Promoting Innovative Multidisciplinary Research for Sustainable Development

ICSESS

17 - 18 May 2017

Proceedings of 3rd International Conference of Science, Engineering and Social Sciences

Collaborators:

UTM International Student Centre

UTM School of Postgraduate Studies

UTM Faculty of Computing

PGSS-UTM

Corporate Partners:

BLUESCOPE LYSAGHT

EDITORS IN CHIEF

- Y. A. Dodo
- E. B. Ogunbode
- E. I. Egba

Proceedings of
The 3rd International Conference of Science, Engineering and Social Sciences (ICSESS'17)

Published by
International Student Society-Nigeria
Universiti Teknologi Malaysia,
81310 Johor Bahru,
Johor, Malaysia.

ISBN 998-978-58482-3-5

CONTENTS

PREFACE

The 3rd International Conference on Science, Engineering and Social Sciences, ICSESS'17 is organised jointly by Universiti Teknologi Malaysia (UTM), International Student Society-Nigeria (ISS-Nigeria), UTM International and International Student Center (ISC). The theme for this year conference is *"Promoting Innovative Multidisciplinary Research for Sustainable Development"*. This promotes and encourage innovative and novelty for sustainable development in wide range of science, engineering, social science researches in terms of approaches and methods, advanced technology, professionalization, experiences, and culture.

The responses from participants for this conference is overwhelming, well attended, and successful. Our participants are from Universiti Teknologi Malaysia (UTM), School of Business, Yogyakarta, Indonesia, Universiti Tun Hussein Onn Malaysia (UTHM), University Andalas, Kampus UNAND Limau Manih, Padang, West Sumatera, Indonesia, Universiti Teknologi Mara (UITM), University of Jos Nigeria, Federal University of Technology Minna Nigeria (FUTMINNA), University of Dammam Saudi Arabia just to mension a few. Hence, this conference provides a good platform for professionals, academicians and researchers to widen their knowledge and approach on latest advances in research and innovation. Papers presented in these conference cover a wide spectrum of science, engineering and social sciences.

Finally, a note of thanks must go to ICSESS'17 central working committee for their remarkable dedication in making these conference a success. We hope the event will prove to be an inspiring experience to all committee members and participants.

ORGANISING COMMITTEE

PATRON

Prof. Datuk Ir. Dr. Wahid bin Omar
Vice-Chancellor,
Universiti Teknologi Malaysia

CONFERENCE CHAIRS

Conference Chairman I	**Conference Chairman II**
Prof. Dr. Mohd. Hamdan Ahmad	Assoc. Prof. Dr. Syed Ahmad Iskander Syed Ariffin
Dean,	Executive Director,
Faculty of Built Environment (FAB),	Institute Sultan Iskandar,
Universiti Teknologi Malaysia	Universiti Teknologi Malaysia

CONFERENCE ADVISORY COMMITTEE

Prof. Dr. Zainuddin Manan	**Prof. Dr. Nordin Yahaya**
Deputy Vice Chancellor,	Senior Director,
Academics and Internationalisation, UTM.	UTM International
Prof. Dr. Abd. Samad bin Haji Ismail Dean, Faculty of Computing	**Assoc. Prof. Lee Chew Tin Ms** Faculty of Chemical & Energy Engineering
Universiti Teknologi Malaysia	Universiti Teknologi Malaysia

CENTRAL WORKING COMMITTEE

Dr. Opaluwa Yusuf Drisu	Agouillal Farid
Dr. Yakubu Aminu Dodo	Yahaya Mohammed Al-Dhelegi
Dr. Kayode Ibrahim Adenuga	Mr. Nurudeen Ibrahim Ibrahim
Dr. Egba Ernest Ituma	Mr. Bruno Lot Tanko
Dr. Ogunbode Ezekiel Babatunde	Mr. Danboyi Joseph Amusuk
Dr. Bemgba Bevan Nyakuma	Mr. Muniru Idris Oladele
Dr. Ajeigbe Sunday O	Mr. Aliyu Isah-Chikaji
Dr. Ola-awo Wasiu Adeniran	Mr. Umar Faruq Muhammad
Dr. Nasiru Zakari Muhammad	Mr. Akintoye Kayode Akinlekan
Dr. Dauda Umar Suleiman	Mr. Ali Hassein Hassan Sabeen
Mr. Samuel Moveh	Mr. Babalola Sunday Oyetayo
Mr. Aliyu Muhammad Aliyu	Mr. Charles Nimi Johnson
Mrs Uche Regina Ezeilo	Mr. Markus Bulus
Mr Abazu Isaac Chidi	Mr. Sadiq Ibrahim Ogu
Mr. Taiwo David Olugbenga	Mr. Atilola Moses Idowu
Mr. Samuel Mofoluwa Ajibade	Mrs. Antonia Adediran
Mr. Abdulkareem Muyideen	Mr. Mohammed Yahaya Mohammed
Mrs. Ajayi Ireti Hope	Mr. Numan Paulson Eberechukwu
Miss. Petirin Olutomilayo Olayemi	Miss. Audu Jemilatu Omuwa
Mr. Muhammed Gambo Abdullahi	

EARTH AND ENVIRONMENTAL SCIENCES

The 3rd International Conference of Science, Engineering and Social Sciences

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Interpreting Nigerian Architects' and Designers' Environmental Awareness in Decision-Making Process of Local Building Materials (LBMS) Selection

Liman A. Saba, Mohd Hamdan Ahmad and Roshida Binti Abdul Majid

Department of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia.
(limansaba@gmail.com, b-hamdan@utm.my, b-roshida@utm.my)

ABSTRACT

Construction activity is known to have a greater impact on the environment as a consumer of a wide range of naturally occurring and synthesized resources. The extraction, treating and usage of these resources can have negative impacts on the environment. Nevertheless, with enhanced sustainability awareness and knowledge of these impacts; attempts are being made to avert these effects. Among these is the appropriate materials specification and selection. This study considered the environmental awareness level and designers knowledge in Nigeria when choosing and assigning LBMs during the design phase. A survey of Nigerian designers was conducted, a total of 480 questionnaires were administered, with a response rate of 43.1%. The data were analyzed with the aid of SPSS and Excel. The finding revealed that the designers are aware of the LBMs environmental impacts, and intimate about possible assesses which could assist to avert the troubles. Nevertheless, they are not following sustainable design approaches. Fundamental policy directions for professional bodies, clients, educators and government are made to enable Nigerian designers to use their knowledge on in their design decisions.
Key words: environmental impact, architects and designers, specification, sustainable design process, Nigerian construction sector.

INTRODUCTION

The activity of construction has semi-permanent impacts on the environment (Ofori, 1992; CIRIA, 1993). Construction professionals and their institutions as well as deal affiliations are assuming steps to avert, correct or/and control the damage of environment ascribable to their actions as well as decisions; Ofori (1999) demonstrates a review of these opening move. For instance, the International Council for Research and Innovation in Building and Construction (CIRBC, 1999) recommends the following opening move: enhance inter-disciplinary practitioners education; re-engineer the process of building to enhance business concern and relationship among players as well as to increase quality management; increase public awareness; choose and follow new building concepts integrating role incorporated systems; heighten research and development; and bring in criteria and rules like 'green' certification (these can also be found in American Institute of Architects, 1996). The building construction resource-intensive nature adds to its environmental impact, which was calculated at approximately 40 percent of the world's energy and material flows (Roodman and Lenssen, 1996). However, non-renewable raw materials remarks are needed in the production these materials (Brantley and Brantley, 1995; CIRIA, 1995). In addition, Hendrickson et al. (1998) analyze the resource utilize environmental impact in the United State construction sector; as well as Cole and Rousseau (1992) evaluate the building materials air pollution and energy significances. There are suggestions that the building material usage level will enhance outstanding to growing population as well as enhances in the space per capital provision in lots of developed countries (Young and Sachs, 1994). The study considers Nigerian architects' and designers' environmental issues awareness and how this determines their design; it concentrates on their specification and selection of local building materials (LBMs). The objectives of this paper includes: evaluate the present architects and designers level of environmental awareness and LBMs selection, research the principal objectives of Nigerian architects and designers when they take part in building projects using LBMs, examine the Nigerian architects and designers fundamental

considerations when selecting LBMs, determine the architects' and designers' views on opening move which would make them specify and choose LBMs, and propose measures so as to improve the environmental impact performance of the Nigerian construction sector with respect to the process of design when selecting LBMs.

METHODOLOGY

This review of literature guided the formulation of a questionnaire which was used in a survey of architects and designers in Abuja-Nigeria. The population of this study consists of professional architects and designers firms who are registered with Nigerian institute of Architects (NIA) and Architect Registration Council of Nigeria (ARCON) in the five Area Councils of Federal Capital Territory (FCT) of Abuja, Nigeria. Clustering and stratified random sampling procedures were the two sampling techniques adopted for this study. A sample size of 480 was considered appropriate. Thus, a total of 207 copies were filled and returned correctly, representing 43.1% of the questionnaire administered. The data collected were analyzed, with the aid of SPSS and Excel software using a variety of statistical methods including descriptive statistics analysis, relative index analysis and Kendall's concordance. Qualitative techniques were applied to make sense of meanings. Contextualizing strategy was used to correct statements, opinion and comments to provide a coherent picture.

MAIN RESULTS

Awareness of environment and action**:** Almost all the survey participants considered the assessment of environment as a significant issue for building construction project and agree that environmental impact impressions or results needs to be integrated into the local material selection process, as showed in Table 1. The participants also assert or affirm strongly; state to be true or existing to possess knowledge, understanding, realization or perception of the result of the usage of local materials on the environment.

Table 1: LBM awareness and local architecture (architects and designers)

Extent of awareness	Number of respondents	Percentage
Not at all aware	0	0
Slightly aware	0	0
Somewhat aware	0	0
Moderately aware	17	8.2
Extremely aware	190	91.8
Total	207	100

CONCLUSION

For environmental considerations to be highly prioritized among construction project objectives, all parties in the project must play a part. The construction industry should initiate a strategy, with specific actions assigned to particular individuals at various phases along the construction value chain including materials, suppliers and regulators. In playing their role, architects should evaluate their design decisions, considering, among other things, the selection and specification of materials including the raw materials and energy consumed and the pollution and waste produced throughout their life cycle.

REFERENCES

Brantley L. Brantley R. (1995). *Building Materials Technology: Structural Performance and Environmental Impact* McGraw-Hill New York

Cole, R. and Rousseau, D. Environmental auditing for building construction: energy and air pollution indices for Building materials. *Building and Environment*, 27 (1) (1992), 23 – 30.

Hendrickson, C., Horvath, A., Joshi, S. and Lave, L. (1998). Economic input-output models for environmental life-cycle assessment. *Environmental Science and Technology, Policy Analysis*, 32(7): 184A–191A.

Ofori, G. The environment: the fourth construction project objective? *Construction Management and Economics*, 10 (1992), 369 – 395.

Ofori, G. Satisfying the customer by changing production patterns to realize sustainable construction. in *Proceedings of the Joint Triennial Symposium of CIB Commissions W65 and 55* Cape Town 5–10 September vol. (1) (1999), 41 – 56.

Roodman D. Lenssen N. (1996). *A Building Revolution: How Ecology and Health Concerns are Transforming Construction* Worldwatch Paper 124 Worldwatch Institute Washington, D.C.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Stakeholders' Perspectives of Future Design Options for a Rooftop Solar PV Self-Consumption Scheme in Thailand

Kokchang, K.*[1], Tongsopit, S[2], Junlakarn, S.[2], Wibulpolprasert W.[3] and Tossabanyad, M.[2]

[1]Environment, Development, and Sustainability program, Graduate school, Chulalongkorn University, Bangkok, Thailand.

[2] Energy Research Institute, Chulalongkorn University, Bangkok, Thailand.

[3] Thailand Development Research Institute, Bangkok, Thailand.

Email:shizukawachi@gmail.com

ABSTRACT

The growth in the adoption of solar photovoltaic (PV) power generation systems has been accelerating around the world, contributing to the debate about the future of policy and regulation in a high distributed energy resources future. Thailand is one of the leaders in solar investment in Southeast Asia. It has recently shifted its policy framework for the support of small scale, distributed solar PV systems from subsidizing power export through feed-in tariff toward a policy that is focused on self-consumption. This paper aims to investigate the perspectives of stakeholders on the detailed design options of self-consumption schemes for supporting rooftop solar PV systems installation. The research methodology employed questionnaires and in-depth interviews in order to understand all study related stakeholders' perspectives on each element of rooftop solar PV self-consumption schemes. The results show that most of stakeholder groups indicated a strong desire to compensate for excess generation from rooftop PV systems in order to encourage Thai consumers to invest rooftop PV systems and also to accelerate market expansion.

Key words: stakeholders' perspectives, self-consumption scheme, Thailand's rooftop solar PV policy, net metering, net billing

INTRODUCTION

Increasing popularity of distributed energy resources, particularly solar photovoltaic technology, has induced the transition of policy and regulatory schemes to encourage self-production and self-consumption by electricity users. Several countries have been introducing self-consumption policies in order to promote the use of PV electricity by compensating for excess electricity using various forms of compensation mechanisms such as net metering and net billing. Since the cost of locally produced PV electricity is less than the retail electricity price of electricity nowadays in some countries, PV electricity production for self-consumption is increasingly more profitable without subsidy. However, there are challenges that a high penetration of distributed PV system for power generation might impact to ratepayers in terms of increasing distribution network charges or taxes (Luthander *et al*, 2015). Among emerging economies, Thailand is the leader in solar PV investment. And though the majority of such investment has been for utility-scale systems, the government has recently shifted the support toward smaller-scale, distributed solar PV systems (Tongsopit *et al*, 2016). The government is currently designing a support scheme on how to support rooftop solar PV systems for self-consumption. The details of the support scheme will have an impact on how consumers produce and use distributed solar PV systems in the future. With regard to self-consumption schemes to support rooftop solar PV penetration, there are less existing studies on stakeholders' perspectives on the design options. This paper thus aims to investigate the perspectives of stakeholders, including consumers, private companies, policymakers, and distribution utilities on the detailed design options of self-consumption, including net metering and

net billing and exensively discusses the various perspectives, which have implications on how to incorporate these stakeholders' viewpoints into the policy-making process in the future.

VARIOUS PERSPECTIVES OF STAKEHOLDERS ON THE DESIGN OPTIONS OF SELF-CONSUMPTION SCHEMES

For self-consumption scheme, most of stakeholders satisfied with no compensation for self-consumed part of PV electricity. This feedback suggested that the respondents believe this scheme is already profitable without adding premium tariff. Since self-consumed electricity is allowed and the prosumers are able to consume their own PV generation which is valued at retail rate, it will instantaneously reduce electricity bill. This preference corresponds to the design of most self-consumption schemes worldwide, which do not compensate for the self-consumed part of electricity. However, there are some countries that adding generation tariff (mostly valued less than retail rate) for all part of PV electricity that is produced, including the self-consumed part in order to incentivize customer to install rooftop solar PV in their households and buildings such as China and United Kingdom (IEA PVPS, 2016). In term of compensation, consumer would prefer net metering mechanism because the excess generation is valued at retail rate, which is very attractive and encouraging for rooftop PV system adoption. In addition, specifically for residential consumers, there is no need to pay for a new meter because the existing meter allowed the excess generation to run backward into distribution grid. As for private companies, which prefer net metering because this scheme does not require any payment during the year due to the excess of PV electricity as it is kept in credits, which means no need to set quota and can stimulate and accelerate Thailand's rooftop solar PV market. In addition, at the end of banking period, the left credits can be valued at zero. However, this scheme would impact utility companies in term of revenue losses and increase burden in term of accounts and taxes. Both utility companies think net metering is not an option as it would require complex account setting and inability to collect tax. These two issues will be the problems that prevent the net metering scheme to be implemented in Thailand. In term of the rate, if excess generation is valued at the full retail rate, utility companies may lose their revenues faster because they typically purchase electricity from the Electricity Generating Authority of Thailand (EGAT) at a wholesale rate. So both utility companies would prefer net billing with real-time buyback but should not be hourly netting because it requires changes in digital meter setting to collect more data and also imply changing or further training of meter reading personnel towards a digital and recent metering technology. However, the cost of changing new meter might occur from net billing scheme via consumers, which may have to bear this cost.

CONCLUSION AND RECCOMMENDATIONS

The stakeholders' perspective above reflect their point of views on each element of self-consumption scheme, including net metering and net billing in order to design the potential scheme for promoting rooftop solar PV system in Thailand. Since natural energy transition from conventional energy sources to renewable energy sources may profound consequences for the utilities. So, they may need more ambitious in order to make a transition toward self-consumption schemes. The implication for scheme selection from stakeholders' perspectives can emerging insights on the future of policy and regulation electric power system point of view to greater attention to consumers' attitudes and behaviors and additionally calls for consumers' active participation in the decision making.

REFERENCES

International Energy Agency Photovoltaic Power Systems Programme, 2016 http://iea-pvps.org/index.php?id=353

Luthander, R., Widen, J., Nilsson, D., Palm, J. (2015). Photovoltaic self-consumption in building: A review. Applied Energy, 142. 80-94. http://dx.doi.org/10.1016/j.apenergy.2014.12.028.

Tongsopit, S., Moungchareon, S., Aksornkij, A., & Potisat, T. (2016). Business models and financing options for a rapid scale-up of rooftop solar power systems in Thailand. Energy Policy. doi:10.1016/j.enpol.2016.01.023.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Analysis of Residents' Satisfaction in Abuja Residential Police Barracks, Nigeria

Sulyman, O. A.*, Medayese, S.O. and Olusegun, S.O.

Department of Urban and Regional Planning, Federal University of Technology, Minna Nigeria. (E-mail: sulymanlance@gmail.com)

ABSTRACT

Housing ranks only after food in the order of man's needs, it transcends just the supply of houses, but also the provision and access to supporting community facilities. The aim of this research is to examine residents' perception of satisfaction with regards to Police Barracks' Housing Condition in Abuja, with the following objectives, to: assess the Condition of Housing in the selected Police Barracks; and examine the residents' satisfaction with dwelling components of the Police Barracks. Stratified random sampling method was employed to determine the particular police barracks for sampling while, simple random sampling was employed to determine the households for sampling. Respondents' satisfaction levels show that in Garki Barracks 52.4% were dissatisfied, 27% were just satisfied, 19% indicated satisfaction for the electrical component of their dwelling; In Nyanya Barracks, 10.2% were very dissatisfied 42.4% were dissatisfied, 42.4% were just satisfied while 3.4% were satisfied while in MD Abubakar Barracks, 3.2% were very dissatisfied 46.5% were dissatisfied, 8% were just satisfied and 76.2% of the respondents were satisfied while 7% were very satisfied. The research established through empirical study that Resident Police Officers are generally dissatisfied with the Housing in Barracks in Abuja, also by comparative analysis satisfaction levels of building, neighbourhood and management components of the three barracks it established a significant relationship between the satisfactions levels of these components across the three barracks studied. This study analysed Residents' Satisfaction of Residential Buildings in Police Barracks in Abuja, Nigeria by employing variables of building, neighbourhood and management components which determine Resident Satisfaction in Police Barracks. The findings of this research show that these variables affect residents' satisfaction therefore establishing previous studies in Housing Satisfaction in Nigeria.

Key words: Housing, Housing Satisfaction, Residents

INTRODUCTION

Housing ranks only after food in the order of man's needs, it transcends just the supply of houses, but also the provision and access to supporting community facilities and services, safety and security, privacy, neighbourhood and communal association, work and recreational activities, and security of tenure that make for healthy living (Sulyman, 2015; Olotuah, 2006). The ultimate goal of every housing scheme is to further improve housing adequacy so as to meet the needs of the residents, this is because housing is not just a vital national investment but also the right of every individual. Nigeria's housing challenges are both qualitative and quantitative (Federal Republic of Nigeria, 1991), studies show that while quantitative challenges can be surmounted by improving on housing supply, qualitative challenges have for the most part been as a consequence of the failure of housing providers to consider processes and determinants of residents' satisfaction (Ukoha and Beamish, 1997; Ilesanmi, 2010). Oladapo (2006) considered that qualitative problems were the major limitations of urban housing in Nigeria.

Police barracks in Nigeria have been described as notorious for their filthy condition and poor maintenance (Civil Society Panel on Police Reform in Nigeria, 2012), with most of the officers unhappy with their living conditions which some of them say can be compared to abodes for pigs and other animals (Dachen, 2015). The aim of this research is to examine residents' perception of satisfaction with regards to Police Barracks' Housing Condition in Abuja, with the view to

proffering solutions and sustainable strategies that will ensure improvements in practice to enhance better service delivery consequently enhancing better quality of life for officers of the Nigeria Police Force with the following objectives, to: assess the Condition of Housing in the selected Police Barracks; examine the residents' satisfaction with dwelling components of the Police Barracks; and evaluate the level of residents' satisfaction with the neighbourhood components of the Police Barracks in Abuja.

MAIN RESULTS

Respondents' satisfaction levels show that in Garki Barracks 52.4% were dissatisfied, 27% were just satisfied, 19% indicated satisfaction for the electrical component of their dwelling; In Nyanya Barracks, 10.2% were very dissatisfied 42.4% were dissatisfied, 42.4% were just satisfied while 3.4% were satisfied. And in MD Abubakar Barracks, 3.2% were very dissatisfied 46.5% were dissatisfied, 8% were just satisfied and 76.2% of the respondents were satisfied while 7% were very satisfied.

Table 1: Residents Satisfaction with Electrical Component

Electrical Component	**Nyanya**	**Garki**	**MD Abubakar**
Very Dissatisfied	6 (10.3)	1 (1.6)	12 (3.2)
Dissatisfied	25 (43.1)	33 (52.4)	30 (8.0)
Neutral	25 (43.1)	17 (27.0)	21 (5.6)
Satisfied	2 (3.4)	12 (19.0)	285 (76.2)
Very Satisfied	-	-	26 (7.0)
Total	**58 (100)**	**63 (100.0)**	**374 (100.0)**

Source: Fieldwork, 2016

Respondents across the three barracks expressed high levels of dissatisfaction with the Roof Condition of their dwelling in Garki, 28.6% were very dissatisfied, 46% were dissatisfied, 11.1% were neutral, and 14.3% were however satisfied. In Nyanya, 35.6% were very dissatisfied, 44.1% expressed dissatisfaction, 11.9% were indifferent; and 8.5%of the respondents was satisfied. In MD Abubakar Barracks, 58.8% of the respondents were dissatisfied, 8.3% were indifferent, 32.1% were satisfied, while 0.8% was very satisfied.

Table 2: Residents' Satisfaction with Roof Condition

Roof Condition	**Nyanya**	**Garki**	**MD Abubakar**
Very Dissatisfied	21 (35.6)	18 (28.6)	-
Dissatisfied	26 (44.1)	29 (46.0)	220 (58.8)
Neutral	7 (11.9)	7 (11.1)	31 (8.3)
Satisfied	5 (8.5)	9 (14.3)	120 (32.1)
Very Satisfied	-	-	3 (0.8)
Total	**59 (100)**	**63 (100.0)**	**374 (100.0)**

Source: Fieldwork, 2016

Relationship between the levels of satisfaction of residents with the housing in the three selected police barracks in Abuja. The research established through empirical study that Resident Police Officers are generally dissatisfied with the Housing in Barracks in Abuja, also by comparative analysis satisfaction levels of building, neighbourhood and management components of the three barracks it established a significant relationship between the satisfactions levels of these components across the three barracks studied. The study established assertions by Onibokun (1973) Oladapo (2006) and Jiboye (2010) that housing satisfaction transcends just the provision of just the dwelling components but include the neighbourhood and management components among other factors that influence satisfaction.

CONCLUSION

This study analysed Residents' Satisfaction of Residential Buildings in Police Barracks in Abuja, Nigeria by employing variables of building, neighbourhood and management components which determine Resident Satisfaction in Police Barracks. The findings of this research show that these variables affect residents' satisfaction therefore establishing previous studies in Housing

Satisfaction in Nigeria. The findings showed that the respondents were generally dissatisfied with their housing environment irrespective of their location but were especially dissatisfied with the management component.

REFERENCES

Dachen, I. (2015). Fit for Pigs: Policemen decry poor living conditions. pulse.ng.com, pp. http://pulse.ng/gist/fit-for-pigs-policemen-decry-poor-living-conditions-id3458170.html.

Federal Republic of Nigeria (1991). National Housing Policy. Lagos: Federal Ministry of Lands and Housing.

Ilesanmi, A. O. (2010). Post-occupancy evaluation and residents' satisfaction with public housing in Lagos, Nigeria. Journal of Building Appraisal, 153-169.

Sulyman, A. O. (2015). Introduction to Housing: Basic Concepts and Applications. Minna: KingJames Publishing House.

Oladapo, A. A. (2006). A Study of Tenant Maintenance Awareness Responsibility and Satisfaction in Institutional Housing in Nigeria. International Journal of Strategic Prop. Manage. Vilnius Gediminas Technology. University, 10, 217-231.

Olotuah, A. (2006). Housing Quality in Suburban Areas: An emperical Study of Oba-Ile, Nigeria. 34(2), 133-137.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Modelling the Practice of Value Management in the Construction Industry

Bruno Lot Tanko*[1,2], Fadhlin Abdullah[1], Zuhaili Mohamad Ramly[1] Jurbe Joseph Molwus[3] and Wallace Imoudu Enegbuma[4]

[1]Department of Quantity Surveying, Universiti Teknologi Malaysia, Johor, Malaysia.
(tankob@unijos.edu.ng, b-fadhlin@utm.my, zuhaili@utm.my)
[2]Department of Quantity Surveying, University of Jos, Jos, Nigeria
[3]Department of Building, University of Jos, Jos, Nigeria
(jurbenang@yahoo.com)
[4]Faculty of Engineering, Computing and Science, Swinburne University of Technology, Kuching, Malaysia.
(wenegbuma@swinburne.edu.my)

ABSTRACT

The theories of value management practice are invaluable, however, the state of practice and awareness of value management application in a locality is imperative. Value management particularly focuses to improve the value of construction projects by getting rid of unnecessary costs without sacrificing quality. The objective of this study is to investigate the current practice of value management activities in the Nigerian construction industry. Data were collected from practicing construction professionals by using a self-administered questionnaire. The Statistical Package for the Social Sciences (SPSS) was used for descriptive analysis, while Analysis of Moment Structures (AMOS) for exploratory and confirmatory factor analysis. The descriptive results revealed the need for adequate value management familiarity among practicing construction professionals. The multivariate results indicated a high correlation within the measurement model for the activities of value management, while the structural model showed that the activities of value management are being executed in the construction industry but then do not follow the standard procedure of a typical value management process. In the end, the model was used to develop a framework for value management practice among construction professionals in Nigeria.

Key words: Value Management (VM); Structural Equation Modelling (SEM); Current Practice; Nigeria

INTRODUCTION

Most construction clients are concern with value philosophies in order to achieve the best from their ventures. Also, the ever-snowballing growing need in the diverse aspects of project management can be appreciated from recent studies that explain project management from several angles. Value management (VM) is one of those ideologies used to specifically optimize value by providing the needed functions at a lower cost without affecting quality and performance of a venture or project. VM which was initially known as Value Analysis (VA) by Lawrence D. Miles (Phyo and Cho, 2014) was designed to enhance value without let go intended functions. VM, which is misunderstood to be a traditional cost reduction tool, is a systematic management approach used to ensure that unnecessary costs of projects are removed, quality performance is improved, and teamwork responsibility is realized.

Currently, VM has been practiced in many countries like the USA, UK, Malaysia, Australia, China, Saudi Arabia, and Hong Kong. Similarly, Karim *et al*. (2014) observed that, VM practices have expanded and have been widely accepted and practiced in many countries. In addition, Luvara and Mwemezi (2017) confirmed that VM has existed for more than five decades and its application has recorded a lot of attainments.

Nonetheless, VM has gained a substantial level of awareness in Nigeria subsequent to the

recommendation for its implementation by some researchers. According to Oke and Ogunsemi (2011), the technique is at present a part of Quantity Surveying academic curriculum of higher institutions but has not been incorporated in the Nigerian construction works. Next, Kolo and Ibrahim (2010) articulated that, VM could be adopted in Nigeria if the construction industry could engage stakeholders on team-oriented basis, implements effective construction programs, explores partnering and strengthens client organizations. Hence, this paper seeks to examine the practice of value management activities in the Nigerian construction environment.

