

Table of Contents

Preface

Committee

Construction and Structures

Lime Stabilization of Black Cotton Soil Using Bagasse Ash as Admixture K.J. Osinubi, T.S. Ijimdiya and I. Nmadu	3
Durability-Based Appropriateness of Sawdust Concrete for Rigid Pavement O.M. Ogundipe and Y.A. Jimoh	11
The Quality of Concrete Made with Typical Benin City Silty Sand O.E. Alutu and E.N. Ejike	17
The Influence of Vibration Time and Sand Type on the Compressive Strength of Sandcrete Hollow Blocks O.E. Alutu and A. Omorogie	24
Accuracy of Static Differential GPS Techniques; Implications for Structural Deformation Monitoring J.O. Ehiorobo	31
The Potential Use of Periwinkle Shell as Coarse Aggregate for Concrete J.O. Osarenmwinda and A.O. Awaro	39
An Assessment of Torsional Parameters of Steel Reinforcement Used in the Nigerian Construction Industry O.U. Orie	44

Electrical and Electronic Technology

Power Quality Assessment in a Distribution Network B.A. Adegboye	53
Application of Particle Swarm Optimization Approach to Optimal Tuning of Load Frequency Controller G.A. Bakare, A.K. Inyanda and M. Kunduli	60
An Electronic Patient Record Management System Using Smart Cards M.O. Eyinagho, E. Solomon, T. Adeyemi, D. Ebhohimen, D. Adeniyi and D. Adams	67
Application of Pareto Analysis to Faults Identification in Electrical Distribution Network: A Case Study of Ugbowo 11kV Feeder, Benin City, Nigeria E.A. Ogujor, E.U. Ubeku and P.T. Aikhoje	75
Differential Evolution Based Optimal Tuning of Load Frequency Controller A.K. Inyanda, G.A. Bakare and M. Kunduli	82
Design and Implementation of a GSM Activated Automobile Demobilizer with Identification Capability M.S. Okundamiya, J.O. Emagbetere and F.O. Edeko	89
Performance of Binary Phase Shift Keying (BPSK) and Quaternary Phase Shift Keying (QPSK) Signalling Schemes in Fast and Frequency Non-Selective Rayleigh Fading Channel with a Decision Feedback Equalizer (DFE) at the Receiver T.I. Raji and Z.K. Adeyemo	99
Reduction of Fire Incidents due to Electrical Faults in Buildings S.O. Onohaebi and S.T. Apeh	105
Analysis of Generating Capacity Dynamics of the Nigerian Power System between 1963 and 2020 M.O. Adegoke	114
Dielectric Strength, Breakdown Voltage and Acidity Test with Respect to Transformer Insulating Oil I.A. Adejumobi	120

Design and Parameter Estimation of a Three Phase Induction Motor Using a User-Interactive Computer Programme E.U. Ubeku and E.A. Ogujor	126
Design, Construction and Performance Evaluation of a Low Cost Electric Arc Welding Machine S.O. Igbinovia, M.C. Onuoha and O.K. Olaogun	135
Comparative Analysis of Electric Field Measurement in Zaria O. Akinsanmi, B.G. Bajoga and D.D. Dajab	141
An Impact Assessment of the Nigerian Power Sector Reforms S.T. Wara, A. Abayomi-Alli, N.D. Umo, I. Oghogho and C.D. Odikayor	147
Human Body Resistance and Temperature Measurement Device S.T. Wara, I. Oghogho, A. Abayomi-Alli, C.D. Odikayor and M.S. Essien	153
An Investigation of Microwave Link Degradation due to Atmospheric Conditions (A Case Study of Akure-Owo Digital Microwave Link) P.O. Otasowie and F.O. Edeko	159
Investigation of the Characteristics of Radio Signal Propagation in Indoor Environment J.O. Emagbetere and F.O. Edeko	166
Electricity Network Planning: The Key to Efficient and Reliable Power Supply to Consumers S.O. Onohaebi and S.T. Apeh	172
An Experimental Autonomous Path Tracking Mobile Robot H.M.B. Senanayake, O. Akinsanmi and M.B. Mu'azu	181
Automatic Transfer and Controller System for Standby Power Generator A.U. Adoghe and I.A. Odigwe	187

