminars and workshops for teachers and students within and outside the Country..

In view of these outstanding achievements, NIPES is pleased to confer on you, this Fellowship Award. Congratulations Ma

Engr. Dr.(Prince) Victor Obanor, Permanent Secreatary, Electricity Regulatory Agency, Edo State Government

Engr. Dr. (Prince) Obanor Victor Osagbouwa has Bachalor of Engineering (B. Eng.Hons.) Electrical/Electronics, M.Sc. in Power and Machines and Ph.D. Human Resource Development. He is a multi-skill and tasking leader with over 20 years of qualitative experience in formulating and implementing strategic plans for electrical engineering projects, established entire operations with a key focus on quality, profitability, and durability. Through dedication to the engineering profession and hard work, he has amassed a number of honors, fellowships, and leadership positions, including Fellow of the Nigerian Institute of Power Engineers (FNIPE); Fellow of Nigerian Institute of Electrical, Electronic Engineers (FNIEEE); Fellow of the Nigerian Institute of Environmental Engineers (FNIEE); Former Chief Inspector of Engineering Regulation and Monitoring (ERM), COREN, Benin Zonal Inspectorate (2016-2021); three terms Chairman, Nigerian Society of Engineers, Benin Branch (2012-2014); Member, Board of Governing Council Edo State Polytechnic, Usen; Member, Nigerian Society of Engineers' National Committee on Health, Safety and Environment (NSE-HSE, 2012-2014); Chairman, EDSG-COREN ERM Adhoc Committee on Ministry of Infrastructure/Environment; Secretary, EDSG Committee on NDDC; and Recipient of Nigerian Society of Engineers' Presidential Award for Excellence. A meticulous Electrical Engineer with the ability to lead project teams throughout the full lifecycle of time-critical and highly complex electrical projects. His proven aptitude to analyze, negotiate and document projects, and formulate/implement strategies to achieve operational/organizational goals while balancing risks in addition to his project management skill sets always ensure the timely completion of projects under his supervision, frequently finishing ahead of schedule as a result of effective staff development and motivation and workload planning. 100s of projects completed under watch are a testament of his professional acumen. As a state leader in the engineering profession, he has trained numerous engineers through demonstrated and profound knowledge of project operations entailing project planning and integration, cost control, resource utilization, and risk management. He is an Associate Examiner to the Nigerian Society of Engineers (2010-till date) and the Council for the Regulation of Engineering in Nigeria (2016-till date). He is a patron of the Association of Professional Women Engineers of Nigeria, Benin Chapter (APWEN); Patron of Nigerian Association of Engineering Craftsmen, Edo State Chapter (NAEC); National Patron of Peace Corps of Nigeria; Patron of Vigilante Group of Nigeria, Edo State Command; Patron of Nigeria Legion of Ex-Service Men, Edo State Command; Patron, Man 'O' War, Edo State Command; South-South Zonal Patron of National Youth Council of Nigeria; and Ambassador to German-Nigeria Cultural Diplomacy; to mention but a few

. **In view of these outstanding achievements, NIPES is pleased to confer on you, this Fellowship Award.**

Congratulations Sir

Mr Imariagbe, Osadebamen Charles

General Manager, Edo State Waste Management Board, Edo State Government

Mr Imariagbe, Osadebamen Charles obtained a Bachelor of Science degree in Biochemistry, from the University of Benin, MSc in Occupational Health, Safety & Environment from University of Birmingham, England, United Kingdom. He is an administrator per excellence and has over the years made significant contributions to public and private sectors within and outside the country. He was a Senior Special Assistant (SSA) to the Governor on Environment from 2013-2016, and was part of the team that reviewed the State's Environmental policy (Edo State Sanitation & Pollution Management Law) and participated in inspections to ensure adherence to best practice. Mr Imariagbe, actively anticipated in several Joint Investigation Visits (JIV) to Oil Spill Sites with relevant regulatory bodies such as NOSDRA, DPR and other stakeholders in line with extant laws as well as executed several EIA Impact Mitigation Monitoring (IMM) exercises & panel review exercises including NNPC Obiafu/Obrikon-Oben Gas pipeline system construction project, Guinness Nigeria Plc Benin Production line expansion project, Presco Plc Ologbo Plantation expansion project, among others. He was a one-time consultant for Family Health International (FHI 360), Abuja, on Global Fund Round 9 (GFR9) Project from 2012 -2013, consultant for Population Council of Nigeria on Data Collector/ Supervisor, 2016. He is a member of several reputable professional bodies including, University of Birmingham Mass Choir, UK ,2012, Member, African Caribbean Society (ACS), University of Birmingham, UK, 2011, Exco Official, Guardian of the Nation International (GOTNI), Abuja from 2008 – 2009 and Editor, Zest magazine, University of Benin, 2004 – 2006. Mr. Imariagbe is currently the General Manager, Edo State Waste Management Board, a position he has held since 2018. It is in recognition of these outstanding achievement and contributions to national development, that NIPES is pleased to confer on you the NIPES Fellowship Award.

In view of these outstanding achievements, NIPES is pleased to confer on you, this Fellowship Award

Congratulations Sir

Dr. Bartholomew I. C. Brai,

Commissioner for Digital Economy, Science and Technology, Edo State Government.

Dr Brai holds a doctorate degree in Biochemistry from the University of Ibadan, Ibadan specializing in Nutritional Biochemistry. He was awarded a Nuffic Short-Term Fellowship for training in Food and Nutrition Security at Wageningen University and Research Centre, The Netherlands in 2007. He worked as a Research Fellow at the Nigerian Institute of Medical Research, Lagos and served as a World Health Organization (WHO/TDR) Consultant in Effective Project Planning and Evaluation in Biomedical Research before joining the services of Federal University Oye-Ekiti. Dr Brai is a member of the Nigeria COVID-19 Research Coalition (NCRC), Nigeria Working Group on Bouillon fortification and Secretary, Board of Trustees of the Nutrition Society of Nigeria. He had served as a member of the Nutrition Council of Nigeria (2017 – 2020), National Committee on Food and Nutrition (2017 – 2020) and National Technical Committee on Homegrown School Feeding Programme (2017 –2020). He is a member of the Nigerian Society of Biochemistry and Molecular Biology, Nutrition Society of Nigeria (NSN), Nutrition Society, United Kingdom, and American Society for Nutrition. Dr. Brai, a former National General Secretary of NSN, is a Fellow of the Nutrition Society of Nigeria and currently serves as Immediate-Past President in the National Executive Council of NSN. He was appointed a Commissioner by the Edo State Governor in March 2022 and currently presides over the Edo State Ministry of Digital Economy, Science and Technology. He has several scientific publications in both national and international peer-review journals.

In view of these outstanding achievements, NIPES is pleased to confer on you, this Fellowship Award

Congratulations Sir

Engineer Osasere Malachi Evbuomwan

Hon. Commissioner for Environment and Sustainability

Engineer Osasere Malachi Evbuomwan is the Hon. Commissioner for Environment and Sustainability, Edo State. He holds a Bachelor's degree Electrical/Electronics Engineering, from the Abubakar Tafawa Balewa University, Bauchi. Engr. Evbuomwan was a one time MD/CEO of Almowe Engineering & Consultancy Services Limited (AESL). As MD/CEO, he successfully directed the operations of the company, attending to diverse clients in Oil and Gas sector, ICT, Manufacturing, Building, Telecommunications industries etc, across the nation. In addition to this role, Engineer Evbuomwan was responsible for business development, resource management and project execution. He has been a consultant to, National Petroleum Investment Management Services (NAPIMS), Nigerian Petroleum Development Company(NPDC), Amazon Energy Group, Federal Inland Revenue Services (FIRS), Federal Airports Authority of Nigeria (FAAN), to mention a few. Engr. Osasere Evbuomwan was initially assigned as the Commissioner for the defunct Ministry of Transportation, Edo State, where he planned and supervised to the re-organization of the Transport sector in Edo State. Among the strategic changes introduced were, the use of Bar codes in all public vehicles (Buses, cabs and taxis) for ease of identification and to ensure safety and security of the residents. He was also recently redeployed to the Directorate of Special Duties (Governor's Office), as a Commissioner in charge of Constituency Projects and ensured the distribution of relief materials to the flood victims in the state during the 2022 flood incident. Currently, Engineer Osasere Evbuomwan oversees the Ministry of Environment and Sustainability where he is driving the task to make Edo a clean, green for the prosperity of all Citizens. He is a member of the Council for the Regulation of Engineering in Nigeria (COREN), Member, Nigerian Society of Engineers (NSE), Member, Nigerian Institute of Electrical and Electronics Engineering (NIEEE), Associate Member, Advertising Practitioner Council of Nigeria (APCON), Fellow, The Institute of Management Consultants (IMC –Nigeria) and Certified Management Consultant, (IMC-Nigeria). Engr. Osasere Malachi Evbuomwan is married and blessed with 3 children.

In recognition of these outstanding achievements, NIPES is pleased to confer on you Fellowship Award.

Congratulations Sir.

Engr. Enabulele Ferguson Ewaen

Permanent Secretary, Ministry of Energy and Mining , Edo State Government

Engr Ferguson is a seasoned Administrator and a goal getter. He uses his good communication, relationship building, Team working, prioritization, Negotiation, organization and time management skills in achieving set goals. He is an Exemplary Engineer with general Engineering experience and particular experience in practical road construction. A road development management expert in terms of Road classification, cost profiling and formulation of adaptive road construction models in line with modern day reality, where the use of native or indigenous materials are becoming the main focus of the construction industry. He pioneered the accelerated road development program, an initiative of Governor Nogheghase Obaseki. A researcher with focus in alternative improvisions for the preservations of our roads which birthed the use of Road Toe Beam in cases where drainages are seemingly impossible due to lack of cost effective discharge zones. Examples are Ihama and Boundary roads. Ferguson is a strategic planner and a great team worker, who deploys procurement tools of Efficiency, Effectiveness and Fairness, he acquired as a pioneer procurement officer, under the world bank assisted Edo State, community based urban development project in his day to day activity. Ferguson is happily married with children, a golfer playing off handicap 21, a Mayor of peace of the United Nations POLAC foundation and currently the Permanent Secretary of the Ministry of Mining and Energy, where he is diligently galvanizing efforts at ensuring that Edo State becomes a major player in the Mining, Oil and Gas Sectors to the benefit of her citizens. He is a COREN registered Engineer, a member of the Nigerian Society of Engineers, American Society of Engineers and the Chairman of Edo State COREN Technical Committee STC), Chairman Edo State Expatriate Monitoring Committee (COREN, ERM) and Governor's representative on board of both committees.

In recognition of these outstanding achievements, NIPES is pleased to confer on you Fellowship Award.

Congratulations Sir.

Engr. Precious Omo- Agege

Vice President, RusselSmith Group, Nigeria Ltd.

Engr Precious M Omo Agege holds a bachelor of engineering degree in Mechanical Engineering from the university of Benin, Edo state and a master's in Engineering management from university of Benin too. With about 20years work experience, most of which has been in the Oil and Gas industry. Engr Precious have been involved in several major projects in the Oil and Gas industry both offshore and onshore in different capacities over the years. He is currently the Vice President/Executive Divisional Head, RusselSmith Group Nigeria Limited in charge of the Niger Delta regional division. He is focused on the successful operation and activities in the Niger Delta region by being an enabler in community relations and human management in the region in line with the local content development.

He is a a member of the Nigeria Institute of Industrial Engineers. He has several other certifications that have helped drive the success of the operation in the region for several years now which included community relationship management. He was one time chairman of pipeline community committee. He is also a certified trained IRATA personal. He has been instrumental to the successful training of several youths in the region to becoming skilled workers in the Oil and Gas industry.

In view of these outstanding achievements, NIPES is pleased to confer on you, this Fellowship Award

Congratulations Sir

ADDRESS BY THE VICE CHANCELLOR, UNIVERSITY OF BENIN, PROFESSOR LILIAN I. SALAMI, ON THE OCCASION OF 2ND INTERNATIONAL CONFERENCE, JOINTLY ORGANISED BY THE NATIONAL CENTRE FOR ENERGY AND ENVIRONMENT (NCEE) AND THE NIGERIAN INSTITUTION OF PROFESSIONAL ENGINEERS AND SCIENTISTS (NIPES), HELD ON WEDNESDAY, 15 FEBRUARY 2023.

Protocol

It gives me great pleasure to welcome you all, our special Guests of Honour, The Director General/Chief Executive Officer, Energy Commission of Nigeria, special guests, the Edo State commissioners for the Ministries of (1) Environment and Sustainability, 2) Water resources, 3) Digital Economy, Science and Technology, 4) Mining and Energy, the Permanent Secretary, Information, Communication and Technology Agency, Edo State Governor's Office and the Permanent Secretary, Edo State, Electricity Regulatory Commission. My warm welcome is also extended to Guests and attendees from within and outside Nigeria. And for all other here physically and attending virtually, Captains of Industry, CSO, members of the university Community, I warmly welcome you all to University of Benin.

Today's Occasion is one of such that has potentials to answer some of the complex problems of youth Unemployment, Poverty, Environment problems, in particular global warming/climate change, terrorism, food shortage and high mortality rate in the sub-Sahara Africa.

Science and Engineering innovations are key to meeting the UN sustainable development goals. At the 2018 Integration Segment of the Economic and Social Council, United Nations, the importance of Science and Engineering, the central focus was new advances in science and technology and their roles towards achieving the 2030 Agenda for Sustainable Development.

As an institution of learning, we have continue to promote cutting-edge research and development in innovative science and engineering. During the Covid-19 pandemic, the University produced an automated three-in-one hand washing machine. Very recently the University was credited to have produced a one-ton utility truck.

So, addressing the present challenges facing our country is possible if we devote and channel our energies to Science, Technology, Engineering, and Mathematics.

This is why am particularly glad this Conference is taking place at the University of Benin and at a moment when the global economic landscape is changing and industrialization is moving to the fourth revolution.

We will definitely not be left out in the scheme of globalization and mechanization.

Finally, I wish to extend my greetings to the invited speakers, Dr Shivan Chetty, director of the Biomedical Industrialisation and globalization division at the Witts health consortium, South Africa and Prof. Ikuobase Emovon, Dean of the Faculty of Engineering, Federal University of Petroleum resources, Delta State, and all specially invited guests, my warm regards also to the organizers of this event, the Leadership of the Nigerian Institution of Professional Engineers and Scientists, and the management of the Energy Commission of Nigeria for putting this event together. It is timely, no doubt.

For our Guests and participants, I dare to say that your participation is a confirmation of our resolve to be part of the solution- Industrial revolution, Economic growth, environmental stability and more importantly a peaceful planet.

I once again welcome you all to this gathering of scholars and wish everyone a successful and enlightening conference.

Thank you all

Professor Mrs. Lilian I. Salami, FNSN, FIFHE

Vice Chancellor, University of Benin, Edo State, Nigeria

A WELCOME ADDRESS BY ENGR. DR. OSAROBO IGHODARO, CHAIRMAN, LOCAL ORGANIZING COMMITTEE AND CHIEF EXECUTIVE OFFICER, NIGERIAN INSTITUTE OF PROFESSIONAL ENGINEERS AND SCIENTISTS ON THE OCCASION OF 2ND INTERNATIONAL CONFERENCE, JOINTLY ORGANISED BY THE NATIONAL CENTRE FOR ENERGY AND ENVIRONMENT (NCEE) AND THE INSTITUTE OF PROFESSIONAL ENGINEERS AND SCIENTISTS (NIPES), HELD ON WEDNESDAY, 15 FEBRUARY 2023.

Protocol

Your Excellency, Mr. Godwin Nogheghase. Obaseki, The Executive Governor of Edo State, Nigeria ,Your Excellency, RT Hon. Comrade Philip Shaibu,,The Deputy Governor of Edo State. The Honourable Commissioners for; Environment and Sustainability, Water resources,
Digital Economy, Science and Technology, Mining and Energy
The Permanent Secretary, Information, Communication and Technology Agency, The Permanent Secretary, Electricity Regulatory Commission, Edo State, The Vice Chancellor, University of Benin, Principal Officers of the University of Benin, Deans and Directors, Heads of Department, Distinguished Participants,

Ladies and Gentlemen

I would like to extend my warmest welcome to the Honourable Commissioners of the Edo State Government, our keynote speakers and all of the distinguished participants, especially those who have travelled long distances to be present here today. Today's occasion is germane for two distinct reasons;

First, our modern world is currently faced with the threat of global warming and food insecurity. As we know, climate change is not particular to any region or race. It is an allencompassing threat to the stability, health, food security and socio-economic well-being of the human society.

The developing nations of which Nigeria is a part is expected to have a greatest share of this threat mainly due to low adaptation capacity, low deployment of Science Technology and Information outputs and the general mismatch between rising population and resources to match.

In Nigeria, this mismatch is easily noticeable as poverty rates remain very high particularly in rural areas, high level of young people unemployment and under-employment.

Secondly, on September 25, 2015, Leaders of the World, of which Nigeria is a part, at the 70th Session of the United Nations General Assembly, adopted the 2030 Agenda for Sustainable Development which is now known as the Sustainable Development Goals, or SDGs.

In principal, the SDGs reflect an opportunity for us to come together to advocate for positive change built on the values of solidarity, with a commitment to leaving no one behind, reaching the furthest behind first and paying particular attention to the voices of the poorest and most vulnerable.

Distinguished Guests, the above scenarios call for a re-think in our attitude and policy initiatives. The Role of Science, Technology and Engineering as a bedrock for social and economic changes cannot be overemphasized. In fact, the gap between the developed and the developing nations of the World can only be explained in the light of Development, Demonstration and Deployment (D^3) of Science Technology and Information outputs.

Without doubts, you will all agree with me that we must intensify efforts if we are to meet the national needs of our people as well as key into the SDGs agenda. This year's conference tagged ***"Emerging Trends in Science and Engineering towards 4.0 Revolution"*** was carefully put together to re-awaken the research and innovative minds of academia, scientists, researchers, technicians and artisans. Therefore, I urge all delegates who are here to contribute and discuss their research results to have an open mind towards other presenters research findings, and interact positively with others in this conference. It is my sincere wish that the discussions and findings resulting from this conference will positively contribute to the consolidation of the aim of this conference

I will like to thank that Management of the Energy Commission of Nigeria for their collaborative efforts towards the success of this conference. I appreciate in no small way, members of the steering Committee for the level of commitments during the planning of the occasion.

Once again, on behalf of the, Governing Council and Directors of NIPES, I welcome the Guest speakers, our invited Guests and participants to the University of Benin.

Thank you and I wish you wonderful stay in Benin

PROGRAM OF EVENTS

Day 1: Wednesday 15th Feb, 2023	
9.00am-9:30am	Arrival and Registration of Participants
9:30am-9:45am	Arrival of invited Special Guests/Guest of Honour
9:45am-10:00am	Arrival of Chairman of the Occasion **Prof. L.I Salami**, Vice Chancellor, University of Benin
10:00am-10:05am	Prayer/National Anthem
10:05am-10:15am	Welcome Address by the Chief Host/Director, NCEE, **Prof. Dennis Iyeke Igbinomwanhia**
10:15 – 10.25am	Address and Declaration of Conference open by Chairman Host, **Prof. L.I Salami**, Vice Chancellor, University of Benin
10.25 – 10.35am	Address by the LOC Chairman and CEO of NIPES, **Dr O.O Ighodaro**
10:35am-10:45am	Address by Special Guest of Honour, **Prof. Eli Jidere, Bala,** DG/CEO Energy Commission of Nigeria
10.45am-11:05am	1st Keynote Presentation by
11:05am – 11:25am	2nd Keynote Presentation by
11:25am-11:30am	An Address by **Engr. Osasere Evbuomwan** Honourable Commissioner, Ministry of Environment & Sustainability, Edo State Government
11:30am- 11:35am	An address by **Dr. Bartholomew I. C. Brai,** Honourable Commissioner, Ministry of Digital Economy, Science and Technology, Edo State Government
11:35am- 11:40pm	An address by **Hon. Moses Agbukor** Honourable Commissioner, Ministry of Water Resources, Edo State Government
11:45pm-11:55pm	An Address by **Engr. Osaze Ethan, Uzamere**, Honourable Commissioner, Ministry of Mining and Energy
11-55pm-12-00pm	An Address by **Engr. Victor Obanor**, , The Permanent Secretary, Electricity Regulatory Commission, Edo State Government
12-00pm-12-05pm	An address by **Mrs. Birgitta Eno Okodugha FMAN** Permanent Secretary, Information and Communication Technology Agency, Edo State Government
12:05pm-12:20pm	Conferment of Fellowship Awards
12: 20pm-12:25pm	Goodwill message by **Prof, F.F.O Orumwense** Immediate past Vice Chancellor, University of Benin/Fellow Nigerian Institute of Professional Engineers and Scientist

12:25pm-12:45pm	**GROUP PHOTOGRAPH/TEA BREAK**
12:45pm – 1:00pm	Invited Paper by **Mr O.C Imariagbe** General Manager, GM Edo State Waste Management Board, Edo State Government

1ST TECHNICAL SESSION WED, 15TH 2023

Moderators of 1st Session
Prof. A.I Obanor
Prof. G.E Sadjere
Prof. K. Obahiagbon
Dr U.P Onochie
Dr. O. Awheme

Sub-Theme:Energy & Power

SN	Topic	Author (s)	Affiliation
001	Hybrid Photovoltaic Thermal (PV/T) System for Heating and Electrification: an Experimental Approach	M.I. Ibrahim	Department of Mechanical Engineering, Federal Polytechnic Bida, Niger State Nigeria
002	Utilization of Concentrated Solar-Thermal Power for Power Generation in Nigeria.	Okpako Ogheneochuko	Department of Mechanical Engineering, University of Benin
003	Off-design modelling of Omoku gas power plant, rivers state, nigeria	A.J Peters and O.O Ighodaro	Department of mechanical engineering, university of Benin
Sub_Theme: Environmental Sustainability			
004	Spatio- Temporal Assessment of the Groundwater Quality Around a Municapal Open Waste Dumpsite in Benin City, South- South Nigeria.	Idehen, Osaretin Friday [1] and Emeribe Chukwudi Nnaemeka [2]	[1]Department of Geography and Regional Planning, Igbinedion University, Okada, Edo State, Nigeria. [2]National Centre for Energy and Environment, University of Benin, Benin City, Nigeria Corresponding Author: idehen.osaretin4@iuokada.edu, 08027112883
005	Assessment of Radiation Levels and Potential Radiological Hazards in Soils of Riruwai Mining Area, Northwestern Nigeria	Hamza Badamasi[1], Umar Faruk Hassan[2], Harami Malgwi Adamu[2] , Nasirudeen Mohammed Baba[3], Dahiru Ajiya Adamu[2], Haruna Baba[4]	[1]Department of Chemistry, Federal University Dutse, Dutse, Jigawa State, Nigeria [2]Department of Chemistry, Abubakar Tafawa Balewa University, Bauchi State, Nigeria [3]Department of Chemistry, Federal University of Lafia, Nasarawa State, Nigeria [4]Department of Chemistry, College of Education Minna, Niger State, Nigeria
006	Strategies in Petrochemical Processes PartI: Case of Peruvian Oil	Orlando Elgura	Instituite of Oil Research,, Peru orlandoelguera@gmail.com

007	Reconstruction of the paleo-depositional settings of the Chattian Gh6.2 sand in the ARO Field, Onshore depobelt, Niger Delta Basin	Ojeaga, Kenneth[1], Okobiebi, Onome[2], and Osakpolor, Roberta[3]	Department of Science Laboratory Technology, University of Benin, PMB 1154 Ugbowo Benin City, Nigeria [2]Ejedawe and Partners Nigeria Limited
Sub_Theme:Renewable Energy & Carbon Capture			
008	Biodesulfurization of disel by groundnut shell activated carbon coated pseudomos stutzeri	Reuben pambami aberuagba folorunso	pamelee23@gmail.com
009	Kinetics and thermodynamics studies of oil extraction from palm kernel	Charity agharigbonse osagiede and george chidozie nwagu	Department of chemical engineering, university of benin, nigeria. Aghariagbonse.osagiede@eng.uniben.edu