MAIN RESULTS

Respondents characteristics

To gather a better understanding about the background of the respondents, their specialisations and familiarity on VM were obtained as shown in Figure 1 (a&b). The results in Figure 1a revealed that 31% (108) of the total respondents are Quantity Surveyors, 26% (90) Architects, 20% (68) Builders, 17% (59) Civil Engineers, while 6% (19) are Services Engineers. Figure 1b indícates the degree of familiarity on VM among construction professionals. The response reveals that 52% (178) of the respondents were familiar with VM, 31% (105) were moderately familiar, while 8% (29) and 9% (32) were totally familiar and not familiar respectively.

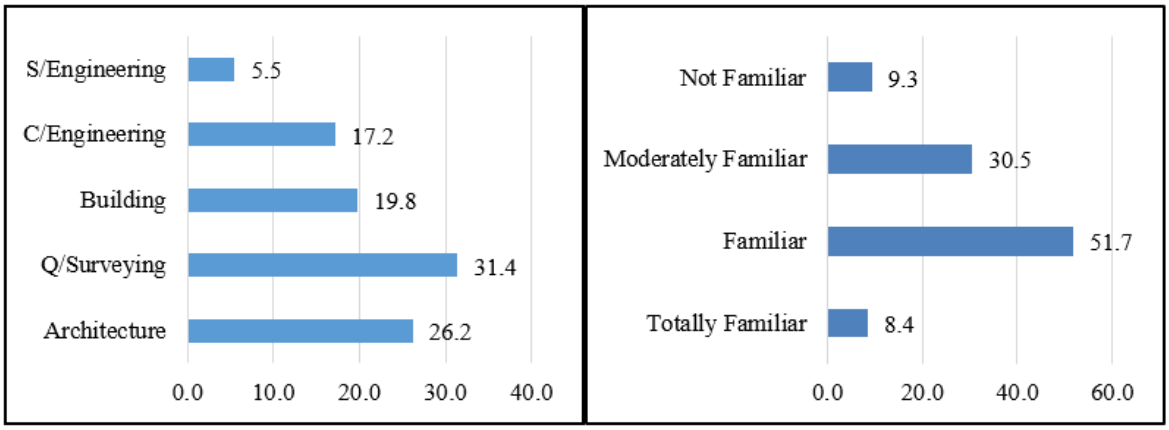


Figure 1 (a&b). Respondents' Specialisations and Familiarity on Value Management

Factor Analysis of the Current Practice of Value Management

The current practice (CP) of VM are the major activities of VM carried out by respective construction professionals. These activities were identified from literature/preliminary survey, and include: carrying out site visitation [CP1], obtaining relevant background information on proposed projects [CP2], defining the timeframe and scope of the project [CP3], understanding the objectives and functions of the project [CP4], involving clients at the initial stage of the project [CP5], assigning responsibilities to construction professionals at the initial stage of project [CP6], defining the procurement approach of the project [CP7], committing client organisations in the project cycle [CP8], clarifying project background information and constraints [CP9], sharing project information among professionals [CP10], making client to clearly express the scope and expectation of the project [CP11], presentation of perceived project constraints by stakeholders [CP12], identifying high cost areas by undertaking relative cost ranking [CP13], classifying functions/elements into basic and secondary elements with their associated costs [CP14], brainstorming ideas to meet the desired functions/elements [CP15], assessing brainstormed ideas to meet the desired functions/elements [CP16], classifying the ideas from the brainstormed section into realistically possible to be implemented [CP17], remotely possible to be implemented [CP18], and realistically impossible to be implemented [CP19]; developing an action plan on the short-listed ideas [CP20], and holding an action plan review meeting.

The KMO and Barlett's test of sphericity were used to establish the instrument validity by assessing the sample adequacy and multivariate normality of the study variables. The KMO value is 0.94 which is above the accepted minimum of 0.6, and the Barlett's test of sphericity is significant by $p<0.05$. The components extraction was based on the total variance explained which

indicated eigenvalues of 1 and more, and also revealed three components with the loading of each variable in a rotated component matrix.

In addition, instrument reliability was used to adequately measure the variables of the study. Cronbach's Alpha values were used to examine the internal consistency of interrelated multiple scale items. The results of reliability test in Table 1 show that the current practice attributes are within the range of 0.96 to 0.97. This implies that the results are highly significant because the values obtained are higher than the recommended minimum value of 0.60 (Enegbuma *et al.*, 2016). Therefore, based on factor analysis, the phases of the current practice of VM are categorized into three as depicted in Table 1.

Table 1: Reliability for Current Practice of VM

Phases	VM Activities	Label	Items	Cronbach Alpha
CPA	CP1-CP7	Information	7	0.96
CPB	CP8-CP14	Information/Function Analysis	7	0.97
CPC	CP15-CP21	Creativity/Evaluation/Development/Presentation	7	0.97

Structural Model for Value Management Practice

The measurement model revealed that the covariance of all the constructs were within the acceptable thresholds of goodness-of-fit indices. Nevertheless, Enegbuma *et al*. (2016) propelled that, the next step should be the assessment of the structural model by way of examining the relationship within the structural model. Hence, Figure 2 shows a model fit in accordance with the data from the respondents.

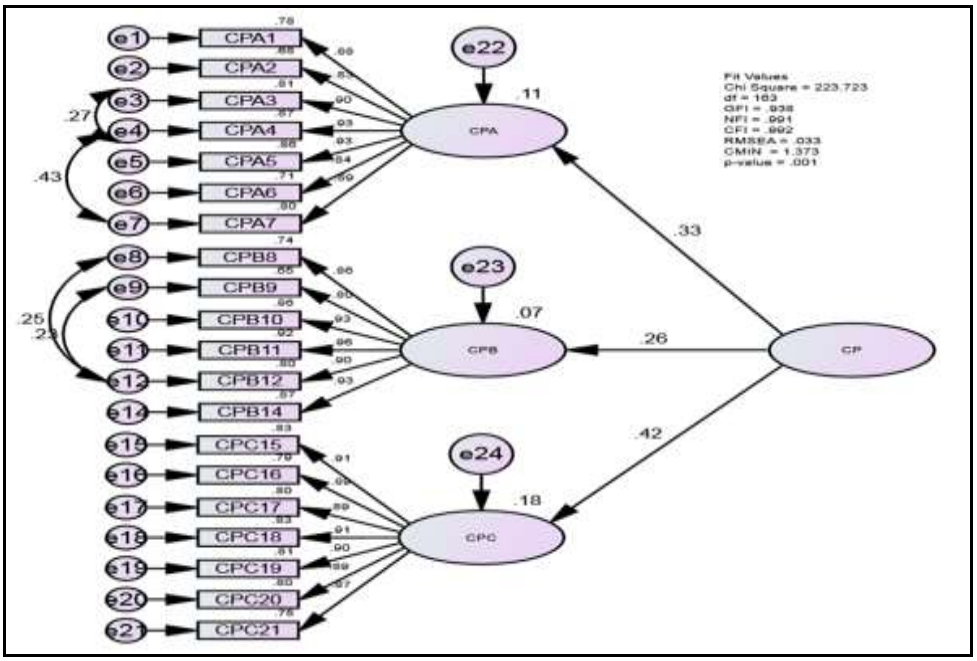


Figure 2. Structural Model for the Current Practice of VM

Framework for the Current Practice of VM

This study identified three phases (3-constructs) of VM using Factor Analysis. Consequently, it can be inferred that the practice of VM activities in the Nigerian construction environment has three phases of application. Hence, it is established that VM is being practiced in Nigeria, however, not according to a typical formal VM methodology. The validated findings from the structural model (Figure 2) are presented in Figure 3 as the framework for VM practice in the Nigerian construction industry.

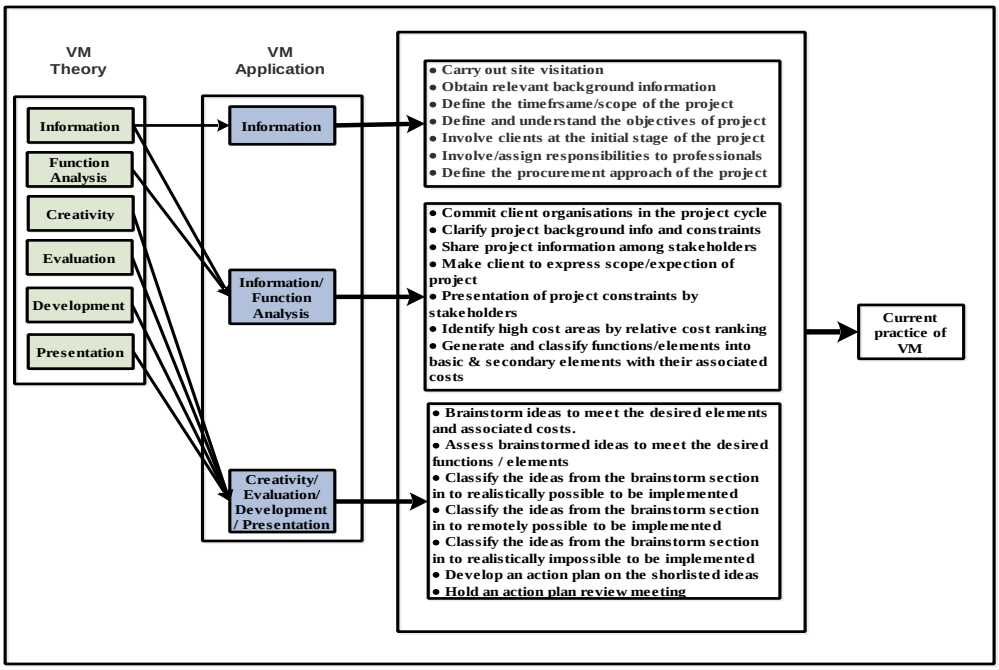


Figure 3: Framework for VM practice in the Nigerian construction industry.

CONCLUSION

The paper examined the relationship between several constructs influencing the current practice of value management in Nigeria. The degree of relationship between the constructs and Structural Equation Modeling (SEM) were used to achieve the objective of this paper by establishing the phases of VM application in Nigeria. The framework can be utilised to develop a roadmap for value management implementation in the Nigerian construction industry.

Acknowledgment:

The authors gratefully acknowledge the financial support of Universiti Teknologi Malaysia and Kaduna State Government.

REFERENCES

Enegbuma, W.I., Aliagha, G.U., Ali, K.N. & Badiru, Y.Y. Confirmatory Strategic Information Technology Implementation for Building Information Modelling Adoption Model. *Journal of Construction in Developing Countries*, 2016, 21(2), 113-129.

Karim, S. B. A., Rahmin, R. Adawiyah, A., Danuri, M. S. M. & Mohamed, O. Developing the Value Management Maturity Model (VM3 ©). *Journal of Design and Built Environment*, 2014, 14, 1-10.

Kolo, B.A. & Ibrahim, A.D. Value Management: How Adoptable is it in the Nigerian Construction Industry? In: Laryea, S., Leiringer, R. And Hughes, w. (Eds) *Conference Proceedings of West Africa Built Environment*, 2010, 653-663.

Luvara, V.G.M. & Mwemezi, B. Obstacles against Value Management Practice in Building Projects of DuresSalaam Tanzania. *International Journal of Construction Engineering and Management*, 2017, 6(1), 13-21.

Oke, A. E. & Ogunsemi, D. R. Value Management in the Nigerian Construction Industry: Militating Factors and the Perceived Benefits. *Second International Conference on Advances in Engineering and Technology*, 2011, 353-359.

Phyo, W.W.M. & Cho, A.M. Awareness and Practice of Value Engineering in Myanmar Construction Industry. *International Journal of Scientific Engineering and Technology Research*, 2014, .3(10), 2022-2027.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Leaching of Lead (Pb) From Petroleum Sludge Treatment by Using Solidification/Stabilization Method

Noorafizah Binti Murshid*[1], Nor Amani Filzah Binti Mohd Kamil[2] and Aeslina Abdul Kadir[3]
[1, 2,3] Faculty of Civil and Environmental Engineering, University Tun Hussien Onn
(E-mail: noorafizahmurshid@gmail.com, noramani@uthm.edu.my; aeslina@uthm.edu.my)

ABSTRACT

Petroleum sludge is one of the major solid wastes generated in the petroleum industry. Generally, there are numbers of heavy metals in petroleum sludge and one treatment that is gaining prominence to treat a variety of mixed organic and inorganic waste is solidification/stabilization (S/S) method. The treatment protects human health and the environment by immobilizing contaminants within the treated material and prevents migration of the contaminants. In this study, solidification/stabilization (S/S) method has been used to treat the petroleum sludge incorporated with palm oil fuel ash as cement replacement. The comparison of hydration days, namely, 7^{th} , 14^{th}, and 28^{th} days in these cement-based waste materials were studied by using Synthetic Precipitate Leaching Procedure (SPLP) and Toxicity Characteristics Leaching Procedures (TCLP). The results were compared to the United States Environmental Protection Agency (USEPA) standards. The results concluded the incorporation of POFA 20% gave minimum concentration of lead (Pb) leaching as the high percentage POFA, more than 20%, deficient in Calcium Oxide (CaO), which is can caused weak solidification in the mixture.

Key words: Solidification/Stabilization (S/S) method, Palm oil fuel ash (POFA), Heavy metal, Waste treatment

INTRODUCTION

Heavy metals are the main inorganic contaminants found in the petroleum sludge.Thus according to Department of Environment (DOE), Malaysia, petroleum sludge is classified as a scheduled waste and it has to be landfilled at secure landfill to meet the Toxicity Characteristics Leaching Procedure (TCLP) guidelines as proposed by DOE of Malaysia. Heavy metal contaminations in waste are causing a serious threat to the environment and human health [2]. One of the technologies that is gaining prominence to treat a variety of mixed organic and inorganic waste is solidification/stabilization (S/S) method [3].
Cement is commonly used as binder and was disccussed widely in literature. However, some disadvantages of this binder including the high cost of the cement and it is also claimed that the usage of the cement as the only binder in S/S method is not effective for the immobilization of several common organic and inorganic contaminants [4]. Therefore, incorporation the palm oil fuel ash as partial cement replacement was implement in the S/S method instead of using fully cements due to its pozzolanic content that able to encapsulate the contaminants better [5].
The main aim of this study is to determine the leaching of Lead (Pb) in variying percentage of POFA as cement replacement. The leaching behavior of Pb in petroleum sludge was studied by using Toxicity Characteristics Leaching Procedures (TCLP) and Synthetic precipitation Leaching Procedure (SPLP). In addition, this study also study the behavior at different curing day namely, 7th, 14th and 28th day.

METHOD

Ordinary Portland Cement (OPC) Type I and Palm Oil Fuel Ash (POFA) were used as binder in this study. OPC was received from Kok Xin Hardware, Parit Raja. POFA was obtained from a factory processing palm oil owned by Kluang Oil Palm Processing Sdn Bhd, Kluang. POFA was dried in the oven at the temperature of 110˚C ± 5 for 24 hours in order to remove moisture. Next, the dried POFA was sieved through a 300 μm and grounded in a modified Los Angeles abrasion test machine in order to increase the finess and consequent reactivity as cement partial replacement. Then, POFA was kept in an airtight container and stored in the humidity-controlled room to isolate from the atmospheric humidity. Petroleum sludge samples were collected from PETRONAS Refinery at Melaka. The petroleum sludge

was dried in the oven for 48 hours at a temperature of 110˚C.
Table 1 summarizes the mix design in this study. The sludge was added together with POFA and OPC then allowed it to homogenize for approximately 5 minutes in order to eliminate any lumps that may have formed. Secondly, water was added gradually at water-to-mixture (W/M) ratio of 0.5 or 0.60. After mixing, the mixture was casted into 50 mm x 50 mm x 50 mm cube molds in 3 layers; with each layer will be compacted by manual compactor to yield good packing of the mixture. All the samples were triplicated for 3 hydration durations which are 7^{th} , 14^{th} , and 28^{th} days for air drying of the solidified samples in a cabinet at a controlled condition (Temperature = 25±2˚C, Humidity> 90%).

Table 1 : Mix design in this study

Sample	OPC (%)	POFA (%)	SLUDGE (%)	Water to cement ratio	Total weight of sample (g)
Control	70	0	30	0.5	250
10%	60	10			
20%	50	20			
30%	40	30			
40%	30	40			

RESULTS

Figure 1 represent the comparison of TCLP and SPLP on Pb leachability of S/S samples at 7th, 14th and 28th days with different percentage of POFA. From the Figure 1, it clearly shows that the concentrations of Pb in SPLP result higher than that TCLP result. It means that during SPLP test, the concentration of heavy metals leach out more compared to TCLP FOR 14th and 28th day of curing. While at the 7th day of curing, the results shows almost similar leaching behaviour might be because at early stage of leability the matrices not attain mature phase of hydration. Also this might be due the type of the acid used and pH of the leaching solution during the test. Acetic acid with pH of 2.88 ± 0.05 used in TCLP able to leach out more than sulphuric acid and nitric acid with pH 4.2 in SPLP.
It is supported by [6] which mentioned that the TCLP test used acetic acid in fluid reagent causing the heavy metals to leach greater than the SPLP. The testing and function of both procedures are completely different as TCLP extraction used acetic acid at pH 2.88 to alter toxicity behavior of heavy metals. Nitric acid and sulphuric acid with pH 4.2 in SPLP is used to stimulate the effect of acid rain in the real condition [7]. Apart from that, all ratios shows Pb concentrations below 5 ppm which means that all Pb concentration complies the USEPA standard.
In addition, POFA contain higher silica more than 60% which able to enhance the formation of bonding and contributes to metal immobilization as supported by [8]. It is proven by [1] said that the substitution of POFA into the mix design over 20%, shows increase in results. This is because POFA deficient in Calcium oxide, CaO as compared to OPC [1]. Therefore, the mixture less CaO composition to sustain throughout the curing periods due to higher POFA substitution.
The concentration of Pb at 28 days is lower than that at 7 days. This scenario is expected because the leachability of heavy metals S/S samples is dependent on the hydration days. It is prove by [9] which stated that long hydration days in S/S method could decrease the leachability in groundwater. Therefore, in this study, the suitable percentage of POFA that can be use as partial cement replacement to treat petroleum sludge by using S/S method is 20%.

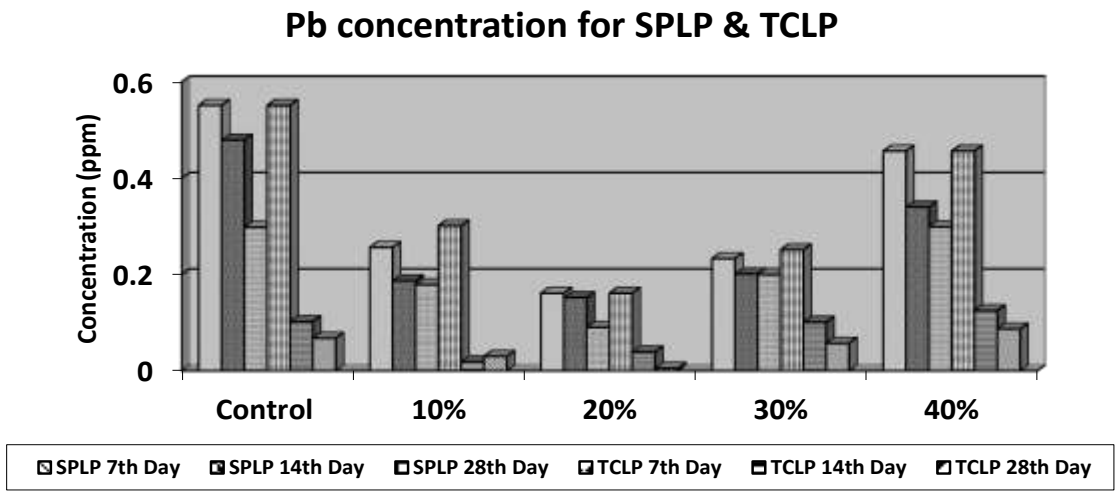


Figure 1. Concentration of Pb for 7th, 14th and 28th day of SPLP and TCLP leacing test

CONCLUSION

The use of POFA as partial cement replacement in this study is an interesting alternative for removal Pb in petroleum sludge. The optimum of POFA percentage found in this study is 20%. Greater than 20% showed unsatisfactory results for leaching test which the results show an increasing value of concentration of Pb. The possibilty of using higher amount of POFA might continuosly increase the concentration of Pb in S/S samples. In addition, the concentration of Pb at 28 days is lower than that at 7^{th} and 14^{th} days due to long hydration days increased bonding reaction between metals and binder.

Acknowledgment:

The authors gratefully acknowledge the financial support of the grant Vot U548 for research tittled "Enhancement Of Petroleum Sludge Waste Treatment Performance By Using Solidification/Stabilization (S/S) Method With Palm Oil Ash As Partial Cement Replacement" and take this opportunity to thankthose who contributed directly or indirectly incompletion of this article and also for their constructive comments.

REFERENCES

Yin C Y, Mahmud H and Shaaban M G, 2006 Stabilization/solidification of lead contaminated soil using cement and rice husk ash., J. Hazard. Mater, 137(3) 1758–64.

Guangji, H., Jianbing, L. & Guangming, Z. Recent development in the treatment of oily sludge from petroleum industry: A review. *Journal of Hazardous Materials*. 2013. 261. 470-490.

Dermont G, Bergeron M and Mercier G, 2008 Metal-Contaminated Soils : Remediation Practices 188–209.

Hytiris, N., Fotis, P., Stavraka, T., Bennabi, A. & Hamzaoui, R. Leaching and Mechanical Behaviour of Solidified/Stabilized Nickel Contaminated Soil with Cement and Geosta. *Proceedings of the 4th International Conference on Environmental Pollution and Remediation*. August 11-13, Prague, Czech Republic. Dukpe, S.M. Title of a master's or PhD thesis. Universiti Teknologi Malaysia, Ph.D. Thesis, 2012.

Kerkez, V., Tomin, M. R. B., Dalmacija, M. B., Tomasevic, D. D., Roncevic, S. D., Pucar, G. V., & Dalmacija, B. D. Leachability and physical stability of solidified and stabilized pyrite cinder sludge from dye effluent treatment. *Hem. Ind*. 2015. Vol 69(3): 231-239.

Du, Y. J., Wei, M. L., Reddy, K. R., Liu, Z. P., & Jin, F. Effet of acid rain pH on leaching behavior of cement stabilized lead-contaminated soil. *Journal of Hazardous Materials*. 2014. 271. 131-140.

Kuo, Y. M., Lin, T. C., Tsai, P. J. Effect of SiO2 on Immobilization of Metals and Encapsulation of a Glass Network in Slag. *Journal of Air Waste Management. Assoc*. 2003. 53. 1412-1416.

Antemir, A., Hills, C. D., Carey, P. J., Gardner, K. H., Bates, E. R. & Crumbie, A. K. Long term performance of aged waste forms treated by stabilization/solidification. *Journals of Hazardous Materials*. 2010. 181. 65-73.

Harbottle, M. J., Al-Tabbaa, A. & Evans, C. W. A comparison of the technical sustainability of in situ stabilization/solidification with disposal to landfill. *Journal of Hazardous Materials*. 2007. 141. 430-440

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Comparative Study of the Effect of Orientation on Courtyard Microclimate in Kafanchan-Nigeria

Markus B.,* Malsiah B. H., Lim Y. W., and Modi S. Z.

Department of Architecture, Faculty of Built Environment,
Universiti Teknologi Malaysia
(E-mail: markusbulus8@gmail.com, malsiah@utm.my, lywah@utm.my)

ABSTRACT
Two prototype courtyard residential buildings were investigated in other to confirm whether orientation has any effect on their microclimate. The case-study buildings have different orientations such as North/South and East/West. They are located in the city of Kafanchan-Kaduna in Nigeria. The study employed the experimental methodology. Two Hobo weather Data Loggers (HWDL) were used to collect data in the courtyards. Only two climatic variables, namely air temperature, and humidity were examined as these variables have not hitherto been investigated in a single research on the courtyard in Nigeria. The results showed a definite difference of the microclimatic conditions of the two courtyards. The courtyard building with North/South orientation was confirmed to have a better air temperature difference of 1^{o}c to 3^{o}c, and relative humidity difference of 1% to 6%. In conclusion, the North/South oriented courtyard residence demonstrated a more favorable microclimatic performance due to the shading effect of the building form on the internal courtyard space, therefore, the form of the courtyard is a major factor that determines the choice of courtyard building orientation.

Keywords: Comparative study, courtyards, microclimate, performance, Orientation.

INTRODUCTION

One of the most important and contemporary discussions in the built environment in this twenty-first century is "Passive Architectural Design Strategies [PADS]" (Markus *et al*., 2017). It is becoming more and more difficult to ignore the issues of microclimatic performance of the architectural design space such as the courtyard. Numerous studies have established that the courtyard is a microclimate modifier to the building interiors (Aldawoud, 2008; Meir *et al*., 1995). Also, recent studies in PADS have emphasized that the courtyard is a good architectural design element, and its microclimatic performance should be investigated (Tablada *et al*., 2005; Akande, 2010; and Markus, 2016).
Consequently, this comparative study attempts to study the microclimatic performance of two similar courtyard forms with the same perimeter and material finished but, different orientations - the North/South oriented courtyard residential building and the East/West oriented courtyard residential building. The main purpose of the study is to compare their microclimatic performances in other to ascertain the effect of orientation.

METHODOLOGY

This comparative study was conducted to examine the microclimatic conditions of two prototype courtyard forms with the same perimeter, and material finished but, different orientations. Two Hobo Weather Data Loggers (HWDL) were used to collect data in the courtyards of the case-study courtyard buildings. The tools were calibrated a day before the experiment in order to validate the accuracy of the tools. The uninterrupted measurement was carried out at the courtyards between 6.00am and 6.00pm on Tuesday, 22nd April 2017. The HWDL was placed at the center of each of the courtyard. The data were calibrated at 30 minutes intervals and fixed at 1.2m above the natural ground level. At the end of the exercise, the acquired data was read out via the HoboPro software and thereafter exported to Origin 7.0 software for analysis.

RESULTS AND DISCUSSION

Air Temperature

The results in **Figure 1** show that the North/South oriented courtyard has better air temperature than the East/West oriented courtyard form. The maximum difference of temperature between the two case-studies was 2ºC. Whereas, the minimum difference of temperature was 1ºC. The discrepancies were observed at almost all the time intervals uniformly. The dimensions and proportions of the North/South oriented courtyard favored optimum shading on the courtyard space, while on the contrary the East/West oriented courtyard form is not (Muhaisen and Gadi 2006). Thus, according to Meir (2000), the orientation of the courtyard in the building may have affected the microclimatic performance of the East/West oriented courtyard negatively.

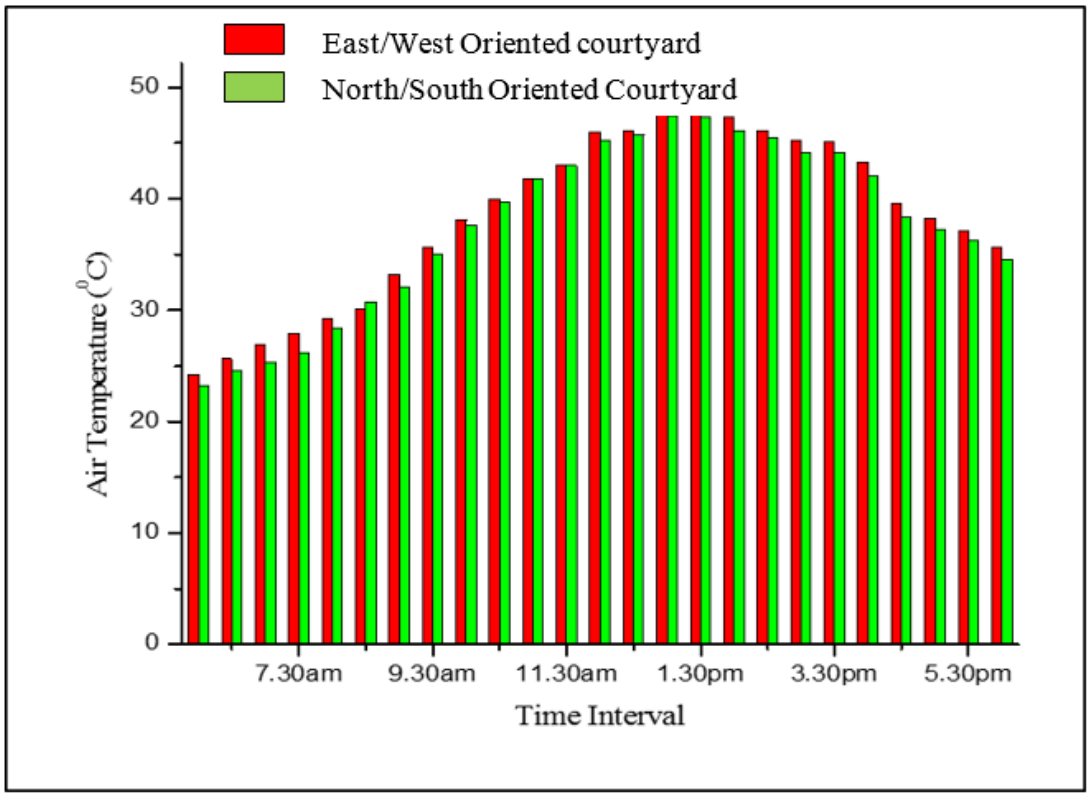


Figure 1. Air Temperature of North/South and East/West Oriented Courtyards

Relative Humidity

While on the other hand, relative humidity and temperature had a converse relationship. As revealed in Figure 2, the relative humidity was greater in the North/South oriented courtyard form than in the East/West oriented courtyard form. However, the condition was different in the early hours of 6:00 am to 7:00 am. According to Boyles Law, as temperature increases, relative humidity decreases. Therefore, the high amount of relative humidity in the East/West oriented courtyard concord with Boyles Law.