Food and Agricultural Technology

Leaching of Trace Metals from Two Different Size Soils A.Y. Abdulfatah, A. El-Hamalawi and A.D. Wheatley	197
Dehydrated Cassava Chips Utilization in Starch and "Garri" Production A.V. Ikujenlola and S.V. Omosuli	203
Determination of Cutting Resistance of Sugar Cane (<i>Saccharum officinarum</i>) Using a New-Type Test Machine F.A. Maude, I.N. Itodo and S. Sule	208
Development and Performance Evaluation of Rainwater Harvester for Drip Irrigation of Juvenile Citrus Orchard S.O. Afolayan, K. Ogedengbe, I.B. Adeoye, O.O. Olufunmi and T. Ajetunmobi	213
Flapper Feed Device for Improved Productivity of Cassava Grater J.U. Okoli and A. Aadum	221
Methods of Preserving and Improving the Quality of Locust Beans I.O. Ogunleye and O. Awogbemi	226
Variations in Certain Climatic Parameters and Implications for Agricultural Production in Makurdi (Benue State), Nigeria M.O. Isikwue, S.B. Onoja and B.C. Isikwue	234
Development and Performance Evaluation of a Manually Operated Cowpea Thresher V.I. Umogbai and A. Shehu	239
Methods of Estimating Runoff and Soil Loss in Plots under Different Plant Densities of Amaranthus C.S. Okoli	247
Effects of Linear Alkyl Benzene Sulfonate Detergent on the Activity of Cassava Fermenting Enzyme E.T. Aisien, E.R. Elaho and F.A. Aisien	258
Field Comparison of Irrigation Scheduling of Tomato (<i>Lycopersicon Esculentum</i>) C.S. Okoli	263

Manufacturing Systems

Responsive Production Systems and Roles that Robots can Play R.H. Weston	275
Application of Enterprise Modelling (EM) Principles to Improving the Performance of a Semi-Automated Production System J.O. Ajaefobi and R.H. Weston	293

Materials Processing

Effects of Selected Media on Corrosion Behaviour of Mild Steel B. Kareem	305
Design of Compatibilizing Interfacial Polymer Layers Using a Macroinitiator M.K. Oduola	311
Rolling Temperature for Steel Hot Flat Rolled at Low Strain Rates P.O. Aiyedun and S.A. Aliu	317
Network Structures, Flexibility and Stability in Thermal and Chemical Environments of Polyurethane Prepared from Rubber Seed Oil. F.E. Okieimen, I.O. Bakare and C. Pavithran	324
Studies in the Utilization of Biobased Additives as Thermal Stabilizer for Plasticized PVC F.E. Okieimen, T.O. Egbuchunam and D.B. Balköse	335
Evaluating Microstructural and Hardness Variations in Time Dependent Multipass Welded Mild Steel M.O.H. Amuda, A.M. Oladoye, K. Ojemeni, J.O. Agunsoye and W. Subair	345
Effect of Base Material on the Pore Size Distribution and Surface Area of Activated Carbon O.O. Ojo	352
Permeability Characteristics and Classification of Coal Seams in Nigeria B.M. Olaleye, O.O. Onyemaobi and J.M. Akande	357
Effect of Particle Sizes on the Reinforcing Properties of Locally Sourced Filler in Rubber Vulcanisate E.O. Aluyor and I.O. Oboh	368
Effect of Lubrication Additives on the Physical and Chemical Properties of Soyabean Oil E.O. Aluyor and T.O.K. Audu	374
The Study of Biogeoavailability of Calcium in Ashaka Cement Industry Environs of North Eastern Zone of Nigeria A.I. Inegbenebor	380
Effect of Pass Reduction on Rolling Parameters Using Reverse Sandwich Model Integrated into the Hot Rolling Bland and Ford's Theory O.J. Alamu, P.O. Aiyedun and N.O. Adekunle	385
Determination of Optimum Welding Flux Composition Using the Bend Strength Test Technique J.I. Achebo and A.O.A. Ibhadode	393
The Dependence on Temperature of Carbonization and Chemical Activation on Characteristics of Granular Activated Carbon Characteristics C.O. Okieimen and S.E. Ogbeide	398
Effects of Preservative Agents on Cassava Starch Adhesives C.E. Akhabue, R.O. Ebewele and E.A. Oyedoh	404