010	Production, Optimization of Biodiesel from Mango Seed Oil and Desert Date Seed Oil Via Transesterification	S. O. Ohile, A. A. Aboje, H. M. Uthman, A. D. Dirisu, Ibrahim Yusuf.	Department of Chemical Engineering, Federal University of Technology, PMB. 65, Minna, Niger State, Nigeriaohile.susan@gmail.com
Sub:Theme: Materials & Industrial Process			
011	A Ratio-Product Estimator for Estimation of Finite Population Mean Using Known Auxiliary Variable	Jamiu Olasunkanmi Muili, Afolabi Wasiu Babayemi, & Ibrahim Yunusa Adamu	[1]Department of Mathematics, Kebbi State University of Science and Technology Aliero, Nigeria [2]Department of Mathematics and Statistics, Federal Polytechnic Nasarawa, Nasarawa State, Nigeria jamiunice@yahoo.com
012	Advanced Ratio-Type Estimator for Estimating Finite Population Variance	Jamiu Olasunkanmi Muili	Department of Mathematics, Kebbi State University of Science and Technology Aliero, Nigeria
013	Evaluation of interaction properties of ionizing radiation on Nitrogen based explosives.	E.O. Echeweozo[1], A.M. Abdelmonem[*2,3]	[1]Department of Physics with Electronics, Evangel University Akaeze, Ebonyi State, Nigeria. [2]Jouf University, Faculty of Science and Arts at Tabarjal, Department of Physics, Al Jouf, Saudi Arabia 3Laboratories for Detection of Landmines and Illicit Materials, Nuclear Research Centre, Atomic Energy Authority, Cairo, Egypt
014	On Magnetic Moment as a Novel Feature in the Direct Production of Magnetic Monopoles at the Large Hadron Collider (LHC) via Drell-Yan Photon Sub-channel Intermediation	Dosu, O. Ebomwonyi	Department of Physics, University of Benin, Nigeria
Sub-Theme: Modeling & Simulation			
015	AI model for email spam detection	Kyrian C. Adimora, & Okereke E. Aru	kyrimanjero@gmail.com, & okezearu@gmail.com Michael Okpara University of Agriculture Umudike, Umuahia

016	Abatement of Cadmium by adsorption on Metal Organic Frameworks MIL-53(Fe) Using Response Surface Methodology	M. S. Sulaiman [1,2], O. A. Ajayi [1] and M. S. Olakunle	Department of Chemical Engineering, Ahmadu Bello University Zaria, P.M.B 3011, Kaduna, Nigeria. [2] Department of Pure and Industrial Chemistry, Bayero University Kano, P.M.B 3011, Kano Nigeria
017	Neural network model approach to intrusion detection in information systems	Osa edosa, pimeh daniel	Department of electrical/electronic engineering, faculty of engineering,university of benin . eddyedos@yahoo.com information technology department distribution operations procter and gamble, lagos, nigeria. pimehD@gmail.com
018	Comparative analysis of Machine learning models leveraging theNSL-KDD dataset.	Osa edosa ekinkonye ifeoma.	Department of electrical/electronic engineering, faculty of engineering,university of benin . eddyedos@yahoo.com department of mathematics and computer science. Western delta university, oghara. Nigeria ejinkonye.ifeoma@yahoo.com
Sub_Theme: Local Content in Manufacturing			
019	Determination of the Suitability of Rice Husk ash as an Alternative to Silica Sand in the Production of Sodium Silicate.	Z. S. ALIYU and **T. M. SALISU	*Department of Glass and Silicate Technology Ahmadu Bello University, Zaria- Nigeria Department of Glass and Silicate Technology Ahmadu Bello University, Zaria- Nigeria
020	Grey Relational Analysis Application to Determine Tribological and Thermal Properties of Cow Hoof – Reinforced Brake PAD	V. N. Haruna[1] and O. Solanke	Mechanical Engineering Department, Federal Polytechnic, Bida, Niger State

021	Design and Construction of Gas-fired Single Drum Tomato Paste Drying Machine	Babatunde. O. Jayeoba* & Babatunde. A. Olaifa	Department of Science Laboratory Technology, Federal Polytechnic, Ilaro, Ogun State, Nigeria babatunde.jayeoba@federalpolyilaro.edu.ng; 08065633250
Sub_Theme: Mathematic – Industrial Physics			
022	Flexural Analysis of Thick Plate under Load Using 3-D Polynomial Shear Deformation Theory	Thompson Edozie Okeke & Festus Chukwudi Onyeka	edozie.okeke@unn.edu.ng, *onyeka.festus@edouniversity.edu.ng [1]edozie.okeke@unn.edu.ng, [2]onyeka.festus@edouniversity.edu.ng
023	Molybdenum and Aluminium Effect on the Impact Strength of Monel 400	Oputa, Anyiam Augustine, Emifoniye Elvis	Department of Mechanical Engineering Technology, Mechanical Engineering Department Delta State Polytechnic, Ogwashi Uku, Nigeria. Delta State Polytechnic, Ogwash Uku.
024	Effects of Particle size of Shea nut Shell ash on Mechanical Properties of Reinforced Aluminum Matrix Composites.	P. T. Zubairu[1], A. B. Hassan[2], R.A Muriana[3] and N.A. Musa[4]	Department of Mechanical Engineering, Federal Polytechnic, Bida. [2, 4]Department of Mechnaical Engineering, FUT Minna. [3]Department of Metallurgical and Materials Engineering, FUT Minna.
SubTheme: Nano-Science & Nano-Technology			
025	Synthesis, Characterization and Utilization of Multiwalled Carbon Nanotubes as Conductor in Alkaline battery.	S. Abdulraheem1, A.S Abdulkareem2, R.A Muriana**3**	Department of Chemical Engineering, Federal University of Technology Minna, Niger State, Nigeria.

026	Nanotechnology and Nanomaterials: A Review of Environmental and Industrial Applications	Tijjani A. F.1, Bello A. U.2, Sulaiman M. B.3*, Tijjan K. F.4, Rabiu A. M.5	1Department of Science Laboratory Technology, Federal Polytechnic of oil and gas, bonny, River State, Nigeria 2Department of Electrical and Electronics Engineering, Gombe State Polytechnic Bajoga, Gombe State, Nigeria 3Department Chemistry, Northwest University Sokoto, Sokoto State, Nigeria 4Department Mechanical Engineering, University of Maiduguri, Borno State, Nigeria 5Department of Mechanical Engineering, Federal Polytechnic of oil and gas bonny, River State, Nigeria *Corresponding author e-mails: sulaimanmuhammadbashir@gmail.com
Sub-Theme: ICT & Smart Systems			
027	Automatic Afaan Oromo Rumor Detection and Classification on Social Media Using Deep Learning Approach	Fanta Teferi	fantateferimego@gmail.com. Ethopia
028	Optimized Intrusion Detection System using Boosting Algorithms with an Improved Feature Selection on Realistic Balanced Datasets.	Okey Daniel Ogobuchi	Department of Computer Engineering, MOMUA, Umudike, 07038640358, okeydanielogobuchi@gmail.com
029	Detecting motorcycle near miss incident using computer vision and image processing-based system	[1]Rotimi-Williams Bello, [2]Daniel A. Olubummo	[1]Department of Mathematics and Computer Science, University of Africa, 561101 Sagbama, Bayelsa State, [2]Department of Computer and Information Systems, Robert Morris University,Moon-Township, Pennsylvania, United States of America sirbrw@yahoo.com
030	Use of Smart Technologies in Addressing Electricity Theft in Nigeria, a Case Study of Smart and Automatic Meter Readers	Erekaa, T. R[1], & Diugwu, I.A	Department of Project Management Technology, Federal University of Technology, PMB 65 Minna Niger State, Nigeria
Sub-Theme:Waste Management			
031	Recovery of Chromium as Chromate from Tannery Effluents	Mohammed Salisu Musa and [2]Abdurrahman A. Audu	Department of Pure and Industrial Chemistry, Bayero University Kano-Nigeria
032	Prediction of Household Solid Waste Generation in Okada Town using Artificial Neural Networks	Orhorhoro Ejiroghne Kelly[1], Erameh Amagbon Andrew[2], Eka Efia Joseph[3*]	Department of Mechanical Engineering, General Abdulsalami Abubakar College of Engineering, Igbinedion University, Okada, Edo State, Nigeria
033	Strategies for Effective Application of the Lean Techniques in Materials Waste Minimisation	Mohammed, Aisha L.,Ruth, O.Umesi,Yandalu, Mohammed Manko,Yusuf Alaya	Department of Quantity Surveying, Federal Pol State Bida Department of Quantity Surveying, Niger Polytechnic, Zungeru, Niger State
Questions/Answer Session/Closing 4:30pm-5:00pm			

DAY 2, THURS, 16TH 2023

Arrival and Registration of Participants 9.00am-9:30am

Welcome and Recap of Day-1 by **Dr Chukwudi Emeribe** 9:30am-9:50am

1ST TECHNICAL SESSION

Moderator of 1st Session

Prof. P.O.B Eyunilo

Prof R. Edokpia

Prof. G. Ariavie

Dr. S.A Aliu

Dr. E. Nwankwo

Dr P. Akhator

Sub_Theme: Energy & Power			
034	Viability Analysis of Mini off Grid Solar System Installation in Wudil, Kano state	Mujittapha idiris wawo, Awal salisu yunusa, abubakar sani Muhammad, abubakadir, ahmad yako	Department of electrical engineering, kano state polytechnic. Department of mechatronics engineering, kano state.
035	Performance Evaluation of 11KV Government Reserve Area (G.R.A), Etete Feeder in Benin Electricity Distribution Company(BEDC), Benin City, Edo State, Nigeria	O.C.Onuigbo and [2]R.O. Edokpia	Department of Production Engineering, University of Benin, Nigeria
036	Performance Evaluation of Chicken Litters Biochar in A Direct Carbon Fuel Cell	Ejedegba Obukohwo Godwin	Federal University of Technology, Minna Chemical Engineering Department Email address: gordonz02@yahoo.com, ejedegbagodwin@gmail.com
Sub_Theme: Environmental Sustainability			
037	Water Quality Analysis of River Ochaja for Irrigation Purposes in Dekina Area of Kogi State, Nigeria	N. N. Ubachuku[1], Umolo Ufoma[2] and A. C. Salihu[1]	[1] Department of Environmental Management, Nigerian Army University Biu, Nigeria Federal Ministry of Agriculture Abuja FCTnchedoubachukwu@gmail.com
038	Analysis of the impact of Fukushima Daiichi Nuclear Accident on the World Today After a Decade	BubakariI Joda[1], Mohammed Joda Bello[2] and Kabiru Abubakar Yahya[3]	Department of Electrical/Electronic Engineering School of Engineering Federal Polytechnic, Kaltungo [2] Nigerian Nuclear Regulatory Headquarter Abuja
Sub-Theme: Renewable Energy & Carbon Capture			

039	Development of heterogenous catalyst from calcuim oxide impregnated with zinc oxide from production of biodisel using prosopis africana	Ahmadadu G.k, Eterigho, E.J and Otori A.A	Department of chemical engineering federal polytechnic, bida, Niger state. Chemical engineering department federal university of technology, minna, niger state
040	A Review on the most Appropriate Alternative Fuels For Automobiles	Igbunu inukori	Department of Mechanical Engineering, University of Benin, P.M.B 1154, Benin City, Nigeria.
041	Characterization and Production of BioEthanol From Agricultural Waste	1Biose, O., 1*Imhontu, M., 1Akenzua, O., 1Onabe, J., 1Angalapu Daudeigha J., 1Okorie, C.	1Environmental Pollution and Remediation Unit, National Centre for Energy and Environment, Energy Commission of Nigeria, University of Benin, Benin City, Nigeria Corresponding Author: imhontu.m@ncee.org.ng, +234-8061517804
042	A comparative study of pre- treatment and hydrolysis of corn cob and cassava bagasse for the production of biobutanol	Eboka Ifeoma Christy	Department : Chemical Engineering Faculty : Engineering
Sub-Theme: Material & Industrial Process			
043	The Comprehensive and Analytic Study of a Duffing Oscillator with cubic, quintic and heptic nonlinearities. (An Analysis)	Ikechukwu Nwamba	
044	The effect of magnetic flux density amplitude on the output of a permanent magnet machine: Part I	Chukwuemeka Chijioke AWAH	Department of Electrical and Electronic Engineering, Michael Okpara University of Agriculture, Umudike awahchukwuemeka@gmail.com, +234-8034221305
045	Photocatalytic Degradation of Dye (Methylene Blue) Over Mo-Co/ZnO Catalyst.	J. A. Aminu[1], U.G. Akpan[2].	[123]Department of Chemical Engineering, Federal University of Technology Minna, Niger State, Nigeria
046	Corrosion Inhibition of Low Carbon Steel using leaves extracts of Phyllanthus Amarus in Acidic Medium	1Abubakar S.A., 2Idim A.I. and 3Nji C.A	1Department of Mechanical Maintenance, Directorate of Services, Petroleum Training Institute, Effurun, Nigeria. 2Department of Electrical & Electronics Engineering, Petroleum Training Institute, Effurun, Nigeria. 3Department of Petroleum Engineering, Federal University of Petroleum Resources, Effurun, Nigeria. E-mail: 1abubakar_sa@pti.edu.ng, 2idim_ai@pti.edu.ng, 3ayafornjichristianlee@rocketmail.com
Sub-Theme: Modelling & Simulation			
047	Promoting An Open-source Process Simulator As A Means To Discourage the Use of Cracked Commercial Simulators: A Study of their Prediction Agreement in A Selected Chemical Process Simulation	Toyese Oyegoke	Chemical Engineering Department, Ahmadu Bello University Zaria, Nigeria. ORCID: https://orcid.org/0000-0002-2026-6864 Email: OyegokeToyese@gmail.com
048	3D modelling of reconditioned piston of a single cylinder 4 stroke diesel engine using solid works	Festus oamen isaac, otunaya obodeh, osagie ighodaro	Mechanical engineering department edo university uzairie. AAU(mechanical engineering. Isaac.oamen@edouniversity.edu.ng., enogobodeh@yahoo.com oighodalo@yahoo.com

Sub-Theme: Local Content in Manufacturing

049	Design and Fabrication of an Improved Automatic White Board Cleaning System	Loyalty Akpeti, Jimoh Hamza, Ukpong Iyeneobong Daniel, Edegbo Maro Felix and Efe Orumwense	Department of Mechanical Engineering, University of Benin, P.M.B 1154, Benin City, Nigeria.
050	Design and Fabrication of a Twin Disc Metallographic Polishing Machine	Akhabue Odion,Beston, Ogbeifun Israel,Ekanosetale and Ufuoma .G . Unueroh (Dr.)	Department of Mechanical Engineering, University of Benin, P.M.B 1154, Benin City, Nigeria.
051	Design and Fabrication of A Firefighting Device	Asemota Esosa, Otobiogeh Pope, Azamosa Harry, Egware Henry, and Unuareokpa Omozee	Department of Mechanical Engineering, Faculty of Engineering, University of Benin, Edo state, Nigeria. Phone: +2349021557243, +2348155612627, +2348061226282 Email: a_esosa@yahoo.com,
052	Design and fabrication of an electric bicycle from recycled material	Umukoro emmanuel et al.	Department of mechanical engineering. University of benin
053	Development of a Compression Molding Machine for Recycling Plastic Wastes	1Abubakar S.A., 2Abdullahi A. and 3Zakariya M.A	1Department of Mechanical Maintenance, Directorate of Services, Petroleum Training Institute, Effurun, Nigeria. 2Department of Electrical & Electronics Engineering, Petroleum Training Institute, Effurun, Nigeria. 3Department of Petroleum and Natural Gas Processing, Petroleum Training Institute, Effurun, Nigeria. E-mail: 1abubakar_sa@pti.edu.ng, 2abdullahi_a@pti.edu.ng, 3zakariya_a@pti.edu.ng
Sub-Theme: Mathematics –Industrial Process			
054	Stir Cast Production Parametric Interaction Effect on Toughness Property of Egg-Shell Reinforced Aluminium Composite	Emifoniye Elvis Oputa, Anyiam Augustine	Department of Mechanical Engineering Technology, Mechanical Engineering Department Delta State Polytechnic, Ogwashi Uku, Nigeria. Delta State Polytechnic, Ogwash Uku.
055	Influence of Different Curing conditions on some Properties of Nigerian Building and Road Reaserch Institute (NBRRI) Leterite Interlocking Bricks	Sule, H. J. A. B. Shehu., Moyi, Z. Nazifi, A.	Nigerian Building and Road Research Institute (NBBRI) Northwest Zonal Office Kano
056	Qualitative Phase Analysis And Determination Of Crystalloghraphic Parameters Of Yantuwaru Natural Fluorite.	Gidado Shehu and Dr. Ibrahim Muhammad Bagudo	Department of Physics, Umaru Musa Yar'adua University, Katsina
057	Air Conditioning System Comparison of Fuzzy Logic and Neuro Fuzzy Algorithms	1Francis. M., 2Raymond. J and 3Bello M. A and 4Muhammad S	1Department of Mechanical Engineering, Faculty of Engineering, Federal Polytechnic Kaltungo, Gombe, Nigeria, maxwellkamo4life@gmail.com; +2348069707263
Subtheme: Nanoscience & NanoTechnology			

058	Reinforcement of Nanoparticulate Polymer Matrix Composite using Rice Husk Ash	Nafisat Tijjani[1], Mastura Shehu Tofa[2], Ibrahim Abdullahi[3], Auwal Salisu Yunusa[4], Ishaq Bala Adam[5].	1,4Department of Mechatronics Engineering Technology, School of Technology, Kano State Polytechnic, P.M.B 3348, Kano State, Nigeria.240 NNDC Quarters, Hotoro GRA, Kano State, Nigeria. 3Department of Mechanical Engineering, Faculty of Engineering, Bayero University Kano, Kano State, Nigeria. 5Department of Mechanical Engineering Technology, School of Technology, Kano State Polytechnic, P.M.B 3348, Kano State, Nigeria. nafisattijjani19@gmail.com
059	Role of Nanomaterials in the Treatment of Drinking Water: A Review	Sulaiman Mohammad Bashir 1* Sulaiman Babayo Ali2, Oluyinka Omoyeni Akinlotan3	1Department Chemistry, Northwest University Sokoto, Sokoto State, Nigeria 2Department of Chemistry, Nigerian Army University, Biu, Borno State, Nigeria 3Department of Chemistry, Kogi State College of Education (Technical) Kabba, Kogi State, Nigeria *Corresponding author e-mails: sulaimanmuhammadbashir@gmail.com
Sub_Theme: ICT & Smart Systems			
060	Engendering National Security in Nigeria through Artificially Intelligent Robots	Iroju Olaronke, Olaleke, Janet and Idowu, C.S.	Department of Computer Science, Adeyemi Federal University of Education, Ondo, Nigeria
061	The Challenges for External Auditors in the Adoption of IFRS in Corporate Financial Reporting in Nigeria	Barakat M.D	Department of Accountancy, Federal Polytechnic Bida, Niger State Nigeria
062	Security issues in digital learning spaces and preventive measures(a case of national open university of Nigeria)	Umar mukhatar. Muhammad, aminu tukar	Department of information technology national open university, abuja. Department of mathematics and computer science, borno state university maduguri
063	Development of a ZigBee tyre pressure monitoring system sensor unit with an efficient battery scheduling algorithm	Kingsley Okeoghene Enalume	Federal University of Petroleum Resources Effurun enalume.kingsley@fupre.edu.ng
Sub_Theme: Waste Management			
064	Examining of Solid Waste and It's Impacts on The Environment (A Case Study of Ikom Urban)	Ushie, O. A, [1]Aasegh T. J.[1]Ama, S.O. and [2]NEJI, S. S.,	Department of Chemical Science, Federal University Wukari, P.M.B. 1020. Taraba State, Nigeria. [2]Faculty of Sciences, National Open University Ikom Study Centre, Cross River State
065	Biosorption of heavy metals by bacteria isolated from uwelu metal dumpsites Benin City, Edo state		
066	Development of LEAN Framework for Effective Minimisation of Materials Waste in Building Projects	Yusuf, Alaya [2] Mohammed, Aisha L., [3]Yandalu, Mohammed Manko, & [4] Isyaku L.M	Department of Quantity Surveying, Federal Polytechnic, Bida [3]Department of Quantity Surveying, Niger State Polytechnic, Zungeru, Niger State

TEA BREAK 12:10pm-12:40pm
2ND TECHNICAL SESSION **Moderator.** **Prof. I. Emovon** **Dr. S. Ikpesini** **Dr. C. Kwasi-Effah** **Dr. N Enoma**

Sub_Theme: Energy & Power			
067	A Unit commitment approach for an integrated energy system	Emodumeh Aloaye et al	Department of mechanical engineering , uniben. abdulweliyaremodomeh@eng.uniben.edu
068	RETscreen feasibility analysis of wind power plant in kano, Nigeria	Mujittapha idris wairo et al	Department of electrical engineering, kano state polytechnic.mujittapha.wawo@yahoo.com
069	Post-Privatization Performance of Power Generation Companies in Nigeria	John Eihoda Mathias* and Ikechukwu A. Diugwu	Department of Project Management Technology, Federal University of Technology, Minna, Nigeria *Corresponding author: johnnyparadigm@yahoo.com
070	Occupational Exposure Level of ELF Magnetic Fields Assessment in 330 kV Switchyards of Hydro-Plants and Gas-Plants Stations in North-Central Nigeria	Ocheni, Abdullahi Ugbede Usman*1, 2; Oyedum, Onyedi David2; Nwohu, Mark Ndubuka3; Moses, Abiodun Stephen2	1Department of Physics, University of Maiduguri, Nigeria 2Department of Physics, Federal University of Technology, Minna 3Department of Electrical and Electronics Engineering, Federal University of Technology, Minna *Corresponding author: Ocheni, Abdullahi Ugbede Usman Email address: oauusman@unimaid.edu.ng
Sub_Theme: Environmental Sustainability			
071	Analysis of the Rheological Characterisation of high Temperature high Pressure water based mud using Rheological Models	Odiri Jude Ogheneyerovo (SPE) (jude.odiri@eng.uniben.edu)PAUL O. Ogbeide (Ph.D, MIMARESTT, SPE, NSE, CILT.) (paulogbeide@gmail.com)	DEPARTMENT OF PETROLEUM ENGINEERING UNIVERSITY OF BENIN
Sub-Theme: Renewable Energy & Carbon Capture			