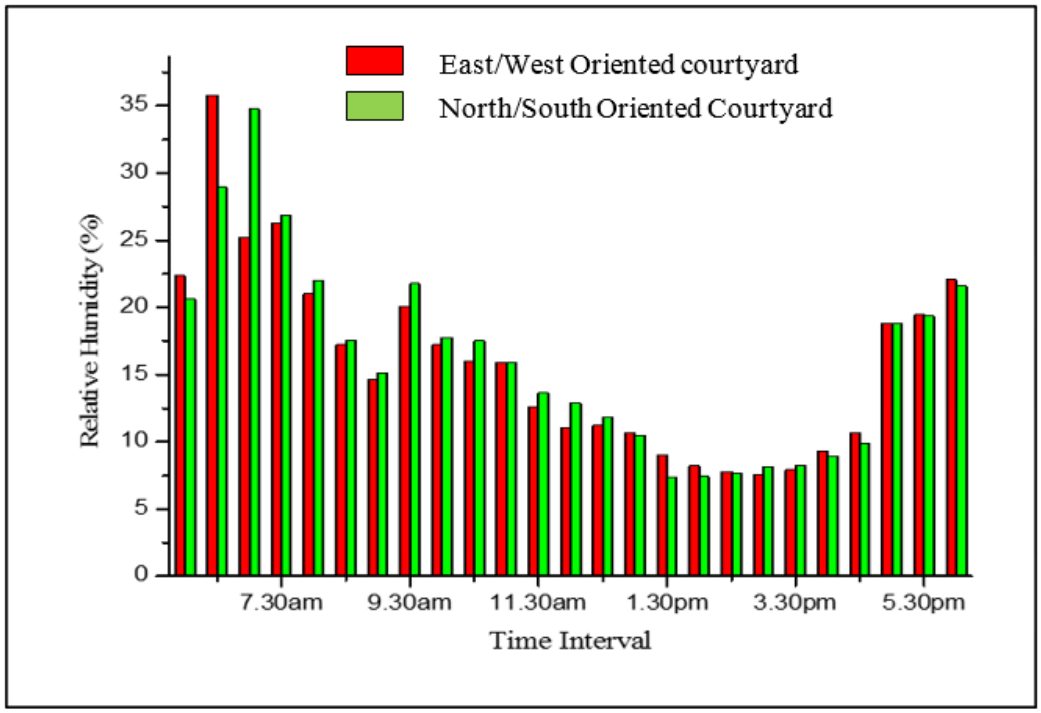


Figure 2. Relative Humidity of Semi-enclosed and fully enclosed courtyards

CONCLUSION

In conclusion, the North/South oriented courtyard has demonstrated a more favorable air temperature than the East/West, while the East/West has a better relative humidity than the North/South. However, the North/South scenario is the most preferred due to the fact that Kafanchan is located within the temperate hot-dry climatic zone of Nigeria, hence, mitigating air temperature is more paramount than relative humidity. Future simulation studies towards the courtyard building optimization for a more favorable microclimatic performance is recommended.

REFERENCES

Akande, O. K. Passive Design Strategies for Residential Buildings in a Hot dry climate in Nigeria. *WIT Transactions on Ecology and the Environment 128* (2010), 61–71.

Aldawoud, A. Thermal performance of courtyard buildings. *Energy and Buildings,* 40 (2008), 906-910.

Markus, B. (2016). Evaluation of Courtyard Usage and its Design Requirements in Residential Buildings in Nigerian Hot-Dry Climate. *International Journal of African Society Cultures and Traditions*, Vol.4, No.4, pp.1-12

Markus, B., Malsiah, B. H. and Lim, Y. W. Courtyard as a Passive Cooling Strategy in Buildings. *International Journal of Built Environment and Sustainability IJBES* 4(1) (2017), 48-55.

Muhaisen, A. S., & Gadi, M. B. (2006). Effect of courtyard proportions on solar heat gain and energy requirement in the temperate climate of Rome. *Building and Environment*, *41*(3), 245–253. http://doi.org/10.1016/j.buildenv.2005.01.031.

Meir, A. I., Pearlmutter, D., and Etzion, Y. On the microclimatic behavior of two semi-enclosed attached courtyards in a hot dry region. *Building and Environment* 30 (1995), 563-572.

Meir, I. A. Courtyard microclimate: A hot arid region case study. Paper presented at the proc. 17th PLEA int. conf...Cambridge. (2000).

Tablada, A., Blocken, B., Carmeliet, J., and Troyer, F. De. The influence of courtyard geometry on air flow and thermal comfort: CFD and thermal comfort simulations. *Energy and Buildings,* 6(2) (2005).

ICSESS 2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

The Critical Success Factors of Public-Private Partnership for Housing Delivery in Nigeria

Muhammad Zayyanu*[1], Foziah Johar[2], Jiman Chado[3], and Baba A. Ndalai[4]

[1, 3, 4] Department of Urban and Regional Planning, Faculty of Built Environment, Universiti Teknologi Malaysia, Johor Bahru, Malaysia
(E-mail: danillelamz@yahoo.com, jimanchado@yahoo.com)
[2] Center for Innovative Planning and Development, Faculty of Built Environment, Universiti Teknologi Malaysia, Johor Bahru, Malaysia
(E-mail: b-foziah@utm.my)

ABSTRACT

Public-private partnership (PPP) has gained popularity with governments as an alternative delivery approach for the provision of public works and services. In international practices, however, there are mixed results, criticism and controversy over PPP. The observed mixed results and controversy in the application of PPP have prompted investigation regarding the explanatory factors that influence the success of PPP projects. However, most studies focused on PPP infrastructure projects, while PPP housing projects remain poorly understood particularly in the context of developing countries. The aim of this paper is to identify and rank the critical success factors (CSFs) of PPP Housing projects in Abuja, Nigeria using Analytical hierarchy process (AHP). The study revealed that "favourable investment environment", "efficient procurement process" and "judicious government control" are the most critical CSFs that influenced the success of the PPP housing project in Abuja, Nigeria. The study concludes that lack of transparency in procurement system, poor economic condition, poor governance, corruption, weak institutions, and incompetent private sector are the contextual peculiarities in Nigeria that influence the extent of contribution of the success factors. The findings of the study would help in PPP policy formulation and development of a framework for effective housing delivery in Nigeria and other developing countries with similar characteristics.

Key words: Critical success factors, Public-private partnership, Ranking, Housing projects, Nigeria

INTRODUCTION

Over the last three and a half decades, the public-private partnership has gained popularity as one of the most viable strategies for the provision of public infrastructure and services (Agrawal 2010). PPP continue to grow in both developed and developing countries for delivering public infrastructure projects such as transport, education, health, prisons, and defence (Hodge & Greve, 2011). However, despite the soaring appeal of the strategy, infrastructure projects constitute the largest sectors of PPP deals internationally (OECD, 2010). The strategy is less applied in housing delivery as in infrastructure provision (Abdul-Aziz & Kassim, 2011). For this reason, PPP housing is very much under-studied worldwide (Sengupta, 2005; Abdul-Aziz, 2012). Hence, the explanatory factors for the success of PPP in housing delivery remained poorly understood particularly within the context of developing countries like Nigeria. As observed by UN-HABITAT (2011), PPP housing programs in the developing world are relatively sparse, with little empirical data to show a trend of success.

This article aims to identify and rank the critical success factors for PPP housing delivery in Nigeria. The paper undertook an extensive literature review to identify CSFs for PPP projects in general. A sequential mixed method research was employed involving a focus group interview followed by a questionnaire survey. The list of CSFs gleaned from the literature was presented to a focus group comprising of PPP experts to verify the appropriate CSFs of PPP for housing delivery in Nigeria. Subsequently, a questionnaire survey asked respondents who participated in the PPP housing project in Abuja, Nigeria to indicate the importance of the CSFs in Nigeria using Analytic Hierarchy Process (AHP). For the qualitative data, conversation analysis was used to determine the

level of consensus by the group of experts regarding the appropriateness of the CSFs. On the other hand, for the quantitative data, the priorities (weighting) derived from the expert choice software are used to rank the critical success factors and the success sub factors.

MAIN RESULTS

The review of literature identified a list of twenty-four success factors which was presented to a focus group interview to verify the relevant CSFs for PPP housing delivery in Nigeria. The analysis of the interview results indicates that twenty-one CSFs are relevant to PPP housing projects in Nigeria. Each of the twenty-one CSFs had gotten at least 50% agreement by all the participants (Figure 1).

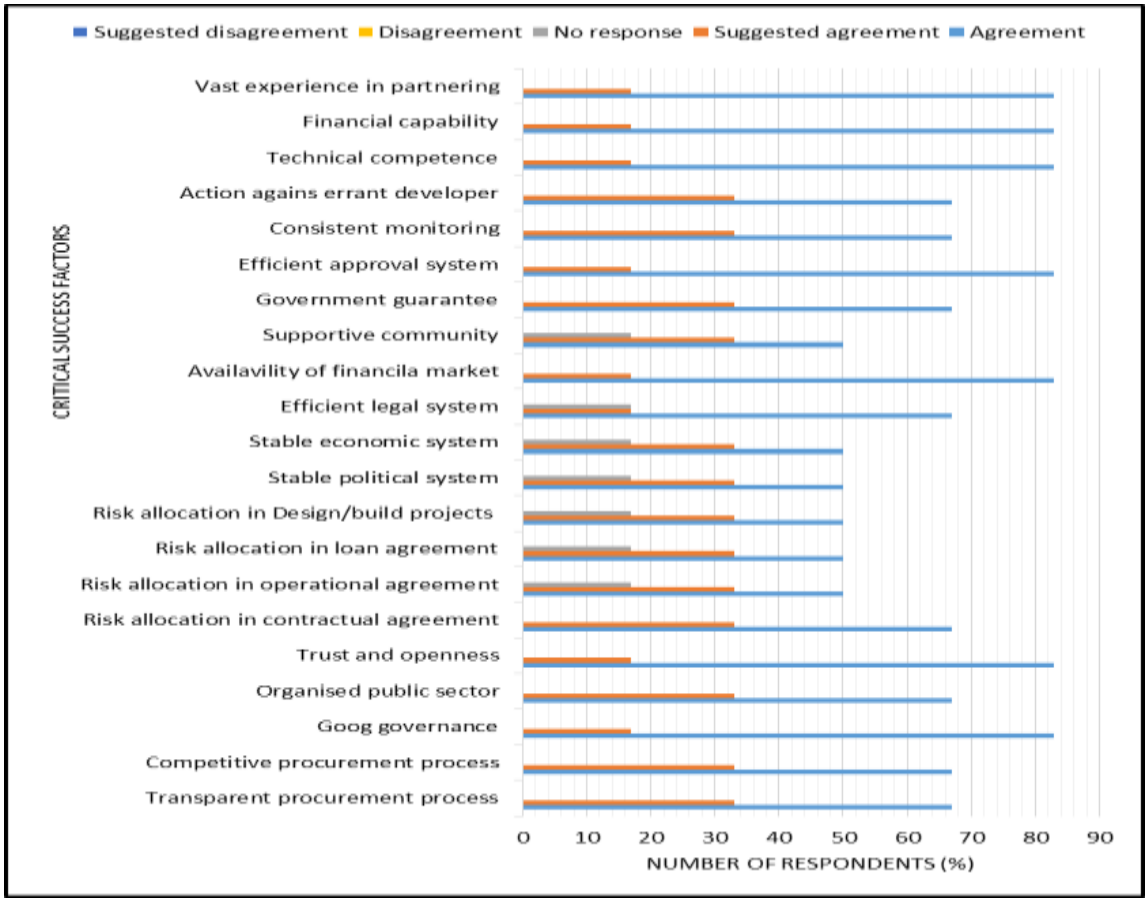


Figure 1. Relevant factors for PPP housing delivery in Nigeria

The ranking shows the relative importance of the factors to the success of PPP housing project in Nigeria (Table 1).

Table 1. Ranking of the critical success factors of PPP housing delivery in Nigeria

CSFs	Normalized weight	Ranking	Success Sub-factors	Normalized weight	Ranking
Effective procurement process (EPP)	1	1	EPP1.Transparent procurement process EPP2. Competitive procurement process EPP3. Good governance EPP4. Well-organized public agency EPP5. Trust and openness between parties	1 0.827 0.715 0.438 0.384	1 2 3 4 5
B. Favourable investment environment (FIE)	0.898	2	FIE1. Stable political system FIE2. Favourable economic system FIE3. Fair and efficient legal framework FIE4. Availability of financial market FIE5. Supportive and understanding community	1.000 0.788 0.593 0.529 0.313	1 2 3 4 5
Appropriate risk allocation (ARA)		3	ARA1. Equitable risk allocation in contractual agreement ARA2. Equitable risk allocation in operational agreement ARA3. Equitable risk allocation in loan agreement ARA4. Equitable risk allocation in design/build contract	1.000 0.776 0.640 0.552	1 2 3 4
Strong private sector (SPS)	0.589	4	SPS1. Technical competence SPS2. Financial capability SPS3. Vast experience in partnering	1.000 0.766 0.496	1 2 3
Judicious government control (JGC)	0.451	5	JGC1. Government guarantee JGC2. Efficient approval process JGC3. Consistent monitoring JGC4. Action against errant developers	1.000 0.674 0.478 0.377	1 2 3 4

CONCLUSION

The findings of the paper have widened the understanding of the critical success factors of PPP housing delivery in Nigeria. The authors conclude that the success of the PPP program is highly influenced by the contextual peculiarities in Nigeria. The understanding of the explanatory factors will guide the formulation of PPP policy and development of a PPP framework for effective housing delivery in Nigeria. Having established the relevant CSFs of PPP housing projects, future research agenda may wish to focus on developing a framework for effective housing delivery through PPP.

REFERENCES

Abdul-Aziz, A.-R., 2012. Control mechanisms exercised in Malaysian housing public-private partnerships. *Construction Management and Economics*, 30(1), pp.37–55.

Abdul-Aziz, A.R. & Kassim, P.S.J., 2011. Objectives, success and failure factors of housing public e private partnerships in Malaysia. *Habitat International*, 35(1), pp.150–157.

Agrawal, R., 2010. *Successful Delivery of Public-Private Partnerships for Infrastructure Development*. Jaypee Institute of Information Technology, Noida, India.

Hodge, G. & Greve, C., 2011. Theorizing Public-Private Partnership Success : A Market-Based Alternative to Government ? In *Public Management Research Conference*. New York, USA, pp. 1–23.

OECD, 2010. *Dedicated Public-Private Partnership Units A Survey of Institutional and Governance Structures*, Organisation for Economic Co-operation and Development.

Sengupta, U., 2005. Government intervention and public – private partnerships in housing delivery in Kolkata. *Habitat International*, p.14.

UN-HABITAT, 2011. *Public-private partnerships in housing and urban development*, Nairobi: UN-HABITAT.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Durability of Bamboo as Reinforcement for Concrete

Muhammad U. F.*[1], Wan Mohd Zakri Wan Abdullah[2]

[1]Department of Architecture, Universiti Teknologi, Johor, Malaysia.
(E-mail: ufmnoble1433@gmail.com,)
[2]Department of Architecture, Universiti Teknologi, Johor,
Malaysia. (E-mail: wanzakri@yahoo.com,)

ABSTRACT

Reinforcement in concrete is very important and usually costly because steel is the conventional material used. Bamboo has been proven to possess the required mechanical properties to be used as alternative reinforcement for concrete. However, the durability of bamboo needs to be enhanced. This review presents studies basically conducted from 2012-2017, on the methods of enhansing durability of bamboo. One of the most significant findings was that, if well protected from the soil, bamboo can last for more than 10years. Other findings revealed the use of chemical and traditional methods of enhancement. The review concludes that bamboo is indeed a viable and sustainable alternative reinforcement for concrete.

Key words: Bamboo, Durability, Treatment, Reinforcement, Concrete

INTRODUCTION

Reinforced concrete is a building material that has acquired a cozy position in construction due to its characteristic durability (Al-Neshawy & Sistonen, 2015). The main contributor to this characteristic is the reinforcing material within the concrete, which is usually steel rods. Bamboo has been tested, trusted and proven to be an alternative material for reinforcement as a result of its lower cost of processing and its sustainable nature (Sakaray, Togati, & Reddy, 2012) (Sharma, Dhanwantri, & Mehta, 2014). However, one of its most important properties, durability, has been a subject of great debate and grave concern among researchers as well as the general public. Focus of this paper is to present summary of findings by some studies within the last five years – 2012 to 2017, on non-chemical, traditional and natural ways to increase the durability of bamboo as concrete reinforcement.

MAIN RESULTS

Most bamboo species, without any treatment, and protected from inclement weather, may last for up to 7 years. However, there are several ways in which the durability can be enhanced to withstand potentially harsh or destructive conditions (Beraldo, 2016). These may be divided into two main categories – non-chemical and chemical methods. Some of the non-chemical methods are: -

- Targeting certain periods for cutting or harvesting the bamboo – related to moon, light and tide.
- Immersion in water for several weeks, which will cause leeching of the starch inside the bamboo.
- Treating the bamboo with smoke from burning some leaves.

Some of the chemical technics are using chemicals like Creosote and Boric acid: -

- Brushing
- Dipping
- Diffusion

CONCLUSION

Bamboo indeed possess the necessary mechanical properties to qualify it as material for reinforcement. Its durability, which may be a source of concern, can be considerably enhanced using numerous traditional and modern methods. Hence, for the purpose of reinforcing concrete, one unequivocally qualified material or candidate is bamboo.

Acknowledgment: The authors would like to express their appreciation for the support of their families and those who assisted in one way or another.

REFERENCES

Al-Neshawy, F., & Sistonen, E. (2015). Durability of concrete. Retrieved from https://mycourses.aalto.fi/pluginfile.php/142949/mod_label/intro/2015-11-23_Durability_Fahim03.pdf

Beraldo, A. L. (2016). Bamboo Housing–Evaluation of the Component's Decay After 17 Years of Exposure.Presented at the 6th Amazon & Pacific Green Materials Congress and Sustainable Construction Materials LAT-RILEM Conference, Cali, Colombia. Retrieved from https://www.researchgate.net/profile/Antonio_Beraldo/publication/303374472_Bamboo_Housing_-_Evaluation_of_the_Component's_Decay_After_17_Years_of_Exposure/links/573f136a08aea45ee844f38e.pdf

Sakaray, H., Togati, N. V. K., & Reddy, I. R. (2012). Investigation on properties of bamboo as reinforcing material in concrete. *International Journal of Engineering Research and Application*, *2*, 077–083.

Sharma, P., Dhanwantri, K., & Mehta, S. (2014). Bamboo as a building material. *International Journal of Civil Engineering Research. ISSN*, 2278–3652.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Solution of Emissions: Embodied Carbon Measurement of a Traditional Method of Construction (TMC) as an Index for Sustainability

Liman Alhaji Saba [*1,2,a], Mohd Hamdan Ahmad [1,b], Roshida Binti Abdul Majid[1,c] and Ahmed Yahaya[2,d]

[1]Department of Architecture, Faculty of Built Environment,
Universiti of Teknologi Malaysia.
[2]Department of Architectural Technology, School of
Environmental Studies, Federal Polytechnic Bida, Nigeria
(limansaba@gmail.com, b-hamdan@utm.my, b-roshida@utm.my,
ahmedyahaya71@gmail.com).

ABSTRACT

Carbon is the most important chemical compound in the process of climate change, There is a growing interest in the minimization or elimination of the carbon in form of CO_2, as it is the main causative agent of global warming and climate change. Especially, residential buildings have been found to contribute substantially to climate change through the carbon emitted to the environment in the process of building procurement and use. In a view to identifying the target areas for decarbonization, the study aimed at tracking the CO_2 content of the various activities and processes involved in building procurement in a Nigerian context. A process life cycle assessment (LCA) coupled with multiobjective optimisation approach using linear programming (LP) was adopted to conduct a partial LCA, from cradle to site, of the construction. An inventory of the materials and fossil fuel energy utilised in the construction was used to calculate the embodied carbon of a residential building apartment in Abuja of Nigeria. The embodied carbon of traditional method of construction (TMC) was found to be 16, 175.88kgCO_2 for a two (2) bedroom apartment house, 234.43kgCO_2/m^2 of useable floor area. However, it shows the importance of considering embodied carbon in making alternative choices for use in different building projects. Hence the paper concluded that de-carbonization strategies should be targeted at both the embodied and operational carbon emissions of buildings. The best result will be achieved if the de-carbonization efforts are combined with natural and active carbon sinks that exist in the study context.

Keywords: pollution to solution, Life cycle assessment, fosil fuel energy, environment..

INTRODUCTION

In 2009, buildings accounted for 32% of total global final energy (IEA, 2012). The building sector emits 8.1 Gt of CO_2 /year (Jennings et al., 2011). Also, the built environment consumes more natural resources than necessary and, therefore, generates a large amount of waste (Osmani, 2011). The high CO_2 emissions and wasteful resources all have huge negative impacts on the environment. Although, the greatest burden of the impacts is on developing countries. Therefore, there is an urgent need for concerted efforts from developed and developing countries to minimise or eliminate activities that contribute to climate change. The increasing concern from developing countries has steadily been reflected in their participation in some high profile international conferences such as Conference of the Parties (COP) 15-Copenhagen, COP17-Durban, and lastly, COP 18-Doha in 2009, 2011 and 2012 respectively. CO_2 is the most significant greenhouse gas (GHG), the principal substance creditworthy global warming and so climate change. The residential buildings climate change mitigation is directed at riddance or minimization of CO_2 emissions. The building construction CO_2 emissions are principally relying on the energy quantity and kind depleted through the building construction process and utilization. Since carbon mitigation objectives for buildings have been demonstrated in lots of geographical legal power. While for developed countries, the mitigation objective is the existing building stock, new buildings are more significant in quickly developing countries (Jennings et al., 2011). The building and construction sector in Nigeria is very active. With population growth range of 2.5%,

approximately 1.5million new houses would be needed annually between 2012 and 2025 (Hogarth et al., 2015). Prior to specified time, due to unfitness to address housing needs quickly, housing shortage has accrued and in the region of approximately 17.5million (Okonjo-Iweala, 2014). Bridging the shortage will call for enhanced CO_2 emissions. Therefore, baseline CO_2 emissions scenarios in buildings require to be demonstrated with the objective of placing the Nigerian view in the studies context and to help benchmarking and subsequently on CO_2 mitigation objectives. Therefore, this study focuses on CO_2 emissions from the building construction procurement (embodied emissions) perspective. Because of the emerging nature of embodied carbon, this study will investigate their shares in the traditional method of construction (TMC) house in Nigeria. In addition, it is imperative to use parameters like embodied carbon (EC) to guide the selection of environmentally benign materials and assemblies from an options for alternative uses in buildings. Based on the review of the literature, there is a lack of quantitative studies in Nigeria regarding embodied carbon of buildings materials and assemblies.

METHODOLOGY

The life cycle assessment (LCA) framework coupled with multi objective optimisation using Linear Programming (LP) was adopted for the study. A building under construction was the base case for the analysis. The building is located at the Kuje campus of Nigeria Ghana International School, in the Abuja region of Nigeria. Nevertheless, the building specific inventory information for EC calculation like quantities and materials specification and components, construction processes and inputs applied were got through observation, interviews and from secondary sources. The building-specific information was got by selecting a case from the residential typologies plan identified in the study and was selected for EC analysis. The alternative material chosen for the analysis is AMC clay block house. The outcomes from the survey and inventory phases were utilized with the ICE database and the process-based method to calculate the embodied carbon emissions of the case building. The materials quantities got from a standard BOQ (bill of quantities) were designated in measure units simpatico with the ICE inventory. The carbon emissions traceable to the embodied buildings stage were estimated by using the carbon emission factor. This was accomplished through the utilization of EC emission coefficients of the Bath University ICE as developed by Hammond and Jones (2008). For materials and components whose emission coefficients were not included in the ICE database, available emission factors from literature were utilized (see Elijosiute et al., 2012). Therefore, this is modelled mathematically as in equations (1).

$$EC_K = \sum_{k=1}^{n} (1 + W_k) \times Q_k \times I_k \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where

EC_k is the embodied carbon of material type k with unit $kgCO_2$;
W_k is the waste factor (dimensionless) of material type k;
Q_k is the total functional quantity of material;
I_k is the embodied CO_2 factor with unit $kgCO_2$/functional unit of material.

$$CEF = A \times EC \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where

CE_F = carbon emission from direct fuel consumption,
A = process data (litres of fuel),
EC = emission coefficient ($kgCO_2$/litre of fuel).

MAIN RESULTS

The overall computed CO_2 for the mention building is 16, 175.88kg over fifty years building life span. These interpret to embodied CO_2 intensity of 234.43kg/m^2 or 4.69kg/m^2/year. As showed in

Table 1, the cradles to gate elements are the most vital, representing for about 97% of overall CO_2 emissions.

Table 1: Summary of embodied carbon (EC) emissions

Embodied Energy Category	Embodied Carbon ($KgCO_2$)	Percentage (%)
Cradle-to-Gate	15,689.70	97.0
Transportation	330.86	2.04
Site Construction	155.31	0.96
Total	16,175.88	100

CONCLUSION

This paper underscored the importance of the built environment especially residential buildings in the reduction of carbon emissions and climate change mitigation. The life cycle carbon assessment method was used to evaluate a predominant residential building prototype in a Nigerian context in order to place it in the wider research context and as a prelude to identifying aspects of the building life cycle that should be targets of carbon reduction strategies. The adoption of low carbon energy development strategies such as increasing use of renewable energy and energy efficient practices becomes apposite. Sometimes, the engineering approach outlined above may not be adequate. It may be necessary to aggregate it with the "soft" engineering approach which includes natural carbon sinks conservation and advancement like sustainable infrastructure, as the case of this study. The results obtained were converted to per unit m^2 to facilitate comparison. Moreover, when compared to other studies, the computational results were in the same range, although significantly lower than values obtained in the developed countries (e.g. UK). The comparison with cement block house revealed cement-block houses depleted more EC than mud houses.

REFERENCES

Blengini, G. A. and Di Carlo, T. (2010). The changing role of life cycle phases, subsystems and materials in the LCA of low energy buildings. *Energy and buildings*. 42(6), 869-880.

Center, M. C. S. P. (2012). *National Low Carbon Fuel Standard*, Carnegie Mellon University.

Elijošiutė, E., Balciukevičiūtė, J. and Denafas, G. (2012). Life cycle assessment of compact fluorescent and incandescent lamps: comparative analysis. *Environmental Research, Engineering and Management*. 61(3), 65-72.

Ezema, I., Opoko, A. and Oluwatayo, A. (2016). De-carbonizing the Nigerian Housing Sector: The Role of Life Cycle CO_2 Assessment. *International Journal of Applied Environmental Sciences*. 11(1), 325-349.

Gilbert, R., Stevenson, D., Girardet, H. and Stren, R. (2013). *Making cities work: Role of local authorities in the urban environment*. Routledge.

Giovannoni, E. and Fabietti, G. (2013). What is sustainability? A review of the concept and its applications *Integrated Reporting* (pp. 21-40) Springer.