Oil and Gas

Maximizing Generated Energy Usage through Combined Cycle Cogeneration C.G. Enyi and D. Appah	415
Pressure Derivative Studies of a Laterally Infinite Reservoir with a Horizontal Well K. Ovwigho and E.S. Adewole	420
Pressure Derivative Behavior of Two-Layered Reservoir with Vertical Wells D. Akhipemelo and E.S. Adewole	426
Geoinformation for Oil Spill Disaster Management in the Niger Delta Region of Nigeria H.A.P. Audu and J.O. Ehiorobo	432

Assessing the Rate of Remediation of Polycyclic Aromatic Hydrocarbon Contaminated Soil Using Redox Parameters C.N. Owabor and K.O. Obahiagbon	439
Influence of Gamma Radiation on the Radiofrequency Dielectric Properties of Nigerian Crude Oil O.D. Osahon and O.D. Nworgu	445
Toxicity Assessment of some Crude Oil Contaminated Soils in the Niger Delta F.A. Aisien, J.C. Chiadikobi and E.T. Aisien	451
Developing a Managed Pressure Drilling Strategy for Casing Drilling Operations B.M. Oyeneyin, V.C. Kelessidis, G. Bandelis and P. Dalamarinis	456
Sand Production Forecasts for Unconsolidated Gas Reservoirs B.M. Oyeneyin and B. Moriwawon	466
A New Correlation for the Viscosity of Natural Gas P.U. Ohirhian and I.N. Abu	474
Equations for the Z-Factor and Compressibility of Nigerian Natural Gas P.U. Ohirhian	484

Renewable Energy

The Role of Renewable Energy in the Electricity Industry in Zimbabwe C. Mbohwa and B. Siso	495
Enhancing the Output Characteristics of a Photovoltaic Position Sensor Using a Feed-Forward Neural Network J.T. Agee, S. Masupe, M. Jeffrey and A.A. Jimoh	506
Application of Wind and Small Hydro Energy Sources for Rural Electric Power Supply in Nigeria B. Jimoh, Y. Jibril and M.B. Mu'azu	512
Analysis of Fish Fillet Drying Rates under Three Solar Energy Drying Systems G. Mwithiga and S.G. Mwangi	518
Development of an Energy Efficient Solid Fuel for Maximum Emission-Reduction and Regular Heating Rate in Fired Heaters G.O. Umosekhaimhe	525
Optimal Utilization of Solar Arrays: Design and Implimentation of a Motorised Solar Energy Photovoltaic Array System E.U. Ubeku and S.O. Igbinovia	533
Optimum Seeking Position Control of Solar Collectors A.S. Kadalla, I.L. Samaila and N.Z. Oriolowo	537
Development of a Photovoltaic Powered Forced Convection Solar Dryer A.O. Adelaja, B.Y. Ogunmola and P.O. Akolade	543

Systems Design and Analysis

Designing Architect's Brief for a Faculty of Engineering M.T. Oladiran and J. Foster	551
Development of a New Product Using Two Distributed Teams C. Mbohwa	557
Maintenance Productivity Measurement: Case Study of a Manufacturing Company O.A. Alli, L. Ogunwolu and O. Oke	565
System Potential-Based Productivity Evaluation Model C.O. Anyaeche and A.E. Oluleye	571
Evaluating Solution Methods to Bicriteria Scheduling Problems E. Oyetunji and A.E. Oluleye	577
Evaluation and Improvement of Dvorak Keyboard Layout Using CADWORK U.J. Udosen	585
Computer Aided Raw Material Requirement Planning (CARMRP) for Job Shop: A Case Study S.B. Adejuyigbe and J.A. Ayeni	592