072	Evaluation of Biogas Homemade Purification Filter	1Zakariya M.A., 2Idi S. and 1Isodje E.	1Department of Petroleum and Natural Gas Processing, Petroleum Training Institute, Effurun, Nigeria. 2Department of Welding Engineering and Offshore Technology, Petroleum Training Institute, Effurun, Nigeria. 3School of Industrial Continuous Education, Petroleum Training Institute, Effurun, Nigeria. E-mail: 1zakariya_a@pti.edu.ng , 2idi_su@pti.edu.ng , 3isodje_e@pti.edu.ng
073	Performance Evaluation of a Biomass Briquette Stove Burner	1Ajiboluwa A.A., 2Enakireru E.E. and 3Akinfaloye A.O.	1Department of Mechanical Engineering, Federal University of Petroleum Resources, Effunrun, Nigeria 2, 3Department of Mechanical Engineering, Petroleum Training Institute, Effurun, Nigeria. E-mail: 1ajiborisha.abisoye@fupre.edu.ng, 2enakireru_ee@pti.edu.ng, 3akinfaloye_ao@pti.edu.ng
Sub-Theme: Material & Industrial Process			
074	The effect of magnetic flux density amplitude on the output of a permanent magnet machine: Part II	Chukwuemeka Chijioke AWAH	Department of Electrical and Electronic Engineering, Michael Okpara University of Agriculture, Umudike awahchukwuemeka@gmail.com, +234-8034221305
075	Prism Methodology and Project Success: A Stakeholders' Perspective	Jato, Peter Igorigo	digijat@yahoo.com Department of Project Management Technology School of Innovative Technology Federal University of Technology Minna, Niger State, Nigeria
076	A Comparative Investigation of the Effect of Dry Quenching and Wet Quenching on The Corrosion Susceptibility of AISI 1018 Steel in Marine Environment	. Awheme1, *, G. O. Okosun2, T. Uwanogho3, K. O. Urhibo4, G. Ojeru5	1,2,3,4,5 Mechanical Engineering Department, University of Benin, P.M.B 1154, Benin City, Nigeria *Corresponding author Tel.: +2348066772354 E-mail address: oghenerobo.awheme@uniben.edu
077	Effect of Reaction Temperature on the Total Petroleum Hydrocarbon of Biodiesel Produced from Waste Cooking Oil using A Heterogenous Catalyst	George Oluwafemi Joseph	Chemical Engineering Faculty of Engineering
Sub-Theme: Modelling & Simulation			
078	Temprature distribution in axsymmentric and 3D models of a disel engine piston crown using finite element method in ANYS software	Festus Oamen Isaac[1], Otunaya Obodeh[2], Osagie Ighodalo[3]	[1,2] Mechanical Engineering Department, Edo University Uzaurie. [3] Mechanical Engineering Department, Ambrose Ali University. Ekpoma. Isaac.oamen@edouniversity.edu.ng, engobodeh@yahoo.com, oighodalo@yahoo.com
Sub-Theme: Local Content in Manufacturing			
079	Design, Fabrication and performance evaluation of Waste Plastic shredder	Azamosa Harry, Idiahi Omolumen, Asemota Esosa, Ataman Raphael, Osamudiame Raphael and A.I. Obanor.	Department of Mechanical Engineering, Faculty of Engineering, University of Benin, Edo State, Nigeria. Phone: +2347016000164 Email: Johnharry238@gmail.com

080	Design and Construction of an Automated Paper Shredder with a Cross-Cut Pattern.	Ikuemonisan Victor Oluwaseyi and [2]Ashiedu Festus Ifeanyi.	Mechanical Engineering Department, Federal University of Petroleum Resources, Effurun, Delta State, Nigeria. victorikus@gmail.com ashiedu.ifeanyi@fupre.edu.ng
081	Design and development of a cost effective automated metal sheet bending machine	Eke lawrence azandah and ashiedu festus	Department of mechanical engineering FULPRE ekelawrence32@gmail.com ashiedu.ifeanyi@fulpre.edu.ng
082	The Effect of Technical and vocational Education on Economic Development and Social Mobility in Katsina State, Nigeria	Saleh Jamilu	Department of Technical Education, Hassan Usman Katsina Polytechnic, Katsina State, Nigeria
083	Acquisition of Employability Skills Through Technical Vocational Education: A Vital Investment for Success in the 21st Century Workforce	Saleh Jamilu	Department of Technical Education, Hassan Usman Katsina Polytechnic, Katsina State, Nigeria
Sub-Theme: Mathematics –Industrial Process			
084	Synthesis of Hierarchical Zeolite Y from Aloji Kaolin.	R. A. Usman, [1,2]A. S. Kovo, [1,2] A. S. Abdulkareem and [1]M. U Garba.	Department of Chemical Engineering, Federal University of Technology, PMB. 65, Minna, Niger State, Nigeria Nanotechnology Research Group, Africa Center of Excellence for Mycotoxin and Food Safety, Federal University of Technology, PMB 65, Minna, Niger State, Nigeria rukiyausman3@gmail.com
085	Optimization of Some Properties (Tensile Strength, Elongation and Water Vapor Permeability) of Biodegradable Films	Sunday, Simon Ochoyoda and	Department of Agricultural and Bio resources Engineering, Federal University of Technology, P.M.B. 65, Minna, Nigeria simonsunday9@gmail.com
	produced from Tacca (*L. Kunze*) Starch and Plasticizer Blends	Orhevba, Bosede Adelola	
086	Mathematical Based Path-loss Model for 4G(LTE) Wireless System AT 850MHz, 900MHz AND 1450MHz Channels in Offa Township, Kwara State	Somoye Olatunde Abiodun & Dr. O Oyeleke:	Federal Polytechnic Offa Kwara State
Sub_Theme: ICT & Smart Systems			
087	Design and Installation of a Capacity Limiting RFID Access Control System	Moluno Richie Chukwunalu, Oyakhilome Lordson Osenegame, Ika Kevwe Ntow, Fidelis Endurance David, Dr P.O Olagbegi	Department of Mechanical Engineering, University of Benin, P.M.B. 1154, Benin City, Nigeria
088	Improved Propagation Model for 4G (LTE) Path Loss in a Mobile Wireless Communication Enviroment (A CASE Study Sango-Otta, Ogun State)	Somoye Olatunde Abiodun	Federal Polytechnic Offa Kwara State

089	Designing Smart-Intelligent System for Teaching-Learning 6-11 Years Robotic Programming	Ibuomo R. Tebepah	Department of Computer Science, University of Africa
Sub_Theme Waste Management			
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091	Anaerobic Co-Digestion OF palm oil Effluent and Food Waste	Ejiroghene Kelly Orhorhoro[*1], Silas Oseme Okuma[2], Samuel Batet[2]	Department of Mechanical Engineering, General Abdulsalami Abubakar College of Engineering, Igbinedion University, Okada, Edo State, Nigeria Department of Mechanical Engineering, Maritime University, Okerenkoko, Delta State, Nigeria
DAY THREE/ CERTIFICATE PRESENTATION/DEPARTURE			
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BOOK OF ABSTRACTS

ABOUT NIPES

NIPES is a research community which combines the engineering and science profession in Nigeria and across Africa. It was founded by a group of researchers in the University of Benin, Nigeria. NIPES is a member organization of Crossref (USA) and the National Chapter of the International Association of Professional Engineers and Scientists which is registered in accordance with the provision of the Allied Matters Act, Cap. C20, Laws of the Federation of Nigeria through the Commission. NIPES stands to promote and facilitate the exchange of research information among engineers and scientists and provide opportunities for interaction among members in the field including those in academia, research institutions, government agencies and industry.

ABOUT NCEE

National Centre for Energy and Environment is an agency of the Energy Commission of Nigeria. It was established by the federal Government of Nigeria on the 12th of March 2009, through the 2009 appropriation bill. The Centre is situated in University of Benin, Benin City in the SouthSouth region of Nigeria. The Centre's mandate is to promoted renewable energy sources through research and developmental initiatives in Bioenergy production and Environmental Forensics/Management, supported by technology transfer.

ABOUT THE CONFERENCE

The Theme of the Conference is "Emerging Trends in Science and Engineering towards 4.0 Revolution". The aim is to bring together academicians, experts, scholars, policy makers and industrialists to discuss contemporary and cutting-edge research issues in engineering and science geared towards meeting key Sustainable Development Goals. The Conference will also provide participants the opportunity to develop new collaborative initiatives in areas of sustainability, engineering innovation, ICT, Nano-technology, renewable energy systems, new materials etc.

CONFERENCE SUBTHEMES

- Energy and Power
- Environmental Sustainability
- Renewable Energy and Carbon Capture
- Material and Industrial Process
- Modelling and Simulation
- Local content in manufacturing
- Mathematics-industrial Physics
- Nano-science and Nanotechnology
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			Engineering, FUT Minna. [3]Department of Metallurgical and Materials Engineering, FUT Minna.
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94	Development of an environmental waste information management system	[1]Amannah Constance Izuchukwu and [2]Olorunda Sunkanmi	Department of Computer science, Ignatius Ajuru University of Education, Port Harcourt, Nigeria
95	Performance of Municipal Solid Waste as Fuel in a Binary Direct Carbon Fuel Cell.	Anthony Richard Ajaw	Department of Chemical Engineering, Federal University of Technology, PMB.65, Minna. Niger State, Nigeria. *Corresponding author's E-mail: ajawz16@gmail.com.Tel:+2347037888594
96	Cervical Cancer Prediction using Ensemble Models	Samuel Ebosele Ojietohamen 1* and Efosa Charles Igodan 2	1,2 Department of Computer Science, Faculty of Physical Sciences, University of Benin, Benin City, Nigeria; seekersoftec@gmail.com1* (Correspondence author), charles.igodan@uniben.edu 2

SUB-THEME 1:

ENERGY & POWER

001

HYBRID PHOTOVOLTAIC THERMAL (PV/T) SYTEM FOR HEATING AND ELECTRIFCATION: AN EXPERIMENTAL APPROACH

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ABSTRACT

The use of photovoltaic (PV) systems is one the most practicable means of harnessing the largest and most accessible source of renewable energy today which can pave way for economic diversification. Generally, reduction in the efficiency of the PV modules has always been a stumbling block in exploiting this system to their fullest capacity. The use of hybrid photovoltaic-thermal (PV/T) system, enhances the efficiency of the PV module, while the PV/T collector also have thermal efficiency that can be channelled for domestic heating demands concurrently. In this paper, an experimental test rig was fabricated and set-up in order to carry out the evaluation of a hybrid (PV/T) system. Two different systems were examined experimentally under the same working condition and their performances were analysed accordingly. The experimental results showed that the highest thermal efficiency obtained for the PV/T system was about 60% while, the highest electrical efficiency recorded for the PV system with and without cooling were 9% and 7.5% respectively. Similarly, a total of 66.3% of power was produced from the system with cooling compared to the system without cooling which manage to generate less than 35%. Based on the analysis presented, the use of (PV/T) system is the promising technology that will enhance both thermal and electrical efficiency of (PV) modules maximally.

Keywords: Photovoltaic thermal system: Module: Retrofitted: Useful energy: Solar radiation

002

UTILIZATION OF CONCENTRATED SOLAR-THERMAL POWER FOR POWER GENERATION IN NIGERIA.

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ABSTRACT:

Power supply is one of the numerous problems today in Nigeria with most rural areas and some states still having huge percentage of poor power supply in homes. Nigeria has struggled with poor and insufficient power supply for years, as a result of inadequate power generation, transmission and distribution problems. Concentrated Solar-Thermal power (CSP) is a technique that involves the conversion of solar energy to thermal energy to generate electricity. Despite the initial cost and large land usage of solar thermal plant, the fact that Nigeria today has insufficient and poor power generation and that solar thermal provides a cleaner energy is one of many reasons for this plant. Since solar thermal plants can feed their electricity into the power grid even after sunset, they are of particular value for an energy system based on renewable energy sources. Although solar thermal plant is not a direct alternative to power generation in national grid, it is an immense contribution to the amount of power generated in Nigeria. With Spain having 2.3GW and the USA having 1.7GW, these countries clearly lead the field in terms of installed capacity. They are ahead of Morocco (516MW), South Africa (500MW) and China (420 Megawatts). The paper describes how Nigeria can harness the full solar potential of its radiation using a solar power tower to produce power for turbine forming a Rankine with superheat thermodynamic cycle to generate electricity and the usage of molten salts for thermal storage to power the plant when there is insufficient amount of sunlight and at nights.

Keyword: Concentrated Solar-thermal, Renewable Energy, Electricity and Power Generation.

003

OFF-DESIGN MODELING OF OMOKU GAS POWER PLANT, RIVERS STATE, NIGERIA

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Abstract
In this study, the performance characteristics of Omoku gas power plant in Rivers State Nigeria, operating at design and part load conditions was evaluated. Differences in part load performance, due to various factors in operation were investigated using EBSILON® Professional. Various part load operation strategies including variation in ambient temperature, variation of fuel and air flow, variation of expected output, variation in efficiency of components were considered while maintaining constant turbine exhaust temperature. The mass flow, air flow ratios under different load conditions (30% to 110%) nominal power was determined. Data were also collected from the power plant through direct observation from the monitoring screen of the human machine. Interface, log-books and manufacturer's manuals. The results showed that variation of temperature in different seasons of the turbine impacted performance; while lower temperatures increased air density and compressed mass flow, and delivered more power. Variation in air ratio in the combustion chamber also enabled the regulation of the maximum temperature of the cycle and achieved specified power output. The results also showed that the power plant with higher design performance exhibited less efficiency degradation during part load operation. The efficiency of the turbine power plants was strongly affected by the pressure ratio, the airfuel ratio, the ambient temperature, and the isentropic efficiencies.
Keywords: Modeling, Simulation, Off-design, Thermodynamic Performance

004

VIABILITY ANALYSIS OF MINI OFF GRID SOLAR SYSTEM INSTALLATION IN WUDIL, KANO STATE

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ABSTRACT

Energy is a very important variable that its conservation is of paramount interest to everyone nowadays. This paper work on power generation from solar source as a system that converts solar irradiance into electric energy. Researchers suggest that the amount of sunlight that strikes the Earth's surface in an hour and a half is enough to handle the entire world's energy consumption for a full year. Here solar energy is converted to electrical energy by means of a solar panel made up of transducers called solar cell. Solar energy has incredible potential to power our daily lives. Solar power system is one of the best renewable energy technology which is not only cost effective but environment friendly as well. The paper focused on the feasibility analysis of an off-grid mini power plant which can help to reduce the dependency on grid and allow isolated area to live in self-sufficient manners without reliance on one or more public utilities. Off-grid or standalone systems can be defined as independent systems that are not connected to any electrical grid. It is mostly used in location where there is little access to grid infrastructure. The feasibility study of a 300KW PV power plant at Wudil, Kano State was conducted. For the study RETScreen software is used, using the RETScreen the benchmark analysis, emission and finally analysis were made. From the bench mark analysis the energy cost of production is reduced to 0.10USD/KWh and finally emission analysis shows that 3,412.6 tCO2 will be reduced from the potential emission to the environment. Hence, this means the project is feasible financially, technically and environmentally and it will help the country to achieve its goal in building clean energy.

Key Words: Photovoltaic, Power Plant, RETScreen, Feasibility, Renewable Energy and Solar Energy.

005 PERFORMANCE EVALUATION OF 11KV GOVERNMENT RESERVE AREA (G.R.A), ETETE FEEDER IN BENIN ELECTRICITY DISTRIBUTION COMPANY(BEDC), BENIN CITY, EDO STATE, NIGERIA

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ABS TRACT

In this present time where the demand of electric energy is increasing rapidly with technological and economic growth. The energy demand of the customers supposed to be met. However, Nigeria's power supply has been experiencing incessant interruptions due to failures in the distribution system which constitutes about 80%. The reliability of the power system is the major challenge to meet the customers demand. In this research work, Reliability, Availability, and Maintainability (RAM) of G.R.A 11KV Feeder in Benin Electricity Distribution Company (BEDC) were evaluated. These was carried out by collating the failure data which includes; outage duration, time of failure, causes of failure, and load interruption from the Injection substations G.R.A Injection substations for the year, 2020 and 2021. Monthly and yearly trend analysis (involving Mean time between failure(MTBF), Mean time to repair(MTTR), failure rate, repair rate, availability), Non parametric method (Distribution Free Method), Customer based reliability indices (SAIFI, SAIDI, CAIFI, CAIDI, ASAI, and ASUI), and parametric method (Exponential and Weibull Distribution) were deployed for the analysis. The works were concluded and recommendations were made on how the performance of the three feeders should be improved.

006 A UNIT COMMITMENT APPROACH FOR AN INTEGRATED ENERGY SYSTEM

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ABSTRACT

Central cooling systems are energy-efficient and cost-effective solutions for providing cooling to large buildings and communities. The unit commitment of a central cooling system is a key process that determines the optimal operation of the system's cooling units, to meet the cooling demands of the buildings while minimizing the overall energy consumption and costs. The study developed an optimization model for the unit commitment of a central cooli0ng system, considering the cooling demands of the buildings, the operating costs of the cooling units, and the availability of cooling sources. The model is formulated as a mixed-integer linear programming problem, and it is solved using Gurobi optimization solver. The results of the study show that the proposed unit commitment model is able to effectively balance the cooling demands of the buildings with the availability of cooling sources and the operating costs of the cooling units. It also demonstrates that the proposed model is able to significantly reduce the energy consumption and costs of the cooling system, as compared to traditional methods. The study concludes that the proposed model is a valuable tool for the efficient operation of central cooling systems, and it can be used to support the decision-making process of future energy models. The model can be implemented in real-world systems to improve the energy efficiency, cost-effectiveness and reliability of the central cooling system.

.Keywords: Central Cooling, Cooling System, Unit Commitment, Guribi, Cost, Optimization

007 RETSCREEN FEASIBILITY ANALYSIS OF WIND POWER PLANT IN KANO, NIGERIA

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ABSTRACT

The development of the electricity sector in Nigeria continues to be fenced by high rates of inefficiencies, insufficient security of supply, low rate of RET investment including wind power plants and the need to further unbundle and liberalize the energy market is increasing, in a bid to produce and maintain a sustainable, secure, flexible in time, efficiently supplied, climatefriendly and affordable energy supply system is required. The most critical aspects of attaining energy expansion goals cannot be achieved without the promotion of carbonless power technologies reducing (GHG) emissions. As a consequence, huge investments in RET energy based power generation systems and related RET technologies are required. To overcome the barriers to clean energy technology implementation especially at the preliminary feasibility stage, the latest model, RETScreen Expert software added the ability to rapidly analyze the feasibility of wind power plant options at real site condition. This fast feature of the model enables us to analyse the real potential of the proposed 3000 KW wind farm. From the simulation executed in RETScreen Expert software, the technical and economic optimization of the proposed energy system is achieved. Environmental friendly with 0 GHG emission off-grid power plants is achieved. Keywords: Wind Power Plant, RETScreen Expert, wind energy

008 POST-PRIVATIZATION PERFORMANCE OF POWER GENERATION COMPANIES IN NIGERIA

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ABSTRACT

Despite government efforts to manage Nigeria's power sector, the sector has not been able to meet the nation's power needs. Taking a bold step to improve performance, the sector was privatized, with a transaction cost of approximately $3.0 billion. Despite this, there are indications that service delivery failures, infrastructure deficits, low returns on investment, massive retrenchment, and escalating rates of electricity tariffs have not been resolved. A minimum of 20,000MW of power could have been generated by investing in the sector, however, after eight years of privatization, the sector's operational generation capacity has fallen by 33%. Moreover, only 23% of the cost of electricity production is recovered, while revenue has fallen by 85%. Nigeria's electricity consumption per capita of 144KwH is low compared to other African countries such as South Africa (4229 KWh), Egypt (1699 KWh), and Libya (1841 KWh). Secondary data of power generation from 2005 (eight years pre-privatization) to 2021 (eight years post-privatization) will be analysed using a paired sample correlation test to evaluate the post-privatization performance of the Generation Companies (GENCOs) in Nigeria. The outcome of this study could become a policy guide for the regulators and financiers of the power sector in Nigeria.

Keywords: Post-privatization, Power generation, Power sector, Generation companies, GENCOS

009

PERFORMANCE EVALUATION OF CHICKEN LITTERS BIOCHAR IN A DIRECT CARBON FUEL CELL

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ABSTRACT;

Biochar obtained from pyrolyzed Chicken litters is a biomass energy fuel of renewable energy resource that can effectively run on a fuel cell. Over reliance on fossil fuel - a non renewable energy resource - for our electrical power generation mostly in this part of the world, not only offers us inadequate energy for high cost but also present us with environmental challenges of high exhaust emission that lead to greenhouse effect. Direct Carbon Fuel Cell (DCFC) is a type of fuel cell that directly convert solid carbon fuel to electricity through electro-chemical reaction. DCFC technology accept carbon from a wide range of carbon-rich biomass including biochar from animal waste which are abundant and readily available. In this study, the Chicken litters was pyrolyzed at 750^{o}C with a biochar yield of 46wt.%. Proximate and Ultimate analyses including Calorific value were conducted. An average moisture content of 4.26wt.%, volatile matter of 21.90wt.% and fixed carbon content of 61.51wt.% were recorded with average calorific value of 28.79MJ/kg and carbon value of 57.501wt.%. As a suitable fuel for DCFC operated within temperature range of 300 to 700^{o}C, it generated a maximum Open Circuit Voltage (OCV) of 1.18 Volt at 600^{o}C. This study show that solid carbon from animal wastes biochar can generate electricity directly in a single step transformation via DCFC.

010

OCCUPATIONAL EXPOSURE LEVEL OF ELF MAGNETIC FIELDS ASSESSMENT IN 330 kV SWITCHYARDS OF HYDRO-PLANTS AND GAS-PLANTS STATIONS IN NORTH-CENTRAL NIGERIA

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ABSTRACT

The ardent quest for electricity that affects virtually all human activities has evolved the speculation of its adverse effect on human health when exposed to the associated electromagnetic field. Occupational exposure levels of the density of extremely low frequency (ELF) magnetic field in five 330 kV switchyards of Hydro-plants and Gas-plant with similar infrastructures were investigated, assessed and analysed. The entire switchyard measurement of ELF magnetic field were performed with reference to three observation heights of 1.0, 1.5 and 1.8 m above ground level via spot measurements techniques in segmented manner using Extech 480826 triple-axis EMF metre in conformity to IEEE standards, and occupational exposure computed from the mean of the three observation heights for each spot. The analysed results using Welch ANOVA SPSS package demonstrated occupational significant differences of ($p < .001$) between 330 kV switchyards of Shiroro Hydro-plant and Geregu Phase II Gas-plant, significant differences of ($p = .045$) between switchyards of Geregu Phase I Gas-plant and Geregu Phase II Gas-plant, and also significant differences of ($p < .001$) in occupational exposure was demonstrated between switchyards of Jebba Hydro-plant, Kainji Hydro-plant when separately compared to Geregu Phase I and Geregu Phase II Gas-plants. However, non-significant differences occurred between switchyards of Shiroro Hydro-plant and Jebba Hydro-plant, Kainji Hydro-plant and Geregu Phase I Gas-plant, and Jebba Hydro-plant with Kainji Hydro-plant. This study has revealed the prevalence of electropollution in occupational environment and variation in the strength between switchyards personnel might encounter at instant of the measurements.

Keywords: Occupational Exposure, Transmission Switchyards, ELF Magnetic Fields, Extech 480826 Triple-Axis EMF Metre and Welch ANOVA

SUB-THEME 2:

ENVIRONMENTAL SUSTAINABILITY

011 SPATIO- TEMPORAL ASSESSMENT OF THE GROUNDWATER QUALITY AROUND A MUNICIPAL OPEN WASTE DUMPSITE IN BENIN CITY, SOUTH- SOUTH NIGERIA.

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Abstract

The spatio- temporal analyses of the physico- chemical and microbiological properties of groundwater samples from four (4) boreholes was carried out to establish the groundwater quality around Ikhueniro Open Waste Dumpsite in Benin City, Edo State, South- South Nigeria. The boreholes were purposively selected in a North, South, East and West direction to ensure spatial spread. Leachate and groundwater samples were taken in both dry (January, 2019) and wet (May, 2019) seasons. Standard equipment and laboratory procedures were used to determine the physical, chemical including heavy metals and microbiological parameters of the leachate and groundwater samples. The physico- chemical and microbiological characteristics of leachate samples from the dumpsite showed high pollution potentials as well as marked seasonal variation. Laboratory results revealed that the concentration of PH, TDS, Ca, Mg, No2, No3, Fe, Mn, and Cd of all the groundwater samples exceeded the allowable limits of World Health Organization (WHO) for drinking water. Besides, the concentration of COD in the groundwater samples from Sampling Point two (2) also surpassed WHO standard limit for drinking water. However, laboratory analyses showed that there was no trace of Total Heterotrophic bacteria Counts (THC) and Total Coliform Counts (TCC) in the groundwater samples around the dumpsite. With the exception of PH values, laboratory results of the physico- chemical properties of groundwater samples generally showed obvious seasonal variation in terms of higher concentration in the rainy season than in the dry season. Specifically, the concentration of Bicarbonate (HCO3) ranged from 45.3mg/l to 72.0mg/l in the dry season and 48.3mg/l to 85.4mg/l in the rainy season. The study therefore revealed that the groundwater around Ikhueniro Open Dumpsite was polluted and unfit for drinking. It was however recommended that there is an urgent need for periodic monitoring and assessment of groundwater quality around Ikhueniro Open Dumpsite and beyond. In Nigeria, this can be achieved by putting in place appropriate groundwater governance structure.