Hammond, G. P. and Jones, C. I. (2008). Embodied energy and carbon in construction materials. *Proceedings of the Institution of Civil Engineers-Energy*. 161(2), 87-98.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Environmental Performance and Corporate Value : Moderating Role of Corporate Governance Characteristics of Listed Company in Indonesia

Sri Daryanti Zen*[1] ; Aza Azlina Md Kassim[2]

[1]Faculty of Economics, University Andalas, Kampus UNAND Limau Manih, Padang, West Sumatera, Indonesia.
[2]Faculty of Business, University Selangor, 4000 Shah Alam, Selangor, Malaysia
yantizen27@gmail.com

ABSTRACT
Previous studies have focused on environmental performance and company performance. Several numbers of studies have reported less evidence on the relationship between environmental peformance and corporate value. Previous studies on relationship between the environmental performance and financial performance have been conflicting. So far, most of these studies come from developed economies such as USA and Europe, where environmental awareness is considered high. However, there have been few studies on environmental performance within developing countries. Therefore, attention has shifted to corporate governance characteristics (ownership structure and board compositions) in order to provide better insight with regards to environmental performance and related corporate value. This study is aimed at discovering the influence of environmental performance and their impact on corporate value, particularly the study on listed company's Participation in PROPER Period 2014-2015 in Indonesia. The study also examines the effect of corporate governance characteristics (ownership structure and board composition) on the relationship between environmental disclosures of corporate value. In addition, the conceptual models on the relationship between environmental performance and corporate value provide an alternative approach unlike the previous models.

Keywords*:* Environmental performance, Corporate value, Ownership structure and board composition

INTRODUCTION

The company is established to improve the welfare of its owners (shareholders) and the objectives can be achieved by a variety of efforts to increase the value of the company (Bringham & Houston, 2014). The value of a company can be determined by the value of the assets owned by companies such as securities. Stock is one of the securities issued by the company, which can be used as an indicator in determining the value of the company. Besides, today's business world is no longer just paying attention to the financial aspect alone (*single bottom line)*, but covers the financial aspects, social aspects, and aspects of the environment or the so-called *triple bottom line.* According to Jon Elkington in *Cannibal With Forks: the Triple Bottom Line in 21st Century Business* (1997, 1999) developed the concept of the triple bottom line in terms of economic prosperity, environmental quality and social justice.

The current issue is from an empirical point of view. A growing body of quantitative studies has tested the linkage between environmental performance and corporate value, with a varied results too, some works find a positive relationship (Plumlee *et al*., 2015) while others do not identify a positive impact of environmental disclosure on corporate value (Saka & Oshika, 2014). This study is aimed to discover the influence of environmental performance and their impact on corporate value study at listed company Participation in PROPER Period 2014-2015 in Indonesia. The government rating was used to measure the environmental performance as the dependent variable, Tobin's Q is chosen as independent variable while the corporate governance characteristics serve as the moderating variables
In this paper, three conceptual models are developed. First model explains the influence of environmental performance on corporate value. The second part describes the moderating model. Corporate governance characteristics (ownership structure and board compositions) will then moderate the relationship between environmental performance on corporate value.

ENVIRONMENTAL PERFORMANCE AND CORPORATE VALUE

Indonesian government through the Ministry of Environment has been doing the rating company's performance in environmental management through a program called PROPER (Program Performance Rating in Environmental Management or Program for Pollution Control, Evaluating and Ratings). PROPER ranking results are now widely used by researchers in Indonesia as an indicator of environmental performance. Among these are works carried out by Sarumpaet (2005); Ignatius *et al.* (2006); Mandy Utami (2007); Luciana and Dwi (2007); Dian (2010); Elvira (2010); Prayanthi and Mandagi (2015).

According to Potter and Van der Linde (1995); Birkin and Woodward (1997) there is a link between environmental performance and financial performance through cost efficiencies that was generated by good environmental performance. This synthesis is supported by (Burnett & Hansen, 2008) who decelerated that eco-efficiency to improve efficiency comes from improved environmental performance.

This viewpoint appears to be different from the conventional view which assumes the effort to improve environmental performance will actually increase cost of environment, thus causing a profits decrease. Pollution or poor environmental performance reflects a fact that resources used are less complete, less effective and less efficient; which will then have an impact on lower earnings (Potter & Van der Linde, 1995). According to Utami and Wiwik (2007), investment in waste treatment program in short termed has visible impact on lower profits, but in long run it will give a good image because there is no violation regulation and also company value will rise. Environmentally friendly image and company social sensitivity is very important because competitive business world today has stimuated a competition to build and keep the image to consumer.

Nonetheless, Tobin's Q measurement has been done by previous researcher such as (Wang *et al.*, 2006). In essence , Performance measurement with Tobin's Q is believed to provide an overview of company market value of assets. It shows not only on fundamental aspects, but also company market valuation. Based on description above, this research hypothesis is:
Hypothesis 1 (H_1): Environmental performance has an effect on corporate value.

Phung and Mishra (2015) examined the effect of ownership structure on firm performance, for listed company on Vietnamese stock exchanges. They found a nonlinear relationship between ownership structure and firm performance

Besides Chu *et al.* (2015) also argue that in emerging market, the negative effect of the divergence on liquidity is worsened by state ownership and poorer shareholder protection, both of which result in more severe agency conflicts; findings also showed however, that this effect is alleviated by the NTS reform, which aligns with the interest of different shareholders.
Hypothesis 2 (H_2): ownership structure moderates the relationship between environmental prformance on corporate value. According to Beasly (2001) there are three important characteristics of the board of commissioners that support its effectiveness in monitoring management activities. These characteristics are: 1) the composition of the board of directors, 2) separation between the leadership of the board of directors by the Chief Executive Officer (CEO), 3) the size of the board of directors. Hypothesis 3 (H_3): board compositions moderates the relationship between environmental disclosure and corporate value.

POTENTIAL CONTRIBUTIONS AND CONCLUSION

From the theoretical perspective, this study extends the application of agency theory within the context of the influence of corporate governance characteristics (ownership structure and board compositions) environmental disclosure to corporate value. In previous studies especially in

Indonesia, the application of agency theory have focused only on influence of GCG (board process, board structures, board composition and board characteristic) directly to corporate value. However, corporate governance characteristics are very much important in today's environmental accounting research. As companies face various challenges due to uncertain economic condition, it will influence on environmental performance. Thus, company with good environmental performance tend to disclose their performance. This will then influence on corporate value.

Meanwhile, the government, especially the Ministry of Environment has developed PROPER instrument as a tool to measure the environmental performance of companies in Indonesia. The results of this research are expected to be taken into consideration in the refinement of instruments and increase the amount PROPER assessed in PROPER. Similarly, from the side of the Ministry of State Owned Enterprises (SOEs) and the Financial Services Authority (FSA), the outcome of this research are expected to aid in tighten regulations governing firmly on disclosure of environmental information for the state-owned companies and those companies listed in Indonesia Stock Exchange.

Moreover, for the organization of the accounting profession of the Indonesian Institute of Accountants (IAI), the results of this study are expected to be driven in formulating standards of measurement as well as reporting external environment for companies that can produce separate reporting environment, which has been standardized for each industry. In addition, the results of this research can be considered to further improve the socialization of the environmental importance.

REFERENCES

Al-Tuwaijri, S.A., Christensen, T. E., & K.E. Hughes, K. E. (2004). The Relation among Environmental Disclosure, Environmental Performance and Economic PERFORMANCE; a Simultaneous Equations Approach. *Accounting Organization anal Society*, Vol. 29, 447-471.

Bringham, E. F., & Houston, J. F. (2014). *Fundamentals of Financial Management*. 8th Edition. South Western Publishing Company.

Elkington. J. (1999). *Triple bottom-line reporting*. *Australian CPA*, March, pp. 18-21.

Lober, D. (1996). Evaluating the Environmental Performance of Corporations. *The Journal of Managerial Issues*, 8 (2), 184-205.

Plumlee, M., Brown, D., Hayes. R. M., & Marshall. R. S. (2015). Voluntary Environmental Disclosure Quality and Firm Value: Further Evidence. *Journal Accounting Public Policy*, 34, 336-361.

Saka, C., & Oshika, T. (2014). Disclosure effects, Carbon Emissions and Corporate Value.
Sustainability Accounting Management and Policy Journal, 5 (5),No. 1, 22-45.

Phung, D. N., & Mishra A, V. (2015). Ownership Structure and Firm Performance: Evidence from Vietnamese Listed Firms. *Flinders University and University if Adelide and Wiley Publishing Asia Pty Ltd.*

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Energy Efficiency in Nigerian Government Office Spaces: Daylighting as a Strategy

Abimaje Joshua*[1], Mohd Zin Bin Kandar[2], Yakubu Aminu Dodo[3] and Williams Opeyemi Samuel[4]

[1, 2, 3] Department of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.
(E-mail: arcabim@gmail.com, mzin@utm.my, dyaaminu@yahoo.com)
[1]Department of Architectural Technology, School of Environmental Studies, Federal Polytechnic, Idah. Kogi State, Nigeria.
[4] Department of Quantity Surveying, Faculty of Built Environment, Universiti Teknologi Malaysia,81310 Skudai, Johor Bahru, Malaysia.
(E-mail: oswilliams2@live.utm.my)

ABSTRACT

Daylight is a well-known architectural design criterion. It is one of the strategies for energy efficiency in office spaces and its utilization results in electrical energy minimisation for artificial lighting. However, many office spaces especially those in the tropics do not utilize the energy saving potential of daylighting. This paper took a cursory look at the level of energy consumption and daylighting performance of government office buildings in Nigeria as well as the contribution of innovative daylighting systems to office spaces daylighting performance as these affects energy consumptions. This was done using online database. The study revealed among other things that most of the government office spaces in Nigeria are not energy efficient. There is sixty percent (60%) reliance on artificial lighting. In addition, eighty percent of the workers expressed dissatisfaction with the illuminance level under the daylighting situation. The traditional method of using windows, atria, and courtyards among others for admitting daylighting into room spaces is not as efficient. There is need to overcome or at least improve this situation. Therefore, the thrust of this paper is in favour of the application of innovative daylighting systems such as a light shelf, anidolic and light pipe as they are found to enhance daylighting performance of office spaces. The study finally recommends further investigation on the interior spaces heating effect of these daylighting systems as lighting is usually associated with heat gain.

Key words: daylighting, daylighting systems, energy efficiency, office spaces, Nigeria

INTRODUCTION

Globally, a total 40% of energy utilization is attributed to the building sector (Omrany et al., 2016). Out of this, 80% is used as operating energy in buildings (Pérez-Lombard, 2008). This operating energy is the energy used for heating, cooling, lighting and other equipment is a building space (Cole & Kernan, 1996). This scenario at the global level is consistent with what is obtainable in Nigeria as revealed in the study carried out by Akinbami and Lawal (2009). Regrettably, in Nigeria, 57% of the energy mix is fuel, natural gas accounts for 36% while hydroelectricity is only 7% as at 2005 (Oyedepo, 2012). This indicates that there is high dependence on the burning of fossil fuel for energy production, a situation that results in the emission of greenhouse gasses into the atmosphere (Marszal et al.;2011). For instance, Juan, et al. (2010) submitted that the consumption of energy in buildings is responsible for over 3 Gigatonnes of emission of carbon dioxide (CO_2) per year. There is the need to adopt energy efficient strategies in buildings to reduce greenhouse gas emissions (Adeyemo and Odukwe, 2008). Consequently, the use of daylighting is essential as this will contribute in no small measure to energy use reduction in office buildings. This paper therefore, aims at presenting a review of energy consumption in office spaces in Nigeria as well as energy saving potential of daylighting and daylighting performance of daylighting systems.

RESULTS

Table 1: Summary of some studies on energy consumption in office spaces in Nigeria

Author(s)	Study	Amount of energy use	Purpose for energy use
Akinbami & Lawal, (2009)	opportunity and challenges to electrical energy and CO2 emissions in Nigeria's building sector	- - -	. air- conditioning . light . other office equipment
Batagarawa et al., (2011)	Disaggregating primary electricity consumption for office buildings in Nigeria	40% 12% 48%	. cooling . lighting . others
Abbas, M.I (2012)	Scenario of energy consumption of office buildings in Abuja, Nigeria	-	. Energy consumption in office building

Table 2.Summary of some studies on the energy saving potential of daylighting in office spaces in Nigeria

Author(s)	Discipline	Study	Energy Saving Potential
Zain-Ahmed et al., (2002)	Energy conservation & management	Daylighting as a passive solar strategy in tropical building: a case of Malaysia	.10% minimum energy saving
Heshemi, A. (2014)	Energy &Building	Daylighting and solar shading performance of an innovative automated reflective louver system.	. 60% reduction in artificial lighting Usage
Rosemann, A. & Kaase, (2005)	Solar energy	Light pipe applications od daylighting systems	. 60% energy savings under a clear sky. . 39% energy savings under overcast sky

Table 3. Summary of some studies on daylighting performance of daylighting systems.

Author(s)	Discipline	Study	Daylighting system	Performance
Bereti and Anaraki (2015)	Energy	Analysis of the impacts of light shelves on the useful daylight illuminance in office buildings in Toronto	Light shelf	. Daylighting . Glare reduction .Increase in useful daylight illuminance
Wittkopf et al., (2010)	Solar energy	Ray tracing study for non-imaging daylight collectors	Anidolic daylighting systems	.Improves daylighting
Rosemann, A. & Kaase, H. (2005)	Solar energy	Light pipe applications for daylighting system	Light pipe	.Increased illuminance

CONCLUSION

There is a high level of energy consumption in offices spaces in Nigeria. 40%, 12% and 48% of this energy are for cooling, lighting and other services respectively. 60% of the office occupants relied on artificial lighting. 80% of the workers in a typical office study reviewed are not satisfied with its daylighting. This implies poor daylighting performance and hence energy inefficient. There can be as much as 60% electrical energy savings with optimization of daylighting in office spaces in a tropical climate like Nigeria. Innovative daylighting systems such as a light shelf, anidolic and light pipes are capable of guiding and redirecting daylighting into the spaces further away from the window. However, there is the need to also study the heating effect of daylighting systems in office spaces since light is usually associated with heat.

REFERENCES

Adeyemo, S. B., and A. O. Odukwe. Energy conservation as a viable pathway towards energy stability. (2008): 233-238.

Akinbami, John-Felix, and Akinloye Lawal. Opportunities and challenges to electrical energy conservation and CO2 emissions reduction in Nigeria's building sector'. *Fifth Urban Research Symposium, Cities and Climate Change: Responding to an Urgent Agenda*. 2009.

Batagarawa, Amina, Neveen Hamza, and S. J. Dudek. Disaggregating primary electricity consumption for office buildings in Nigeria. *Proceedings of Building Simulation 2011: 12th Conference of International Building*. 2011.

Berardi, Umberto, and Hamid Khademi Anaraki. Analysis of the impacts of light shelves on the useful

daylight illuminance in office buildings in toronto. *Energy Procedia* 78 (2015): 1793-1798.

Cole, Raymond J., and Paul C. Kernan. "Life-cycle energy use in office buildings." *Building and environment* 31.4 (1996): 307-317.

Hashemi, Arman. Daylighting and solar shading performances of an innovative automated reflective louvre system. *Energy and Buildings* 82 (2014): 607-620.

Juan, Yi-Kai, Peng Gao, and Jie Wang. A hybrid decision support system for sustainable office building renovation and energy performance improvement. *Energy and buildings* 42.3 (2010): 290-297.

Marszal, Anna Joanna, et al. Zero Energy Building–A review of definitions and calculation methodologies. *Energy and buildings* 43.4 (2011): 971-979.

Mu'azu, Abbas I. Scenario of Energy Consumption of Office Buildings in Abuja, Nigeria. (2012):96-10

Omrany, Hossein, et al. Application of passive wall systems for improving the energy efficiency in buildings: A comprehensive review. *Renewable and Sustainable Energy Reviews* 62 (2016): 1252-1269.5

Oyedepo, Sunday Olayinka. On energy for sustainable development in Nigeria. *Renewable and Sustainable Energy Reviews* 16.5 (2012): 2583-2598.

Rosemann, Alexander, and H. Kaase. Lightpipe applications for daylighting systems. *Solar Energy* 78.6 (2005): 772-780.

Pérez-Lombard, Luis, José Ortiz, and Christine Pout. A review on buildings energy consumption information. *Energy and buildings* 40.3 (2008): 394-398.

Wittkopf, Stephen, et al. Ray tracing study for non-imaging daylight collectors. *Solar Energy* 84.6 (2010):986-996.

Zain-Ahmed, A., et al. Daylighting as a passive solar design strategy in tropical buildings: a case study of Malaysia. *Energy Conversion and Management* 43.13 (2002): 1725-1736.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

An Investigation of Influencing Factors on Indoor Environmental Quality in Marginalized Urban Precinct

Sadia Afrin* and Sohel Rana

Faculty of Built Environment, Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia.
Email: asadia2@live.utm.my, rsohel2@live.utm.my

ABSTRACT

This study has investigated the factors that influence occupants' comfort in marginalized urban precinct of Dhaka, Bangladesh. Studies discovered that a fast spatial development of slums in Dhaka which has been occurring significant fluctuations that were seen in land utilize. Furthermore, indoor environment quality (thermal conditions, acoustic, visual, and air quality), have all turned out to be intense, and are hence posturing indeterminate problems to the tenants' heath. The survey was to define which of the circumstances were ranked by the users with the overall satisfaction level of "indoor environmental quality (IEQ)" and its effect on human well-being. The urban slums are found to give an insufficient indoor environmental quality and it is expected to fundamentally enhance the well-being, and health hazards, of inhabitants living in slums. With overall high population growth and urban migration, housing remains a noticeable urban problem in the slum areas. One notable slum (Korail) in Dhaka City was selected. A stratified random sampling method was used to choose 35 households. Open-ended interviews were conducted on their family members who were aged 18 years above and participant observation at moderate level ensured the trustworthiness of the data. The data was gathered into focus groups of inhabitants in the qualitative method of study. The qualitative approach lets an enhanced perception of the dwellers' experiences of IEQ in homes. The inquiries were detailed of both 'open' and 'closed' questions. Throughout the investigation, audio recordings and notes were involved for coding and analysis. The satisfaction level of IEQ will effect in superior health hazards in lower-income groups. These outcomes will assist to formulate the much desirable policy for affordable housing design.

Key words: Satisfaction, comfort, well-being, indoor environmental quality

INTRODUCTION

Now, environmental problems are some of the most noticeable side effects of the difficulties confronting unplanned and slum settlements. Expansive slums, contaminated waterways, waste management are most common in urban slums, wellbeing and improvement perceptions evaluate the circumstances on the personal satisfaction (Angeles, 2009). Though housing quality in marginalized slums is regularly viewed as substandard, the slum inhabitants are regularly compelled to live in environmentally dangerous areas, contaminated places near open drainage system, waste disposals, and sewers etc (Gruebner, 2014). A solid reason that might be showed for this is the evidences connecting accommodation quality with inhabitants' well-being, personal satisfaction. It is additionally vital to comprehend the comfort determinants for the slum occupants. A study (Frontczak, 2011) reasoned that 4 principle IE parameters (visual, thermal, air quality, and acoustic condition) add to a sufficient indoor condition; of the 4, environmental domains was understood by the inhabitants to be of more prominent significance for comfort contrasted with acoustic (Un-habitat, 2010), air quality and visual. In this study, comfort is characterized as the fulfillment with IEQ only and exclude fulfillment with other aspects of satisfaction of the building, for example, furniture, hues, and so on. The particular targets of this study were to: carry out an indoor temperature observing review in destitute families to pick up confirmation of indoor ecological quality; understand how occupants see the indoor nature of their homes. A stratified random sampling has been used to select the samples (35 households) from the notable slum (korail) in dhaka for questionnaire survey method and the open ended questionnaire survey involves the respondents to categorize the satisfaction level for comforting features. The respondents were need to level their perception on satisfaction grounded on 5 "numerical Likert-

scale; 1 (Very dissatisfied), 2 (Dissatisfied), 3 (Moderately satisfied), 4 (Satisfied), and 5 (Very satisfied)".

MAIN RESULTS

24 attributes addressing housing environmental quality in the questionnaire formed the basis for this paper. Selection of 35 respondents was done in stages and investigation of the data revealed that female respondents (58.5%) were more than male (41.5%) respondents. 10 most frequently used attributes contributing to comfort from the survey are shown in the following table 1.

Table 1. Frequently used Attributes Contributing to Comfort

Factor	Percentage of all responses	Factor	Percentage of all responses
Light, Sun	47%	Fresh air, smell	34%
Warmth, Temperature	42%	Sewer	30%
Waste disposal	40%	Water Pollution	25%
Noise, Sound	36%	Open drainage	19%
Health Distress	31.5%	Peace, silence	16%

It has been found that more than half (57.8%) of the respondents having a space of 60-80sft for their living and the rest 24.4% and 17.8% of the total respondents living in a space having 'above 80-below 100sft' and 'above 100sft' respectively. Only 15.6% of their houses is made of brick wall and tin roofing while 84.4% of houses is made of tin both wall and roofing are made of straw, bamboo, and polythene. They have no specific cooking space in their dwellings. 62.2% of them have cooking facility inside of their only living space and 13.3% of them utilizes the spaces outside their dwelling for cooking food whereas another 24.4% of the families cook in open spaces and face significant problem during the rainy season. From the survey the respondents have reported about the sufficient air-flow and light; 53.3% of the respondents have only one window in their dwelling, and surprisingly a large amount of them (35.6%) have no window and a few of them have 2 windows which is very rare. The following Table-2 is describing the percentage of the diseases households suffer from (for example, diarrhea/dysentery, malaria, jaundice, and respiratory diseases, tuberculosis, skin diseases, and other diseases).

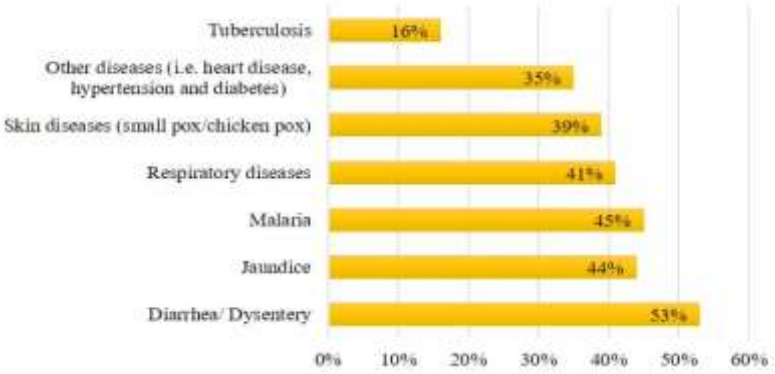
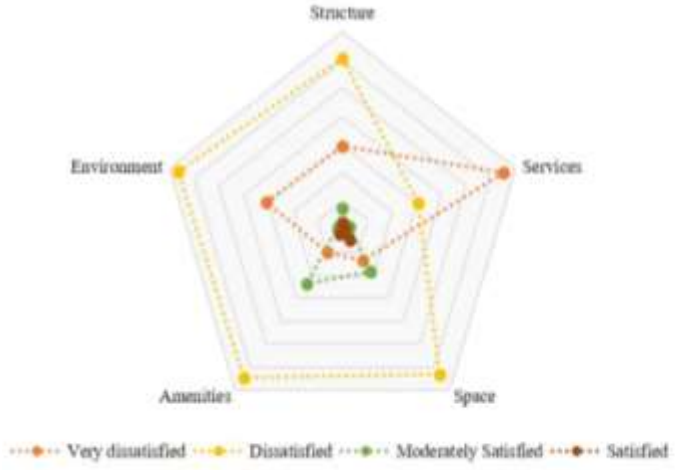


Figure 1**:** Example of Significant Health Problems

From literature, it has been found that 28% of slum inhabitants are having psychiatric disorders (Afrin 2015). All these syndromes are a consequence of substandard environmental conditions unsanitary and unhygienic situation, lack of basic services, environmental and mental deprivation, and precarious health situation. The slum settlements are adjacent to a large lake that is highly contaminated with sewer water, solid waste and other discarded stuffs. The adjacent territories are poorly maintained with narrow lanes, poor sanitation and highly concentrated land use. The drainage system with high danger of waterlogging and the deposition of solid waste into it makes the environment filthier. The following Figure-2 is showing the satisfaction level of IEQ from the dwellers.



	V-D (%)	D (%)	M-D (%)	S (%)	V-S
Structure	29.5	60.5	8	3	
Services	65	30.5	3	1	-
Space	13.5	63.5	18.5	4.5	-
Amenities	10	64.5	23.5	2	-
Environment	31	66.5	2	-	-

Figure 2**:** Occupants' Satisfaction Level of IEQ

CONCLUSION

It is to highlight that, majority of the respondents are overall dissatisfied about the IEQ of their environment. The shelter deficiencies (proper sanitation, water supply, durability) are needs to be developed along with the IEQ standards. The quality of marginalized slum area has not been standard to the, well-being, social, housing needs, and cultural needs as it affects the quality of life and psychosocial aspects of the occupants. Thus, the inhabitants share the environmental risk and the slums need to be studied as "spatial entities." Though the statistics has been drawn from an informal settlement in Dhaka, its outcomes are anticipated to be of broader national and universal application and can endure as a foremost concern for the intervention of stakeholders.

Acknowledgment:

The authors sincerely acknowledge Faculty of Built Environment of University of Technology Malaysia (UTM) for the research support.

REFERENCES

Angeles, G., Lance, P., Barden-O'Fallon, J., Islam, N., Mahbub, A., & Nazem, N. I. (2009). The 2005 census and mapping of slums in Bangladesh: design, select results and application. International Journal of Health Geographics, 8(1), 32.

Gruebner, O., Sachs, J., Nockert, A., Frings, M., Khan, M. M. H., Lakes, T., & Hostert, P. (2014). Mapping the Slums of Dhaka from 2006 to 2010. *Dataset Papers in Science, 2014*.

Frontczak, M., & Wargocki, P. (2011). Literature survey on how different factors influence human comfort in indoor environments. *Building and Environment, 46*(4), 922-937.

Un-habitat. (2010). State of the world's cities 2010/2011: bridging the urban divide: EarthScan.

Afrin, S., & Khan, T. H. (2015). Women's Perception on Space Layouts in Affordable Housing in the Context of Dhaka City. *British Journal of Humanities and Social Sciences, 14*(1).

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Causes of Low Skilled Workers' Performance in Construction Projects

Alhaji Ali Zannah*[1], Aryani Ahmad Latiffi[2], Abdulazeez Umar Raji[3], Abdullahi Abba Waziri[4], Usman Mohammed[5].

[1]Dept of Architectural Technology, Mai Idris Alooma Polytechnic, Geidam, Yobe State, Nigeria.
[2,3]Department of Construction Management-Universiti Tun Hussein Onn Malaysia.
[4]Department of Quantity Surveying-Federal Polytechnic Mubi, Adamawa State, Nigeria.
[5]Department of Architectural Technology -Federal Polytechnic Mubi, Adamawa State, Nigeria.
(E-mail: zannah2200@gmail.com)

ABSTRACT

Skilled workers' performance is one of the crucial aspects of labour productivity that requires proper attention for effective projects delivery in the construction industry. The level of skilled workers' low performance has been seen to be a major factor which contributes toward inefficient construction projects productivity. Therefore, the objective of this research is to identify the causes of low skilled workers' performance in construction projects in the Nigeria. The objective was achieved through a structured quantitative method of questionnaire distributed to 150 respondents from project manager, project engineer, site engineer and site supervision that are active in the Nigerian construction and 111 of the response were collected which was 74% of the response rate. The data were collected and analysed using Statistical Package for Social Sciences (SPSS) version 22.0. Mean ranking and Analysis of Variance (ANOVA) were used as tools to analyse the data. The finding shows that; low wages of skilled, lack of sufficient skill acquisition centres and lack of incentive schemes for skilled workers were the most significant causes of low skilled workers' performance in the Nigerian construction industry. The homogenous analysis indicates that, there are significant differences in perception of respondents on few variables whereas majority of respondents have similarities in most of the variables. The research findings confirmed that, stakeholders in the Nigerian construction industry should strategies on motivation, training and retraining, conducive working condition, supply of quality materials and equipment, and proper site management in order improve low skilled workers' performance in Nigerian construction industry.

Keywords: Skilled Workers, Project Performance, Construction Projects.

INTRODUCTION

Construction industry in many developing countries are greatly concerned with low level of skilled workers' productivity due to economic, social, physical and psychological related factors influencing the performance of the skilled workers (Naoum, 2016). Low productivity of skilled workers is one of the most serious tasks facing the construction industry especially in developing countries such as Malaysia, Indonesia, Singapore, Hong Kong, and other states in Southeast Asia (Kaming *et al.,* 2010). In today's global economy, skilled workers' productivity is becoming more intense than ever due to the low level of quality performances of the skilled workers in the construction industries of most developing countries (Davenport, 2013). Arshad and Ab Malik (2015) assert that, productivity improvement can be achieved when construction workers with high skills and knowledge, together with sound physical and mental health perform tasks with efficiency and effectiveness. In most countries, the cost of operatives comprises 30 % to 50 % of the overall projects' cost, and thus, it is regarded as a true reflection of the efficiency of the operation (Kazaz *et al.,* 2008).