A Study of Urban Traffic Management- A Case Study of Lagos State Traffic Management Authority E.I. Bello and C.I. Usifo	599
Investigation of the Vibrational Mode of a Long Bone – The Ulna O.D. Nworgu and O.D. Osahon	606
Surface Roughness Optimization of some Machining Parameters in Turning Operations Using Taguchi Method I.M. Dagwa	613
Development of a Model for Analysing Forging Process J.A. Akpobi and C.O. Edobor	621
Development of a Model for Analysing Radial Flow of Slightly Compressible Fluids J.A. Akpobi and E.D. Akpobi	629
Finite Element Simulation of Performance Characteristics of Infinitely Wide Plane Pad Slider Bearing M.H. Oladeinde and J.A. Akpobi	637

Tools, Machines and Equipment

Mathematical Modeling of a New Improved Design of a Rail Carriage Suspension System for the Wagons Used in Zimbabwe C. Mbohwa, J. Agwa-Ejon and C. Murasiki	645
Development of Software Package in Designing Chain Drives as Engineering Transmission Element M.K. Adeyeri and M.B. Adeyemi	655
Rising of a Four-Cavity Die Production Mould by Convectional Method L.B. Zhengwuvi and A.O.A. Ibadode	664
Design and Manufacture of Palm Nut/Fibre Separator A.C. Igboanugo and G.C. Ovuworie	671
Design for Manufacture of a Miniature Batch Reactor A.C. Igboanugo and T.O.K. Audu	681
The Effect of Baffles in Shell and Tube Heat Exchangers E. Akpabio, I.O. Oboh and E.O. Aluyor	694
Computerised Design Approach to a Sub-Press Mould for Composite Materials Manufacture I.M. Dagwa and A.O.A. Ibadode	700
Quality Characteristics of Basic Hand Tools Sold in Nigeria F.A. Oyawale and M.A. Ogunmolati	708

Waste Technology

Design, Development and Performance of Palm Waste Briquette Stove for Domestic and Industrial Usage C.O. Ilechie, G.F. Aibangbee, S.R. Ogblechi and P.E. Amiolemhen	717
Performance Evaluation of Palm Waste Screw Press Briquette Moulding Machine C.O. Ilechie, G.F. Aibangbee, S.R. Ogblechi and P.E. Amiolemhen	723
Fuzzy Based Solid Waste Management Method O.O. Ojo and B.U. Anyata	728
Sustaining the Rural Energy Demand through Biogas Technology J.O. Aribisala and T. Omotoso	736
Indoor Smoke Emissions from Direct-Fires in Urban Households in Benin City Area of Midwestern Nigeria G.O. Umosekhaimhe	744
Additives Effects of Cement and Silica Clay on the Thermophysical Properties of Sawdust I.O. Ogunleye	752
Batch Treatment of Palm Oil Mill Effluent F.A. Aisien, A.A. Ojarikre and E.T. Aisien	759

Solid Waste Crisis in Nigeria – A Case Study of the Constraint to Effective Private Sector Participation (PSP) on Solid Waste Management in Lagos Metropolis D.I. Igbinomwanhia and J. Olanikpekun	763
Improved Sawdust Briquette: An Alternative Source of Fuel J.O. Osarenmwinda and S. Imoebe	769
Bio-Treatment of Brewery Effluent Using Enzymes F.A. Aisien, G.A. Oyakhilomen and E.T. Aisien	774

Water Engineering

Drinking Water Quality Monitoring in Ado-Ekiti and Environs O.P. Folorunso and T. Omotoso	781
Modelling of Sediment Transport Capacities of Ogbese and Owena Rivers in S.W. Nigeria C.S. Okoli, S.I.A. Ojo and A.M. Oguntuase	786
Use of Hydraulic Network Model for Evaluating Fire Flow Capacity of a Water Distribution Network O.C. Izinyon and B.U. Anyata	797
Bio-Treatment of Crude Oil Polluted Water Using Mixed Microbial Populations of P. Aureginosa, Penicillium Notatum, E. Coli and Aspergillus Niger K.O. Obahiagbon and C.N. Owabor	802