Key Words: Leachate, groundwater water quality and groundwater quality parameters.

012 STRATEGIES IN PETROCHEMICAL PROCESSES PART-I: CASE OF PERUVIAN OIL

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ABSTRACT

The great importance of oil in today's world economy is based on their contribution the total energy supply. In 2020, the world consumed 91.3 million barrels of oil per day. Depending on the quality of the crude (chemical and physical properties), the different types of oil are commercialized around the world. For two decades ago, approximately, there are tendencies up to lower or free Sulphur fuels (content under 50 ppm) for vehicles in order to reduce the emissions generated. The sulfur content of crudes is important for the determination of commercial values. Peru exports most of their crude, due to this is too heavy in Sulphur content (2000-5000 ppm) for their refineries. Peru has undergone changes in the last three decades that increased the pressure about environmental issues. The Transport is considered one of the main causes of air pollution in several Peruvian cities. For this reason, it is imperative the development strategies in order to reduce the emissions of Sulphur compounds and/or improve the existent chemical processes of petrochemical industry. We present

an alternative process design, corresponding to the Sulphur desorption unit for Peruvian crude oil, in order to minimize their content, previous to the distillation unit

013 ASSESSMENT OF RADIATION LEVELS AND POTENTIAL RADIOLOGICAL HAZARDS IN SOILS OF RIRUWAI MINING AREA, NORTHWESTERN NIGERIA

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ABSTRACT

The aim of this research is to determine the concentrations and evaluate the radiological hazards associated with natural radionuclides (238U, 232Th and 40K) in the soils of Riruwai mining area. A total of 60 surface soil samples from four (4) sampling sites, including 18 from active mine sites, 12 from abandoned mine sites, 21 from farmlands, and 9 from control sites, were collected during the dry and rainy seasons. The concentrations of 238U, 232Th and 40K were measured using a HPGe Gamma-ray Spectrometer, and the measured concentrations were used to estimate the internal hazard (Hin), external hazard (Hex) and gamma dose rate. The findings of the study revealed that the concentrations of 238U and 232Th in all sampling sites and seasons were higher than the world average value, while the concentrations of 40K were lower than the world average value. The levels of radionuclides in the soils show a significant seasonal variation, with higher concentrations obtained during the dry season. The correlation analysis revealed a very strong positive relationship between all the radionuclides, which indicates a common origin (parent material). The Hin and Hex assessments show that only the active mining sites have the potential to be hazardous to human health. The gamma dose rate computations revealed that only active and abandoned mining sites have their mean gamma dose rate greater than the tolerable limit of 59nGy/h. The researchers, therefore, recommend that comprehensive monitoring of mining operations and public education about the dangers of radiation exposure in the study area be carried out.

Keywords: Hazards, HPGe Gamma-ray Spectrometer, Radionuclides, Riruwai,

014 RECONSTRUCTION OF THE PALEO-DEPOSITIONAL SETTINGS OF THE CHATTIAN GH6.2 SAND IN THE ARO FIELD, ONSHORE DEPOBELT, NIGER DELTA BASIN

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ABSTRACT

Delineating the depositional environment is a key factor in oil field characterisation because it serves as a key input into property distribution in the 3D model. This study is carried out to reconstruct the paleo-environment of deposition of the GH6.2 reservoir through data integration. A combination of well logs, lithological and mineralogical description of side wall samples and biofacies data were used to reconstruct the paleo-environment of deposition. Gamma ray log signatures were utilised to infer depositional features, discriminate litho-units, and define facies association. Lithological descriptions of Side Wall sample describes a grey sandy clayey, fine to silty with rare to medium and coarse grains sediments across some wells. The mineralogical description on side wall sample denotes the presence of quartz, mica flakes and pyrites. The interpretation of biofacies data located the deposit in the Middle to Outer Neritic environment deposited in the Oligocene in the Chattian age during a rising sea level. The integration of the results from the well logs, side wall samples,

mineralogical studies, and biofacies data points that the GH6.2 reservoir is a channelised shoreface deposit, deposited in the Chattian age in a transgressive environment.

Key words: Paleo environment, biofacies, well logs, side wall sample, channel and Shoreface

015

WATER QUALITY ANALYSIS OF RIVER OCHAJA FOR IRRIGATION PURPOSES IN DEKINA AREA OF KOGI STATE, NIGERIA

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ABSTRACT

The physico-chemical property of river Ochaja in Dekina area of Kogi State, Nigeria conducted to determine its suitability for irrigation purpose. Three water samples were collected at different locations: upstream, midstream and downstream during the rainy season in the month of September 2021. Water samples were collected in liter capacity plastic bottles by deeping it to about 10 cm below the water surface. Prior to sampling, the plastic bottles were rinsed three times with the water to be sampled and the samples were transported and stored in the laboratory under temperature of 4°c before analysis. Irrigation parameters like the sodium adsorption ratio, residual sodium carbonate were calculated. The result showed that the water quality was suitable for irrigation; most of the parameters were within the FAO permissible limit for irrigation purpose and falls to the class of C1S1 (low salinity and sodium hazard) based on electrical conductivity and sodium adsorption ratio. The study recommended among others that villagers should be enlightened on the proper use of surface water to prevent contamination that could lower the quality. Farmers around this area should be encouraged and enlightened on the benefit of practicing irrigation to improve yield to meet the demand of the growing population. More so, since the quality of water changes with time, the need for continuous monitoring of surface water quality is advocated.

Key words: Water Quality; Suitability; irrigation; Ochaja River; Nigeria

016

ANALYSIS OF THE IMPACT OF FUKUSHIMA DAIICHI NUCLEAR ACCIDENT ON THE WORLD TODAY AFTER A DECADE

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ABSTRACT

This paper provides detailed analysis on the causes and present-day influence of the aftermaths of March, 2011 (a decade ago) Fukushima Daiichi Nuclear Power Plant (FDNPP) accident is thoroughly reviewed. The impacts of the accident on the future of the nuclear energy industry, together with its health, energy security, psycho-social and ecological effects are the main consequences of the accident studied. Some proposed measures posited by some organizations, research groups and governments' agencies to curtail the lasting effects of the accident and avert its reoccurrence were also analyzed. The main sources of information used in conducting this study are official reports, academic papers and mass media reports.

KEY WORDS: Nuclear Power Plant, Fukushima Daiichi, nuclear energy, energy security, psycho-social and ecological effects

017

ANALYSIS OF THE RHEOLOGICAL CHARACTERISATION OF HIGH TEMPERATURE HIGH PRESSURE WATER BASED MUD USING RHEOLOGICAL MODELS

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ABSTRACT

This paper examines the rheological characterization of the High Temperature and High Pressure Water Based Mud using rheological models. The goal was to find the most appropriate model that effectively characterizes the HT HPWBM. The Power Law model, the Bingham Plastic Model, the Hershel-Buckley Model, and the Casson Model are only a few of the mathematical models that have been used to describe the rheology of non-Newtonian fluids. To get accurate findings for pressure drops and hydraulic calculations, the optimum rheological model that accurately represents the shear stress-shear rate analysis must be used. Hence, in this study two fluids are used, the base fluid formulation represented as sample 1 and the base fluid formulation with an addition of KCl and aging is represented as sample 2. By using standard conversion factors and a variety of non-Newtonian models, the dial readings from the viscometer were then translated into stresses. The degree of deviation of each model from the measured stress, the absolute average percentage error (ϵ_{AAP}) was used and at the end, the Hershel-Bulkley rheological model was found to be the model with the least value of error. Hence, it is the most appropriate model as it was able to characterize the mud behaviour of the sample fluids with the lowest error relative to the other models across the entire shear rate conditions.

SUB-THEME 3:

RENEWABLE ENERGY AND CARBON CAPTURE

018

BIODESULFURIZATION OF DIESEL BY GROUNDNUT SHELL ACTIVATED CARBON COATED *PSEUDOMONAS STUTZERI*

Reuben Pambami

ABSTRACT

The combustion of sulfur containing fuel produce substances that are harmful to the environment and this has led to a lot of researches aimed at reducing the sulfur content of fuels to a level that is environmentally friendly.The sulfur content of hydrodesulfurized fuels which is the conventional method of removing sulfur from fuels are still high due to the presence of some sulfur compounds that are either recalcitrant or refractory.Biodesulfurization which plays a complimentary role to hydrodesulfurization is slow just like other bioreactions.For biodesulfurization to play the complimentary role effectively, there is need to make it faster. In this research, activated carbon was produced from groundnut shell. The structural morphology and functional group present were investigated using scanning electron microscope (SEM) and fourier transform infrared (FTIR) spectroscopy respectively. The produced activated carbon was coated with an isolated pseudomonas stutzeri. The role of the activated carbon on the biodesulfurization activity of the pseudomonas stutzeri on diesel was investigated. The specific surface area (S_{BET}) of the produced activated carbon was calculated by applying the BET equation to the adsorption data to be 986m^2/g. The result from this study showed a high level of desulfurization of 92% for coated bacteria as compared to 70% for uncoated bactaeria which is due to the high surface area of the activated carbon and the functional group created during activation.

Keywords: Activated carbon, *Pseudomonas stutzeri* , SEM, FTIR, biodesulfurization

019

KINETICS AND THERMODYNAMICS STUDIES OF OIL EXTRACTION FROM PALM KERNEL

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ABSTRACT

The inadequate availability of kinetics and thermodynamic data in the design stage of oil extractors contributes to the inefficiency often encountered. The kinetics and thermodynamics of oil extraction from palm kernel seeds were investigated in this study. The mass transfer kinetic power model and the laws of thermodynamics were applied to describe the kinetics and the thermodynamics of the oil extraction process, respectively. The physicochemical parameters of the palm kernel oil extracted were determined according to the methods recommended by AOAC (1990). The results showed that a maximum oil yield of 48.56% was obtained from the dried palm kernels under optimum conditions of 70 °C, a particle size of 2.0 mm, and an extraction duration of 90 min, using 250 ml of n-hexane. The oil extraction process was found to follow secondorder kinetics, whose rate constant is dependent on temperature, and the activation energy (Ea) was 54.69 kJ/mol. The thermodynamic parameters of the extraction process were an enthalpy change (ΔH) of 24.94 kJ/mol, an entropy change (ΔS) of 0.08 kJ/mol, and negative values of Gibbs' free energy change (ΔG) at each prevailing temperature

value. The results of the thermodynamic study implied that the palm kernel oil extraction process is endothermic and requires a constant supply of energy for effective and efficient extraction. Also, the physicochemical properties of the oil showed that it is edible and also suitable for use in soap production, pharmaceutical industries, and as a feedstock in the production of biodiesel.

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020 PRODUCTION, OPTIMIZATION OF BIODIESEL FROM MANGO SEED OIL AND DESERT DATE SEED OIL VIA TRANSESTERIFICATION

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ABSTRACT

Due to the adverse effect of exhaust emissions from the combustion of petroleum-based fuels, the global warming phenomenon and greenhouse effect has escalated in recent decades. These problems have necessitated the use of alternative fuels more than ever in today's ever-changing world. Furthermore, convectional fossil fuels such as coal, petroleum and natural gas are constantly being depleted. Nevertheless, the world's dependency on these fuels is still growing and this problem has prompted the need for this research, which is aimed at the production of biodiesel from mango seed and desert date seed oils as an alternative source of fuel since they are readily available and environmentally friendly. The study reports the yield of biodiesel from the transesterification of mango seed oil, desert date seed oil and the blend of both seed oil using methanol as the alcohol and NaOH as the catalyst for the reaction. Optimization was carried out via response surface methodology (RSM) using the Box-Behnken approach with the software, Design Expert 13. The results of the analysis of the produced biodiesel, which were found to agree very well with the standard values, indicated that the liquid produced from the desert date seed oil by transesterification process was indeed, biodiesel with a yield of 82 %, which agreed with results from Giwa et al. (2016) and likewise, the biodiesel obtained from mango seed oil by transesterification process was also found to be predominantly biodiesel with a good yield of 75 % which is slightly lower than the results from Hiwot (2018).

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021 DEVELOPMENT OF HETEROGENEOUS CATALYST FROM CALCIUM OXIDE IMPREGNATED WITH ZINC OXIDE FOR PRODUCTION OF BIODIESEL USING *Prosopis africana*

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ABSTRACT

The major part of all energy consumed worldwide comes from fossil sources. However, these sources are limited, and will be exhausted by the near future. Biodiesel (Methyl ester of fatty acids), an alternative diesel fuel, is made from renewable biological sources such as vegetable oils and animal fats. This study dea;s wotj the transesterification of Prosopis Africana seed oil with heterogeneous catalyst using CaO loaded with ZnO as solid base catalyst. Four different parameters were optimize namely: methanol to oil ratio (5:1), Temperature (50 ^{0}C), catalyst concentration (2.2 wt%) and reaction time (60

min) to have high yield of biodiesel with 95% conversion rate. The fuel properties of the produced biodiesel were compare with ASTM and EU standards and they are all in conformity with the standards.

Keywords: Impregnation, Calcination, Prosopis africana, Heterogeneous catalyst, Calcium oxice, Zinc oxide

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022

A REVIEW ON THE MOST APPROPRIATE ALTERNATIVE FUELS FOR AUTOMOBILES

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ABSTRACT

There is an increase in research to encourage the usage of alternative fuels in automobiles due to the depletion of oil sources and certain environmental concerns. Some fuel sources will stand out in this regard with particular benefits, while others will not. Choosing the alternative fuel source that is best for automobiles in the present environment is essential, and understanding the characteristics of various forms of energy is also very essential for recommending an alternative fuel. In this research, a comprehensive review is carried out on existing literature on the benefits, drawbacks, environmental impact, effects on human health, availability, and economic implications of alternative fuels. This was to determine the fuel that is most appropriate for use in automobiles. The alternative energy sources for vehicles considered are LPG, CNG, hydrogen, biodiesel, ethanol and methanol, electric vehicles, hybrid, and fuel cell vehicles. The study reveals that alcohol (butanol, methanol, ethanol, and fossil fuels) are the most affordable alternative fuels, but electric and fuel cell cars stand out for their environmental advantages. Hydrogen can be sourced easily and is an important fuel source for internal combustion engines and fuel cell vehicles. The study concludes that while there is no one-size-fits-all solution, a combination of alternative fuels can provide a path towards reducing dependence on fossil fuels and mitigating the negative impacts of transportation on the environment. The research highlights the need for investment in research and development and supportive policies and infrastructure, to accelerate the transition towards a cleaner and more sustainable transportation sector.

Keywords: Alternative fuel, fossil fuel, environmental impact, energy, internal combustion engine.

023

CHARACTERIZATION AND PRODUCTION OF BIO-ETHANOL FROM AGRICULTURAL WASTE

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ABSTRACT

Waste to energy plays an important role in fulfilling the world's future demands. The continuous climatic change which is primarily caused by the atmospheric concentration of greenhouse gases from the continuous use of fossil fuel due to the high demand for energy in our society has affected the human race negatively over the years. Similarly, the indiscriminate disposal of agricultural waste (watermelon waste) in markets and environs creates an offensive smell over time and has led to blockage of drainages in our environment during heavy rainfall, destroying the aesthetics of the market, therefore, making it environmentally unsafe for man. This research work is aimed at the characterization, fermentation and production of bio-ethanol from agricultural waste with a focus on watermelon waste (exocarp and endocarp). A total of 78.6 kg of watermelon waste was collected from Tenboga market, upper mission, Road, Benin City, Edo State. The watermelon exocarp was processed and fed into the grinding machine for blending while the endocarp was processed using a locally fabricated juicing machine for extraction of the juice. The juice resulting from the two extracts was fed independently into separate fermentation pots, which were fermented for five days. Brewer's yeast (Saccharosomysis

Cerevisae) and amylase of 11g each were added to the feedstock to facilitate the fermentation process. pH, conductivity, sugar content, refractive index and alcoholic content were observed daily and recorded during the period of fermentation. The beer was distilled at an ethanol boiling point of 79^0C utilizing an indigenous bio-ethanol plant. It was recorded that 35% alcoholic content was obtained at the end of the distillation process for the exocarp while for the endocarp, the distillate produced 65.3% alcohol content from about 60 litres of juice. This, therefore, suggests that watermelon waste can be harnessed as a viable feedstock for bioethanol production.

KEYWORDS: ***Waste to Energy, Bioethanol, Watermelon Waste, Environmental Management***

024

EVALUATION OF BIOGAS HOMEMADE PURIFICATION FILTER

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ABSTRACT:

Biogas purification is a vital production process of biogas. Before being utilised as fuel, biogas needs to be filtered to remove gas contaminants so as to improve the quality of methane produced. The well-known filter for biogas is activated carbon. However, commercial activated carbons are costly because of high production costs. In this study, the evaluation of biogas purification filter was carried out. A cylindrical filter made from polyethene outer casing was fitted with sponge containing silica gel, iron fillings and calcium oxide in three separate layers respectively. This was used to purify biogas yielded from the anaerobic digestion of cow dung and cassava peels. The results obtained were analyzed for percentage composition of biogas and the activeness of the purifier. The results showed an improvement in the percentage composition of methane from 65.05% to 80.25%. More so, there was dropped in the percentage composition of carbon (IV) oxide, water vapour, and hydrogen sulphide from 30.18% to 13.50%, 0.66% to 0%, and 4.45% to 0.001%. These results simply showed that the purification filter can be more effectively used for processing produced biogas using alternative synthesis of high-quality, which is more affordably priced than the activated carbon.

KEYWORDS: Biogas, Purification, Percentage Composition, Methane, Impurities

025

PERFORMANCE EVALUATION OF A BIOMASS BRIQUETTE STOVE BURNER

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ABSTRACT

In developing countries, biomass energy sources especially residues from agricultural and forest reserves are important resources. By using briquetting fuel technology, which can address handling, shipping, and storage issues, this biomass can be transformed into densified solid biofuel. This study focuses on the performance evaluation of an already design and fabricated biomass briquette stove burner from locally sourced materials in comparison to previous developed ones. The designed and constructed biomass briquette stove burner is a circular section and consists of chimney, smoke ring, air inlet, combustion chamber, fuel loading section, and ash tray. The briquette stove was constructed using locally available materials. Materials selected and used for this research work include; mild steel casing, clay, and fiberglass. The combustion chamber was design to ensure that optimum concentrate of flame and heat is conveyed to the cooking utensils for maximum efficiency. Biomass briquette produced from corncob was used for testing of the stove

burner. The performance of the biomass briquette stove burner was evaluated by comparing burning the briquette using biomass briquette stove, and burning in open air. The performance test results show that maximum thermal efficiency of 76.27% was obtained with the system. **Keywords:** Biomass, Briquette stove, Design, Construction, Thermal efficiency, Combustion Chamber

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026

A COMPARATIVE STUDY OF PRE- TREATMENT AND HYDROLYSIS OF CORN COB AND CASSAVA BAGASSE FOR THE PRODUCTION OF BIOBUTANOL

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ABSTRACT

The global population and industrialization have increased energy demand. This study focused on biobutanol production for biofuels and other high-value products. This study compares corn cob and cassava bagasse biobutanol production. Due to their estimated hemicellulose, cellulose, and lignin content, corn cob and cassava bagasse, both waste products, are suitable biobutanol feedstocks. Lab analysis did this. Dilute sulfuric acid and enzymatic hydrolysis produced fermentable sugar. The response surface methodology was used to optimize the sulfuric pretreatment's concentration, temperature, and time. This was done to recover lots of fermentable sugars from both feedstocks. At 76^0C, 31 minutes, and 4.3% (w/w) hydrogen sulfide, total sugars in corn cob and cassava bagasse showed their highest response, which was 804.23 mg/L and 807.28 mg/L, respectively. Enzymatic hydrolysis using cellulase and beta-glucosidase enzymes was performed under these conditions. Within the first 24 hours after hydrolysis, there was an overall increase of 15% in the total sugars. Because of the findings of this research, it is possible to draw the conclusion that corncob bagasse and cassava bagasse are two excellent and environmentally friendly feedstock options for the production of biobutanol.

SUB-THEME 4:

MATERIAL & INDUSTRIAL PROCESS

027

A RATIO-PRODUCT ESTIMATOR FOR ESTIMATION OF FINITE POPULATION MEAN USING KNOWN AUXILIARY VARIABLE

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ABSTRACT

Ratio estimation is a technique that uses available auxiliary information which is positively correlated with the study variable while product estimation is a technique that uses available auxiliary information which is negatively correlated with the study variable. In this study, ratio-product estimator has been proposed for the estimation of finite population mean of study variable. The purpose of this study is to develop a new ratio-product estimator to improve the precision of estimation of finite population mean in sample random sampling without replacement using information of auxiliary variable. The properties of the proposed estimator namely Bias and Mean Square Error were derived up to first degree of approximation by Taylors series expansion. The empirical results shown that the proposed estimator is more efficient than the sample mean, ratio estimator and other existing estimators.

Keywords: Median, Efficiency, Mean Square Error, Ratio Estimator, Product Estimator, Percentage Relative Efficiency.

028

ADVANCED RATIO-TYPE ESTIMATOR FOR ESTIMATING FINITE POPULATION VARIANCE

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ABSTRACT

Centile is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. A set of ratio estimators for estimating the finite population variance of the study variable with known auxiliary variable in simple random sampling without replacement (SRSWOR) have been suggested. The expressions of the bias and mean square error (MSE) of the suggested estimators were derived by Taylor series method up to first degree

of approximation. The efficiency conditions under which the suggested ratio estimators are better than sample variance, ratio estimator, and other estimators considered in this study have been established. The numerical and empirical results shown that the suggested estimators are more efficient than the sample variance, ratio estimator, and other existing estimators.

Keywords: Centile, Ratio Estimator, Quartile, and Variance.

029

EVALUATION OF INTERACTION PROPERTIES OF IONIZING RADIATION ON NITROGEN BASED EXPLOSIVES.

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ABSTRACT

Gamma radiation, neutron, electron and charged ions interaction properties of ten nitrogen-based explosive compounds with densities range from 0.77 to 1.72 g.cm^{-3} were theoretically evaluated. Phy-X/PSD and GRASP computer programs were deployed and compared in the calculation of gamma rays interaction properties. Interaction of light and heavy charged ions [proton (H^+), alpha (He^{2+}), C^{4+}, Bi^{5+}, and Pb^{2+}] were computed with SRIM Monte Carlo computer program at selected energies, the total stopping power and range values for electron interactions were deduced with ESTAR NIST program, while the fast neutron removal cross-section (FNRCS) was calculated with Phy-X/PSD software and Macroscopic effective removal cross-section (MRCs) computed with MRCsC software. Results showed that interaction of all investigated explosive samples are majorly dependent on density, mean excitation potential and chemical composition of the sample. Among all investigated explosives, higher gamma ray interaction was observed in E7 (Nitrocellulose) and E3 (HMTD) explosives. CSDA range of charged ions increased with decrease in density of samples but increased with projectile energies of charged ions. E1 (Ammonium nitrate) gave the maximum stopping power at highest electron energy and minimum range at highest electron energy. The E1 (Ammonium nitrate) also displayed the highest value of FNRCS (0.121cm^{-1}) while E8 (Nitroglycerin) gave the lowest value of FNRCS (0.044cm^{-1}). These interaction properties are veritable parameters of consideration in characterization and detection of these explosives. The average relative deviations between Phy-X/PSD and GRASP computer programs in the measurement of MAC is 0.0501%. The mean relative deviation between Auto Zeff and GRASP programs is 0.3390%. This implies that the newly developed GRASP can be deployed for the computation of gamma rays interaction parameters with reasonable accuracy.

Keywords: Nitrogen-based explosives; gamma radiation, neutron; Charged ions; Phy-X/PSD; SRIM; EST.