CATEGORIES OF SKILLED WORKERS IN CONSTRUCTION PROJECTS

According to Ogochukwu (2014), the Industrial Training Fund (ITF) in Nigeria enumerated the followings as recognised skilled workers in the construction industry, namely; masons, steel fixers, electricians, carpenters, plumbers and welders. Uchitelle (2009) asserts that, common skilled workers include electricians, plumbers, painters, carpenters and bricklayers, bar benders, tile fixers, plant operators, welders, mechanics, and steel fixers. Offei-Nyako *et al.* (2014) stressed that, skilled workers vary from mason, carpenter, tile worker, steel worker, painter, electrician and plumber. The study of Ameh and Shokumbi (2013) viewed that, skilled workers in the construction industry include; iron bender, carpenter, bricklayer, painter, electrician, welding worker, plumber and tiler. However, Adewale *et al.* (2014) listed categories of skilled workers which include; carpenter, bricklayer, painter, iron bender and plumber. Oseghale *et al.,* (2015) assets that, frequent used skilled workers in the construction industry include; carpenters, bricklayers, bar bender, plumbers and painters where their services are required most in construction projects.

CRITERIA FOR SELECTION OF SKILLED WORKERS IN CONSTRUCTION PROJECTS

According to Ling and Tan (2015), it is important for contractors to be familiar with some criteria in selection of efficient skilled worker that can lead to efficient productivity of any construction projects. Joseph (2016) opined that, the pride and satisfaction of every skilled worker carrying task by building structures that are useful to people are more than enough to make up for the physical and mental demands that come with the job. However, before venturing in any of the construction skilled career, one must possess certain qualities and skills, which are requisites for the chosen job. Such skills and qualities can be acquired through education, vocational trainings and experience.

Therefore, the criteria for selection of skilled workers in construction projects comprises of the followings:

i. Physical strength and stamina
ii. Manual dexterity and coordination
iii. Knowledge and analytical skills
iv. In-depth knowledge in handling tools and equipment

CAUSES OF LOW SKILLED WORKERS' PERFORMANCE IN CONSTRUCTION PROJECTS

Odesola (2016) classified factors of low skilled workers' performance into five (5) broad groups, namely; management-related factors, labour-related factors, environmental-related factors, project-related factors and natural-related factors. Ogochukwu, (2014) opined that, poor supervision, shortage of skilled workers, delay in supply of materials to site, high rate of accidents on sites and conflicts among skilled workers, are factors leading to low performance of skilled workers. Jarkas and Radosavljevic (2013) identified nine (9) most significant factors causing low skilled workers' performance, such as; delay in payment of wages, too many rework, lack of financial and non-financial incentive schemes, extent of change orders during project execution, incompetent supervision, delay in responding to requests for information, overcrowding of skilled workers, unrealistic scheduling of programme of works and shortage of materials and equipment on sites.

Zou *et al.* (2007) stressed that, causes of low skilled workers' performance mainly arise in large construction projects due to seven (7) reasons such as unfair wages, lack of motivation and incentives, lack of training and retraining, inclement weather condition, design changes, use of low quality tools and equipment and delay in deliverance of materials to sites. Odesola *et al.* (2013) however, identified causes of low skilled workers' performance such as, shortage of skilled workers on sites, poor site management, lack of safety and health services, inefficient plants and equipment and unnecessary overcrowding of skilled workers. Kazaz *et al.* (2008) consider factors of low skilled workers' performance under four categories, namely; organisational factors, economic factors, physical factors and socio-psychological factors, based on the theory of motivation. Hickson and Ellis (2014) identified seven (7) prevalent issues of low skilled workers' performance such as; delay in deliverance of materials and equipment, shortage of plants and equipment, incompetent management, excessive rework, lack of incentive schemes, lack of motivation and improper schedule of work.

CONCLUSION

It has been clearly stressed that the importance of labour management in the construction industry cannot be over emphasized when it comes to the productivity of workers and project performance. The causes of low skilled workers' performance in construction projects in Nigeria' as the major objective of this paper was achieved through survey using well-structured questionnaire form to selected positions in the Nigerian construction industry such as; project manager, project engineer, site engineer and site supervisor. However, the findings revealed that, five (5) most significant causes of low skilled workers' performance in the Nigerian construction industry. These are; low wages, lack of sufficient skill acquisition centres, lack of incentive schemes programmes, vulnerability to safety and health care services and lack of standard salary scales for skilled workers. Therefore, there is the need to curtail the listed causes of low skilled workers' performance in order to improve by various motivational factors so as to achieve successful construction project delivery in the Nigerian Construction Industry.

REFERENCES

Adewale PO, Siyanbola AB, Siyanbola SO. Building craftsmanship skill development and Nigeria's vision 20: 2020: Imperatives and daunting challenges. International Journal of Vocational and Technical Education. 2014 Nov 30;6(4):36-42.

Ameh OJ, Shokumbi BB. Effectiveness of non-financial motivational scheme on construction workers output in Nigeria. Ethiopian Journal of Environmental Studies and Management. 2013;6(3):263-72.

Arshad MN, Ab Malik Z. Quality of human capital and labor productivity: A Case of Malaysia. International Journal of Economics, Management and Accounting. 2015 Jan 1;23(1):37.

Davenport TH. Thinking for a living: how to get better performances and results from knowledge workers. Harvard Business Press; 2013 Dec 30.

Hickson BG, Ellis LA. Factors affecting Construction Labor Productivity in Trinidad and Tobago. The Journal of the Association of Professional engineers of Trinidad and Tobago. 2014 Apr;42(1):4-11.

Jarkas AM, Radosavljevic M. Motivational factors impacting the productivity of construction master craftsmen in Kuwait. Journal of Management in Engineering. 2013 Oct 17;29(4):446-54.

Joseph S.A. Study on the impact of training programs of Central Board for Workers Education on the quality of work life of the organized, unorganized and rural labour in Kerala. MSc. Thesis. University Grant Commission, New Delhi, India. 2016.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Red Light Running: Challenges and Implications in Minna, Nigeria

Sulyman, A.O., Medayese S.O. and Abd'razack, N.T.A.

Department of Urban and Regional Planning, Federal University of Technology, Minna
Nigeria. (E-mail: m.samuel@futminna.edu.ng, abdrazacknta@futminna,edu.ng and sulymanlance@gmail.com)

ABSTRACT

This research pursued the objectives of assessing the awareness, perception, and levels of adherence of road users to traffic rules and regulations. The study was carried out in Minna and the major signalized roads were the target of the research. The research applied the survey research methodology, which involves carrying volumetric count of vehicles running the red lights on the signalized routes. The research therefore, found out that, majority of the violators of the traffic signals were the motorcycle riders, closely followed by the tricycle operators; the commercial vehicle owners also form a major percentage of violators of the red light rules in the city. The research, therefore, recommended that, strict measures aimed at ensuring immediate compliance with the traffic signals should be implemented, through fines and sanctions on violators to impoundment of offending vehicles. The research concluded that, if instant measures are not put in place to check the menace of the red light running, it will have serious adverse effect on the social and economic strata of the city.
Key words: Traffic Signals, Riders, Red Light, Violation, Signalized Roads

INTRODUCTION

Over the years, the basic measures to address road traffic accidents (RTAs) in Nigeria have been characterised by a lack of strong political will, concern and priority (Lee *et al*, 2007). Usually the responses experienced have been characterised by high vigilance following a major road accident, which gradually dies off with the passing of time (Kulanthayan, 2000). Manifestation of violation of road traffic rules in Nigeria includes; failure to use seat belts, over speeding, reckless driving, dangerous overtaking, driving without authorized plates, lack of fire extinguisher, making phone calls while driving, failure to obey traffic lights, traffic signs and over loading among others. Private and commercial motorcyclists are not left out of this malaise.

Adherence of road users to traffic rules and regulations is an on-going challenge in Minna metropolis the capital of Niger State. Traffic rules are said to be violated when drivers and pedestrians deliberately disobey formally prohibited or socially accepted codes of driving behaviour (Brittany, 2004). Niger State government introduced traffic light across the major busy or heavy traffic areas in Minna as a way of ensuring compliance with road traffic rules by drivers. However, despite these efforts, there has been continued and increasing non-compliance with road traffic rules by drivers, including those driving personal vehicles and motorcycles (Gaymard, 2009). This research work carried out a clear assessment of underlying factors that influence road users of not adhering to the traffic rules and regulations in Minna metropolis.

The aim of the study is to assess the rate at which the road users in Minna comply with the traffic rules and regulations within the town. In order to achieve this aim, the following objectives were set that is; To; assess the awareness and perception of road users to traffic rules and regulation in Minna metropolis; examine the levels of adherence of road users to traffic rules and regulations; appraise the factors that influence the non-adherence of road users to traffic rules and regulations; and evaluate the impacts of road traffic rules and regulation on the road users.

MAIN RESULTS

Level of Adherence of Road Users to Traffic Rules and Regulations

Personal observation of road users was carried out within Minna on selected strategic points where traffic lights are positioned to examine the level of adherence of road users to traffic rules and regulations. The traffic count was conducted at six points namely; Shiroro road intersection, Top Medical/Paiko road intersection, and Obasanjo Complex road for a period of three days (Monday, Thursday and Saturday), while another three points namely; Government House road, High Point International School junction along Shiroro road and Mobil axis for only a day. The survey was carried at specific peak hours when traffic is known to be much; 8:00am to 10:00am, 12:00pm to 2:00pm and 4:00pm to 6:00pm. The results from the counts are thus presented in Table 1.

Table 1: Red Light Running Along Shiroro Road, Minna.

DAYS	Vehicle Categories / Time	Commercial Motorcycles	Private Motorcycle	Tri – cycles	Commercial Vehicles	Private Vehicles	TOTAL	
							Hrs	Days
Mon 08-08-2016	8:00am – 10:00am	218	38	26	3	39	**324**	**2100**
	12:00pm – 2:00pm	443	199	71	5	285	**1003**	
	4:00pm – 6:00pm	328	175	49	0	221	**773**	
Thurs 11-08-2016	8:00am – 10:00am	157	44	11	0	48	**260**	**1930**
	12:00pm – 2:00pm	448	106	54	5	182	**1095**	
	4:00pm – 6:00pm	313	83	24	2	153	**575**	
Sat 13-08-2016	8:00am – 10:00am	198	34	16	1	26	**275**	**1850**
	12:00pm – 2:00pm	419	186	37	2	201	**1007**	
	4:00pm – 6:00pm	276	80	23	0	189	**568**	
TOTAL	**2800**	**945**	**311**	**180**	**1344**			**5880**

Source: Shiroro Road Traffic Violation Survey, August, 2016.

It can be observed from Table 1, that the highest red light violations were recorded in the afternoon specifically between the hours 1:00pm and 2:00pm; this is as a result of the dismissal of Vehicle Inspection Officers (VIO) who is normally actively stationed on the road between 8:00am and 1:00pm daily. The drastic change as observed from the number of violations in the Morning and later in the Afternoon makes it very obvious that road users tend to obey the stop signal on the traffic light because of the presence of Enforcement Agencies such as the Vehicle Inspection Officers. Also, Table 1 shows that the commercial motorcyclists are by far the worst culprits of traffic light violation. This can be attributed to their swift maneuvering ability and the non-existence of motorcycling license.

CONCLUSION

In conclusion, the research study shows that there is high level of awareness of road traffic rules and regulation among road users in Minna Metropolis. However, there is high level of non-adherence to road traffic rules and regulation by the same road users. Also, it was observed that in the case where a vehicle user violates, there is usually the tendency of others following suit. This is as a result of the inability of FRSC/VIO to enforce the penalties of non-adherence to road traffic rules and regulation. The research further reveals that there is no serious enforcement of penalties to violation of road traffic rules and regulations on the part of the Law Enforcement Agencies of Government in Minna Metropolis.

REFERENCES

Brittany, N.; Campbell, B.N.; Smith, J.D.; and Najm, W.G. 2004. Analysis of fatal crashes due to signal and

stop sign violations. Report no. DOT HS-809-779. Washington, DC: National Highway Traffic Safety Administration.

Gaymard, H. (2009). Situation du livre-Evaluation de la loi relative au prix du livre et questions prospectives.

Kulanthayan, S., Umar, R. R., Hariza, H. A., Nasir, M. M., & Harwant, S. (2000). Compliance of proper safety helmet usage in motorcyclists. *Medical Journal of Malaysia*, 55(1), 40-44.

Lee, H., Dellatore, S. M., Miller, W. M., & Messersmith, P. B. (2007). Mussel-inspired surface chemistry for multifunctional coatings. science, 318(5849), 426-430.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Assessment of Variables Affecting Innovations in the Nigerian Construction Industry

Jacob A. Awolesi
Department of Quantity Surveying, Federal Polytechnic, Ilaro.
Ogun State Nigeria.
(Email: biodunawolesi@yahoo.co.uk**)**

ABSTRACT
Innovation is critical to success of any company in the Nigerian construction industry. The demands of clients and the complexity of designs and construction make it imperative for professionals to adopt new approaches. This paper seeks to assess variables affecting innovation in the Nigerian construction industry. To achieve the main objective of this paper, one hundred and fifty (150) questionnaires were administered to major stakeholders in the construction sector, comprising architects, engineers, quantity surveyors, builders and estate surveyors using random sampling technique. Sixty-two (62) questionnaires were retrieved. The results indicated that the most important variable affecting innovation in the Nigerian construction industry is management support (4.56), followed by innovation motivation (4.35) and technology Synergy (4.26). Other factors as rated by respondents have high mean scores which account for lack of innovation in the Nigerian construction industry. However, the paper concluded that these variables, if given utmost attention will bring about turn around in construction projects development in Nigeria.

Keywords: Construction, innovation motivation, synergy, variables

INTRODUCTION

Innovations have helped other industries overcome long standing obstacles (Winch, 2003). Unfortunately, there is a perception that the construction industry has been comparatively slow to adopt innovations (Damanpour and Schneider, 2009). Pérez-Luño, Cabrera, and Wiklund (2007) add that innovation is vital to achieving competitive advantage and to ensure survival in the industry. Past researchers have identified numerous impediments to successfully implementing an innovation in construction. There is great potential for improvement of the Nigerian construction industry if it could overcome these impediments. Unfortunately, there is no simple solution to guarantee the success of an innovation (Yusof, Kamal, Kong-Seng and Iranmanesh, 2014). Previous studies in this domain shows that there are many variables that affect the outcome of implementing an innovative idea. This paper summarizes and assesses the impacts of these variables on construction innovations in the Nigerian construction industry.

Hence the basis of this paper was formed in relation to assessing the impact of these variables with a view to encourage innovations in the Nigerian construction industry.

RESEARCH METHODS.

The population for this study includes; client organizations, architects, engineers, quantity surveyors, builders, and registered contractors in Lagos. Data were collected personally by the researchers through a cross-sectional survey using random sampling technique. A five point Likert scale was adopted for the study. The data collected was analysed using SPSS version 23. Mean Item scores were obtained and the variables were ranked accordingly**.**

MAIN RESULTS

Table 1: Mean Item Score

Variables	Mean Item Score	Rank
Management Support	4.56	1st
Innovation Motivation	4.35	2nd
Technology Synergy	4.26	3rd

Proficiency of Launch Activity	4.22	4th
Champion	4.12	5th
Firm size	4.04	6th
Innovation Rewards	4.00	7th
Experience Diversity	3.94	8th
Estimated Payback Period	3.88	9th
Patient Money	3.80	10th
Innovation Versatility	3.76	11th
Design Involvement	3.68	12th
Competition Atmosphere	3.60	13th
Tolerance	3.50	14th
Informal Communication	3.44	15th
Regulation	3.40	16th
Questioning	3.35	17th
Schedule Allotment	3.28	18h

Source: Fieldwork (2017)

CONCLUSION

The results indicate that lack of management support (4.56) has the greatest impact on construction innovation in the Nigerian construction industry. Others include; innovation motivation (4.35), technology synergy (4.26), proficiency of lunch activity (4.22) and Champion (4.10). The ratings by the respondents show that most of the variables have high mean scores which accounts for poor or lack of innovations in the Nigerian construction industry. Hence, the need to consider these variables is expedient to improve innovations in the construction sector in Nigeria.

REFERENCES

Damanpour, F., and Schneider, M. (2009). Characteristics of innovation and innovation adoption in public organizations: Assessing the role of managers. Journal of Public Administration Research and Theory, 19, 495-522.

Pérez-Luño, A., Cabrera, R. V., and Wiklund, J. (2007). Innovation and imitation as sources of sustainable competitive advantage. The Journal of the Iberoamerican Academy of Management, 5(2), 71-82.

Winch, G. M. (2003). How innovative is construction? Comparing aggregated data on construction innovation and other sectors— A case of apples and pears. Construction Management and Economics, 21, 651-654.

Yusof, N.; Kamal, E. M.; Kong-Seng, L. and Iranmanesh, M. (2014). Are Innovations Being Created or Adopted in the Construction Industry? Exploring Innovation in the Construction Industry. SAGE Open July-September 2014: 1–9. DOI: 10.1177/2158244014552424 sgo.sagepub.com

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Contravention of Planning Regulations by Informal Economic Activities in Public Housing

Adams Ndalai Baba*, Zayannu Muhammad, and Olugbenga David Taiwo

Department of Urban and Regional planning, Universiti Teknologi Malaysia, Skudai, Johor Bahru, MALAYSIA
(Email: babaadams88@gmail.com, danillelamz@yahoo.com, tdavidolugbenga@gmail.com)

ABSTRACT

Informal economic activities are visible within dwellings, on streets and public spaces in a haphazard manner and to a great extent contravene established neighbourhood planning standards in public housing development. The manner and extent of this contravention in public housing of Lokoja city, Nigeria formed the focus of this study. The study undertook a review of the existing neighbourhood planning standards, identified the type and extent of informal activities, and determined the nature of contraventions based on the existing planning regulations. Findings revealed that activities are largely small-scale retail, manufacturing, and services with about 22 percent occurrence among 1607 housing units in 10 neighbourhoods. Consequently, about half of the activities' manifestation shows various forms of contravention of the neighbourhood planning standards. Proactive measures that will curb their further proliferation in the form of effective development control and participatory integration programmes has been suggested to avert negative externalities.

Key words: Contavention, Planning regulation, Informal, Public housing

INTRODUCTION

Quite a number of urban economic activities have come to be subsumed under a broad concept known as the "informal sector", a term created by Keith Hart and the International Labour Organization (ILO), to mean urban self-employment (Chen and Doane, 2008). The collaborative workshop organised by the Central Bank of Nigeria (CBN) and Nigerian Institute of Social and Economic Research (NISER) in 2001 describe the informal sector as activities carried out without requisite authorised guidelines, and whose operations under legislation do not compel rendering of official returns on its activities (Onwe, 2013).

There are quite a lot of benefits neighbourhoods and housing provides apart from living (Forrest, 2012). However, it is obvious that the relationship between the home environment and economic activities has really not been appreciated in housing studies (Reuschke and Houston, 2016) due to the relatively little attention paid to it especially in low-income housing (Kellett and Tipple, 2000). Despite their economic significance, Kellett and Tipple (2002) observed that HBEs tend to be unpopular with regulatory authorities with regards to issues of employment conditions, land use planning or building control. The conflict between housing and economic activities could occur in the areas of planning regulations, zoning, and building regulations. In Nigeria, the perception of the informal sector by authorities show that it is not recognised in urban development policies and practices (Nzeadibe and Ajaero, 2010). This official perception depicts negative attitudes leading to repression and complete neglect of the sector (Aderibigbe, 2008; Nzeadibe and Ogbodo, 2009). Control over HBEs is nearly difficult because they easily assimilate to the residential environment and activities. However, despite official disapproval, poor households have not relented in establishing and operating HBEs (Tipple et al., 1996). In most cases, legislations are not available to specifically address the issue of HBE occurrences in neighbourhoods of many developing countries. Interestingly, as part of the shared vision of the New Urban Agenda, the UNCHS has shown commitment to harnessing local economies and taking note of the contribution of the informal economy while supporting a sustainable transition to the formal economy (UN, 2016).

Upon this premise, this study assesses the nature of contraventions by entrepreneurial undertakings in public residential housing in Lokoja city, Nigeria.

As working objectives, we identified the type and extent of activities carried out, reviewed existing neighbourhood planning standards and measured the nature of contraventions on planning standards. We carried out an enumeration of economic activities in 353 households and spaces in 1607 housing units of 10 neighbourhoods of lokoja city, Nigeria. Neighbourhoods were selected on the basis of convenient cluster sampling method that met some stipulated criteria. Observed locations of economic workplaces were measured with linear tapes to ascertain compliances with building set-back standard and conflicts of uses with other neighbourhood activities.

MAIN RESULTS

There are variations in occurrences of economic activities among selected public housing in the study area as shown in Table 1. Overall, 49.6 percent locations are mainly in-dwelling and show no sign of contravention to existing standards. However, 50.4 percent occupy public spaces meant for other activities, on street and within and beyond building lines in conflict with set-back standards. Official records and position show no approvals for such activities even though they have been ignored in development control enforcements. Nature of occurrences of activities is shown in Figure 1.

Table 1. Distributions of economic activities among public housing in Lokoja city

NEIGHBOURHOODS		FREQUENCY	PERCENTAGE
1	Lokogoma 1	58	16.4
2	Lokongoma 2	42	11.9
3	Adankolo	18	5.1
4	Salau Attimah	20	5.7
5	Workers Village	36	10.2
6	Aniebo Quaters	36	10.2
7	Oba Michael Olobayo 1	25	7.1
8	Oba Michael Olobayo 2	32	9.1
9	Otokiti	32	9.1
10	Ganaja	54	15.3
	Total	353	100

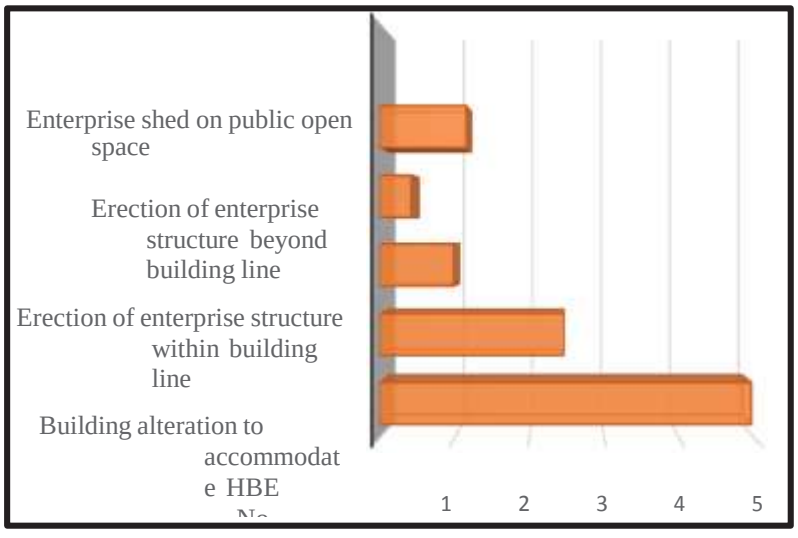


Figure 1. Nature of contraventions to neighbourhood standards

CONCLUSION

A mix of residential housing and economic activities have been encouraged as a contemporary paradigm for housing sustainability by stakeholders, however planning efforts in Nigeria has not provided a conducive environment for such assimilation. This failure has led to the observed significant contravention of neighbourhod planning standards in public housing. There is the need for future research geared towards effective integration strategy for economic activities and the living component in the form of enterprise housing concept. This will take care of negative externalities brought about by their locational misfits.

REFERENCES

Chen, M. and Doane, D. *Informality in South Asia:* A Review. Women in Informal Employment: Globalizing and Organizing (WIEGO), 2008.

Onwe, O. J. Role of the Informal Sector in Development of the Nigerian Economy: Output and Employment Approach. *Journal of Economic Development Studies.* 1, (2013), 60–74.

Forrest, R. *Housing and Social Life*. In Clapham D., Clark W.A.V., and Gibb K (Eds.), *The Sage Handbook of Housing Studies* (pp. 313-326). Sage, London, 2012.

Reuschke, D. and Houston, D. The Importance of Housing and Neighbourhood Resources for Urban Microbusinesses. *European Planning Studies*. 24(6) (2016), 1216–1235.

Kellett, P. and Tipple, A. G. The Home as Workplace: A Study of Income generating Activities within the Domestic Setting. *Environment and Urbanization*.12 (1) (2000), 203–214.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Identifying Critical Success Factors for Achieving Scheduling Performance in Partnering Projects

Ola-awo, Adeniran Wasiu *[1,2], Roslan Bin Amirudin[1] , Alumbugu Polycarp Olaku[2], and Saidu Ibrahim[2]

[1]Universiti Teknologi Malaysia, 81310, Johor Bahru, MALAYSIA.
(E-mail: olaade4u2006@gmail.com,
[2]Federal University of Technology, Minna, Nigeria.
(Email: polycarpalumbugu@yahoo.com, isaidu525@yahoo.com)

ABSTRACT

Underperformance in term of schedule of partnering projects called for this study to proffers for improvement. 32 factors responsible for the success of partnering projects were identified through literature review and pilot interview. This paper aims at investigating which of these factors is responsible for the scheduling performance. The study was conducted through self-administered questionnaire survey and analysis of the obtained data was through multiples statistical tools such as descriptive, Kruskal-Wallis, and ordinal regression. The study discovered that acting inconsistent with the objectives, effective coordination, commitment and support of management and involvement of all the stakeholders are the CSFs of ensuring scheduling performance. The paper, therefore, recommends that all the key players should be engaged from the commencement of the project. The stakeholders should ensure adequate staff, attention, and material before embarking on the project. It was concluded that top management support contributed significantly in ensuring schedule performance of a partnering project. The results of this study would improve the delivery of partnering performance and assist policies makers in decision making.

Keywords: Partnering, Scheduling, Project, Success, and performance

INTRODUCTION

The main pillar of the Nigerian economy is the construction sector. The Nigerian construction industry produces nearly 70% of the nation's fixed capital formation and contributes 2% of the GDP (Idrus and Sodangi, 2010). Although, construction sector accounts for a substantial percentage of the Gross National Product (GNP), total public spending, and employment generation. But problems such as cost overrun, schedule delay, low quality, and stakeholders' dissatisfaction have made the industry a place of resident. To get out of these problems necessitate collaborative means of procurement. There are various types of collaborative procurement such as design and build, partnering, and turkey type project procurement. The choice of this paper is partnering. Partnering implementation is rising in Nigeria to meet the needs of project delivery. Partnering procurement system is one of the three most used project delivery systems in Nigeria, others are traditional procurement and design and build.

Construction Industry Institute (1991) defined partnering as a long-term commitment between two or more organizations for achieving specific business objectives by maximising the effectiveness of each participant resources. Unfortunately, the performance of partnering projects in Nigeria in terms of time of delivery is nothing to write home about and discouraging owing to poor performance such as cost and time overruns. Previous studies conducted on performance improvement revealed that a number of factors called success are influencing project objectives. Chua et al. (1999) confirmed that success factors are objective specific. The literature on critical factors for partnering project reveals that very few studies relate these factors to the project performance and the limited available one do not focus on individual performance criterion rather on performance criteria.

The target of this paper is to identify and investigate the success factors for the scheduling

performance on partnering construction projects. Several authors identified measures of partnering success in which schedule is one of them, but limited studies have been carried out to investigate critical factors for delivering construction projects in Nigeria, not to talk of partnering projects. This study aims to fill this gap by pursuing these objectives: to identify CSFs for partnering project; to investigate which of the factors are/is responsible for scheduling performance, and to test if there is an agreement in the ranking of the factors. This study finding will provide a better understanding of factors critical to partnering implementation and helps practitioners involving in partnering projects to take measures to ensure better project schedule objectives.

Furthermore, lack of understanding of factors that responsible for performance made it difficult for the stakeholders to known the actions to take when looking for project success improvement. In Nigeria, the high number of partnering projects failed to meet scheduled is an indication that there existence an underlying CSFs which are yet to be identified. Therefore, the target of this paper is to identify the critical factors that lead to scheduled performance. In developing countries such as Nigeria, it becomes difficult to deliver construction projects due to complexity; this cannot be continued due to the competitive nature of the industry, therefore, achieving success in project execution is becoming more paramount.

The understanding of CSFs influencing scheduling performance will help improve partnering project management, and that would lead to better delivery. This knowledge will allow construction practitioners to adopt best practices to support continuous improvement and help their organization to remain competitive. This study will facilitate a better comprehension of factors contributing to the scheduling accomplishment in the Nigerian context. Understanding of the impacts of the CSFs on the scheduling performance is crucial to decision-making and problem-solving. This paper is structured thus: First, review the concept of success and criteria in relation to the construction industry. Next is an explanation of the concept of CSFs in construction projects generally and in partnering projects in particular. Partnering projects in Nigeria discussion will then follow. After that, approach and methodology adopted for this paper, data analysis and discussion of the findings were presented. The conclusion was then drawn for the paper.

RESULTS AND DISCUSSION

Thirty- two factors were identified as contributors to the success of construction partnering projects through a pilot study and excessive literature. Identified factors run through logistic regression analysis to ascertain those having a great impact on the scheduling performance of partnering projects. The result of the analysis revealed that only four factors were significant predictors of the partnering project scheduling performance outcome when the probability of delivering the project on schedule was considered as project success criterion. The factors are acting consistently with objectives, effective coordination, commitment & support of management and involvement of all key stakeholders. The four variables are statistically significant ($\rho<0.05$) predictor of project success in scheduling performance. This study finding tallied with Chen & Chen (2007) in the study CSFs for construction projects in Taiwan. Summary of the results present in the tabular format below.

Table 1. Scheduling analysis using Logistic Regression Statistics

Predictor	B	SE	Wald	Df	Sig	95% confidence interval	
						lower	Upper
Acting consistently with objectives	-.738	.285	6.689	1	.010	-1.297	-.179
Effective coordination	.486	.226	4.621	1	.032	.043	.930
Commitment & support of Management	.536	.252	4.516	1	.034	.042	1.030
Involvement of all key stakeholders	.503	.220	5.227	1	.022	.072	.934

* Significant at $p< 0.05$

CONCLUSION

In conclusion, even though all the 32 identified factors are equally important to partnering projects success. The level of contribution of each of these CSFs to project goals varies. This study identified four CSFs that responsible for achieving schedule performance in partnering construction projects in Nigeria. It also tested the practitioners (clients, contractors, and consultants) agreement on the ranking of the partnering CSFs, and several recommendations were proposed to respond to the critical factors. The analysis reveals that acting consistently with objectives, effective coordination among parties, commitment and support of management, and involvement of all key stakeholders are the four vital factors influencing the schedule performance of partnering projects in Nigeria. Furthermore, the results of the Kruskal-Wallis test implied that there was no statistically significant difference among respondents in 28 out of 32 factors (P-value > 0.05).

REFERENCES

Chen, W.T., Chen, T-T. (2007). Critical success factors for construction partnering in Taiwan. *International Journal of Project Management*, 25 (2007) 475–484.

Chua, D.K.H., Kog, Y.C. and Loh, P.K. (1999) Critical success factors for different project objectives. *Journal of Construction Engineering and Management*, ASCE, 125 (3), 142-50.

Construction Industry Institute (1991). In Search of Partnering Excellence. Special Publication, 17-21.

Idrus, A.B., &Sodangi, M. (2010).Framework for Evaluating Quality Performance of Contractors in Nigeria. *International Journal of Civil & Environmental Engineering*, 10 (1), 31-36.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Review of the Concept of Residential Segregation in Jos City, Nigeria

Rasheed Osuolale Oladosu*, Ahmad Nazri B. Muhamad Ludin and Siyaka Abdulrahman Arudi

Department of Urban and Regional Planning, Faculty of Built Environment, Universiti Teknologi Malaysia, Johor Bahru, Malaysia
(email: oladosurasheed@yahoo.com, b-anazri@utm.my, abdulsiyaka@yahoo.com)

ABSTRACT
There is a widespread belief that most multi-ethnic cities of the world experience one form of segregation or the other and that the relationship among the inhabitants of such cities are undoubtedly fragile. This is in consideration of the degree of occurrence of ethno-religious urban conflicts spiralling in such cities across the globe. Yet, it is a common hypothesis that a stable and ethnically integrated cities is unavoidable for socio-cultural and economic development of any nation. The wide array of residential segregation discourse in the literature reveals that varying factors are responsible for the development of the phenomenon. Segregation in Jos, like most other multi-ethnic cities in Nigeria, is rooted in the colonial creation of spatial separation among ethnic groups. The latest segregation challenges in the city particularly from the turn of the century, was however the result of recurring violent urban conflicts among the dominant ethnic and religious groups. In addition to the general review of the causes and challenges of segregation therefore, this paper overviews the immediate and proximate causes of residential segregation in Jos.
Keywords: Residential segregation, Urban violence, Multi-ethnic cities, Jos

INTRODUCTION

A wide array of residential segregation discourse exist in the literature. The definition given depends on the interest of the researcher, the direction of the research and the hypothesized outcomes. It is a form of separation that sorts people into various neighbourhood context and shapes the living environment and social space at neighbourhood level (Muhammad et al, 2015). A non-planned distribution of people of different groups into social strata and the associated social and physical distances between groups (Bruch & Mare, 2009). It is the practice and ideological expression of socio-economic characteristics which is shaped through socio-spatial residential organization (Wu et al, 2014). Within the general context of the leading cause of the phenomenon in the developing nations, especially sub-Sahara Africa, residential segregation is the splitting apart of residents of a city who hitherto were living and interacting together in a single socio-physical space, into residential neighbourhood enclaves on the basis of religion and/or ethnicity within the same city and among people who ordinarily are bound by a common physical, cultural, and socio-economic environment.

Although residential segregation along races has been observed to be associated with few social and mental health merits such as protection of minority group against prejudice and discrimination of the majority, reinforcing their social control and fostering strong social cohesion among members of a group (Kershaw et al, 2014), notwithstanding, studies' report generally show that it is against the spirit of socio-economic and cultural wellbeing of any nation. For instance, correlations have been established between segregation and differences in health issues (Kershaw et al, 2014), access to job opportunities (Williams and Collins, 2001), access to housing and mortgage facilities (Williams and Collins, 2001), income disparity (Glitz, 2014), and inequality in the distribution of education, water, health, and transport facilities (Olima, 2001).

RESIDENTIAL SEGREGATION IN NIGERIA

The initial segregation in Nigeria like most other African countries, was a creation of the colonial administrators through their objectives of establishing housing and infrastructure that were in total contrast to those of their subjects; and which eventually delineated their residential areas.

Promotion of functional spatial structure, hygienic and healthy environment, as well as socioeconomic development also led to racial segregation among different tribes within their territories (Njor, 1998). Edewor (2011) noted that the Nigerian settlements especially in the north were heterogeneous with people of different tribal orientations living together prior the era of colonization. The British government put an end to the heterogeneity of the settlements through the creation of 'Sabongari' meaning new settlement which eventually culminated into physical, legal, social and psychological segregation of groups. Also of significance to note is the role played by the colonial masters in rooting Nigeria on segregation through the divide and rule strategy that was used to pitch different ethnic groups against themselves by reawakening their tribal consciousness. Aside the history of colonization however, ethno-religious and politically induced urban violence are factors most recently responsible for residential segregation that is typical of many Nigerian cities, most especially in the north. The cities of Jos, Kaduna, Kano and some parts of Bauchi have been physically polarized along ethnicity and religion (Aliyu et al., 2012; Muhammad et al., 2015).

DEVELOPMENT OF RESIDENTIAL SEGREGATION IN JOS

Jos' experience of initial residential segregation is similar to those of other cities of northern Nigeria where the colonial masters buffered their residential housing from the black natives Under the 1917 Township and Public Health Ordinance, the 1918 city layout divided the settlement of Jos into three major sections. The Native town which was located to the north was inhabited by the indigenes, the Township dominantly occupied by the immigrants was located in the south and east, and the European reservations which was inhabited by the colonial administrators was found further south (Omokhodion and Associates, 1980). However the segregated pattern was again hardly visible until the recent event of violent crisis that engulfed the city and eventually succeeded in segregating it along ethno-religious divides (Higazi, 2011).

Jos was considered as a peaceful city compared to its peers in other states that have experienced one form of urban violence or the other. That made no Nigerian expected the deadly ethno-religious violence that engulfed the city from 7^{th}-12^{th} September, 2001 (Human Right Watch, 2001). Although some research reports noted that the city had some experience of violence long in the past (Higazi, 2011), notwithstanding it was known for peace which made it to be titled the nation's 'home of peace and tourism' despite its high cosmopolitan status. Following the 2001 incidents, some residents attempted relocating to their homes after some level of subsidence but several resurgence of the violence in 2002, 2008, 2010 and 2011 led to a perpetual segregation along religion and ethnicity divides, described as 'two communities in one settlement' (Aliyu et al, 2012). Claim of the ownership of the city and the implications of the claim were central to the causes of the violence through which segregation that is currently visible in the city emerged.

CONCLUSION

Residential segregation is a common urban challenge identified with the world multi-ethnic cities. It often impacts negatively on the socio-cultural relationship of citizes and physical development of nations. Segregation in Nigerian cities including Jos started during the colonial era. However, the recent experience of segregation in Jos city was the result of recurring urban violence.

REFERENCES

Aliyu, A.A., Abdu, A.A., Kasim, R., Martin, D, Diah, M.L.M. and Ali, H.M. Implication of intangible location attributes on residential segregation in Jos, Nigeria. Journal of Sustainable Development 5 (2012), 65-81.

Bruch, E and Mare, R. Segregation dynamics. In The Oxford Handbook Analytical Sociology (eds), Hedstrom, P. and Bearman (2009). 272.

Edewor, P. A. Residential segregation in Nigerian cities. In Globalizing cities: inequality and segregation in developing countries, Sandhu, R. S. & Sandhu, J. (eds), (2011), 29-42.

Glitz, A. Ethnic segregation in Germany. Labour Economics 29 (2014), 28-40.

Higazi, A. The Jos crisis: a recurrent Nigerian tragedy. A Discussion Paper. Abuja: Ebert Stifftung (2011), 1-30.

Human Right Watch. Jos: A city torn apart 3, 9 (A) (2001). HRW<http://hrw.org/nrde/76878>. Accessed on 6/10/2016.

Kershaw, K.N., Osypuk, T.L., Do, D.P., De Chavez, P.J., and Roux, V.D. Neighbourhood level racial/ethnic residential segregation and incident cardiovascular disease: The multi-ethnic study, Etiology:[8] Epidemiology (2014), 1-30.

Muhammad, S.M., Kasim, R. and Martin, D. An evaluation of factors influencing residential satisfaction in selected areas of Bauchi metropolis, Northern Nigeria. Mediterranean Journal of Social Sciences 6, (2015), 127-140.

Olima, W.H.A. The dynamics and implications of sustaining urban spatial segregation in Kenya: experiences from Nairobi Metropolis. International Seminar on Segregation in the City, July 26-28, 2001.

Omokhodion Associates. Jos-Bukuru metropolitan area development programme vol. 1:existing conditions. Lagos: Omokhodion Associates, Consultants on Development (1980),113-163.

Williams, D. R. and Collins, C. Racial residential segregation: A fundamental cause of racial disparities in health. Public Health Reports 116 (2001), 404-416.

Wu, Q. Socio-spatial differentiation and residential segregation in Chinese city based on the 2000 community level census data: A case study of the inner city of Nanjing. Cities 39 (2014), 109-119.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Dynamic Web for Online Delivery of Cadastral Services for Land Registration in Nigeria

Babalola S. O*[1,2],Abdul Rahman A.[1], Choon L. T[1]and Tata H[2].
[1] Faculty of Geo-information and Real Estate, Universiti Teknologi Malaysia.
*(omooroloba@gmail.com), (allias@utm.my)
[2] Department of Surveying and Geoinformatics, Federal University of Technology, Akure, Nigeria.
*(omooroloba@gmail.com), (htata@futa.edu.ng)

ABSTRACT

The new innovative of technology by Geographic Information System, (GIS), Land Information System (LIS) and Cadastral Information System (CIS) has been playing a leading role in the development of cadastral and land administration in this study area. The customary ways and approach to the land titling and registration in the time past has resulted in the delay in the processes of obtaining title to the land. Land administration system in Nigeria includes the processes of land registration, cadastral mapping, land valuation and land inventory. Most of developing nation particularly Nigeria is faced with the problem of poor land administration and management. Technology is paramount in acquiring a proper technological development in land administration. The need to develop a dynamic web for the processes in the land registration arises from the dynamic relationship to the land of the people. The delay in time and process of land registration couple with the exploitation in land related activities has called for the urgent intervention of all the stakeholders in land administration. In this study, a website was developed for the processes involved in the land registration having examined the fastest way to solve the problem. A web was developed so that a client (applicant) can check the status of their application on the internet. A robust dynamic database was also developed which is capable of accommodating several numbers of applicants. The advantages of this are numerous as stated in this study.

Key words: Sporadic, Systematic, Adjudication, Dynamics web, Static web

INTRODUCTION

Web designing is that tasks associated with developing websites for hosting the Internet, the process of which includes Web content development, Web design, client-side/server-side scripting and network security configuration, and database technology. There are main two types of website commonly used, the static web and dynamic web. The dynamism of a web is dependent on the use of scripting language, in another word, a dynamic web must contain a scripting language connected with the database [1]. This technology, however, has been used by lots of business enterprise to make a market for their companies. Also, the technology has been extended to almost all professions because of the technology advancement in this century. Technology changes as the days and the hours of the clock are moving. Given this, surveying and geo-informatics also have metamorphosis from the era of analog to the digital age and online delivery of cadastral services.

In the study area, the problem in the process of land registration has been an aged long problem emanated from the provision of Land Use Decree of 1978 [2]. Also [3], reviewed land information and management in the context of land titling in Nigeria. He identified that the problem of land titling and registration emanated from some of the provision of Land Used Act of 1978. This Decree is a resulting Act controlling the activities in land management and administration in Nigeria. According to [3], [4] and [5] put Nigeria as the country with the highest number of stages, days and the amount needed to get the land registered.

DISCUSSION

The figure below is the framework of the system developed for land registration processes within the study area. The ownership is the candidate that applied for the certificate of occupancy. The certificate of occupancy is the evidence of document that proves one to be the right owner of a

particular parcel of land. The title of the property is only valid for 99 years renewable after the period of 99 years. The PHP code and the database are kept safe at the server side while the client uses the computer to access whatever he needed to get from the system. The server serves as the back end for accessibility for the entire stakeholder in the business of land transactions and cadastral services which are provided online.

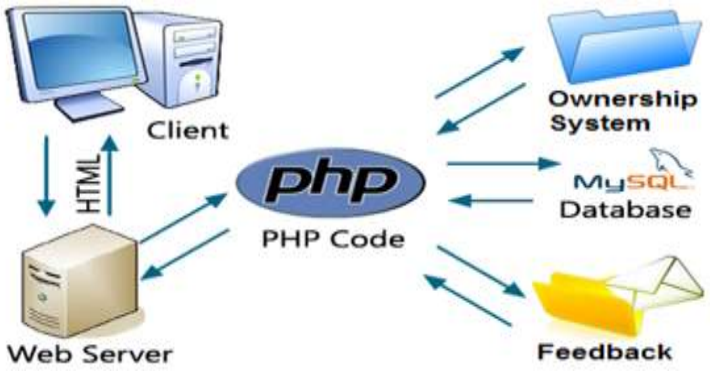


Figure 1; PHP Application on web server side

The figure shows the operational framework of the system. The Processes and stages of land registration as recommended in this study.

1 The Scheme Officer (SO) prepares the application for the Certificate of Occupancy (C of O), signs off on the file and forwards the files to Executive Sectary (ES) Land Use Allocation Committee (ES LUAC) - 5 Days

2 ES LUAC approves processing and signs letter of allocation. ES LUAC signs off on the file and sends the file to the Senior Special Assistant (SSA) to His Excellency, Lands (SSA Lands) - 5 Days

3 The Surveyor General provides Scheme Officer with digitized survey – 5 Days

4 The SSA, Lands vets the entire file and sends it with a covering memo to the Permanent Secretary (PS) Lands Bureau (PS Lands) - 3 Days

5 The PS, Lands signs off on the memo and sends the file to His Excellency - 3 Days

6 His Excellency approves file and electronically signs the C of O – 3 Days

7 Upon approval and signing of the C of O by His Excellency, He signs off and sends it to the Deputy Registrar for further processing - 2 Days

8 The Deputy Registrar processes the file further, signs off and sends it to Registrar of Titles for final registration - 2 Days

9 The Registrar of Titles registers the C of O, signs off and request for printing of C of O and signed it for collection- 2 Days.

The entire document required for land registration is collected at the admin office and verified to check the authenticity and the accuracy of the cadastral plan attached before it will be uploaded. The documents are scanned in pdf format and uploaded by the Scheme officer. The admin registered all the officers that are working on the file so as to have access to the document uploaded online. Given this, there is safety in the information on the database as there are data integrity and security.

Figure 2: Ownership Documents uploaded

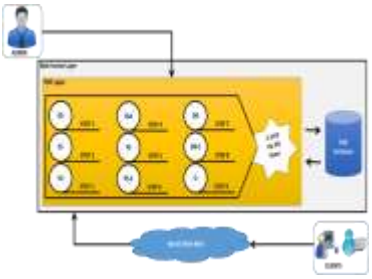


Figure 3: Operational Framework

The system is also designed in a way that an officer cannot leave the work undone in his system because there an indicator in the system warning, specifying the number of the day in a particular unit or department in which a file can be delayed. Following the steps and the processes as seen in the figure above, the process is designed to be completed in 30 days. However, if there is an error while processing the C of O, the file may be sent back to the admin where the entire document is loaded for correction. But while all the processes are going on, the application can also check the progress of the application submitted for land registration and give feedback when necessary. The C of O is granted for 99 years. The counting starts as soon as the C of O is signed by the Governor as recorded by the system. It is easy to search or query for any particular or C of O in the database.

CONCLUSION

The land that is not titled can be said to be valuable without value and has no economic value. Although there are lots of problems associated with getting a title to a parcel of land in the study area, it is a duty that must be done. One of the main impediments has been linked with the provision of Land Use Decree of 1978. This study tried to encourage land title registration by providing web technologies that are faster and suitable with a low rate and minimum delay. The merit of the system of this study cannot be overemphasized because it provides security for the ownership and guaranty the integrity of the data. The system has eradicated the hoodlums and the middlemen cluttering around in the Ministry and Lands Department for the illegal land transaction. Also, the study has added an improvement to Cadastral service, and land registration practices in Nigerian Cadastre System.

Consequently, the next study will be on how the production of the cadastral plan can be improved further in the study area and computerized the whole process of land registration in line with World Bank recommendation for the adoption of ISO19152 Standard in the study area.

REFERENCES

Babalola, S.O., C.T. Liata, A. Alias, A. Winstonc, and A. Gabrielb, An Analysis of 3d Situation as A Prospect for Land Administration Domain Model (Ladm) in Nigeria: A Malaysian Initiative. Jurnal Teknologi, 2015. 77:14 p. 7-13.

Atilola, O., Systematic Land Titling and Registration in Nigeria: Geoinformation Challenges Nigeria, in FIG Working Week 2013 Environment for Sustainability. 2013: Abuja, Nigeria.

Nuhu, M.B., Land Information Management: Strategy For The Implementation Of e-Conveyancing In Nigeria, in NIS AGM. 2011: Calabar, Nigeria.

World Bank, Doing Business (2009) Nigeria: Comparing Economies, Washington D.C.: The World Bank, 2009. 2009.

World Bank, Doing Business 2010 Nigeria: Comparing Regulation in 183 Economies, Washington D.C.: The World Bank,. 2010.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Evaluation of Mass Housing Scheme as a Strategy of Social Housing in Abuja, Nigeria

Rasheed Osuolale Oladosu*, Siyaka Abdulrahman Arudi
Department of Urban and Regional Planning, Faculty of Environmental, Abubakar Tafawa Balewa University, Bauchi, Nigeria.
(Email: oladosurasheed@yahoo.com, abdulsiyaka@yahoo.com)

ABSTRACT
Abuja like many cities in the developing nations, has persistently faced daunting challenges of housing provision for her ever-increasing population. This is much so as a result of the pulling forces engineered by its status as the federal capital territory of Nigeria. Several governments and managers of the city have sequentially formulated policies and programmes aimed at stemming this challenge of deficit in housing supply. Social housing in the form of mass housing scheme targeting housing delivery particularly to the no, low and medium income earners at affordable prices, was introduced and implemented in three phases between 2000 and 2011 with emphasis on providing enabling environment for active participation of the private sector. This studies looks at the success of the scheme, evaluating how it has met its target goal. Quantitative data were collected through face-to-face questionnaires administered on 112 randomly selected residents across the mass housing estates and the 96 duly completed were analysed using descriptive characteristics in addition to those obtained from relevant secondary sources. Findings reveal that the scheme was implemented in six, eight and fourteen districts respectively in phase one, two and three. Land allocation increases from phase 1 through phase 3 while the development-lease period decreases from 3 year term in phase 1 to 1.5 in phases 2 and 3. The scheme generally recorded low degree of success due to failure of both the government and the private developers to abide by some crucial clauses of the agreement terms, land grabbing and high prices of the provided housing units which make them largely unaffordable by the target beneficiaries.

Key words: Mass housing scheme, Social housing, Private developers, Low income earners

INTRODUCTION

Housing is a basic necessity of life, a pre-requisite for human survival and a fundamental determinant of the quality of human's life, often considered next to food in the hierarchy of man's needs. Government of nations the world over and more succinctly managers of cities in the developing countries, have continued to strive to live up to the housing challenges faced by their citizens, thereby formulating policies and developing programmes to stem the tide of the shortfall often experienced between housing demand and supply. The Nigerian government has made series of intervention in housing right from the colonial time through the period of regional governance to the current national democratic practice. For instance, the serving Nigeria vice president during the 22nd Nigeria economic summit, reiterated the government's plan to through the local and international private investors, raise a special intervention fund, up to a trillion naira, for social housing programme aimed at housing for the low income earners, especially any Nigerian capable of raising a minimum of 30,000.00 naira per month (Vanguard Newspaper, October 16, 2016).
The magnetic attractions of Abuja right from its official advent as the federal capital territory of the federal republic of Nigeria in December 1991 coupled with the attendant consequences of its new status, with 9.3% annual growth rate, described as the highest in Africa (Elaigwu, 2010), has manifested in gross deficit in housing provisions. Social housing by a way of mass housing scheme is one of the strategies employed by the city's administrators to address this menace of housing shortfall in the capital city.

THE ABUJA MASS HOUSING SCHEME
The Federal Capital Territory Administration (FCTA) and the Federal Capital Development Authority (FCDA) decided in the year 2000 to employ mass housing programme as a strategy to

stem the tide of housing deficit in Abuja. There are quite a number of the schemes which are categorized into three including initial government scheme, resettlement scheme and private intervention scheme.

The private intervention scheme which is the thrust of this study, laid emphasis on creating enabling environment for active collaboration between the private sector and government towards effective and efficient housing delivery at low cost through Public Private Partnership concept. It was implemented in three phases between 2000 and 2011 (Table 1).

KEY FINDINGS

Allocation of land to developers

The scheme was implemented in three phases in an increasing proportion in land allocation. A total of 2610 hectares forming 17.06 percent of the total was allocated within six districts in the first phase. Development-lease period was pegged at three years in this phase. The allocation was increased to 4541.85 hectares (29.68 percent of the total) in the second phase but the development lease period was reduced to one and a half years. The largest allocation was made in the last phase when 8149.85 hectare (53.26 percent of total) was allocated to the approved private developers.

Table 1. Land allocation to private firms for mass housing scheme

Phase	Land allocation (Hectares)	% of total allocation	Development-Lease period (years)
Phase 1 (2000-2003)	2610.00	17.06	3
Phase 2 (2004-2007)	4541.85	29.68	1.5
Phase 3 (2008-2011)	8149.85	53.26	1.5
Total	15301.7	100.0	-

Source: Department of mass housing, FCT, 2013.

Types of residential buildings and residential densities

The study's survey revealed that all housing estates developed through the scheme are characterized by low and medium densities across horizontal and vertical axes respectively. Some occupants construct extensions in the occupied housing units to suit their needs. Table 2 shows that, of the 96 responses analysed, bungalows and duplexes are the most common taking up to 39.5% and 33.3% respectively. Mixed buildings are 22.9% while flats are only 6.3% in the surveyed estates.

Table 2. Types of residential buildings

Residential building type	**Frequency (n = 96)**	**Percentage (%)**
Bungalows	38	39.5
Duplexes	30	31.3
Block of flats	6	6.3
Mixed buildings	22	22.9
Total	96	100.0

Affordability of the residential buildings

Provision of affordable houses for the no, low and medium income Nigerian residents of the city was the main policy thrust of the mass housing scheme. However, available information from secondary sources indicates that the housing units developed through private interventions are mostly not affordable by the target population of the scheme. According to Ukoje and Kanu (2014), the goal of the scheme in this regard is therefore far from being achieved. The market price of the smallest 2 bedroom semi-detached bungalow found in the estates is N15,000.00 implying that a Nigerian who earns a minimum wage of N18000.00 requires an outragegeous minimum of 69.4 years of 100% saving of her salary to afford one.

Field observation

Aside the issues responded to in the questionnaires by the residents, the researchers while on the estate round observation survey, noted that the dimensional coverage of the buildings on the plots do not conform with the planning standard of 33% and 56% for low and high density respectively. It was also noted that though not common, there are instances of usage conversions due inadequate provision for neighbourhood facilities such as schools, shopping outlets, worship places and workshops for the artisans. Lack of provision for solid waste disposal facilities was equally

observed as refuse dump in undeveloped residential plots were noted. These observations comform with the findings of Alao (2009) in his sustainability assessment of the Abuja mass housing scheme.

CONCLUSION

Social housing in the form of mass housing schemes was employed to address the challenge of persisting housing deficit in Abuja. Private intervention was employed through land allocation to registered private developers by the FCTA/FCDA. However, the goal of the schemes was far from being realized as the no, low and medium income earners who were the original target beneficiaries were edged out through high prices of the buildings and non-fulfilment of some key areas of the intervention agreement by both the FCTA and the private developers.

REFERENCES

Alao, D.A. A review of mass housing in Abuja, Nigeria: problems and possible solutions towards sustainable housing. Eastern Mediterranean University North Cyprus, Master Degree Thesis, 2009.

Elaigwu I.. Abuja, Nigeria. In *E. Slack and R. Challopadhyay, (Ed), Finance and Governance of the Capital Cities in Federal System, 2009*, McGil-Queens University Press (2009), 342.

Ukoje, J.E. and Kanu, K.U. Implementation and challenges of mass housing in Abuja, Nigeria. *American International Journal of Contemporary Research* 4 (2014).

Vanguard Newspaper. FG plans N1trn social housing scheme. Available at: http:/www.vanguardngr.com/2016/10/fg-plans-n1trn-social-housing-scheme. Accessed on April 10, 2017.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Investigating Drivers and Barriers to Whole Life Costing by Quantity Surveying Firms in Kaduna State, Nigeria

Abdulkadir Babale Lawal*, Sani Abdullahi Sarki and Abdullahi Salihu Halidu
Department of Quantity Surveying, Nuhu Bamalli Polytechnic, Zaria, Nigeria.
(E-mail: abdumi@gmail.com, abdulsani43@yahoo.com and ashalid@yahoo.com)

ABSTRACT

In recent times, buildings were wholly designed to minimize the initial construction costs, and maintenance costs, therefore leading to the increasing patronage of costing techniques that takes these aspects of costs into cognizance (i.e. Whole Life Costing). Previous researches have shown that lack of understanding of WLC concept is a major barrier to its wide application. The study utilizes a qualitative approach with review of existing literature. Semi-structured interviews were used to collect data, which were analyzed using constant comparative analysis method. The research found that, provision of standards, effective teamwork amongst consultants during project inception and design stages and clients demand for WLC techniques during procurement are drivers to WLC application. This study further affirmed that political reasons, absence of guidelines and lack of teamwork are the barriers preventing the application of WLC in Nigeria. The study recommends that standard procedure and guidelines should be established to form the basis for WLC application.

Keywords: Whole Life Costing, Barriers, Drivers, Quantity Surveying

INTRODUCTION

At the start, buildings were designed solely to minimize the initial construction costs, but as time went on, around 1930s a number of clients understood that the running costs of buildings has a significant impact over their budget (Dale, 1993). In view of that, it is inadequate to make a design decision on the basis of initial construction cost only. Maintenance and operation cost turn out to be significant issues, thereby leading to the development of a costing technique that takes into cognizance of these aspects of cost.