030

ON MAGNETIC MOMENT AS A NOVEL FEATURE IN THE DIRECT PRODUCTION OF MAGNETIC MONOPOLES AT THE LARGE HADRON COLLIDER (LHC) VIA DRELL-YAN PHOTON SUB-CHANNEL INTERMEDIATION

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ABSTRACT
This study proposed magnetic moment as an explanation for the observed differences in the signature recorded in the Electromagnetic Calorimeter (ECAL) crystals at the LHC's compact muon solenoid (CMS), using 000000fb"-1 of 13TeV proton-proton collision data. Registrations of kinematics parameters, such as kinetic energy, transverse and total momentum, and pseudorapidity for the results interpreted in the Drell-Yan production models for monopoles with spins 0 and 1/2, were generated and studied. A confidence level upper limit of 0000- 00000fb was set on the cross-section of the Dirac magnetic monopole's production. We considered masses between 500GeV and 4500GeV Keywords: Magnetic moment, Monopoles, Pseudorapidity, Efficiency analysis, Drell-Yam mechanism.

031

THE COMPREHENSIVE AND ANALYTIC STUDY OF A DUFFING OSCILLATOR WITH CUBIC, QUINTIC AND HEPTIC NONLINEARITIES. (AN ANALYSIS)

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ABSTRACT
In this work, a thorough analysis of the generalized Duffing system was presented. A special case of this system, the cubicquintic-heptic Duffing system which suitably models the restrained cargo system was treated comprehensively using analytical methods and the method of averaging (a powerful tool of nonlinear analysis). In our analysis, it was observed that the cubic-quintic-heptic Duffing system exhibits some certain behaviors not present in the dynamics of the cubic and cubicquintic Duffing systems. The approximate solutions obtained through the use of the averaging technique were compared to the exact solutions obtained numerically using Runge-Kutta method.

032

THE EFFECT OF MAGNETIC FLUX DENSITY AMPLITUDE ON THE OUTPUT OF A PERMANENT MAGNET MACHINE: PART I

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ABSTRACT

The effect of magnetic flux density amplitude on electromagnetic characteristics of a double stator permanent magnet machine is investigated in this study. The studied parameters are: flux linkage, electromotive force, speed characteristics, torque and inductance profiles. 2D-finite element analysis is implemented in the result predictions with the aid of MAXWELL software. It is revealed that the amount of magnetic flux density in an electric machine would determine its corresponding output performance level; however, with a direct consequence of magnetic saturation at high working conditions. The predicted amplitude of electromotive force in the analyzed machine at no-load condition using fast Fourier transform analysis is: 3.91 V, 4.87 V, 3.96 V and 3.11 V at magnetic flux density of 1.0 T, 2.0 T, 3.0 T and 4.0 T, respectively. Also, the corresponding electromagnetic output torque of the investigated machine at operating current of 15

A, simulated at 1.0 T, 2.0 T, 3.0 T and 4.0 T is: 2.05 Nm, 2.59 Nm, 2.13 Nm and 1.66 Nm, respectively. It is also observed that the fault-tolerance potential of the analyzed machine would be higher at lower magnetic flux density, based on the machine's self-inductance and mutual-inductance characteristics.

Keywords Electromotive force, flux linkage, flux density, inductance, speed and torque.

033

THE EFFECT OF MAGNETIC FLUX DENSITY AMPLITUDE ON THE OUTPUT OF A PERMANENT MAGNET MACHINE: PART II

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ABSTRACT

The effect of magnetic flux density amplitude on the electromagnetic performance of a three-phase double stator permanent magnet synchronous machine is investigated and presented in this study. Time-stepping finite element analysis is adopted in predicting the results with the help of MAXWELL-2D computational software package. Performance indices such as: cogging torque, rotor unbalanced magnetic force, losses, efficiency and field-weakening capability etc. are considered. The results reveal that the magnetic flux density magnitude of a given electric machine would only produce the required optimum electromagnetic output in a given machine, for a limited period i.e. before saturation effect sets in. Nevertheless, the unbalanced magnetic force (UMF) magnitude of the analyzed machine is directly proportional to the machine's magnetic flux density value. The predicted UMF value is: 128N, 240N, 332N and 420N at 1T, 2T, 3T and 4T, respectively. The loss and efficiency profiles of an electrical machine are also affected by this undesirable saturation effect. Moreover, there is a consequent impact of the magnetic flux density value on torque-speed and power-speed trajectories of the analyzed machine, at both constant torque and constant power operating regions. Thus, electrical machine designers and practitioners need to estimate and factor in the adverse effect of high magnetic flux density during the design and optimization phase and also during different operation modes, for improved machine output.

Keywords Electromagnetic, permanent magnet machine, magnet flux density and saturation.

034

PRISM METHODOLOGY AND PROJECT SUCCESS: A STAKEHOLDERS' PERSPECTIVE

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ABSTRACT:

A project is the means by which new products, services, or results are created. Traditionally, project performance is a measure of how well a project satisfies the Triple Constraints, while project success is the degree to which a project meets the stated requirements utilizing a methodology. However, the method for success assessment has evolved due to new challenges and requirements. PRojects integrating Sustainable Methods (PRiSM), is a principle-based, sustainable project management approach that incorporates the Triple Bottom Line; environmental, social, and economic aspects as well as the Iron Triangle into the project evaluation process. This methodology is gaining popularity in the built environment as it is realised to be an effective way to increase project success while reducing the likely negative impact of the deliverable on the environment. The purpose of this research is to examine the PRiSM methodology from the perspective of stakeholders in Nigeria's building sector. This study, through a survey of 239 professionals from three educational institutions in four states in southern Nigeria, sought the opinions of stakeholders on the PRiSM approach and its effect on project delivery. The outcome suggests that PRiSM approach could result in improved collaboration and communication, better project planning and execution and will contribute to a high likelihood of project success. Nevertheless, it revealed that the use of sustainable building techniques and materials is one of the main obstacles to the adoption of the PRiSM approach, along with the need for a cultural shift, lack of understanding about new methodologies and technologies, lack of senior management support, and others. The findings show that there is a need for professionals to acquire new skills and retrain in cutting-edge, sustainable techniques and technologies. There is also significant evidence that respondents would use the PRiSM approach if they possessed the requisite knowledge and skill. Though this research focused on the construction sector, it opens a vista of opportunities for further studies in other sectors such as Oil and Gas, Manufacturing, Pharmaceuticals and others. It is hopeful that this information could be helpful to project management experts in understanding these challenges and strategizing and seizing opportunities to increase the project success rate while reducing the carbon footprint.

Keywords: PRiSM Methodology, Project Success, Project Performance

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035

A COMPARATIVE INVESTIGATION OF THE EFFECT OF DRY QUENCHING AND WET QUENCHING ON THE CORROSION SUSCEPTIBILITY OF AISI 1018 STEEL IN MARINE ENVIRONMENT

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ABSTRACT

This paper presents the result on the investigation of the effect of dry and wet quenching on the corrosion susceptibility of low carbon steel exposed to seawater. The samples of the steel were subjected to heat treatment involving austenizing at 870^{o}C, the soaking time was 13 minutes, then dry quenching was done in ash and sand and wet quenching was done in oil and water to room temperature, there were control samples which were not heat treatment (as-received). The microstructural examinations were carried out. The weight loss and corrosion rate were calculated at 10 days interval for 40 days after immersion in marine environment. Eight samples were dry quenched another eight were wet quenched and four were the control sample. The results obtained from the samples immersed in the seawater showed that the samples from wet quenching medium showed the lowest weight loss of 0.08g for water and 0.114g for oil, followed by samples from dry quenching medium which gave 0.297g for sand and 0.353g for ash, and then the control sample gave the highest

weight loss to be 0.385g. The samples from wet quenching medium also showed the lowest corrosion rate of 0.033mm/yr for water and 0.069mm/yr for oil, followed by samples from dry quenching medium which gave 0.122mm/yr for sand and 0.13mm/yr for ash and then the control sample which gave the highest corrosion rate to be 0.144mm/yr. The corrosion test results indicated that the wet quenched steel showed better corrosion resistance over the entire exposure periods when compared to the dry quenched and the control steel samples. It was therefore recommended that the samples specifically from water quenching medium are preferred over other quenching medium for corrosion resistance in marine environment for low carbon steel.

Keywords: Dry Quenching, Wet Quenching, AISI 1018 Steel, Corrosion, Marine environment

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036

PHOTOCATALYTIC DEGRADATION OF DYE (METHYLENE BLUE) OVER MO-CO/ZNO CATALYST.

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ABSTRACT

The present study is aimed at producing an improved photo catalyst for efficient degradation of dye constituents. This study seeks to evaluate the degradation potential of Mo-Co/ZnO bi-catalyst on dye effluent. Dyes are compounds which can impact colour to a substrate when applied in solution from either aqueous or organic solvents. Dyes are applied in the textile industry, plastics, paints, pharmaceutical industries amongst many others. The use of dyes to solve problems and needs of man such as food, clothing and shelter, creates other problems such as pollution of water as most industries which use dye in their operations discharge dye effluent into streams and rivers which causes harm to the aquatic life in the ecosystem. Dyes are very problematic to decolorize via the existing methods owing to their compound structure and breakdown mechanism. Therefore, there is need to device an efficient and effective method to remove and degrade the accompanied constituents of dye effluent before being discharged into the environment. Methods like filtration, adsorption, photo catalysis and sedimentation are currently being used to degrade dye. Photocatalytic degradation for organic dyes and chemicals has been established as one of the most significant and green technologies for wastewater remediation techniques. In this process, the organic pollutants are effectively degraded in the presence of photo catalyst, through photocatalytic oxidation–reduction reactions. In this research, the degradation of dye effluent under sun light was investigated using developed Mo-Co supported on ZnO photo catalyst. This was achieved through development and characterization of ZnO particle using chemical route, formulation and characterization of Mo-Co/ZnO via impregnation method, Photocatalytic degradation of dye effluent under sunlight, evaluation of the kinetic and the degradation isotherm parameters. The developed catalyst(Mo-Co/ZnO) was used to degrade methylated blue dye under various conditions and parameters. Time and catalyst concentration was varied to measure the performance of the catalyst. 0.2g of catalyst was added to Six samples of equal volume(100ml) of 5g/ml of Methylene blue and placed under sunlight for varying time(s) 10, 20, 30, 40, 50 and 60 minutes respectively. For catalyst concentration, 0.5, 1.0, 1.5, 2.0, 2.5 grams of catalyst was added into six samples of equal volumes(100ml) of methylene blue at placed under sunlight for 60 minutes. The percentage degradation was measured using a photo spectrometer. It was observed that the highest removal was at Time of 60 minutes as a percentage removal of 84.50% was achieved while catalyst amount of 0.5g gave the highest percentage degradation of 89.91%.

037

CORROSION INHIBITION OF LOW CARBON STEEL USING LEAVES EXTRACTS OF PHYLLANTHUS AMARUS IN ACIDIC MEDIUM

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ABSTRACT

Recent studies on the ability of natural materials derived from plants to inhibit corrosion have generally indicated that these natural chemicals have good inhibitory efficiency. Organic corrosion inhibitors are widely used in industry because of their effectiveness at wide range of temperatures, compatibility with protected materials, good solubility and relatively low toxicity. The yield of these natural products as well as the corrosion inhibition abilities of the plant extracts vary widely depending on the part of the plant and its location. Nevertheless, the known hazardous effects of most synthetic organic inhibitors and the need to develop cheap, non-toxic and environmentally benign processes have now made researchers to focus on the use of natural products. In this study, the inhibitive action of leaves extracts of Phyllanthus amarus on low carbon steel corrosion in acidic medium was investigated using weight loss. The corrosion inhibition experiment was performed by setting up reactors containing low carbon steel coupon with variable concentrations of plant extract and 500ml of 2.5M tetraoxosulphate (VI) acid solution. The study revealed that the leaves extracts of Phyllanthus amarus was an efficient inhibitor and was most effective as the concentration increased from 0, 1.0, 2.0, 3.0, 4.0 % v/v respectively. The importance of this study is partly attributable to the fact that natural products are ecologically sound and environmentally friendly. **Keywords:** Low Carbon Steel, Corrosion, Inhibitor, Phyllanthus Amarus, Weight Loss

038

EFFECT OF REACTION TEMPERATURE ON THE TOTAL PETROLEUM HYDROCARBON OF BIODIESEL PRODUCED FROM WASTE COOKING OIL USING A HETEROGENOUS CATALYST

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ABSTRACT

The continuous increasing demand for energy and the decrease in petroleum reserves has led to the search for alternative fuels which are renewable and sustainable. Biodiesel a renewable fuel has proven to be more useful in combustion engine than the petro-diesel because of its biodegradability and smoother combustibility. Transestrification of waste cooking oil to biodiesel was carried out with methanol to oil molar ratio of 8:1 using activated carbon from coconut shell as catalyst. The temperature of the reaction was varied. The total petroleum hydrocarbon (TPH) of the biodiesel produced were determined at reaction temperatures of 40^0C, 50^0C and 60^0C,while biodiesel properties produced at 40^0C, 45^0C, 50^0C, 55^0C and 60^0C were also determined. The concentrations of total petroleum hydrocarbon for biodiesel at of 40^0C, 50^0C and 60^0C were 1652.65, 9629.803 and 9608.752 respectively. Total petroleum hydrocarbon explains the nature of the oil used in the transesterification and hence the quality of the biodiesel produced. Higher

temperature of above 50^0C does not favor the presence of some hydrocarbon in the fuel produced. The properties of the biodiesel produced conform to ASTMD 6751.

SUB-THEME 5:

MODELLING AND SIMULATION

039

AI MODEL FOR EMAIL SPAM DETECTION

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ABSTRACT

The continuous attack of email spam on internet users has geometrically increased and necessitated the need for a more robust and dependable anti-spam technology for filtering email spam. Presently, individuals and organizations often lose millions of dollars to fraud by mere opening or responding to email spam sent to their email inboxes despite the anti-spam software in existence. This has brought about major economic losses, email traffic problems, a shortage of memory space, and limits the system's computing power. This paper proposes an Artificial Intelligence (AI) model that trains, tests, and validates, email datasets using machine learning classification, regression, and clustering algorithms. The performance metric was done using the root mean squared error. The negligible error value achieved is approximately zero (0.02349), which significantly indicated the effectiveness of the proposed AI model in filtering email spam. A web application was built to test the robustness, performance, accuracy, and reliability of the system. The results revealed an excellent performance at a minimal system error level of 0.0004.

040

ABATEMENT OF CADMIUM BY ADSORPTION ON METAL ORGANIC FRAMEWORKS MIL-53(FE) USING RESPONSE SURFACE METHODOLOGY

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ABSTRACT

The pollution of the environment with heavy metals is a serious global concern. Cadmium is liberated to the environment from chemical, petrochemical, textile, fertilizer, and cement industries. According to International Agency for research on cancer it is categorized as Category-1 and Group-B1 carcinogenic. This study explore the possibility to remove Cd (II) from aqueous solution using Metal organic frameworks MIL-53(Fe). MIL-53(Fe) powder was synthesized solverthermally. Typically, a mixture of iron (III) chloride hexahydrate ($FeCl_3.6H_2O$) 0.674 g, terephthalic acid (H_2BDC) 0.415 g and N,N dimethylformamide (DMF) 56 ml with a molar ratio of 1:1:280 was dissolved and sonicated at room temperature for about ten (10) minutes until a clear solution was obtained. The solution was then transferred into a Teflon-lined stainless steel autoclave (100 ml) and heated at 150 ^{0}C for 12 hours. The as-obtained yellow MIL-53(Fe) powder was obtained by centrifugation at 6000 rpm for 5 minutes and re-heated at 150 ^{0}C overnight to remove the DMF inside the pores of MIL53(Fe). After cooling down to room temperature, the solid was then washed with a large volume of de-ionized water (1 g of MIL-53 in 0.5 l of water) and then dried at 100 ^{0}C for 10 hours to give the final MIL-53(Fe). The MIL-53(Fe) was characterize using PXRD, FTIR, BET, SEM/EDX and the amount of Cd (II) adsorbed was analyzed using Atomic Absorption Spectrophotometer (AAS). Effect of various operating parameters such as initial metal concentration, adsorbent dosage and contact time was studied and optimized using central composite design of the response surface methodology. In the present study, response surface methodological optimization strategy using central composite design

was used for the adsorption of Cd (II) using metal organic framework (MIL-53(Fe) as adsorbent. At the optimized conditions { initial metal concentration (10 mg/L), adsorbent dosage (46 mg) and contact time (85 minutes) the maximum percentage of Cd(II) removal was found to be 74%. The pseudo second order kinetics explains the adsorption process with the correlation coefficient (R^2) of 0.99987. The adsorption process was fit to Langmuir model and Gibbs free energy ($\Delta G°$) shows that adsorption processes studied are spontaneous.

Keywords: Adsorption, Central composite design, Cd (II), Metal organic frameworks, Heavy Metals

041

NEURAL NETWORK MODEL APPROACH TO INTRUSION DETECTION IN INFORMATION SYSTEMS

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ABSTRACT

Security of information Systems has become a top priority since the present trend for record keeping in almost all spheres of human operations is fast becoming electronic. Data such as human or animal patient records, research data, and database of environmental or agricultural variables, weather patterns, finance data and the like are mostly housed in various personal or network computer systems for ease of management or collaboration amongst other purposes. However, criminal elements are found to go after such data for one of many reasons such as ransom, competition, naughtiness, and political maneuvers and so on. There is the need therefore to protect such systems. Various traditional interventions have been used over the years such as firewalls, legacy Intrusion Detection systems and the like. However, such systems lack capacity to keep up with the large amounts of data being generated in the fast paced information sphere we currently live in. Moreover, they find it difficult to detect zero-day attacks. Such problems can be overcome by applying artificial intelligence interventions. This work aims to present an artificial intelligence solution to detect attacks in information networks namely a Neural
Network Model. It is designed in a Google Colab environment using tools such as Python programming language and Tensor flow. It also implements the Sparse Categorical Cross entropy method. Results show up to 99.7% accuracy. This presents an excellent model for detecting intrusion in computer information networks.

Keywords: *Data, Neural Network, Intrusion, Artificial Intelligence.*

042

COMPARATIVE ANALYSIS OF MACHINE LEARNING MODELS LEVERAGING THE NSL-KDD DATASET

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ABSTRACT

Cyber-attack on networks is a major threat to information security in the society. Various attacks are being launched continually to intrude into personal and organizational networks by attackers for malicious purposes. Intrusion detection systems act as a defensive tool in detecting such attacks on a network. Recently, machine learning algorithms are being utilized in developing such systems and one integral component of such design is the dataset. This paper is aimed at performing a comparative analysis of the performance of some machine learning models with respect to the NSL-KDD dataset. Models such as Random Forest, Logistic Regression, Support Vector Machine (SVM), Artificial Neural Network

(ANN) and K-Nearest Neighbour (KNN) were considered without feature selection. Performance metrices such as Accuracy, F1-score, Precision and Recall were used as basis for comparing the models. Results show that Random Forest gives a better performance than the other models.

Keywords: *Dataset, Machine Learning, Random Forest, Accuracy, NSL-KDD.*

043

TEMPERATURE DISTRIBUTION IN AXISYMMETRIC AND 3D MODELS OF A DIESEL ENGINE PISTON CROWN USING FINITE ELEMENT METHOD IN ANSYS SOFTWARE

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ABSTRACT

This paper presents the comparison between the steady-state thermal analysis using finite element method (FEM) of an axisymmetric and 3D model, respectively of a conventional piston of a single cylinder four-stroke diesel engine using ZS1115NM diesel engine specification. The sizing of the piston was done before being modelled in a SOLIDWORKS 2013
3D Computer Aided Design (CAD) software. After modelling in SolidWorks, quarter view of the model was imported into ANSYS Workbench for steady-state thermal analysis. Similarly, an axisymmetric (2D) model was also created in Mechanical ANSYS Parametric Design Language (APDL) for the same steady-state thermal analysis. The material chosen for the piston (substrate) is an aluminium alloy designated as A92618 or simply A2618, due majorly to its high coefficient of thermal expansion (CTE) which enables the piston withstand high thermal stress without cracking or failure. The triangular discretization of the 3D quarter model produced 8904 elements and 15872 nodes and that of the axisymmetric (2D) model was 372 elements and 859 nodes. The 3D quarter model produces finer mesh than the axisymmetric one and the maximum surface temperature obtained in the 3D model was 1249 K and that in the axisymmetric one was 1232.7 K. It is seen that the temperature distribution in the ANSYS 3D simulation decreases faster as heat is being conducted away from the piston to ensure its long-life span. This is again seen in the minimum temperature of the 3D model which is 438.30 K as compared to the axisymmetric model having 546.01 K.

Keywords: 3D model, ZS1115NM, Axisymmetric model, SOLIDWORKS 2013, A2618, ANSYS Workbench, ANSYS Parametric Design Language, Coefficient of thermal expansion, Computer Aided Design, Finite element method.

044

3D MODELLING OF A RECONDITIONED PISTON OF A SINGLE CYLINDER FOURSTROKE DIESEL ENGINE BY USING SOLIDWORKS

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ABSTRACT

This paper presents a 3D modelling of a reconditioned or thermal barrier coated piston of a single cylinder four-stroke diesel engine using ZS1115NM diesel engine specification. Due to upsurge of counterfeit spare parts in the market, meeting the original equipment manufacturer (OEM) standards requires a reconditioning process. Reconditioned piston is a thermal barrier coated one with a ceramic material that enables it to withstand high gas combustion temperature without cracking. Piston converts thermal energy into mechanical energy in an internal combustion engine (ICE). The methodology applied was sizing and modelling of the conventional piston, topcoat and bond coat layers and finally assembling them to get a reconditioned piston using SOLIDWORKS 2013 3D Computer Aided Design (CAD) software. The material chosen for the piston (substrate) is an aluminium alloy designated as A92618 or simply A2618, due majorly to its high coefficient of thermal expansion (CTE) which enables the piston withstand high thermal stress without cracking or failure. The ceramic material chosen is a 7.5% yttria stabilized zirconia (7.5% Y_2O_3-ZrO_2) which is the topcoat with a low thermal conductivity and high coefficient of thermal expansion (CTE) on a bond coat metallic material called Nickel Chromium Aluminium Cobalt Yttria (NiCrAlCoY) which are practically thermally plasma sprayed on the crown of the substrate. The chosen thickness from literature of the top coat layer is 0.35 mm and that of the bond coat layer is 0.15 mm. Also, from literature, the major reason for thermal barrier coating (TBC) of a diesel engine piston crown using a ceramic material was to improve its performance by increasing the brake power and brake thermal efficiency including reducing brake specific fuel consumption (BSFC) and emissions.

Keywords: 3D modelling, ZS1115NM, Original equipment manufacturer, SOLIDWORKS 2013, A2618, 7.5% Yttria stabilized zirconia, Nickel Chromium Aluminium Cobalt Yttria, brake specific fuel consumption.

045 PROMOTING AN OPEN-SOURCE PROCESS SIMULATOR AS A MEANS TO DISCOURAGE THE USE OF CRACKED COMMERCIAL SIMULATORS: A STUDY OF THEIR PREDICTION AGREEMENT IN A SELECTED CHEMICAL PROCESS SIMULATION

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ABSTRACT

The significance of process simulators in training process engineers in petrochemical, chemical, nuclear, and biochemical processes cannot be overemphasized. It helps simplify the teaching of several chemical engineering courses like process design, thermodynamics, process integration, separation processes, safety, and a lot more. Most of these process simulators are primarily commercialized, with only a few being freeware. The commercialized ones are known for their friendliness, high publicity, and global trust gained for their predictions in several industrial applications over the years. However, they are costly for schools in low-income nations to afford. In contrast, the freeware publicity is not relatively low, less friendly, and cheaper than the commercial ones. To help promote the confidence of the institutions in the prediction of freeware process simulators, this report comparatively investigates the agreement of the prediction of commercial process simulators with freeware ones. In the analysis, a selected chemical process involving the Gibbs reactor and mixer was modeled and simulated in the COCO [1], DWSim [2], and Aspen HYSYS [3] simulator. Findings from the analysis reveal

good agreement in the predicted results obtained from the various process simulators. The study suggests the promotion of utilizing the freeware process simulator over the cracked version often used in low-income nations in teaching process engineers and research studies due to cost.

Keywords: Process, Modeling, Simulation, Freeware, Plant, Chemical Process.

SUB-THEME 6:

LOCAL CONTENT IN MANUFACTURING

DETERMINATION OF THE SUITABILITY OF RICE HUSK ASH AS AN ALTERNATIVE TO SILICA SAND IN THE PRODUCTION OF SODIUM SILICATE.

046

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ABSTRACT

Samples of rice husk was obtained from Zaria local government area of Kaduna state, beneficiated, ashed and analyzed using x-ray fluorescence to determine the oxides composition the rice husk ash in wt%. The result of the analysis revealed that the rice husk ash sample has a high silica content up to 92.5wt%. The concentration of silica in Zaria rice husk ash was enough to be used as a starting material for making glass and glass-ceramics using sol-gel process. A batch was formulated which constitutes rice husk ash in conjunction with chemical grade soda ash as a source of alkali oxide (Na_2O). The batch was melted at 1000°C for 4 hours in a muffle furnace to produce sodium silicate glass which can be majorly used for preserving eggs.

Key words: Rice husk ash, characterization, melting,

GREY RELATIONAL ANALYSIS APPLICATION TO DETERMINE TRIBOLOGICAL AND THERMAL PROPERTIES OF COW HOOF – REINFORCED BRAKE PAD

047

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This paper focuses on determination of tribological and thermal properties of cow hoof - reinforced brake pad. The brake pad was produced using cow hoof as the reinforcement material alongside with other ingredients which are binder (epoxy and hardener), graphite, calcium carbonate and aluminium oxide. These ingredients were in the proportion of 25%, 25%, 10%, 30% and 10% by weight respectively. The produced brake pad was subjected to wear rate and coefficient of friction (COF) tests. Grey relational analysis (GRA) was used to obtain values of the manufacturing parameters (moulding pressure, moulding temperature, moulding time and post curing time) that gave optimum performance of the produced brake pad. The values of the wear rate and COF of the optimized sample are 0.197mg/m and 0.781 respectively. The optimized sample was also subjected to thermal conductivity test which gave a value of 0.0248 $Wm^{-1}K^{-1}$ and thermo-gravimetric analysis (TGA) which reveals that asbestos based brake pad has a better thermal stability than the cow hoof based brake pad. However, cow hoof based brake pad has its maximum decomposition at elevated temperature range of $300^0C - 400^0C$ which coincides with the average brake temperature range. The experimental results of the produced brake pad compared well with the commercial and other existing experimental brake pads hence, cow hoof can serve as promising alternative friction material to asbestos in brake pad industry.

Keywords: Cow hoof, Wear rate, COF, GRA, TGA

048

DESIGN AND CONSTRUCTION OF GAS-FIRED SINGLE DRUM TOMATO PASTE DRYING MACHINE

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ABSTRACT

Preservation of goods is a paramount application of mechanical engineering that result from the basic principle of physics of heat and interaction with matter in meeting the demand for the solution to sustainable development goals problems of hunger alleviation, food insecurity, wastage of agricultural resources such as perishable goods are problems to be solved technologically. This study aimed at design and construction of mechanical gas-fired single drum drying system for preservation and processing of tomato paste to proffer solution through agricultural resources management. Dehydration and moisture removal from tomato paste was carried out with designed and constructed gas-fired single drum drying system. The design was made through a computer aided design application AutoCAD with well analysed dimensions before it was constructed with the aid of welding, fitting and coupling using studied materials based on thermal properties and its effect on product consumption (mild steel, iron, galvanised stainless steel) for maximum efficiency. After a careful construction of subsystems, it was coupled where heat energy was supplied through an adjustable gas cylinder. The system was tested igniting the heat source which was channelled through the burner into the drum, tomato paste was gradually released from a reservoir into the rotating heated drum with constant temperature of 50^{o}C at bone drying conditions, after a complete revolution the dried paste is scrapped into the underneath tray. The sample was analysed and found to have specific energy consumption and drying efficiency varied from 3.72 to 2.29 MJ/kg water and 67.8 to 83.8%, respectively. For commercial preservation of tomato paste, there is need to increase the dimensions of the design and construction to meet up with large scale drying of goods in order for implementation of mandates concerning sustainable development goals (SDG).

KEYWORDS: Mechanical, gas-fired single drum, thermal, AutoCAD.

049

DESIGN AND FABRICATION OF AN IMPROVED AUTOMATIC WHITE BOARD CLEANING SYSTEM

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ABSTRACT

In recent times, whiteboards have gradually replaced the conventional blackboards used in various schools and educational institutions and the ease of cleaning is a major driving force that led to these changes. Whiteboards with automatic cleaning devices have also been gaining popularity in most parts of the world and one with an effective cleaning device is expected to totally erase conventional cleaning methods off the markets. In this work, we introduce, design and develop an effective and cheap automatic whiteboard cleaner made with locally sourced materials. A lot of design factors were put into consideration so as to outperform the currently existing systems. Testing and results showed that our design is capable of cleaning specific areas of a whiteboard and not just the whole board at once as is common with other automatic whiteboard cleaners currently available. The cleaning time is recorded at 18 seconds and the device is capable of leaving zero residue

after a few sweeps of the board. In conclusion, our whiteboard cleaning system performed efficiently and effectively, and it easily meets market standards.

Keywords: Whiteboard, Duster, Automatic, Arduino, Cleaner, Board.

050

DESIGN AND FABRICATION OF A TWIN DISC METALLOGRAPHIC POLISHING MACHINE

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ABSTRACT

The metallographic specimen polishing machine is one of the most helpful pieces of equipment for grinding and polishing metallic samples so that their physical makeup may be examined under a microscope. In metallography, to obtain a smooth surface, the metallographic machine which comprises rotating plates and their forces is used. Polishing is the final process of the precipitating part of the test. Virtually every material-related research work needs its microstructure to be examined. To achieve this, they need to pass through the metallography process. Most Nigeria Universities do not have adequate equipment to carry out research. This has necessitated the need to design some of this equipment locally. This locally designed equipment can serve as an alternative to the imported and costly polishing machines currently in use. The design uses motor-powered grinding wheels of appropriate composition to be rotated against a marked-out area of a sample metal piece to be polished and subsequently etched for metallographic purposes. A considerably chemically inactive liquid does the etching in Nita solution comprising nitric acid and ethanol. Mainly dependent on the type of metal being polished, water is used for flushing the polished area to ensure a smooth polished surface that retains the original microstructural composition and arrangement inherent in the original sample as it where before polishing. The polishing wheels are finegrained and dense structured abrasive materials bonded together with an appropriate bonding agent. Provision is made for wheel insertion and removal from the motor spindle to accommodate different wheel types- either with a soft grinding abrasive material for polishing hard metals or hard grinding abrasive material for soft metals. A tank will also be incorporated into the machine to aid the flow of fluid needed for this experimentation. Thus, with the locally fabricated polishing machine from this project, it is possible to etch different types of metals for proper surface exposure for optical or electron microscopic investigations and analysis.

Keywords: Metallographic, Disc, Polishing, Wheel, Fabrication, Twin.

051

DESIGN AND FABRICATION OF A FIREFIGHTING DEVICE

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ABSTRACT

Fire, a very vital substance in the advancement of the human species, has proven to be almost as destructive as it is useful. With the increased concepts of engineering devices aimed to ensure the safety of the human race in this world, this work aims at saving lives and the protection of property from the raging claws of fire. This device is for extinguishing fire while being wirelessly controlled. The main systems that make up this device focus on mobility, obstacle avoidance through the use of a controller, visual aid, and flame extinguishing. Mobility is achieved through the use of motors, chain drives, sprockets, and a 12V battery all fused with programmable logic and circuit integration. Obstacle avoidance is made possible through the use of a wireless controller and a receiver. A Wi-Fi camera connected to a mobile phone was used to

relay visuals to the controller to aid the movement of the device. Also, the flame extinguisher uses CO 2 as a main source to extinguish the fire, it was also designed to be able to use water as the main extinguishant in the event of a lack of CO 2 . With these systems, we were able to create a low-cost device that would aid firefighters in the war against fire.

Keywords: Firefighting, Design and Fabrication, Extinguisher, Wirelessly controlled, water

052

DESIGN AND FABRICATION OF AN ELECTRIC BICYCLE FROM RECYCLED MATERIALS

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ABSTRACT

Electric vehicles (EVs) have long been recognized as a sustainable and efficient mode of transportation, but their high cost and limited customization options have hindered widespread adoption. This research project aims to address this issue by designing and fabricating an affordable and customizable electric bicycle using a converted car alternator as an electric motor. The design and fabrication process followed a systematic approach, including research and sourcing of materials, conversion of a used car alternator into an electric motor, creation of a 3D model using computer-aided design software, and fabrication and testing of prototypes. The resulting electric bicycle is not only affordable and customizable, but also meets all necessary safety and performance standards. The electric bicycle designed in this project is a significant step towards addressing the problem of high cost and limited customization options in EVs, and brings us closer to a greener future with more accessible and sustainable transportation options. The use of a converted car alternator as an electric motor also reduces waste by repurposing existing resources. In this report, we present the details of the design and fabrication process and the results of our testing, making it a valuable resource for those interested in sustainable transportation, electric vehicles, and alternative energy.

Keywords: Electric Vehicle, Green Energy, Pedelec, Alternator, Motor, Bicycle.

053

DESIGN, FABRICATION AND PERFORMANCE EVALUATION OF WASTE PLASTIC SHREDDER

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ABSTRACT

It is common thing in societies today to see plastic materials discarded inappropriately with a consequential effects of degradation of the environment through drainage blockage, emission of human unfriendly gasses when combusted which is a normal practice by locals amongst other negative impacts. Arising from this it became pertinent to recycle these plastic wastes for the production of new economic materials via recycling processes which include shredding, sorting, controlled melting, moulding, extrusion etc. some of these processes and the relevant machineries for executing them are imported and not easily accessible to many. This has in turn led to the need to research cheap and local methods of producing them using locally sourced materials. In this respect, in the present research a plastic shredding machine was designed and fabricated. It consisted of a loading hopper, shaft with 3 shredding blades at 120o angles apart, sieve, bearings and an Test results obtained from the operational testing of the machine showed that it took an average time of 73.7 seconds for the plastic shredding machine to shred the given amount of load input of 25kg of plastic waste. The fabricated plastic shredder

had machine throughput capacity of 1170kg/hr. The efficiency of the machine was calculated as 95.7%. The comparative analysis of the results with other research findings showed that it was well within optimum operating capacity and suitable for use in small to medium scale plastic shredding.

Keywords: Design, fabrication, waste, plastic, shredder, performance evaluation.

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054 DESIGN AND CONSTRUCTION OF AN AUTOMATED PAPER SHREDDER WITH A CROSS-CUT PATTERN.

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ABSTRACT

A Paper Shredder can be used to shred or cut documents made of Paper or Plastic into tiny strips. To keep documents that contains sensitive information out of wrong hands, it is necessarily to destroy the Materials Properly and Safely. Private businesses use it to shred sensitive papers, such as contracts, into tiny pieces or rubble. As a result, these gadgets secure information while reducing environmental waste. This research work focuses on the Development of an Automated Paper Shredding Machine. In order to actualize the set objectives, the design has been divided into two; Mechanical and Electronic Control units. The machine frame, with calculated dimensions of 210 mm by 297 mm, will be constructed using mild steel. In addition, the fabrication process will involve procedures like Metal Shaping, Welding, Machining, and the usage of Mechanical Fasteners. The Cutting Blades and shafts will consist of Medium Carbon Steel (Gear). The Machine will use an Arduino Nano Microcontroller, a Programmable Integrated Circuit to Control the Machine's operation. Other significant sections for this design include the Power Supply, Blades, DC Motor, Microcontroller, Indicator, and many more. When completed, this automated Paper Shredder with cross-cut pattern will be able to eliminate noise and vibration, affordable, improvement in work efficiency and ease of operation and solve environmental problem. Also, this machine will be subjected to a Paper Shredding Test using a Cross-Cutting Technique to validate its performance and calibrate it for efficient operation.

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055 DESIGN AND DEVELOPMENT OF A COST-EFFECTIVE AUTOMATED METAL SHEET BENDING MACHINE

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ABSTRACT

In the Metal Production industry, metal sheet fabrication is crucial. This involves manufacturing products like hinges, tools, vehicles, and machine plates. A single flat sheet of metal can be folded into different designs without being stretched or chopped. Numerous research studies have been carried out to design metal sheet bending machines using techniques ranging from manual, semi-scale metal, and metal product makers is a crucial job driven by the worldwide movement towards intermediate technology and sustainable development. Generally, in large-scale manufacturing and construction Industries, Metal Sheet Bending machines are expensive due to their enormous work. In most cases, the power

consumption of the machine is always high and a larger space is occupied during installation. However, in small and medium-scale industries (artesian workshops), metal bending imposes greater challenges for business owners. Metal bending is done with aid of a vice and hammer. The difficulty of using human effort results in workplace accidents, man-hour loss, and a reduction in revenue. This work focuses on the development of a cost-effective automated metal sheet bending machine. This design will comprise several sections, the micro-controller unit, the display unit, the power supply unit, rollers, bending components, the rigid frame, etc. The device is aimed at effortlessly bending aluminum sheet that is 0.5 to 1mm thick in a small and medium-scale workshop if put into practice. It is expected to lead to a short cycle time, lower cost of production, high-quality product, manpower reduction, increase in the safety of bending machine operators, and increase in revenue of business owners.

Keywords: fabrication, bending machine, micro-controller, power supply,

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056

DEVELOPMENT OF A COMPRESSION MOLDING MACHINE FOR RECYCLING PLASTIC WASTES

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ABSTRACT

A major goal of solid waste management system's is to efficiently safeguard the health, safety, and welfare of the general public. Some of the alternatives used in the waste management process includes landfilling, incineration, and recycling into more usable forms. However, recycling of plastics in particular would not be successful completed without the installation of necessary infrastructure for waste collection and the technology needed to profitably reprocess the waste into new forms. In this study, a compression molding machine capable of recycling plastic wastes was developed from locally available raw materials. The machine consists mainly of the following units; threaded screw, hopper, heater, heating chamber, forming chamber, steel frame, and control switch. The plastic wastes were loaded through the hopper and heated within an experimental temperature of 220^0C and under a pressure of 4 MN/m^2. The compression molding machine was tested and evaluated for optimum performance. The force due to pressure was calculated as 142.14KN and the total force obtained as 142.58KN. Also, the threaded screw speed was calculated as 6mm/sec and the volume low rate was obtained as 1.178 x $10^{-5}m^3$/sec. The compression mold was able to successfully compress the molten plastic wastes materials. The outcome of the mold formed as compared to other studies showed that the machine was more effectively used to recycled plastic wastes in a small scale. The development of new materials using recycled plastics is important to both the construction and the plastics recycling industries.

***Keywords*:** Development, Plastic Wastes, Compression Mold Machine, Recycling, Temperature

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057

THE EFFECT OF TECHNICAL AND VOCATIONAL EDUCATION ON ECONOMIC DEVELOPMENT AND SOCIAL MOBILITY IN KATSINA STATE, NIGERIA

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ABSTRACT
The role of Technical and Vocational Education (TVE) in Nigeria is crucial for improving employment prospects, contributing to the country's economic growth, and developing human resources. The government is working to overcome challenges such as funding and outdated curricula by incorporating technology into new technical colleges and offering hands-on training through apprenticeships. This paper discusses the benefits of TVE in promoting social mobility, reducing poverty and youth unemployment and contributing to overall economic development. The paper also highlights ongoing challenges such as lack of access to quality education and shortage of skilled workers in Katsina state, where specific difficulties include a shortage of academic staff, inadequate facilities, and limited resources for modern equipment. The conclusion and recommendations include increasing funding for infrastructure and resources, implementing updated curricula, providing training for academic staff, emphasizing hands-on experience, integrating technology, strengthening the role of the National Board for Technical Education, addressing the lack of access to quality education and disconnect between education and work, investing in human capital development, promoting TVE to women and girls, and addressing challenges in the education system.

Key words: Technical and Vocational Education, Economic Development, Social Mobility, Katsina State, Nigeria.

058

ACQUISITION OF EMPLOYABILITY SKILLS THROUGH TECHNICAL VOCATIONAL EDUCATION: A VITAL INVESTMENT FOR SUCCESS IN THE 21ST CENTURY WORKFORCE

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ABSTRACT
As the number of Technical Vocational Education (TVE) graduates continues to rise, so does the unemployment rate among youths in many countries, particularly in developing nations. To address this issue, TVE graduates must possess the employability skills required by the 21st century workforce in order to secure employment. The aim of this paper is to highlight the significance of TVE and employability skills. The paper examines the needs of employers in the 21st century and the crucial role of acquiring employability skills in TVE institutions. The conclusion is that TVE institutions must prioritize the development of employability skills by integrating them into their curriculum. This will ensure that TVE graduates possess the necessary skills to succeed in the 21st century workforce.

SUB-THEME 7:

MATHEMATICS – INDUSTRIAL PHYSICS

FLEXURAL ANALYSIS OF THICK PLATE UNDER LOAD USING 3-D POLYNOMIAL SHEAR DEFORMATION THEORY

059

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ABSTRACT.

Structural failure found in the world today is attributed to the inability of the de-signers to perform a thorough structural analysis to obtain the design moment and stresses that are induced due to loads subjected to the structure. Previous studies have applied two-dimensional (2-D) model, but analysis of plate requires a three-dimensional (3-D) analogy. This study presents a static flexural analysis of a simply supported rectangular plate with one edge freely supported (SSFS) using an analytical polynomial model developed from the 3-D plate theory. In the developed model, the elastic static principle was applied in the coupling the 3-D kinematics and constitutive relations to formulate the total potential energy equation. The formulated energy equation was transformed into the equilibrium equation which was used to obtain the shape function of the plate. An exact polynomial deflection of the plate which is a product of its coefficient and shape function was obtained analytically through the principle of general variation. Furthermore, the formula for calculation of the dis-placements and stresses induced due to application of a uniformly distributed load in the plate was obtained by the direct variation of the total potential energy equation to produce a reliable solution for the statically bending analysis of the plate. The outcome of the numerical analysis revealed that increase in the span-thickness ratio led to the decrease in the value of displacement and stresses induced in the plate. On the other hand, as the longest-breadth ratio of the plate increased, the value of the displacement and stresses in the plate increases. The result showed that the present model developed gives distinct and satisfactory solution but still followed an identical pattern when compared with previous studies, this shows the credibility of the derived relationships. Based on the percentage error evaluation, it can be said that the present model, unlike the 2-D model and numerical model provide a reliable solution in the analysis of any type of plates under SSFS boundary condition. Thus, the present model can be used with confidence for the analysis of any type of rectangular plate under the same loading conditions.

Keywords: Bending analysis 3-D plate, exact polynomial function, displacement and stress in SSFS thick plate

STIR CAST PRODUCTION PARAMETRIC INTERACTION EFFECT ON TOUGHNESS PROPERTY OF EGG-SHELL REINFORCED ALUMINIUM COMPOSITE

060

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ABSTRACT

Research on reinforced aluminium with egg-shell has been reported by several authors with common reduced toughness values that have limited its application. This research uses the response surface methodology to optimize stir-casting process parameters for improved toughness on the casting of aluminium reinforced with Eggshell in the proportion of 90% matrix and 10% reinforcement respectively. Stirring time, stirring speed and reinforcement preheat temperature was varied while taking other casting parameters constant for resulted toughness test being conducted. Box Behnken Experimental design method determined parameter settings whereas the importance level of the parameters on toughness was resolute through analysis of variance (ANOVA). Parameters set at (Stirring Speed 241 RPM, Stirring time 6.5 minutes, and Reinforcement Preheat Temperature 125 o C) resulted in maximize toughness of 8.8 joules. The interaction effects of production parameters of stirring time and preheat temperature has the highest relative impact on the toughness response with a coefficient of
0.3000 from the output predicted mathematical model with the parameters of stirring time and stirring speed having the least interaction effect with a coefficient of 0.0500. Keywords: Stircast, Composite, Toughness, Parametric Interaction effect and Optimizaton

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MOLYBDENUM AND ALUMINIUM EFFECT ON THE IMPACT STRENGTH OF MONEL 400

061

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Strengthening metals and alloys require restriction of dislocation motion either by generating internal stress that oppose their motion, or placing particles in their paths that require them to cut or loop the particles. This is because grain boundaries are frequently sections of internal weakness along which failure by fracture or corrosion propagates through materials interfacial network. Grain size reduction results to blockage of dislocations by grain boundaries which increase the PeierssNabarro stress of materials. Therefore, a fine-grained material is stronger than one that is coarse grained, since the former has a greater total grain boundary area to obstruct dislocation motion. Materials with finer grain sizes have more grain boundaries, and this reflects a possible higher mechanical property. However, restriction of dislocation movement reduces materials ability to absorb energy because of the reduced or absence of vacancies that allows and accommodate atoms displacement. Therefore, materials with large grain sizes, and fewer grain boundaries have higher toughness. This research focus on the effect of molybdenum, and aluminium addition on the toughness of Monel 400. A Design of experiment was done using a computer software. Test samples were produced using sand casting technique, and were annealed at 950 ^{0}C, soaked for one hour and cooled in the furnace. Annealed samples were machined to ASTM standard. Machined specimens were loaded into work fixture of the impact tester. Procedures for impact testing was observed prior during and after testing. Test result for each sample was observed, and recorded. Average values for five samples was taken for each run. The test result of the experiment was discussed, a conclusion reached and recommendations given.

Keyword: Monel 400, k500, sand casting, alloys, molybdenum, annealing, grain size, and grain boundaries.

062

EFFECTS OF PARTICLE SIZE OF SHEA NUT SHELL ASH ON MECHANICAL PROPERTIES OF REINFORCED ALUMINUM MATRIX COMPOSITES.

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[3]Department of Metallurgical and Materials Engineering, FUT Minna.
***Corresponding Author: nmapee@gmail.com ABSTRACT**

In this study, ash derived from shea nut (*vitellaria paradoxa)* shell, was used in developing aluminum matrix composites (AMCs) using Al6063 as the matrix and the effect of three particle sizes on the mechanical properties of sample composites were evaluated. The shea nut shell ash (SSA) was segregated into 75µm, 150µm and 180µm particle sizes using different sieve mesh. Each of the particle sizes was used separately to compound composite samples via stir casting technique, with 3wt% SSA+97wt% Al6063, 6wt% SSA+94wt% Al6063, 9wt%SSA+91wt%Al6063 and 12wt%SSA+88wt%Al6063. Composite samples produced were machined using lathe machine, to test sample specimens for hardness test, tensile test, impact test, fatigue test and micro structural analysis. Result of the mechanical tests shows that the highest hardness value of the composites was obtained in sample 6wt% SSA+94wt% Al6063 with 180µmparticle size; with hardness 103.32HBN. Tensile strength of the samples produced with 75µm particle size, shows reduction in tensile strength with increase in wt% SSA, while those of 150µm and 180µm particle sizes, decreased with increase in wt% SSA from 3wt%SSA to 6wt% SSA. The impact test revealed that the impact energy improved as the wt% SSA increased for 75µm samples but for 150µm and 180µm, it declined at 12wt% and 9wt% respectively. Fatigue result showed appreciable resistance of the developed composites for all the samples compared to that of 'as cast'; however, the sample with the best resistance to fatigue is 3wt%SSA+97wt% with 180µm particle size. From the results obtained, it shows that particle size of reinforcements play a critical role in the mechanical properties of composites.
Keywords: Vitellaria paradoxa, Composites, Hardness, Tensile strength, Impact, Fatigue

063 INFLUENCE OF DIFFERENT CURING CONDITIONS ON SOME PROPERTIES OF NIGERIAN BUILDING AND ROAD REASERCH INSTITUTE (NBRRI) LETERITE INTERLOCKING BRICKS

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ABSTRACT

The study aimed to determine the influence of different curing conditions on some properties of Nigerian building and road research institute (NBRRI) literate interlocking bricks. The constituent materials were tested and batched by weight, using mix ratio of 1:6, i.e., one part of cement to six parts of fine aggregate (lateritic soil) as recommended in the Nigerian National Building Code and Nigerian Building and Road Research Institute. The bricks with dimensions 250 × 130 × 220 mm^3 were casted using NBRRI semi-automatic brick production machine. The bricks were cured using eight different curing conditions. The eight curing conditions used in the study are Condition "A": covering of bricks with tarpaulin with sprinkling of water twice a day (morning and evening). Condition "B": wet curing throughout (by complete immersion in portable water and covering with tarpaulin). Condition "C": complete covering with air and water tight polythene bags. Condition "D": covering with wet hessian and polythene sheet. Condition "E": keeping under dry laboratory conditions. Condition "F": keeping in open air under direct sunshine. Condition "G": keeping in open air under shed. For all other curing conditions, bricks were tested for bulk density, water absorption, durability and compressive strength at the end of every curing period. . It was concluded that the highest gain in average bulk density, water absorption, durability and compressive strength was recorded for bricks complete covered with air and water tight polythene bags. The lowest gain was recorded for the specimens cured in open air under direct sunshine. Based on results of tests, curing condition "C" is tested to be use in curing NBRRI interlocking bricks, if effective gain in strength and durability of the bricks needs to be attained.