According to Ashworth (2010) Whole Life Costing (WLC) is normally embraced by clients as part of strategic re-assessment of their facilities. It influences the procurement of new building and engineering facilities and the decisions about renewal, refurbishment and disposal. It has since been established that to assess the costs of buildings and engineering structures on the basis of their initial costs only is insufficient. Certain consideration must also be given to cost-in-use which will flow all through the life span of the building or structure. Hence, the use of WLC for this reason becomes obvious; this is because all costs accruing from an investment are applicable to that choice or option (Ashworth, 2010). Studies have been conducted in the areas of WLC application in various countries, they include that of Olubodun *et al*. (2010); Rum and Akasah (2011); Chirigwi *et al*. (2010); Shahata and Zayed (2011), these works considered the application of WLC in various countries highlighting the difficulties faced in implementation of WLC as well as the drivers to the application.

According to Bull (1993), the normal practice of accepting the lowest initial cost discourages WLC procurement. Lack of understanding of WLC by the clients is a major barrier to the implementation of the practice. Similarly, Clift and Bourke (1999) and Cole and Sterner (2000) identified inadequate motivation on the part of the clients to use WLC. El-Haram *et al*. (2002) acknowledge that absence of consistent and reliable data on elements of WLC and the achievement of building

elements and services as major barriers to its successful implementation. The drivers to WLC includes the client's request for WLC practice, hands on approach to WLC training, provision of guides as key motivating factors to the practice of WLC (Chirigwui *et al.*, 2010; Olubodun *et al.*, 2010).

Table 1: Barriers to Wlc application in the NCI as discussed in the interviews

Barriers	**Themes identified**
Political	• Budget Allocation • Limited resources • Corruption
Data	• No maintenance records • Absence of planned maintenance
Capability	• Sufficient knowledge to enable practice • Need for continuing education
Absence of Standards	• Hinders WLC practice • Difficulty in making comparisons
Complexity of WLC process	• Not complex
Perceived Inaccuracies	• Not a barrier
Client Barriers	• Clients do not require it • Lack of knowledge on the true nature of cost by client.

CONCLUSION

The findings of this study confirmed that practicing quantity surveying firms in Nigeria have a good understanding of WLC concepts. This implies that, although the competencies of carrying out WLC practice are available in Nigeria, there is a tendency for the implementation to face bottlenecks due to inadequate comprehension of the concept by the clients.

Therefore, it can be safe to report that Nigerian quantity surveying firms have adequate knowledge base sufficient for WLC practice for the benefit of their clients; hence capability is not a barrier to WLC application in Nigeria.

REFERENCES

Ashworth, A. (2010). Cost Studies of Buildings. (5th ed.). England: Pearson Education Limited.

Bull, J. W. (1993) The Way Ahead for Life Cycle Costing in the Construction Industry. In Bull, J. W. (ed.) Life Cycle Costing for Construction. Blackie Academic & Professional, Glasgow, UK.

Chiurugwi, T. Udeaja, C. and Hogg, K. (2010). Exploration of Drivers and Barriers to Life Cycle Costing in Construction Projects: Professional QS Assessment. Proceedings of the International Conference on Computing in Civil and Building Engineering. Retrieved on 12th June 2016 from emerald publishing website.

Clift, M. and Bourke, K. (1999). Study on Whole Life Costing. BRE Report 367. CRC

Dale, S. J. (1993). Introduction to Life Cycle Costing in Bull J W (ed.). Life Cycle Costing for Cconstruction. Glasgow: Blackie Academic and Professional.

El-Haram, M. A. Marenjak, S. and Horner, M. W. (2002). Development of a Generic Framework for Collecting Whole Life Cost Data for the Building Industry. Journal of Quality in Maintenance Engineering. 8(2), 144–151.

Olubodun, F. Kangwa, J. Oladapo, A. and Thompson, J. (2010). An Appraisal of the Level of Application of Life Cycle Costing within the Construction Industry in the UK. Emerald Group Publishing Limited. 28(4) 254-265.

Rum, A. M and Akasah, Z. A. (2011). Implementing Life Cycle Costing in Malaysia Construction Industry: A Review. International Building and Infrastructure Technology Conference, Penang, Malaysia. Project Submitted to the Department of Quantity Surveying, Ahmadu Bello University, Zaria.

Whyte, A. Al-Hajj, A. and Aouad, G. (1999). The State of Life Cycle Costing in Construction: Towards a New Framework for LCC Analysis of Buildings, Internal Research Report. School of Construction, Property and Surveying, the Robert Gordon University, Aberdeen.

Yin, R. K. (2009). Case Study Research: Design and Methods. London: Sage Publications Ltd.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences Universiti Teknologi Malaysia 17 -18 May 2017

Review of Building Construction Accidents: Concept, Cases, Causes, Consequences and Control Measures

Williams, Opeyemi Samuel*[1], Razali Bin Adul Hamid[1], Mohd Saidin Misnan[1], Abimaje, Joshua[2,3], Yakubu Aminu Dodo[2], and Taki Eddine Seghier[2]

[1]Department of Quantity Surveying, Faculty of Built Environment, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor Bahru, Johor, Malaysia.
(E-mail: oswilliams2@live.utm.my or yemiwilly2006@gmail.com)
[2]Department of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia(UTM), 81310 Skudai, Johor Bahru, Johor, Malaysia.
[3]Department of Architecture, Federal Polytechnic, Idah, Kogi State. Nigeria.

ABSTRACT

Construction industry copiously contributes to the economic growth of any country in the world, and yet it is prone to accident. The industry is characterised with dangerous activities during the process of construction, which metamorphose to accidents. Divers occupational accidents occur on construction site, fatal and non-fatal injuries are sustained by construction workers, coupled with loss of lives, properties and company reputation. The paper is a review study conceived to depict the concept and causes of accident, identifying different types of accident, revealing the reported, recorded, and published accident cases, as well as unveiling the consequential effects of accident. Building construction accident impacts the construction process and productivity as it attracts direct and indirect costs. It is, however, imperative to control the occurrence of the site accident in order to avoid its impacts on the project, contractor and the construction workers. Consequently, extensive review of literature reveals divers control measures that can be implemented in mitigating the occurrence of accidents. It is recommended that the implementation of these measures will inadvertently avert the occurrence of accident on building construction site.

Keywords: Construction industry, accident, construction site, accident prevention

INTRODUCTION

The construction industry has been described to be the hub of economic and social development of all countries in the world (Agwu & Olele, 2014). It is a vital and significant sector of the economy. It plays a significant role in the improvement of countries' economic growth (Hosseinian & Torghabeh, 2012). Ikpe (2009) defines the construction sector as one which is made up of the clients, professionals, contractors, sub-contractors, producers and suppliers of construction products and materials, providers and installers, and other organisations that are relevant to the design, build, operation and refurbishment of buildings. However, construction is widely regarded as an accident-prone sector which consists of copious hazards and dangers having the potential of producing hundreds of injuries and deaths (Tahir *et al*., 2008). It is a hazardous profession, where accidents occur because of the tasks performed and nature of the activities on construction sites (Al-Tabtabai, 2002). Mohd Ashri (2010) is of the opinion that accidents that are not unpredictable that may put construction workers' lives at risk do take place at any time during the construction period. Laryea & Mensah (2012) give the reasons for the risks involved in construction to be: nature of the construction work operations; construction methods; the physical environment of the work; construction materials; heavy equipment used and physical properties of the construction project itself. Rizwan (2015) posts that; construction industry has always been a critical issue, as it is considered as among the most hazardous sectors when it comes to occupational accidents.

2.0 REVIEW OF LITERATURE

Concept of Accident: Heinrich *et al.* (1980) gives the definition of an accident as "an unexpected, unavoidable, unintentional act resulting from the interaction of host, agent, and environmental factors within situations which involve risk taking and perception of danger". Accident, as defined by (Pillay, 2014; Griffith & Howarth, 2000) is an undesired circumstance which results in ill health or injury, damage to plant, property, products or the environment, or a loss of business opportunity". It is a condition or circumstance where a worker or operative is injured at the course of operation, or material or equipment is damaged. Accidents happen to site workers without their intention, nor any preparation for it. It is a dangerous occurrence that impedes the smooth running of activities on site.

Types of Construction Site Accidents

Various types of construction accident are identified by different authors and organisations (Orji *et al.*, 2016; HSE, 2006; Hovden *et al.*, 2008; Nkem *et al*., 2015; Edwards & Nicholas, 2002; Weeks, 2011; Nnedinma *et al*., 2014; Orji *et al.*, 2016). However, RIDDOR (2015), in HSE (2015), identifies and outlines fifteen (15) types of construction accident.

Cases of Construction Accident

Evidences avail in most places on the occurrence of accident on building construction sites. It is neither a fiction nor an abstract referencing accidents cases. Some of these cases are published on-line, some appearing in literature, while some obtainable at the offices of any of the organisations regulating occupational health and safety of construction site workers, e.g. Department of Occupational Safety and Health (DOSH) in Malaysia, Industrial Labour Organisation (ILO) etc

Causes of Accidents on Building Sites

Accident causation process is complex (Suraji *et al*., 2001). Most accidents are caused by "human error" rather than unsafe mechanical or physical conditions (Jones, DuBois, & Wuebker, 1988). Abdelhamid & Everret (2000); Kai Chen Goh *et al.* (2016) categorise causes of accident under Human factors; Personal factors; Physical factors; Machinery factors and Environmental factors. To Abdul Rahim *et al.* (2008), Unsafe equipment; Job site conditions; Unique nature of industry; Unsafe method; and Human elements are responsible for accidents on building construction sites. Nkurunungi (2005) equally maintains human, technical and working environment factors as the causes of accident on building sites.. Equally, Kazan (2013) posts that human and environmental factors are causal roots of accident, with numerous occurrences under each factor. However, many scholars (Kadiri *et al*., 2014; Lubega *et al*., 2000; Toole, 2002) have stressed out the fact that the following are responsible for accident on site: lack of protection in material carrying and storage, lack of teamwork, lack of attention from leaders, lack of training, inexperienced managers, lack of technique guide, non-use of personal protective equipment, carelessness and negligence. Furthermore, Suraji *et al*. (2001), who studied 500 accident records provided by the U.K Health and Safety Executive, describes the constraints and responses experienced by the parties involved in project conception, design and construction. Asan and Akasah (2015) report that it is predicted that future accident causation and prevention models will become more complicated to keep up with the increase in the usage of high technology tools on site, types of construction procurement and height of building.

Cost and Consequences of Construction Accidents

Occurrence of accident is consequential and cost-associated, hence a company would have been financially healthier if accident is prevented. Holt (2008) describes the cost of accident to be monetary loss to employers, community and society from worker injuries and ill-health, damage to property and production delays, and an inclusion of cost of compensation, which are also considered to be direct costs. The author equally identifies the indirect costs of accident. Orji *et al.* (2016) and Steensma (2010) add that accident results to injury to personnel, damage to plants and equipment, loss of working hour, loss of money, lowering of workers morale, loss of confidence on the part of the constructor and delay to completion time. The loss of time in project execution is equally identified by Kadiri *et al*. (2014) and Pillay (2014) as a consequence of accident. However, the direct cost is a very small portion in relation to the indirect costs, and can be concluded to be an "iceberg" as a result of the invisible hidden costs below the waterline.

Control Measures of Building Site Accidents

Control measure of accident, is a cognate of accident prevention, loss prevention, total loss control, safety engineering, or safety management (Heinrich *et al*, 1980). However, prevention is cost saving. Consequently, many scholars have given their opinions on the control of accident on the site.

ILO (1991) highlights three procedures to be followed in order to prevent major accident on construction sites. Besides, Oladiran *et al.* (2008) recommend four measures to be taken to control the occurrence of accident. However, it takes human effort to control accidents on site, as indicated in the metaphorical domino theory of Heinrich (1980).

RESEARCH MEHODLOGY

Consequent upon the aim of the research, the methodology consists of review of literature. Literature survey was carried out, and scholarly articles are reviewed to identify the different types of accidents on building construction, as well as the various factors responsible for site accidents. The concept, cost, consequences and control measure of accidents are gotten through the extensive review of construction accident related articles.

DISCUSSION

The concept of accident has been discussed. Extensive list of types and cases of accident is presented in the full paper in corroboration with the research work of other scholars. The occurrence of accident is associated with both direct and indirect costs, which are some of the consequences of accident on site. Lives are lost through accident, properties are damaged and fatal and non-fatal injuries are sustained by workers on site. It becomes therefore, imperative for control measures to be put in place for the elimination of hazardous activities in order to ensure the safety of workers on the site. Hence, the authors have highlighted various measures as recommended by different scholars (Oladiran *et al*., 2008; ILO, 1991; Jones & Wueker, 1988). Though, regarding the contribution of Rizwan, (2015), much progress has been made in HSE performance in developed countries, but the construction industry still lags behind in most of other countries. Consequently, the main concern of all workers and employers in any country should be how to restrain occupational injuries/fatalities/illness on site.

CONCLUSION

Accidents are preventable, though not in all cases. An accident caused by act of God can hardly be prevented. Siri Wardena *et al*. (2006), cited in Kadiri *et al.* (2014), points that acts of God (Oladiran & Sotunbo, 2012; Hyatt, 2006; Alfred *et al*., 2007) or disasters (wind, rain, landslides, flooding, earthquake) as related to construction are events or actions which cause severe damages to construction products, processes and stakeholders. However, construction safety is not an impossible dream; it is an achievable goal (Holt, 2008). Hence, a clarion call goes to the professionals, to ensure all hands are on deck to foster zero-accident on the construction sites, while the regulatory bodies should enforce the countries with poor safety records to have a rethinking on accident reporting system and get it improved so as to further assist in preventing future occurrence of accident.

REFERENCES

Agwu, M. O., & Olele, H. E. (2014). Fatalities in the Nigerian Construction Industry : A Case of Poor Safety Culture, British Journal of Economics, Management & Trade, 4(3), 431–452.

Akhmad Suraji, A. Roy Duff, and Stephen J. Peckitt (2001). Development of Causal Model of Construction Accident Causation. Journal of Construction Engineering and Management, Vol. 127, No. 4, ASCE, ISSN 0733-9634/01/ 0004-0337–0344.

Al-Tabtabai, H. M. (2002). Analyzing construction site accidents in Kuwait. Kuwait Journal of Science and Engineering, 29(2), 213–238.

Asan, A., & Akasah, Z. A. (2015). Developing an Accident Causation Model for Accident Prevention at Building Construction Sites, Springer Science+Business Media Singapore 273–285. https://doi.org/10.1007/978-981-287-290-6.

HSE (Health and Safety Executive) (2015). Reportable Incidents- http://www.hse.gov.uk/riddor/reportable-incidents.htm (accessed on 12/01/17).

Holt, A. S. J. (2008). Principles of Construction Safety. Blackwell science Ltd. A Blackwell Publishing, USA.

Hosseinian, S. S., & Torghabeh, Z. J. (2012). Major Theories of Construction Accident Causation Models : A Literature Review. International Journal of Advances in Engineering & Techonology, 4(2), 53–66.

Ikpe, E. O. (2009). Development of Cost Benefit Analysis Model of Accident Prevention on Construction Projects, A Published PhD Thesis Submitted to the University of Wolverhampton.

International Labour Office (1995). Safety Health and Welfare on Construction Sites - A Training Manual.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Commercial Banks Real Estate Finance Challenges: A Case of Nigeria

Anthonia O. Adediran*, Hishamuddin M. Alia and Moses, I. Atilola

Faculty of Geoinformation and Real Estate, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia.
(E-mail: harinolatonia@yahoo.com, hishamuddin@utm.my, atilola2004@gmail.com)

ABSTRACT

Real estate investment is globally recognized as a huge investment asset which benefits contemporary social development and economic business cycles, with a resultant employment opportunities and wellbeing. The level of capital formation and easy acquisition of development finance dictate the nexus for a successful real estate operation, while also influencing the realization of a development plan. However, in Nigeria, fund constitutes a dominant problem to its investment due to numerous issues. This study examines the major challenge affecting real estate development funding via commercial banks in Nigeria. The study explores the banks underwriting procedures and its impact on corporate developer's loan procurement. A cross section research design was employed using survey Monkey software and questionnaire tool. A structured questionnaire was administered to the total 25 banks existing in Nigeria, 19 questionnaires were retrieved and found valid. Thus this formed the basis upon which analysis was done. The Findings revealed amongst other things that real estate funding problem relates to the country's land titling issues. Base on the research findings', authors recommends that a critical review of the process and cost of land titling in Nigeria. This is opined to support efficient real estate loan disbursement and procurement within the country.
Key words: Commercial Banks, Real Estate development, Finance procurement, Land titling

INTRODUCTION

Real Estate investment is a large multidimensional and essential asset market which offers life and character to a city with most accessible places. It ranges from the conversion of ideas documented into real properties either as a building renovation work or purchase of new land parcel through its development (Ubom, And Ubom, 2014). This is then commonly recognised as an asset class which exists and grows within a wide institutional framework, resulting from a sound and developed economy, stable socio-economic arrangements, as well as dominant depth and liquidity of money market (Lieser, and Groh, 2014). Linking Real estate development with other industrial production processes, several products are required to be imputed to get a desired output. Such product include: land, labour, materials and capital. Although, the investment is a risky venture with a steady payback period, nonetheless, the use of equity and non-equity capital determines every real estate investment outcome (Emoh, and Nwachukwu, 2011).. Worthy of note is that the availability and easy accessibility of both capitals in sufficient quantity often accelerate project delivery while stimulating economic growth as well (Ezimuo *et al*., 2014).

More so, Commercial banks are major financial institutions which serve the capital needs of the people by providing a debt capital for investors. Owning to the international trades of these banks, real estate lending has been funded through the retained capitals and portfolio of commercial banks. As such, the bases of their lending pattern has been a subject of research discussion in real estate literatures (Levitin and Wachter, 2013). Subsequently banks lends confidently to borrowers who possess essential documents such as a valid title deed among other documents, as well as loan repayment capacity in accordance with transaction agreements (Ajoku, & Nubi, 2009; Nubi, 2015). Ambrose (1996) maintained the significant implication of banks' lending requirements on investors or developers' portfolio returns. Additionally, there are common characteristics existing on real estate mortgages such as finance sources and repayment strategies, debt-to-income ratio (DTI) and loan-to-valur (LTV) ratio as well as debt service ratio in terms of rent/profit to mortgage repayment (Levitin and Wachter, 2013). Evidently, these features vary across nations and regions

with relative deeper mortgage market correlations that changes gradually over time according to economic operations.

However, Real Estate funding is indeed not easy to secure in Nigeria, no doubt the reflection of the state of the economic development. Finance procurement for development position a great deal of problem to real estate investors and developers owning to the economic instability as well as the rigorous procedures often impose by most finance institutions. Therefore, the study examines commercial banks loan underwriting with a view to determine the major challenge affecting real estate investment funding by these banks.

MAIN RESULTS

Figure 1 revealed the essential mandatory documents often required by commercial banks before application for loan is considered. Using a multiple choice answer, the response show that 73.68% for certificate of occupancy (C of O). This is followed by 36.38% banks which considers Feasibility and viability appraisal report, Environmental impact assessment, past records of developers' performance and building approval plan, while other factors are survey plan 26.32%, Tax Clearance Certificate 21.05%, Development Levy receipt 10.53% and Bill of quantity 5.26%. The C of O is a nationwide land title evidence of ownship of title in land issue by all the state government with regards to the commencement of the Land Use Act in 1978 in Nigeria. In a nutshell, the C of O is often the collatral for the loan. It is not surprising that majority of the respondent identified Cof O as the major challenges among the documents that are prerequiste for loan advancement. This finding corroborate with that of (Ajoku & Nubi, 2009), that the time and cost of proceduring C of O either on a fresh application for it, or on subsequent transaction are matter of serious concern for real estate deveploment.

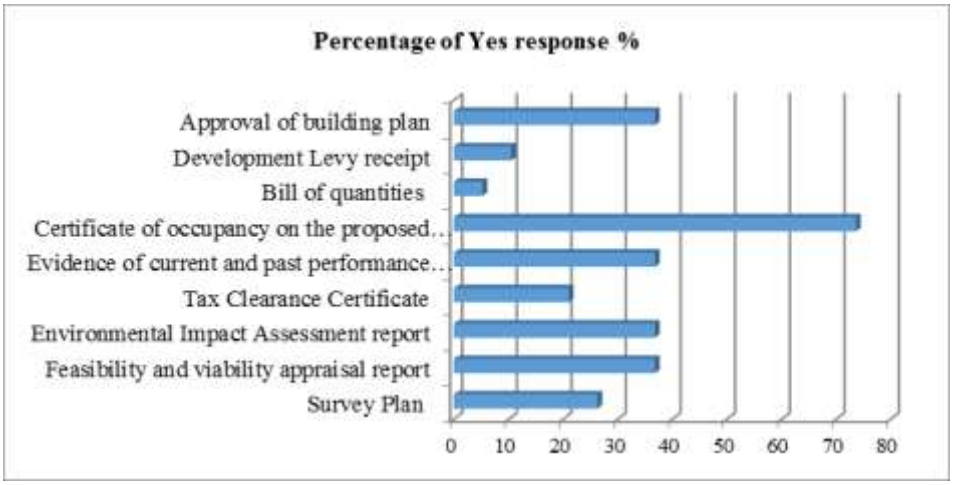


Figure 1. Factors hindering bank's lending decisions for real estate development

CONCLUSION

The study has succeeded in identifying the major factor in real estate investment loan transactions that undermine corporate developers, real estate investment in Nigeria. Hence, C of O is the most significant constraint for the disbursement of loan for real estate activitives by the commercial banks in Nigeria. Although, the result reveals that other factors such as building plan approval, evidence of current and past performance of developers, Environmental impact assessment, feasibility and viability study report are needed for the loan application to be processed. Consequently, the result of the analysis have shown that the problem attached to certificate of occupancy procurement is more significant in relation to the country's existing land titling issues.

In accordance with the aim of the study it is then recommended that since the essential requirement of C of O pose a challenge to real estate loan acquisition within the country, state government in charge of urban land should endeavour to review and fine tune the documention process for C of O procurement and consent for subsequent transaction. Inaddition to this, the cost of procuring C of O should be reviewed downward. This measure will minimize the time lag on

commercial banks' loan disbursement, simplify and stimulate developer's investment plan delivery as well as reducing loan repayment default.

REFERENCES

Ubom, A. U. and Ubom, U. B. (2014). The contributions of primary Mortgage Institutions (PMIS) to Real Estate Development in Nigeria International Journal of Finance and Accounting 3(3).

Lieser, K. and Groh, A. P. (2014). The Determinants of International Commercial Real Estate Investment. The Journal of Real Estate Finance and Economics. 48(4), 611-659.

Emoh, P. N. and Nwachukwu, C. C. (2011). Critical Issues in real estate finance as an index in building construction project management success in Nigeria American journal of social and management sciences 2(1).

Ezimuo, P. N., Onyejiaka, C. J. and Emoh, F. I. (2014). Sources of Real Estate Finance and their Impact on Property Development in Nigeria: A case Study of Mortgage Institutions in Lagos Metropolis British journal of Environmental Research. 2(2).

Levitin, A. J. and Wachter, S. M. (2013). The commercial real estate bubble. Available at: www.hblr.org/wp-content/uploads/2013/08/HLB108_crop.pdf. Accessed: 21st Feb. 2017.

Ajoku, C. V., & Nubi, T. G. (2009). The Nexus between Effective Land Management and Housing Delivery: An Overview of the Lagos Situation. The Estate Surveyor and Valuer, 32(1), 39-50.\

Nubi T.O (2015). Beyond Bricks and Mortar: Demystifying the Affordable Housing Debacle in a Transiting Economy. Being an Inagural Lecture series, Presented to the Faculty of Environmental Science, University of Lagos, Lagos State, Nigeria. Available at: https://studylib.net/doc/.../demystifying-the-affordable-housing-debacle-in-a-transiti... Accessed: 20th Feb. 2017.

Ambrose, B. V., John, B. and C, P. (1996). Credit Restrictions and the Market for Commercial Real Estate Loans. Real Estate Economics. XXIV.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Users' Satisfaction and Management Practices of Tourism Destinations in Ondo State, Nigeria

Adeyemi, Olabisi Omowumi*[1], Olugbenga David Taiwo[2] and Adeyemi Babawale Akin [3]

[1]Department of Urban & Regional Planning, The Federal Polytechnic, Ado-Ekiti, Nigeria (fisusibisi@yahoo.com)
[2]Faculty of Built Environment, Universiti Teknologi Malaysia, Malaysia (taidavison@yahoo.com)
[3] Department of Geography, Adeyemi College of Education, Ondo, Nigeria,(adeyemibabawale@yahoo.com)

ABSTRACT

Tourism comprises of activities of persons travelling for the purpose of visiting or staying in places outside their usual abode for recreation, leisure and provision of other services. The study identified and analysed the spatial pattern of tourism destinations in Ondo State and examined the relationship between management practices and patronage patterns. Data for the study were obtained from both primary and secondary sources. The primary sources of data were collected through the administration of questionnaires on the management of nine identified tourism destinations in the study area. The coordinates of the tourism destinations were taken with the use of a handheld Global Positioning System. Topographic map of Ondo State and the list of tourism destinations were obtained from the Ministry of Urban and Physical Planning, Akure and the Ministry of Culture and Tourism, Akure, respectively. The study revealed that the most frequently visited tourism destinations include Owo Museum, Idanre hills and Deji's Palace. The study revealed that 85.1 percent of patrons visited these sites during weekdays and the rest of 14.9 percent visited the sites during weekends. The study also discovered that 57.2 percent of the patrons resided in the study area while 42.8 percent are visitors that came from other places. The study also revealed that most of the tourism destinations were underfunded resulting in inadequate staffing. The result of the spearman correlation (r= 0.303) computed to establish the relationship between the users' satisfaction with management and patronage of the sites showed a significant but low level. Similarly, the services rendered and available facilities were positive but have a low relationship (r=0.326). The study established that the relationship between management practices and patronage levels of tourism destinations in the study area is low and the study recommended an urgent improvement in the tourism destinations.

Keywords: Tourism, destinations, recreation, pattern

INTRODUCTION

The word tourism is defined by the World Tourism Organization (1995) as the act of travelling for the purpose of recreation and the provision of services for this act. It further explained that a tourist is someone who travels at least eighty kilometres (fifty miles) from home for the purpose of recreation. Tourism to a layman is the act of visiting other places for the purpose of sightseeing and enjoyment but the activities of tourism are more than that. Tourism according to Wikipedia Encyclopedia (2006), is travelling for predominantly recreational or leisure purposes or the provision of services to support this leisure travel. Tourism is one of the largest global industries as observed by UNWTO (2017). It has a huge potential in job creation and in offering the opportunity to develop less favoured regions. Travel and Tourism is a labour-intensive activity and the majority of enterprises operating in tourism are Small Medium and Micro Enterprises. Ashley *et al.* (n.d) noted that travel and tourism could be used as an activator for related industries due to investments and efforts that have been spent in infrastructure, plants and capital equipment from suppliers.

Tourism is one of the industries with the strongest effect on the economy because it helps in developing other sectors. "Tourism is a composite of activities, facilities, services and industries

that deliver a travel experience, that is, transportation, accommodation, eating and drinking establishments, entertainment, recreation, historical and cultural experiences, destination attractions, shopping and other services available to travellers away from home (Shamin *et al*., 2015). The significance of tourism, as defined by Ghosh (1998), among others, is one of the major items of international trade. In terms of technologies the application of new information and communication technologies has dramatically broadened people's access to information and travel opportunities The study identified and analysed the spatial pattern of tourism destinations in Ondo State and examined the relationship between management practices and patronage pattern.