Keywords; Curing condition, interlocking bricks, water absorption, and compressive strength.

064

QUALITATIVE PHASE ANALYSIS AND DETERMINATION OF CRYSTALLOGHRAPHIC PARAMETERS OF YANTUWARU NATURAL FLUORITE.

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ABSTRACT

The incorporation of Calcium fluorite (CaF2) as a passivation agent for improving photovoltaic performance has become one of the best ways for enhancing the efficiency of solar cells. During the fabrication of titanium dioxide/calcium fluoride (TiO2/CaF2) photoanodes, a dosage of CaF2 is used to optimize the crystal structure and consequently the photovoltaic performance for a better energy harvest. Owing to this remarkable application of CaF2, continuous exploration and intense studies of natural fluorite seem necessary for meeting the demand and ensuring reliability. In this research, a confirmatory study of natural fluorite from Yantuwaru local mining site in Katsina state has been reported. Samples of natural fluorite were analyzed using X-ray Fluorescence and X-Ray Diffraction techniques. X-ray Fluorescence analysis determined the elemental composition of the sample. The obtained X-ray diffraction patterns were used for further analysis to determine their phases and lattice parameters. X-Ray Diffraction techniques data analysis for all the samples was performed using X'Pert Highscore Plus. High Calcium concentration of 61.546% (61546.0 ppm), 49.101% (491010.0 ppm) and 27.199% (271990.0 ppm) in sample A, B and C respectively shown by XRF analysis was supported by the results of XRD data analysis which showed correspondence of the natural Fluorite samples with CaF_2 indicating that the crystalline phase of the samples is predominantly CaF_2.

065

AIR CONDITIONING SYSTEM COMPARISON OF FUZZY LOGIC AND NEURO FUZZY ALGORITHMS

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ABSTRACT

Fuzzy logic and neuro- fuzzy controls are commonly used to improve the performance of an air conditioning system. Two logics, fuzzy logic and neuro- fuzzy logic, were designed and used in this work. A set of rules was proposed that used three input variables, temperature, humidity, and the number of occupants, and one output variable, the compressor. A fuzzy logic and neuro- fuzzy comparison of the system's simulated results was used to see which of the two produced the best results.

066 SYNTHESIS OF HIERARCHICAL ZEOLITE Y FROM ALOJI KAOLIN.

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ABSTRACT

Zeolites has emerged as a main heterogeneous catalyst in most chemical industries. Its diffusion limitation causes ineffective utilization of the catalyst, leading to early coking and subsequent deactivation of the zeolites. Hierarchical zeolites have been identified as suitable advanced material that addresses the limitations encountered with microporous zeolites in the catalytic reaction. It has an enlarged pore improved surface area and reduced channel that speed-up the reaction in many applications. The development of hierarchical zeolites Y from Aloji kaolin as a possible catalyst in reactions is the focus of this work. The bottom up synthesis approach of hierarchical zeolites Y denoted by (YB) involved the use of pluronic123(copolymer) as mesopores directing agent. The crystallized hierarchical zeolites (YB6) were characterized with XRD, SEM, TEM and BET. The crystallite sizes of the YB6 is 35.69nm with percentage crystallinity 73.50%. The pore distribution of 0.2nm to 90nm was observed with the synthesized hierarchical zeolite. The SAED images of synthesized hierarchical zeolitesYB6 depicts a polycrystalline material with distinct rings showing grains of different sizes. The hierarchical zeolite Y has surface area of 6.2817m^2/g, pore volume of 0.013655cm^3/g and pore size of 8.4194nm.

067 OPTIMIZATION OF SOME PROPERTIES (TENSILE STRENGTH, ELONGATION AND WATER VAPOR PERMEABILITY) OF BIODEGRADABLE FILMS PRODUCED FROM TACCA (*L. KUNZE*) STARCH AND PLASTICIZER BLENDS

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ABSTRACT

Tacca (*L. Kunze*) starch films (TSF) were developed and investigated for the effects of starch level (5-15g) w/w, glycerol (0 – 4.5g) w/v, sorbitol (0 – 4.5g) w/v and process temperature (75 – 95^{0}C) on their tensile strength, elongation and water vapour permeability using Box-Behnken experimental design in response surface methodology (RSM). Model optimization of the results and formulation for prospective food packaging applications was done using Analysis of variance (ANOVA). The linear and quadratic effects of independent variables shows that starch levels significantly affected ($p<0.05$) all the responses except for tensile strength with no significant effect of starch at 5% level of significance.

Results also shows that plasticizer blend and concentration (sorbitol and glycerol) had significant effect ($p<0.05$) on all responses with interactive effects on film tensile strength. Temperature only had a significant effect on water vapor permeability (WVP). WVP of the film varied from 4.9 to 12.13 x 10^{-9}g. $s^{-1}mPa^{-1}$ and tensile strength varied from 1.006 to 9.13MPa while elongation varied from 2.41 to 53.17%. The optimized values indicated that TSF prepared with 13.728g of starch, 4.5g of sorbitol, 4.5g of glycerol and 75^0C of process temperature provided TSF with improved and satisfactory response with a desirability value of 0.609. R^2 (Coefficient of determination) values shows a good correlation between experimental and predicted values, revealing the adequacy and fitness of the model. The results obtained clearly illustrates that within the optimum levels of the process parameters, the suitability of the developed linear and quadratic models for optimal values of response variables are valid.

Keywords: Optimization, Tacca starch, Biodegradable film, Box-Behnken, Response Surface Methodology

068

MATHEMATICAL BASED PATH-LOSS MODEL FOR 4G(LTE) WIRELESS SYSTEM AT 850MHz, 900MHz AND 1450MHz CHANNELS IN OFFA TOWNSHIP, KWARA STATE

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ABSTRACT

Propagation modelling is the most important part of mobile wireless network planning. Wireless network planning requires an accurate calculation of the path, which depends on different environmental conditions and Channels. This paper studies the path loss models of the wideband channels at 850MHz, 900MHz and 1450MHz for the 4G (LTE) Network in Offa Township, Kwara State. The Hata-Okumura equation used for predicting signal lost in suburban environment was modified and simulated with Python Programming language. The 850MHz model shows the lowest path loss at the terrain.

SUB-THEME 8:

NANO SCIENCE AND NANO TECHNOLOGY

069

SYNTHESIS, CHARACTERIZATION AND UTILIZATION OF MULTIWALLED CARBON NANOTUBES AS CONDUCTOR IN ALKALINE BATTERY.

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ABSTRACT

Alkaline battery market revenue is projected to grow from 7.8 billion dollars in the year 2021 to 10.9 billion dollars in the year 2028 period. But increase in demand for rechargeable batteries such as lithium-ion batteries will restrain the alkaline market growth because of its efficiency and lower cost. The aim of this research work is to utilize MWCNTs as dopant in alkaline battery. The multiwalled carbon nanotubes (MWCNTs) were prepared by catalytic chemical vapour deposition method (CCVD) using acetylene gas (C2H2) as hydrocarbon source and nitrogen gas (N2) as dilute gas on Fe-Ni bimetallic catalyst supported on kaolin. The produced MWCNTs was purified by acid treatment then characterized before and after doping MnO2 with purified MWCNTs using Brunauer, Emmett and Teller (BET), and before and after purification using High Resolution Scanning Electron Microscopy (HRSEM), High Resolution Transmission Electron Microscopy (HRTEM). And conductivity of the purified MWCNTs was determined through measuring the voltage of the produced battery. The Brunauer, Emmett and Teller (BET) analysis of the nanocomposite (MnO2/Graphite/MWCNTs) reveal a higher surface area and pore volume of 204.681 m2g−1 and 0.101 cm3g−1 when compared with the surface area and pore volume of purified MWCNTs of 168.117 m2g−1 and 0.082 cm3g−1. The HRSEM and HRTEM reveals a tube-like, concentric and twisted material. The lowest voltage measured was 0.50 V (with cathode of MnO2 (20%) MWCNT (100%)) and the highest voltage measured was 1.45 V (with cathode of MnO2 (60%), MWCNT (100%)).

Keywords: Alkaline Battery, MWCNTs, Chemical Vapour Deposition, Acid Treatment and Conductivity

070

REINFORCEMENT OF NANOPARTICULATE POLYMER MATRIX COMPOSITE USING RICE HUSK ASH

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ABSTRACT

Polymer matrix composites (PMC) are widely used as structural materials for different engineering applications. They provide better mechanical properties than the unreinforced polymers. Composites formed by addition of nanoparticles provide even more enhanced mechanical properties due to their higher surface area to volume ratio, and their better adhesive strength in contrast with those formed with micro particles. Treated plant fibres from some common agricultural wastes have been found to be suitable for reinforcing PMC due to their low density, low cost, high strength and stiffness. Rice husk is an agricultural waste found in abundance that can be utilised as reinforcing material when incinerated. The aim of this paper is to investigate the effect of addition of Rice husk ash (RHA) to nanoparticulate plastic composite for strength enhancement. RHA was produced by completely burning rice husk to ashes in a furnace at 700ºC for 4 hours. It was then cooled and the ashes were ground using mortar and pestle then sieved to 75µm and further ground for 11hours in Laboratory Ball Mill to get the RHA nanoparticulates. X-Ray Fluorescence (XRF) Technique was used to determine of the chemical composition of the RHA. Micrographs of the RHA were produced using Scanning Electron Microscope (SEM), and ImageJ software was used for characterisation of the particles. RHA nanoparticles having mean diameter of 21nm were used for the composite production. Composites test samples were produced by manual mixing with 2wt%, 4wt%, 6wt%, 8wt% and 10wt% RHA reinforcement, in cast iron mould. The mixing ratio for the composite samples were 0-10wt% added at 2wt% interval, and 5:1 catalyst-accelerator mixing ratio. Methyl ethyl ketone peroxide (MEKP) was used as catalyst, and cobalt napthalate as accelerator. The test samples were subjected to tensile tests and three point bending tests. The results from the tests carried out showed maximum improvement of Ultimate Tensile Strength (UTS), Tensile Modulus (TM) and Modulus of Rupture (MOR) at 2%wt RHA reinforcement when compared with the unreinforced polyester. A decline in the properties was observed with further increase in RHA.

071

NANOTECHNOLOGY AND NANOMATERIALS: A REVIEW OF ENVIRONMETAL AND INDUSTRIAL APPLICATIONS

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ABSTRACT

Nanotechnology refers to technologies that operate at the nanometer level, it is a growing scientific field with applications in many different areas, including in electronics, environmental, medicine, industries, etc. Research efforts in the two decades have resulted in thousands of potential application areas for nanomaterials. These materials are eco-friendly and industrially relevant, their applications replacing the traditional materials. This review article highlights established industrial and environmental applications of nanomaterials and then moves to rapidly emerging applications in the environmental and industries, and discusses future research directions. A nanomaterial-focused analysis discusses new trends, such as particles with an identity, and the influence of modern instrument advances in the development of novel industrial products. Besides, future aspects of nanomaterials in environmental and industrial applications are discussed.

Keywords: Application, Industrial, Nanomaterials, Technologies

ROLE OF NANOMATERIALS IN THE TREATMENT OF DRINKING WATER: A REVIEW

072

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ABSTRACT

Water is one of the most important natural sources and the prime fundamentals responsible for life on earth. The deterioration of water quality arises from the introduction of foreign substances into the water body from anthropogenic activities and natural processes. People on the globe are under tremendous need for clean water as a result of undesired changes in the chemical and biological characteristics of water due to increase in human population, industrialization, use of fertilizer in agriculture, and man- made activities, it is highly polluted with different harmful contaminants. Recently, water quality has been associated with the development index of society. Numerous chemical and biological contaminants have endangered the quality of drinking water. Understanding of molecular nature of contamination in drinking water, significant progress has been made to use the chemistry of nanomaterials for water purification. Advances in nanoscale science and engineering that many of the current problems involving water quality could be resolved or greatly improved using nanosorbents, bioactive nanoparticles, nanostructured catalytic membranes, nanocatalysts, and nanoparticle-enhanced filtration based on approaches to remove pollutants from water are eco-friendly and efficient, and processes resulting from the development of nanotechnology. This review paper describes various applications of nanomaterials in removing different types of impurities from polluted water were highlighted and discussed.

Keywords: Chemical, Nanomaterials Nanoparticle,Water,

SUB-THEME 9:

ICT & SMART SYSTEMS

073

AUTOMATIC AFAAN OROMO RUMOR DETECTION AND CLASSIFICATION ON SOCIAL MEDIA USING DEEP LEARNING APPROACH

Fanta Teferi

ABSTRACT

In this era, the social media platform is increasingly used by persons to follow interesting events because it is fast, easy to access, and inexpensive relatively. Despite the increasing use of social media for information and newsgathering, its nature leads to the emergence and spread of rumors i.e., information that is unverified at the time of posting, which may cause serious damage to government, markets, and society. Therefore, there is a necessity for an effective system for detecting rumors as early as possible before they are widely spread. Determining a portion of a text containing rumor detection is not a simple task for humans. It is time-consuming and introduces subjective ideas of what constitutes a text to be Rumor or not Rumor. As a solution to this problem, this research proposed automate a Rumor detection model using deep learning and feature extraction techniques to build a detection model. The required data were collected from the Facebook public page and manually labeled into two classes Rumor and Not Rumor and a dataset that consists of 1004 Afaan Oromo Rumor sentences was prepared. The experiment conducted by using 80%, and 20% of the total dataset for training and testing, respectively. Using the Scikit-learn feature extraction python library word embeddings range we build the feature extraction method for Convolutional neural network, Bidirectional Long short memory, and Gated Recurrent network classification algorithm. We have applied three deep learning algorithms such as Bidirectional long short-term Memory, Convolutional neural Network, and Gated Recurrent Unit for classification purposes. Tensor Flow the deep learning python library was used to implement all deep learning algorithms. The researcher attained an average accuracy of 80%, 84%, 87% Convolutional Neural Network, Gated Recurrent Unit, and Bidirectional Long Short-Term Memory respectively. Experimental results show that the Bidirectional Long Short-Term Memory performed better than the other models by outperforming all other classifiers and achieving the best results in terms of improved accuracy (87%). Therefore, to conclude, the Bidirectional Long Short-Term Memory revealed the best algorithm for Rumor detection and classification, which gives a valuable approach for researchers and other users. We recommend that diverse social media also be targeted for future work; because this study only focused on the Facebook domain. Keywords: Afaan Oromoo, Deep Learning, Rumor Detection, social media

074

THE CHALLENGES FOR EXTERNAL AUDITORS IN THE ADOPTION OF IFRS IN CORPORATE FINANCIAL REPORTING IN NIGERIA

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ABSTRACT

The international financial reporting standards (IFRS) is gaining very high momentum in many countries in the world. This is because of its nature and usefulness to the financial reporting environment. Nigeria is not an exception to this, if she does not want to be left out in the current development that is on going in the world, especially where she can tap from the ocean of such developments. This study is aimed at examining the challenges faced by Nigerian auditors in the convergence with the activities of IFRS. In an attempt to achieve this aim, a survey method was carried out to obtain valuable information's from selected audit firms in Kano state Nigeria and the responses obtained from various respondents were analysed using statistical methods. The study documents that auditors face challenges in the adoption of IFRS and that the majors challenges faced by auditors is the lack of adequate training for its members. Therefore, it was recommended that auditors should take up the courage to train themselves through getting useful materials that would assist in addressing these challenges.

075

OPTIMIZED INTRUSION DETECTION SYSTEM USING BOOSTING ALGORITHMS WITH AN IMPROVED FEATURE SELECTION ON REALISTIC BALANCED DATASETS.

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ABSTRACT

With a high increase in network attacks by cyber criminals who use various strategies to break through the security measures in a network to gain access to essential and classified information, it has become necessary to design systems that can detect such actions. In this context, the general approach has been to develop a system to monitor network traffic and other activities and determine whether they contain malicious intent. These particular systems are called Network Intrusion Detection Systems (NIDS). These systems must be capable of achieving freedom from raising false alarms as this would negatively impact the general purpose of their implementation. Both traditional and intelligent methods have been used in the NIDS design. While the traditional approach focuses on using known behavioral patterns to define network activities, intelligent methods based on machine learning (ML) have been widely used. In developing the models, ensuring that the resultant model can detect prevalent, highly sophisticated attacks is very important. This paper proposes applying ML classification algorithms based on advanced feature selection to develop intrusion detection systems (IDSs). The algorithms used are XGBoost, LightGBM, CatBoost, and AdaBoost. The algorithms are trained and evaluated on two recent datasetsCIC-IDS2017 and CSE-CICIDS2018 with preprocessing. Performance optimization was done by tuning the hyperparameters to ensure that the models are efficient, reliable, and effective. We also performed synthetic oversampling to generate a balanced dataset free of bias. The results are compared with existing models, and our proposed models were found to perform above the baseline, reaching an accuracy of 99.9% for XGBoost, 99.8% for LightGBM, 98.9% for CatBoost, and 96.7% for AdaBoost on both datasets.

Keywords: Network Security, Cybersecurity, Intrusion Detection System, Machine learning, Feature selection.

076

DETECTING MOTORCYCLING NEAR MISS INCIDENTS USING COMPUTER VISION AND IMAGE PROCESSING BASED SYSTEM

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ABSTRACT

Commercial motorcycling is one of the economical means of transportation in many countries, although many perceive it as a dangerous means of transportation, which is affirmed by the number of casualties recorded daily. This life threatening record has greatly hindered continuous support for commercial motorcycling as an affordable means of transportation. Information retrieved from near miss datasets can be a telltale of potential hazards and how to prevent them from happening. However, many researchers have come up with different definitions for near misses, and this has created a gap in understanding the right definition for near misses, thereby making it statistically difficult to address the situation for a safer commercial motorcycling. In this paper, we present near misses as corrective and preventive measures to safety events. Our focus is on the risk factors of commercial motorcycling near miss incidents, which we address by proposing near miss detection framework based on deep learning and its models. Video streams in form of near miss dataset were collected for the experiment. The research contributes to the different approaches employed in literature for solving near miss incidents with the proposed computer vision-based camera embedded system for detecting and analyzing near miss incidents in a complex environment, which can be extended to other safety related events.

077

USE OF SMART TECHNOLOGIES IN ADDRESSING ELECTRICITY THEFT IN NIGERIA, A CASE STUDY OF SMART AND AUTOMATIC METER READERS

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ABSTRACT

This study determined the possibility of eradicating electricity theft in Nigeria through the deployment of Smart Energy Meters. The research carried out a review of available literatures on pre-paid and smart meter technologies with a view of finding their contributions in ending energy theft. It was discovered during the research that, pre-paid meters which is currently been deployed as a billing system by Nigerian Electricity Distribution Companies (Discos), lacks not just the ability to address theft related issues, but is also limited in solving recharging issues, and has a fragile infrastructure that is prone to manipulations or modifications by electricity users. It was further discovered during the research that, Smart Meters, built with theft detectors can address electricity theft and solve recharging issues, currently experienced by pre-paid meter users. Smart Meters were also discovered to have capacity to provide remote monitoring and control, hence can be used to connect or disconnect a customer remotely and are equally useful in carrying out energy forecasting using historical data, obtained from customer's pattern of energy consumption. The study suggested the deployment of Smart Energy Meters as a solution to the lingering electricity theft challenge in the Nigerian Electricity Supply Industry (NESI).

Keywords: Economic growth, Electricity theft, NERC, NESI, Theft detector, Smart Meters.

078

DESIGNING SMART-INTELLIGENT SYSTEM FOR TEACHING-LEARNING 6-11 YEARS ROBOTIC PROGRAMMING

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Paper Presented at the 2nd International Conference of Nigerian Institution of Professional Engineers and Scientist on Engineering Trends in Science & Engineering towards industry 4.0 Revolution, Benin City, Edo State

ABSTRACT

This paper aims in designing a smart-intelligent educational system that will aid self study and same time serve as a teaching tool for teachers. The criterion used as the design base were derived after a critical review, comprising usage, analysis of end users experience, and articles of existing application and IDEs for children within the age bracket. The design comprises components such as user analysis, log files, database, initial user data input, provisioning and hybrid machine learning algorithms that facilitates the smartness and intelligence of the system. Though the design was not demonstrated in this paper, it however created a framework for its subsequent development.

079

ENGENDERING NATIONAL SECURITY IN NIGERIA THROUGH ARTIFICIALLY INTELLIGENT ROBOTS

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ABSTRACT

National security is the protection of a sovereign state, its citizens and institutions against potential harm such as war, terrorism, cyber-insecurity, food insecurity, foreign dictation, natural disaster, health and economic insecurities. The major goal of national security is to guarantee the protection of the lives and properties of its citizens. However, over the years, this objective has been stymied in the Federal Republic of Nigeria despite the efforts of the government to provide national security through adequate policing, military interventions, efficient judicial system and the enactment of the Anti-terrorism Act in 2011. Kidnapping for ransom, terrorism, separatist agitations, farmer-herder clashes, book haram activities, hostage taking, religious and politically motivated violence, banditry, civil unrest, insurgencies, cybercrimes and maritime crimes are some of the pervasive security challenges in Nigeria in recent times. Hence, Nigeria has become a dangerous location for her citizens as well as other people across the world. The attendant effect of insecurity in Nigeria include incessant loss of lives and properties, displacement of individuals from their homes, disruption of economic activities, increase in brain drain, decrease in foreign investment, unemployment, poverty and hunger and decrease in tourism. Hence, insecurity in Nigeria is a threat to the peace of the citizens and human existence. Consequently, the global peace index for 2021 ranked Nigeria 146th in global peace out of 163 countries. This indicates that Nigeria is in a comatose state of insecurity. In a bid to ameliorate the exponential rise in the insecurity of the country, the Federal Government of Nigeria has appropriated a huge allocation of the budget to national security, and also heightened security measures across the country by providing security facilities such as the installation of Computer-based Closed Circuit Television cameras (CCTV) in some parts of the country and also passed the Anti-terrorism Act in 2011. In spite of this effort, the level of insecurity in Nigeria is still very high. One of the major reasons for the high level of the lingering insecurity challenges in Nigeria is because the Federal Government of Nigeria has not been able to harness the rising state of insecurity with technology tools such as artificially intelligent robots. Artificially Intelligent robots have created a paradigm shift in security. This shift is apparent in the law enforcement agencies in developed countries where they are used to replace law enforcement officers

who left their professions as a result of the risks associated with it. Artificially Intelligent robots have been deployed for patrol activities, they have also been used to detonate suspicious objects that may explode. They are also known to tackle illegal trafficking, combat terrorism, protect critical national infrastructures, enhance cyber security and provide security through border management. Consequently, developed countries such as the United States of America, Spain and Canada have adopted the artificially intelligent robots such as unmanned aerial vehicles, unmanned ground vehicles, autonomous underwater vehicles, knight scope robots and position tracker robots to tackle national insecurity. It is against this backdrop that this study examines how artificially intelligent robots can be used to combat the exponential rise in insecurity in Nigeria. Keywords: artificially intelligent robot, national security, Nigeria

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080 IMPROVED PROPAGATION MODEL FOR 4G (LTE) PATH LOSS IN A MOBILE WIRELESS COMMUNICATION ENVIROMENT (A CASE STUDY SANGO-OTTA, OGUN STATE)

Somoye Olatunde Abiodun: Federal Polytechnic Offa Kwara State

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ABSTRACT

Accurate characterization of radio propagation channel through important parameters and a mathematical model is important for improving signal coverage, achievable data rates, specific performances attributes of signalling and reception schemes. This work is to modify the Okumura-Hata model which has wide acceptability and currently in use for mobile radio propagation to suit the terrain of Sango-Otta. The Okumura- Hata's equation for predicting signal path loss was modified and simulated with Python Programming language. The results were compared with the Empirical method results from the Okumura-Hata's model. From the results obtained, necessary adjustments to the model are proposed for use in mobile communications system designed to improve the Quality of Service in the system.

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081 SECURITY ISSUES IN DIGITAL LEARNING SPACES AND PREVENTIVE MEASURES (A CASE STUDY OF NATIONAL OPEN UNIVERSITY OF NIGERIA)

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ABSTRACT

During the COVID-19 pandemic the demand for digital learning space became higher like never before for academic institutions of learning, with learning institutions going fully online for the delivery of training and education cybercriminals have more opportunities to take advantage of vulnerable LMS to steal sensitive information or deploy ransomware. Irrespective of the cybercriminals motive, a compromised system has serious consequences on the institution. Institutions need to to invest in choosing the most secured LMS and apply the required security controls as recommended in this paper. The National Open University of Nigeria (NOUN) implements its digital learning spaces using the Moodle LMS, vulnerabilities are found in some specific versions of Moodle based on the 2022 CVE and the 2021 OWASP top ten analysis. The 2022 OWASP top 10 vulnerabilities are: Broken Access Control, Cryptographic Failures, Injection, Insecure Design, Security Misconfiguration, Vulnerable and Outdated Components, Identification and Authentication Failures, Software and Data Integrity Failures, Security Logging and Monitoring Failures, and Server-Side Request Forgery. A secured learning platform should incorporate all the aspects of security without affecting too much the system performance. Security risks in learning institutions increased significantly with the COVID-19 and it very important to consider security during design. A system needs to implement security services such as authentication, encryption, access control, managing users and their permissions. The paper analyzed the CVSS of Moodle and recommended the implementation of all solutions recommended by the OWASP.
Keywords: LMS: Learning Management System CVE: Common Vulnerability and Exposure CVSS: Common Vulnerability Scoring System OWASP: Open Web Application Security Project

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082

DESIGN AND INSTALLATION OF A CAPACITY LIMITING RFID ACCESS CONTROL SYSTEM

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ABSTRACT

Radio Frequency Identification (RFID) access control systems are a vital component of any security system. They are used to control access to restricted areas and to ensure that only authorized personnel are allowed access. The use of RFID access control systems helps to reduce the risk of unauthorized access and to increase the safety and security of a facility. Capacity limiting RFID access control systems are designed to limit the number of people who can access a facility at any given time. This is important for ensuring that only the required number of personnel are allowed access to the restricted area. It also helps to reduce the risk of overcrowding in areas where large numbers of people are allowed access. This project involves the design and installation of a capacity limiting RFID access control system to improve security and safety in an area at the Faculty of Engineering. The system was designed to utilize Radio Frequency Identification (RFID) technology to identify and authenticate users, as well as limit the number of users who can access the area at any given time. The system was designed to be flexible and customizable, allowing for the addition of extra hardware and software components as needed. The installation of the system include the setup of the RFID readers, the configuration of the software, and the integration of the system with existing security systems. The project was successfully installed at the e-library of the Mechatronics Engineering with a limiting number of twenty (20) persons. It is expected that the system will provide an effective, efficient, and secured solution to controlling access to the area while also limiting the number of people that can access the e-library at any given time.
Keywords: RFID, Readers, Transponders, Tags, Beacons.

083

IMPROVED PROPAGATION MODEL FOR 4G (LTE) PATH LOSS IN A MOBILE WIRELESS COMMUNICATION ENVIROMENT (A CASE STUDY SANGO-OTTA, OGUN STATE)

Somoye Olatunde Abiodun: Federal Polytechnic Offa Kwara State

ABSTRACT

Accurate characterization of radio propagation channel through important parameters and a mathematical model is important for improving signal coverage, achievable data rates, specific performances attributes of signalling and reception schemes. This work is to modify the Okumura-Hata model which has wide acceptability and currently in use for mobile radio propagation to suit the terrain of Sango-Otta. The Okumura- Hata's equation for predicting signal path loss was modified and simulated with Python Programming language. The results were compared with the Empirical method results from the Okumura-Hata's model. From the results obtained, necessary adjustments to the model are proposed for use in mobile communications system designed to improve the Quality of Service in the system.

084

DEVELOPMENT OF A ZIGBEE TYRE PRESSURE MONITORING SYSTEM SENSOR UNIT WITH AN EFFICIENT BATTERY SCHEDULING ALGORITHM

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ABSTRACT

Proper tyre pressure is very important for even tread wear, fuel economy, safe driving and better braking performance. To ensure the effective monitoring of tyre pressure, tyre pressure monitoring systems (TPMS) was developed. However, powering the sensor unit which is enclosed by the Tyre has continued as a challenge. In this work, we developed an algorithm to extend the battery life of a sensor unit for TPMS. Besides, the frequency used by most original equipment manufacturers (OEM) of TPMS in the US and Europe is 315 MHz and 434 MHz respectively, which is within the frequency band of TV signal transmission in Nigeria (41MHz – 960 MHz). Hence, we chose a 2.4 GHz unlicensed frequency for our work. We chose ZigBee over Bluetooth technology as it consumes lesser power and has a wider range. Then we designed and developed the sensor unit, measured the unit's sleep and wake-up currents and used the values to develop an idle and active mode operation for the sensor unit which was implemented in the program code. We compared the results of the system when it was continuously transmitting data with the system when our algorithm was implemented. We observed a 99.97 % power savings between the current in the sleep mode and wake-up mode thereby extending the battery life without reducing the system's efficiency. Using a 700 mAH Li-ion battery, the battery lifespan could be increased from 1.34 – 1.77 years to 4.69 – 6.195 years which is large enough to cover the 4 years lifespan of a tyre.

SUB-THEME 10:

WASTE MANAGEMENT

085 RECOVERY OF CHROMIUM AS CHROMATE FROM TANNERY EFFLUENTS

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ABSTRACT

The importance of regenerating any vital metal from industrial wastes cannot be over emphasized. In this work, recovery of chromium as chromate from tannery effluents was carried out in order to reduce cost of production and minimize environmental hazards. Tannery effluents from Challawa industrial area of Kano, Nigeria were collected from different locations for the recovery. Chromium (III) in the effluents was independently oxidized to soluble chromate in alkaline solutions of hydrogen peroxide (H_2O_2), sodium hypochlorite (NaOCl) and calcium hypochlorite, $Ca(OCl)_2$. Results from this study revealed that H_2O_2 is the most suitable oxidant for chromium recovery. The amount of chromium recovered was determined by atomic absorption spectrophotometry (AAS) and the percentage recovery of chromium ranged from 39 to 77%.

Keywords: Chromate, Chromium, Effluents, Oxidants, Recovery

086 PREDICTION OF HOUSEHOLD SOLID WASTE GENERATION IN OKADA TOWN USING ARTIFICIAL NEURAL NETWORKS

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ABSTRACT:

There is a poor waste management policy in Nigeria, just like in other sub-Saharan African countries, and solid waste generated is improperly disposed of in our environment. Waste from most towns in Nigeria is sometimes discharged into adjoining streams without treatment due to poor implementation of standards, thus causing environmental and public health hazards. Also, one cannot ascertain the quantity of solid waste generated in Okada town, hence this study. The materials used for this study include a weighing balance, hand gloves, a nose mask, and a black polyethylene bag labeled in the following order: sample A-food waste, sample B-plastic and rubber waste, sample C-glass waste, sample D-paper waste, sample E-metal waste, and sample F-other waste. The solid waste generated in Okada town was randomly collected from different households after a period of seven days (one week), and the quantity of household solids generated was measured after sorting with a weighing balance. A stratified random sampling (SRS) method was applied. Artificial Neural Networks (ANNs) was used to predict the solid waste generated daily. From the results of the waste survey carried out, a total of 318.879 kg of household solid waste was generated per week by 100 households, consisting of 334 people. It was observed that an R^2 value of 0.99621 was obtained for the training set. Furthermore, R^2 values of 0.98253 were obtained for the testing set, 0.99560 for the validation test, and 0.99834 for the all-data set. As determined, all the values were found to be high and close to 1. Also, there was a close correlation between the data used in the validation process and the

predicted values of household solid waste generated. This affirmed that the ANNs were capable of predicting household solid waste generation.

KEYWORDS: Household Solid Waste, Stratified Random Method, Artificial Neural Network, Prediction, Food Waste

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087

STRATEGIES FOR EFFECTIVE APPLICATION OF THE LEAN TECHNIQUES IN MATERIALS WASTE MINIMISATION

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3 Department of Quantity Surveying, Niger State Polytechnic, Zungeru, Niger State

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ABSTRACT

The existing lean framework have proven complicated to implement and fail to consider specific context of building construction and materials waste minimisation in a Nigeria. Thus, this research aims to fill this gap by developing a lean framework for material waste minimisation in building projects in Abuja, with a view to minimising the endemic problems of material waste in building construction projects in Nigeria. The study adopted a survey design approach using quantitative method but the model developed was validated using qualitative interviews. Data were collected using well-structured questionnaire administered to 320 respondents including, project managers, contractors, heads of waste management departments, and consultants of 80-active building construction sites that are practicing lean within Abuja, using Judgemental sampling method. A total of 189 questionnaires were retrieved from 320 administered. From the study, it was revealed that training of construction personnel on lean, use of more efficient construction equipment, good coordination to avoid over-ordering and Just-in-time operations, were the key action points for lean application in material waste minimisation. The study developed lean-framework for material waste minimisation in building projects. Based on the findings, the study recommended proper implementation of the lean framework developed in this study, as it would translate into a drastic reduction in the quantity of material waste generation in building construction projects. Keywords: Building project, Construction industry, Relative importance index, Lean,

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088

EXAMINING OF SOLID WASTE AND IT'S IMPACTS ON THE ENVIRONMENT (A CASE STUDY OF IKOM URBAN)

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ABSTRACT

The research aimed at establishing the Examining of Solid Waste and it impacts on the environment (A case study of Ikom Urban) . The study seeks to examine the types of solid waste management practices already existing in Nigeria(Ikom Urban), examine the impacts of solid waste on the Ikom urban (Environment), and to examine ways on how to manage waste for a sustainable and healthy Ikom urban (Environment). The research was carried out using survey research design In order to achieve the objectives, questionnaire was designed and administered to 160 people across several streets of Ikom Urban area in Cross River State. Findings revealed that Many keep bags and containers at home where waste is collected and later emptied into any of the dumping sites which may be either in public dump site, valley/lake/River, by the road/street side, open space, e.t.c. and solid waste actually affected them negatively resulting to serious outcomes like flooding,

unpleasant odors, inability to breathe properly, sickness, pest increase, e.t.c. It was recommended that the council government should provide public bins all around the streets, dying environmental sanitation day should be brought back, Any body caught for not using the nearest public bin to him, should be asked to pay or be imprisoned and Creation of recycling Bank by entrepreneurs or government.

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089 BIOSORPTION OF HEAVY METALS BY BACTERIA ISOLATED FROM UWELU METAL DUMPSITES BENIN CITY, EDO STATE

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ABSTRACT

It is alarming to see how much more heavy metals are building up in the environment. The amount of heterogeneous waste being dumped in landfills has significantly increased over time. Biosorption is a biological remediation technology that involves the removal of metal species from a solution by inexpensive biomaterials. The subject matter has been of scientific relevance from previous researches for its efficiency, relatively low cost and minimal negative effects to the environment. The project was aimed at determination of heavy metal biosorption efficiency of the bacteria isolated from the soil of uwelu metal dumpsite. Soil sample from uwelu metal dumpsite, Benin City, Edo state, Nigeria, the location was preferred because of the high concentrations of metallic waste, the sample was taken to the laboratory for bacteria isolation and physicochemical determination. The isolated bacteria were screened for their percentage tolerance against the heavy metal cobalt, copper, lead and nickel. From the results, the identified bacteria were *Proteus vulgaris*, *Acinetobacter lwoffi*, *Enterobacter* sp., *Escherichia coli*, *Micrococcus luteus*, *Clostridium perfringes* and *Arthrobacter* sp. The soil physicochemical parameter showed that the pH, organic carbon, organic matter, total nitrogen values were 8.40±0.00, 3.84±0.05 (TOC), 6.61±0.08 kg and 0.23±0.02 mg/l respectively. The bacterial isolate with the highest % tolerance to two heavy metals was *Arthrobacter* sp with values of 100% for lead and nickel respectively, *Clostridium perfringes* had the highest % tolerance to two heavy metals with values of 100%, 272.72% for cobalt and copper. The bacterial isolate with the least % tolerance to two heavy metals was *Acinetobacter lwoffi* with values of 1.84%, 2.78% for nickel and copper respectively. *Micrococcus luteus* had the least % tolerance to with value of 1.56% for lead. The isolates *Enterobacter* sp. and *Arthrobacter* sp. both showed 0 % tolerance to copper from the analysis carried out. Due to the high percentage (%) tolerance of the isolates, could made them useful as a bioagent for biosorption of heavy metals from the environment.

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090 DEVELOPMENT OF LEAN FRAMEWORK FOR EFFECTIVE MINIMISATION OF MATERIALS WASTE IN BUILDING PROJECTS

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ABSTRACT

Lean framework have proven complicated to implement and fail to consider specific context of building construction and materials waste minimisation in a Nigeria. Thus, this research aims to fill this gap by developing a lean framework for material waste minimisation in building projects in Abuja, with a view to minimising the endemic problems of material waste in building construction projects in Nigeria. The study adopted a survey design approach using quantitative method but the model developed was validated using qualitative interviews. Data were collected using well-structured questionnaire

administered to 320 respondents including, project managers, contractors, heads of waste management departments, and consultants of 80-active building construction sites that are practicing lean within Abuja, using Judgemental sampling method. A total of 189 questionnaires were retrieved from 320 administered. From the study, it was revealed that training of construction personnel on lean, use of more efficient construction equipment, good coordination to avoid over-ordering and Just-in-time operations, were the key action points for lean application in material waste minimisation. The study developed lean-framework for material waste minimisation in building projects. Based on the findings,the study recommended proper implementation of the lean framework developed in this study, as it would translate into a drastic reduction in the quantity of material waste generation in building construction projects.

Keywords: Building project, Construction industry,Relative importance index, Lean,

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091

PRODUCTION AND CHARACTERIZATION OF SOLID WASTES DERIVED FUEL FROM PLASTIC WASTES AND SAWDUST

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ABSTRACT

Plastic wastes greatly contributes to the amount of greenhouse gas emissions and the annual increase in the amount of wood wastes which are also directly linked to the increase in the rate of deforestation are also aiding the level of greenhouse emissions yearly. The indiscriminate disposal of these wastes has also contributed to degradation of the environment over the years. The need for an ecological and economical way of managing these wastes is highly pertinent. Hence this study was originated with the aim of proffering a sustainable option for managing plastic wastes and wood wastes by converting them into solid waste derived fuel (SWDF), which is a better option for energy generation than either of the wastes. Plastic wastes used in this study were Polyethylene terephthalate (PET) bottles. The used bottles were collected around Benin City, the capital of Edo State in South-Western Nigeria and pulverized without their labels and tops using a shredding machine. The utilized wood wastes (sawdust) in the study were collected from wood processing workshops in Benin City. The wood wastes were sorted using a 2mm mesh sieve to attain uniform grain distribution. The shredded plastic wastes and sieved sawdust were mixed in varying proportions of 50:50, 60:40, 40:60 respectively, which were then bounded together using an aqueous starch solution. The blends were compacted into 1inch diameter pipes of 5cm length each, which served as moulds for the briquettes' (SWDF) formation. These produced briquettes, labelled sample A (50:50), B (60:40) and C (40:60) respectively were then left to sun dry to form a solid mass. The samples were analysed to determine their physicochemical properties. Results from the analyses revealed sample C had the highest calorific value (CV) of 13.95MJ/kg, followed by sample A with a CV of 13.17MJ/Kg while Sample B had the lowest CV with a value of 6.04MJ/Kg. The results show that the quantity of sawdust in each sample probably contributed greatly to the calorific value of each sample. With such reasonably high calorific value, it can be concluded that the produced SDWF can serve as fuel for energy generation and such production would hugely contribute to the sustainable management of plastic wastes and wood wastes.

092

ANAEROBIC CO-DIGESTION OF PALM OIL EFFLUENT AND FOOD WASTE

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ABSTRACT:

The yearly expansion of oil palm plantations in Nigeria is accompanied by an increase in the number of palm oil mills that produce crude palm oil (CPO) from fresh fruit bunches (FFB). In Okada alone, there are several palm oil mills, and Igbinedion University just acquired a palm oil farm that is currently undergoing development. The production process in a palm oil mill consists of sterilization, stripping, clarification, and palm kernel oil recovery. This generates solid waste and liquid waste. The liquid waste (i.e., palm oil effluent), when discharged directly into the environment without proper treatment, can pollute the environment, emitting greenhouse gases (GHG) that cause global warming. In this study, palm oil effluent and food waste were evaluated for biogas production under liquid-state anaerobic co-digestion. Food waste and palm oil effluent from Okada Town were co-digested in a fixed dome anaerobic digester at a mesophilic temperature range. The highest cumulative biogas yield was achieved from the co-digestion of palm oil effluent and food waste. The biogas yield rate was highest with co-digestion as compared to when food waste and palm oil effluent are digested separately. Besides, the digestates obtained at the end of the complete hydraulic retention time were odourless, which is an indication of thorough treatment of the palm oil effluent. More so, such digestates can serve as organic manure for Okada palm oil farms.

Keywords: Palm oil effluent, Food waste, co-digestion, biogas yield, mesophilic temperature

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Optimization of Biogas Yields by the Combination of Algal Biomass and Food Waste

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ABSTRACT

The possibility of algal biomass as a source of liquid and gaseous biofuels has been the subject of considerable discussion among researchers recently. Researchers totally agreed that algae have the potential to become a viable aquatic energy crop with a higher energy potential compared to that from either terrestrial biomass or municipal solid waste. In this study, an experimental biogas optimization via the use of algal biomass and food wastes as feedstock for biogas production was investigated. The algal samples collected from the ocean in Nigeria were digested separately and co-digested with food waste collected from Igbinedion University restaurants using a batch bioreactor. The operating conditions of the biogas reactor were closely monitored. The results showed that the bioreactor was kept within a $37 \pm 1°C$ mesophilic temperature range. Besides, average daily biogas yields of FW-0.21 m^3 , FWAB-0.26 m^3, and AB-0.14 m^3 were obtained. With higher biogas yields recorded with the co-digestion of food waste and algal biofuel (FWAB), there is huge potential for biogas production from algae biomass.

KEYWORDS: Algal Biomass, Food Waste, Anaerobic Digestion, Biogas, Batch Bioreactor

094 Development of Solid Waste Management Strategy for Auchi Polytechnic New Staff Quarters, Auchi, Edo State, Nigeria.

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Abstract

Proper management of solid waste is essential for environmentally sustainable living conditions, but it remains a challenge for many developing countries like Nigeria including their tertiary institutions and environs. Therefore, this study has developed a solid waste management strategy for the Auch Polytechnic new staff quarters based on information on their existing solid waste management and the rate of waste generation in the quarters. Information on the existing waste management in the new staff quarters was gathered via interviews conducted in some selected sections of the Polytechnic community (Administrative block, Environmental and Sanitation Department and Works and Maintenance Department) while waste generation analysis was used to obtain data on rate of waste generation in the quarters. The findings from the studies revealed that currently, there is no well-structured collection/disposal mechanism of solid waste in the new staff quarters. Results from waste generation rate showed that the amount of solid waste generated in the new staff quarters on a daily basis is quite high with values ranging from 352.09kg/day to 732.76kg/day. The solid waste consists of various components with generating rate of 1125.73kg/month (6.33%), 1328.74kg/month (7.47%), 5357.47kg/month (30.12%), 3471.96kg/month (19.52%), 6503.26kg/month (36.56%) for paper, aluminium, plastic, polythene and organic wastes respectively. Organic waste comprises the highest composition of the waste and the least was paper. In decreasing order, the composition of the waste is organic waste> plastics>polythene> aluminium>paper. Based on the findings from the study, possible solid waste management strategies for a sustainable management of the waste in the new staff quarters was developed to include the practice of the 3R (reduce, reuse and recycle) concept, composting, proper training, provision of incentive and other fiscal policies.

095 DEVELOPMENT OF AN ENVIRONMENTAL WASTE INFORMATION MANAGEMENT SYSTEM

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ABSTRACT

Environmental pollution has been a major problem in the country, due to improper disposal of waste. As a result of the increase in urbanization coupled with the infrequent environment sanitation exercises some of the drainage systems in the country have been turned into dumps of all sorts of solid waste. The aim of the study was to develop of an environmental waste information management system. This study essentially modeled a waste management system using web-based technology, garbage truck weighing mechanisms, helping waste management agents in monitoring position of waste in the environment. The methodology adopted in the stud was the Object-Oriented System. It is adopted because it is an effective, efficient, reliable, reusable and a faster way of developing systems. The study was implemented using

Hyper pre-processor (PHP) programming language linking it up with Microsoft Structured Query Language (MySQL) in Xamp and Javascript. The testing phase integrated the software application with the external computer peripherals devices in order to check how components interact with one another and with the system as a whole. This is also called End to End scenario testing. User have to create an account with the system before user can login. The study developed an environmental waste information management system, integrated the environmental waste information management system, implemented the environmental waste information management system and evaluated environmental waste information management.

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Performance of Municipal Solid Waste as Fuel in a Binary Direct Carbon Fuel Cell

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ABSTRACT

A variety of abundant carbonaceous fuels such as municipal solid waste (MSW) and biochar from biomass carbonization can be utilized to generate electricity in a direct carbon fuel cell (DCFC) system.In this paper, in the characterized municipal solid waste.The proximate and ultimate analysis employed to determine the High heating value, HHV. The result shows that the HHV of municipal solid waste is 11.0 MJ/Kg. The calorific value was evaluated to be 7.9 MJ/kg .The amorphous carbon present by the XRD and SEM/EDX analysis shows the utilization of municipal solid waste(MSW) as fuel in a direct carbon fuel cell(DCFC) for power generation.

Keywords:Municipal solid waste,Characterization,Energy,Biochar,DCFC.

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Cervical Cancer Prediction Using an Ensemble Model

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ABSTRACT

Feature selection is one of the ways for data dimensionality reduction a requisite machine learning task. Most existing studies only concentrated on a centralized fashion in its application, i.e., using the entire benchmark datasets all at once in the feature selection process before machine learning is applied. As a result, the issues facing data with enormity on size, noise, missing values, redundancy, and relevance are partially unattended to. In this research, a new approach for creating a homogeneously-centralized feature selection referred to as cascaded ensemble feature selectors is proposed. Chi-squared, information gain, and Relief are homogeneously combined and then embedded feature selector- Recursive Features Elimination-Support Vector Machine (RFE-SVM) is centrally used in determining the final distinctive feature subsets for ensemble classifiers prediction. The adequacy of our proposal is applied on cervical cancer dataset, which is a challenge for researchers due to its similarities among others as well as its effect the world over. The standard metrics was used to measure performance of our model and comparison done. Our proposed cascaded ensemble feature selectors-classifier shows improved performance obtaining accuracies of 97.6% and 97.7% for bagging and boosting respectively, and showing future improvement.

Keywords: Filter Method, Embedded Method, Ensemble Method, SVMs, and Cervical cancer