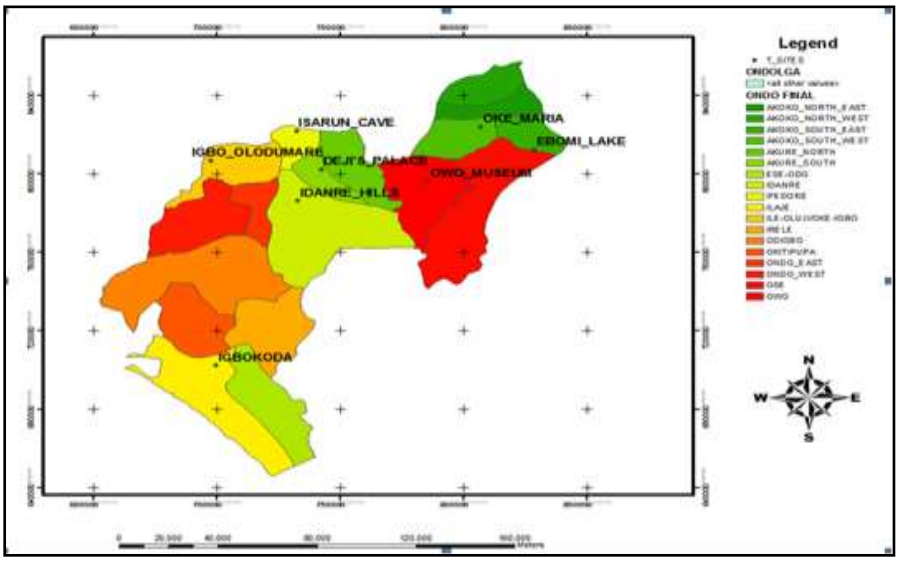


Figure 1: Map Showing Tourism Destinations in Ondo State

MAIN RESULTS

The study revealed that 37.5 percent of the tourism destinations in the study areas which include Owo Museum, Idanre hills and Deji's Palace attracted high patronage over others. On a general note, 85.1 percent of patrons visited these sites during weekdays while the remaining 14.9 percent visited the sites during weekends. The perceptions of participants towards coming back for the second visit shows that only 33.4 percent of are willing to come for a second visit. The result of the spearman correlation (r=0.303) computed to establish the relationship between the users' satisfaction with management and patronage of the sites showed a significant but low level. Similarly, that of services rendered and available facilities was also positive but the low relationship (r =0.326). This confirmed that patrons were not fully satisfied with the studied patronage sites.

CONCLUSION

The overwhelming returns from oil industries have brought about government at all levels not to be paying the desired attention to the tourism development of other sources of finance for economic development in Nigeria. The tourism sites, if explored and effectively utilised could be invaluable sources of revenue generation for renewal programmes towards sustainable national development. The exploitation of the potentials of tourism sites and effective management could also promote environmentally efficient urban centres and culturally positive urban lifestyles. The study established that the relationship between management practices and patronage levels of tourism destinations in the study area is low. This confirmed that patrons were not fully satisfied with the patronage sites. The study is calling for improvement in the tourism destinations in order to boost the economic development of the government as well as the standard of living of the locality where these tourist attractions are situated.

REFERENCES

Ashley C. Debrine P. Leur A. & Wilde H. The Role of the Tourism Sector in Expanding Economic

Opportunities: Corporate Social Responsibility Initiative Report No 23. Cambridge, MA: Kennedy School of Government, Harvard University. World Tourism Organization. WTO Yearbook of Tourism Statistics Madrid, Spain 1995.

Ghosh, B. Tourism and Travel Management. Vikas Publishing House Pvt Ltd. 1998.

Shamin A. S. & Muzafar, A.W. Application of Geospatial Technology for the Promotion of Industry in Sringar City, International Journal of u-and e- Service, Science and Technology Vol.8, No.1 2015.

United Nations World Tourism Organisation (UNTWO) Tourism and Economic social Phenomenon; UNWTO News 61 April 2017.

Wikipedia Encyclopedia, an on-line encyclopaedia retrieved in July 2006.
http://en.wikipedia.org/wiki/Tourism and http://en.wikipedia.org/wiki/Recreation

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Standard Form of Contract and Contractual Behavior in Civil Engineering Works

Ahmad Arzlee Hassan*[1], Hamimah Adnan[1], Wan Norizan Wan Ismail[2], Norazian Mohamad Yusuwan[1] and Mysarah Maisham[1]

[1]Centre of Studies of Quantity Surveying, Faculty of Architecture, Planning and Surveying, Universiti Teknologi Mara, Shah Alam, Selangor Malaysia
(E-mail: arzlee@salam.uitm.edu.my, mimad856@gmail.com)
[2]Centre of Studies of Building Surveying, Faculty of Architecture, Planning and Surveying, Universiti Teknologi Mara, Perak Malaysia
(E-mail: wanno134l@perak.uitm.edu.my)

ABSTRACT

The importance of civil engineering works are undeniable as it triggers economic growth by improving transportation, communication and services. As it is dominantly initiated by government sectors, performance of the civil engineering projects are always observed. This study aims to investigate the contractual factors i.e. the quality of Standard Form of Contract, the contractual behavior of the key participants and how do these two factors affect civil engineering projects performance. The study would be extended to the identification of the characteristics of civil engineering projects as well as how they affect the civil engineering projects performance, the quality of Standard Form of Contract and the contractual behavior of the key participants by addressing the aforementioned concerns. Literature reviews, preliminary and final questionnaires survey were conducted to undertake the research. A total of 50 questionnaires were distributed and 10 questionnaires were returned, resulting in a 20% response rate. The research unveiled that performance of civil engineering projects are influenced greatly by the ability to handle the unpredictable character of the civil engineering projects, the effective enforcement of Standard Forms of Contract and adequate behavioral management. Apart from that, balancing the factors with high quality of workmanship, avoidance or well managed conflicts and high satisfaction level will ensure performance in projects.

Keywords: Standard Forms of Contract, performance, Civil engineering

INTRODUCTION

Civil engineering structures have always been a traditional responsibility of the public sector. Performance of the civil engineering projects is prominent in order to maintain the public's trust, to fulfill policy goals and most importantly, to deliver projects as promised to the citizenry. The performance of construction project remains a prominent issue in the industry worldwide. The complicated process has proven to be critical, as they have succumbed to eventual issues. This research addresses four major concern; the characteristics of civil engineering projects, the quality of Standard Forms of Contract, contractual behavior of key participants and the effects it has over performance of civil engineering projects.

Literature reviews repetitively provided evidences on the direct impact of the quality of Standard Form of Contract towards the project performance. The contractual relations are related to the relationship, the risk apportionment, the division of responsibility and the reimbursement mechanism (Bubshait and Almohawis, 1994). Tour and Ogunlana (2010) and Ling *et al*. (2012) discovered that most of the problems in construction projects were related to the contractual behavior of individual key participants in the project. The contractual behavior of the key participants i.e. delay in paying interim payment, late in giving possession, architect's behavior,

adversarial relationship, poor communication are among other things that affect the project performance (Jaffar *et al*., 2011; Ling *et al*. (2012).

This study focuses on the investigation of contractual factors i.e. the quality of Standard Form of Contract, the contractual behavior of the key participants and how do these two factors affect civil engineering projects performance. The objectives laid out are; 1) to identify the characteristics of civil engineering projects, 2) to determine the quality of Standard Forms of Contract used for civil engineering projects., and 3) to establish the contractual behavior of the key participants in civil engineering projects. In order to achieve the objectives formulated, this research will be divided into two main phase, which are; literature review and Preliminary Questionnaire Survey, and Final Questionnaire Survey. The study generally focuses on contractors and professionals in civil engineering projects in Malaysia. A total of 50 questionnaires were distributed and 10 questionnaires were returned, resulting in a 20% response rate.

Standard Forms of Contract and Contractual Behavior

Respondents are very certain that civil engineering project are characterized by highly susceptible to the unpredictable force of nature, costly and time consuming, complex and full of uncertainty, and involved varieties of stakeholders. Standard Forms Of Contract used by the respondents in their civil engineering projects are PWD 203 (Revision 2007) and PWD 203A (Revision 2007) Standard Forms of Contract.

Table 1: Standard form of contract's content and efficiency in resolving conflict

Civil engineering project characteristics	Frequency of Agreement						TR	MR	Ranks	Freq
	Not agree 1		Neutral 2		Very agree 3					
	No	%	No	%	No	%				
The Standard Forms of Contract is very clear	3	43%	4	57%		0%	7	1.57	2	Not agree
The Standard Forms of Contract is very complete	5	71%	2	29%		0%	7	1.29	4	Not agree
The Standard Forms of Contract is very fair	5	71%	2	29%		0%	7	1.29	4	Not agree
The Standard Forms of Contract clarifies the roles and responsibilities of every party	3	43%	4	57%		0%	7	1.57	2	Not agree
The Standard Forms of Contract provides flexibility in managing uncertainties	2	29%	5	71%		0%	7	1.71	1	Neutral

Standard Form of contract in resolving conflict	Frequency of agreement						TR	MR	Ranks	Freq
	Not agree 1		Neutral 2		Very agree 3					
	No	%	No	%	No	%				
Do you agree that Standard Form of Contract are effective in resolving conflict		0%	2	29%	5	71%	7	2.71	1	Very agree

Table 1 indicates that the respondents are mostly neutral in regards to the documents' flexibility in managing uncertainties, represented by 71%. As observed, none of the respondents indicated that the content of the documents are satisfactory. However, respondents also agreed that the documents are effective in resolving disputes. In a nutshell, it is observed that even though the respondents mostly displeased with the content, the respondents concurred that the documents provided sufficient details to resolve conflicts.

Table 2: Contractual behavior among the parties in civil engineering works

Contractual behavior among the parties in civil engineering works	Frequency					
	Very poor		Neutral		Very good	
	1		2		3	
	No	%	No	%	No	%
How frequent did the client give direct instruction (without going through the architect)	1	14%	4	57%	2	29%
How frequent did the architect/S.O give unauthorised instruction to the contractor	0	0%	2	29%	5	71%
How frequent did the contractor obeyed to the unauthorised instruction from the S.O	5	42%	5	42%	2	17%
How frequent the client paid the interim payment within the stipulated time	3	43%	3	43%	1	14%
Please rate the communication skills of the contractor	1	14%	3	43%	3	43%
Please rate the communication skills of the S.O	1	14%	2	29%	4	57%
How do you rate the effectiveness of communication between the S.O and the contractor		0%	4	57%	3	43%

Concisely, communication between parties were rated from neutral to any positive scale, indicating that parties accepted the communicational relationships within civil engineering works environment. Even though there was a preconceived notion that communicational problems are predominant in the industry, it is not observed here.

CONCLUSION

The performance of civil engineering projects are influenced greatly by the ability to handle the unpredictable character of the civil engineering projects, the effective enforcement of Standard Forms of Contract and adequate behavioral management. An improvement to suit the characteristics of the civil engineering works would be advantageous. Most behavioral issues are induced by communication problems. Evidently, performance are also influenced by high quality of workmanship, avoidance or well managed conflicts and satisfaction level. A balanced in the aforementioned factors will ensure performance in the civil engineering projects.

Acknowledgment: The authors would like to express their appreciation for the support of Institute of Research and Management Innovation, UiTM. Project No. 600 – RMI/DANA 53LESTARI (232015)

REFERENCES

Bubshait, A.A., and Almohawis, S.A. (1994). Evaluating the general condition of a construction contract. *International Journal of Project Management*, 12(3), 133-135.

Jaffar, N., Tharim, a. H. A., & Shuib, M. N. (2011). Factors of Conflict in Construction Industry: A Literature Review. *Procedia Engineering*, 20, 193–202. https://doi.org/10.1016/j.proeng.2011.11.156

Ling, Y.Y and Li, S. (2012). Using Social Network to Manage Construction Projects in China. *International Journal Project Management*. 30(2)(2012) 398-406.

Toor, S.-R., & Ogunlana, S. O. (2010). Beyond the "iron triangle": Stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects. *International Journal of Project Management*, 28(3), 228–236. https://doi.org/10.1016/j.ijproman.2009.05.005

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Applicability of Global Pressure and Temperature Model (GPT2w) for GPS Meteorology in Peninsular Malaysia

Opaluwa, Y. D.[*1,2], Musa, T.A.[1], Omar K. [1], Samaila-Ija, H. A.[2] and Izah, N. L.[3]

[1]Geomatics Innovative Research Group (GIRG), Faculty of Geoinformation & Real Estate, Universiti Teknologi Malaysia.
[2]Department of Surveying and Geoinformatics, Federal University of Technology Minna, Nigeria.
[3]Department of Surveying and Geoinformatics, Federal Polytechnic Auchi, Nigeria.
(Email: *opaluwayd@futminna.edu.ng)

ABSTRACT

Global Positioning System (GPS) meteorology requires that, surface meteorological data (temperature and pressure) should be preferably obtained from in-situ measurements co-locating with or close to the GPS antenna, this is not always available because most GPS network is for positioning and navigation. This paper presents an assessment of GPT2w model for GPS meteorology in the equatorial region; therefore, a study over Malaysian Peninsula was conducted. The accuracy of the model interpolated temperature and pressure was first evaluated based on meteorological data interpolated from AWS observations. Using the AWS-based IWV as reference, the GPS-derived IWV from GPT2w model was assessed. From the results, relative accuracy of 1.61%, 0.67% and 1.27% were obtained for the GPT2w model-based IWV at BANT, GETI and PEKN respectively with a correlation coefficient of over 0.9 at all the GPS stations. Therefore, applicability of the GPT2w model for GPS meteorology would be beneficial for GPS atmospheric remote sensing in Malaysia.

Keywords: GPS Meteorology, GPT2w model, ZHD, ZWD, interpolated surface meteorological data, GPS-IWV

INTRODUCTION

High amount of atmospheric water vapour in the equatorial region due mainly to high evaporation rates and the prolonged seasonal monsoons has made it difficult to effectively monitor the equatorial troposphere. Thus, GPS meteorology has been recently used to support classical meteorology but requires that surface meteorological data (temperature and pressure) should be preferably obtained from in-situ measurements co-locating with or close to the GPS antenna. This is seldom available as most GPS networks are for positioning and navigation. The use of approximate pressure and temperature information obtained from empirical models such as global pressure and temperature (GPT, Böhm *et al*., 2007) may be remarkable for GPS meteorology projects. Recently, there has been increased awareness on the need for GPS meteorology in Malaysia, but only four of the Malaysian Real Time Kinematic GPS network (MyRTKnet) have the Automatic Weather Stations (AWS) and their collocating radiosonde launch sites located relatively at close range (Musa *et al*., 2011). Therefore, this paper investigates the applicability of GPT2w model for GPS meteorology in Peninsular Malaysian.

MATERIALS AND METHODS

The hourly sampled surface temperature and pressure from the AWS covering day of year 001 to 366 (one year) in 2008 as well as from GPT2w model available at http://ggosatm.hg.tuwien.ac.at/delay.html, was collected. In addition, GPS data from the three MyRTKnet stations over the same period of 2008 was accessed and used in this study, the GPS data were acquired at 15 seconds sampling rate.

Since AWS are not collocated exactly with the GPS stations, the observed data from the AWS were interpolated to the closest GPS stations. The GPS Data was processed using Bernese software version 5.0 (Dach *et al*., 2007) to estimate hourly zenith path delay (ZPD) based on data double-differencing technique. Also, hourly surface temperature and pressure from the 1˚ x 1˚ background grid of the GPT2w (i.e GPT2_1w) model were interpolated to the GPS sites using the station coordinate and ellipsoidal height as input. The ZPD consists of the zenith hydrostatic delay (ZHD) and the zenith wet DELAY (ZWD), the ZHD at all the GPS sites were estimated based on Saastamoinen model then, ZWD was obtained as a difference between ZPD and ZHD (Musa *et al*., 2011). Integrated Water Vapour (IWV) depends on ZWD and their relationship has been given by Bevis *et al*. (1992).

Data from the three AWS (Sepang (KLIA), Kota Bharu (KTBR) and Kuantan (KUAN)) was used to assess the surface meteorological data obtained from GPT2w model, while IWV assessment was performed relying on the GPS data from the corresponding MyRTKnet stations (BANT, GETI f PEKN). the spatial relationship between the meteorological stations and the corresponding GPS stations has been given by Musa *et al*. (2011).

RESULTS

The assessment was performed in two-folds; analysis of the interpolated meteorological parameters (Figure 1) and the estimated IWV (Figure 2 and Table 2) form GPT2w model and AWS data.

Figure 1: Time series of the observed (blue), interpolated (red) and the GPT2w model (green) pressure (left panel) and temperature (right panel) at the three AWS and the corresponding GPS stations (BANT, GETI and PEKN) respectively.

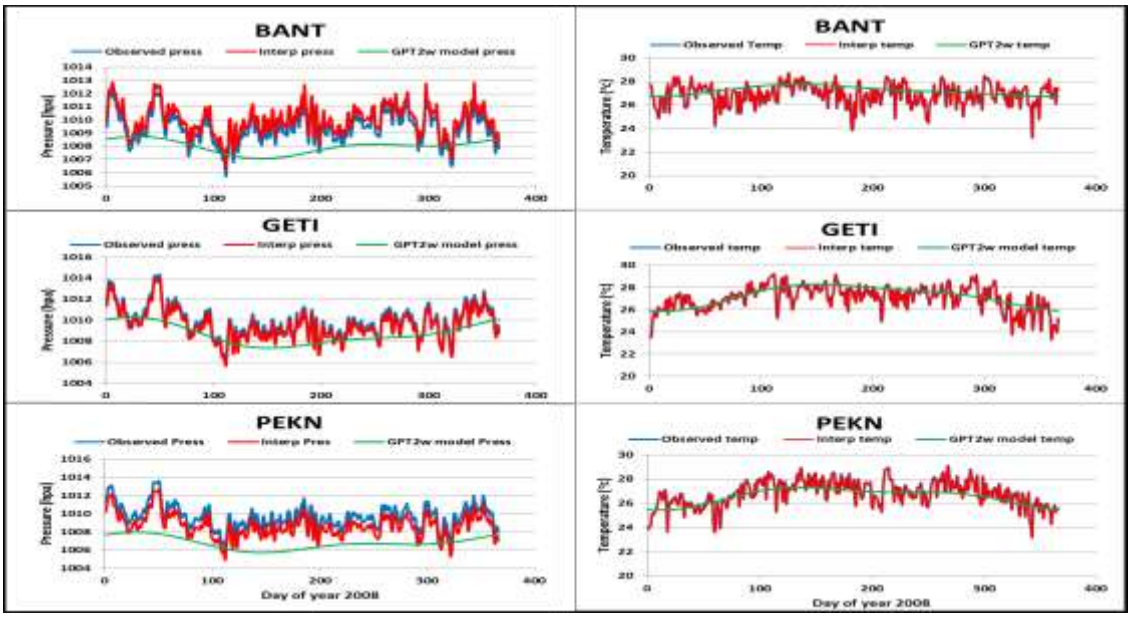
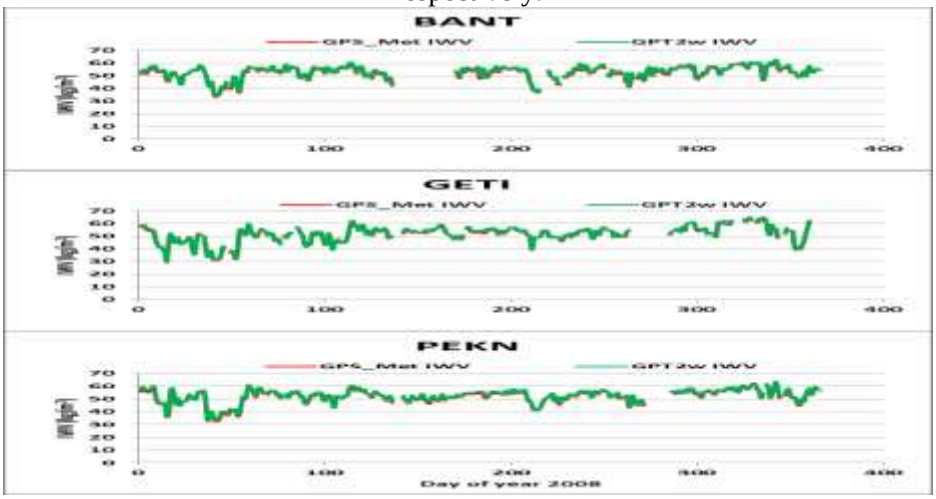


Table1. Summary of statistics of the GPT2w IWV

Station	Relative Acc.	Root Mean sq.	Correl. Coeff.
BANT	0.0161	0.9187	0.9907
GETI	0.0067	0.5871	0.9945
PEKN	0.0127	0.8129	0.9924

Figure 2. Time series analysis comparing the daily trend of IWV from interpolated AWS meteorological data (green) and the GPT2w model meteorological data (red) at the three GPS stations (BANT, GETI and PEKN) respectively.



CONCLUSION

The applicability of GPT2w model for GPS meteorology has been investigated in this paper. It was found that GPT2w model-based GPS IWV possessed almost equivalent accuracy as GPS-derived IWV based on interpolated surface meteorological data.

REFERENCES

Bevis, M., S. Businger, T.A. Herring, C. Rocken, R.A. Anthes and R.H. Ware (1992). GPS Meteorology: Sensing Of Atmospheric Water Vapour Using the Global Positioning System. J. Geophys. Res. 97(D14), 15787-15801, October 20, Pii: 0148-0227/92JD-01517$05.00.

Böhm J, R. Heinkelmann and H. Schuh (2007). Short Note: A Global Model of Pressure and Temperature for Geodetic Applications. J. Geod 81(10):679–683. doi:10.1007/s00190-007-0135-3.

Dach R., U. Hugentobler, P. Fridez, and M. Meindl (2007). Bernese GPS Software Version 5.0. Astronomical Institute, University of Bern, Bern, Switzerland.

Musa, T.A, S. Amir, R. Othman, S. Ses, K. Omar, K. Abdullah, S. Lim and C. Rizos (2011). GPS Meteorology in a Low-Latitude Region: Remote Sensing of Atmospheric Water Vapour over the Malaysian Peninsular. J. Atmos & Solar Terr. Phys., 73 (16), 2410-2422. Doi: 10.1016/j.jast.2011.08.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Indoor Environmental Quality (IEQ) Performance Assessment in Hospital Buildings: Factorial Validity and Invariance among Three Occupant Groups

Pontip S. Nimlyat[*1], Mohammed G. Abdulahi[2], Zin M. Kandar[2], Umar A. Audu[1]

[1]Department of Architecture, University of Jos, Nigeria.
(E-mail: pontipn@unijos.edu.ng)
[2]Department of Architecture, Faculty of Built Environment,
Universiti Teknologi Malaysia.

ABSTRACT

Indoor environmental quality (IEQ) therefore, plays an important role as one of the key determining factors of a building success or failure, because of its significant impact on the building occupants. This study evaluate the level of invariance in the perception of indoor environmental quality (IEQ) among the three occupant groups typical in hospital buildings. A subjective survey was carried out on a sample of 875 patients, staff, and visitors in three case study hospital buildings in Nigeria. The results from the analysis indicated that the hypothesised four-factor parameters construct model is a valid measure of IEQ performance in hospital buildings, having a model fit indices that are within acceptable limits. Results of the multi-group analysis confirmed three levels of invariance in the perception of IEQ by the three occupant groups. Configural (factorial), metric and structural invariance were established for the IEQ performance measurement construct. This study results is a further cross-validation of thermal quality, acoustic quality, visual quality, and indoor air quality (IAQ) as determinants of IEQ performance in hospital buildings.

Key words: Indoor environmental quality, Occupant groups, Invariance, Hospital buildings, Assessment,

INTRODUCTION

The design and construction of buildings is purposely for the provision of an environment that is appealing and comfortable to support the activities of the users. Indoor environmental quality (IEQ) therefore, plays an important role as one of the key determining factors of a building success or failure, because of its significant impact on the building occupants. Indoor environmental quality (IEQ) have been defined as, the determination of the significant factors that have direct effect on a building occupant comfort and wellbeing (Garnys, 2007). On the other hand, Bonda and Sosnowchik (2007) see IEQ as components responsible for an environment that appears to be psychosocially healthy for its inhabitants. Since buildings are designed and constructed generally for human habitation, the requirements for their usage is needed to be fulfil as a precondition for their wellbeing. The design of the hospital building environment should therefore be such that it has positive influence on occupants' health, comfort, and productivity.

The assessment of IEQ in hospital buildings have been based mostly on the use of subjective occupants survey alongside objective physical measurement (De Giuli *et al*. 2012; Fransson et al. 2007). However, subjective occupants survey is considered to be a better predictor of overall occupants' comfort (Fransson *et al.* 2007). In addition, the evaluation of IEQ using objective physical measurement have been viewed as costly, intricate, and unstandardized because of the instrument involve, leading to the adoption of subjective occupants survey (Zimmerman & Martin 2001). Since buildings are designed for people, the performance measurement should therefore be based on their perceived satisfaction with the IEQ variables.

For green building ratings to be applicable in hospital buildings, occupants' comfort assessment aspect of IEQ criteria should be based on an established level of invariance in the perceptions of the three main occupant groups (patient, staff, and visitor). This level of invariance will further

validate the four-factor parameters as the determinants of occupants' perceived IEQ performance in hospital buildings. This study therefore focus on testing the level of invariance in the perception of IEQ across the three occupant groups (patient, staff, and visitor) typical in hospital settings. The aim of the study is to evaluate the configural (factorial) construct of IEQ performance as measured through subjective survey of the three occupant groups in hospital buildings, and determine the level of invariance in the perception among the occupant groups. To achieve the aim of this study, two hypothesise were stated as follows:

Hypothesis 1: The four-factor construct of IEQ is a valid determinant of IEQ performance measurement in hospital buildings.
Hypothesis 2: The four-factor construct measurement is invariant across patient, staff, and visitor as occupants in hospital buildings.

MATERIALS AND METHODS

This study is carried out in Plateau State, which is the twelfth largest state in Nigeria. The State is located on latitude 9^{o} 10' N and longitude 9^{o} 45' E in central Nigeria. It has a total land area of 30,913 square kilometres and an estimated population of over three million people based on the 2006 population census, and having a population density of 100 per square of a kilometre (National Population Commission 2010).

In this study, the perceived performance of IEQ in the hospital ward buildings is measured by the level of satisfaction of the occupants with the parameters of IEQ. The questionnaire as the survey instrument was designed with reference to established protocols and tools such as those developed by Building assessment survey and evaluation (BASE).
The questions on the occupant's level of satisfaction with the environmental variables involved the use of a 7 – point semantic differential scale with endpoints "extremely satisfied" and "extremely dissatisfied". To allow for comparison, the semantic scale was assume to be linear and assigned ordinal values to each point along the scale, from 1 (extremely dissatisfied) to 7 (extremely satisfied) having the middle alternative on the scale (4) serving as an arbitrary zero point.

The test for measurement invariance is carried out on data collected from three categories of occupant groups in hospital buildings. This is to determine if there is a consistency or equivalence in perception of the three occupant groups. The second order CFA is adopted in testing for invariance in perception of IEQ parameters among patients, staff and visitors as occupants in hospital buildings. The acceptability of the data fitness to a model depends on chi square (X^2), degree of freedom (df) and the probability should not be significant at 0.05 (95%).

MAIN RESULTS

A CFA measurement model of the second order IEQ performance estimated simultaneously for the three (3) occupant groups showed that there was configural invariance (equivalence) across the groups based on the model fit indices. Since configural invariance is established for the occupant groups, the composites of these parameters was used for the structural regression model. Also as seen earlier in section 4.3 and section 4.4, which established a similarities in the factorial structure of perceived IEQ performance measurement based on the four parameters, it can be stated that the four-factor parameters of IEQ are valid determinants of perceived IEQ performance in hospital buildings. That is, the perception of IEQ parameters as subjectively measured by each of the occupant's groups (patient, staff, and visitor) can be taken to be equal for rating and benchmarking purposes. Therefore, hypothesis 1 is accepted.

Configural and structural invariance established across the three occupant groups' perception of IEQ performance in the hospital buildings shows that the factorial structure of the measuring instrument used for this study replicated across separate samples collected within the same population. This level of invariance therefore, cross-validate the four IEQ parameters as determinants of IEQ performance in hospital buildings. This result is an indication that the four-factor construct measurement model of IEQ is invariant across the different occupant groups in hospital buildings, which confirmed Hypothesis 2 as stated earlier.

Table 1. Summary of Fit Indices of CFA Measurement Model across Occupant Groups

	Model Goodness of Fit Indices					
Occupant Group	**X^2**	**df**	**p-value**	**CFI**	**TLI**	**RMSEA**
Patient Model	23.543	31	.829	1.000	1.008	.000
Staff Model	33.785	31	.334	.997	.996	.019
Visitor Model	24.609	31	.785	1.000	1.008	.000
Configural Baseline	81.944	93	.787	1.000	1.004	.000

Table 2. Fit Statistics for Invariance Models Testing

	Fit Indices					Fit Indices Difference			
Invariance	**Chi-**	**df**	**p-**	**CFI**	**RMSEA**	**Chi-square**	**d**	**p-**	**ΔCFI**
Configural/Factor	81.944	93	.787	1.00	.000				
Metric Weight	98.672	10	.655	1.00	.000	16.728	1	.160	.000
Scaler	255.53	12	.000	0.96	.035	173.586	3	.000	.036
Structural Weight	100.426	11	.754	1.00	.000	18.482	2	.424	.000

CONCLUSION

In conclusion, the promotion of green buildings and sustainable architecture in healthcare facilities should be focus towards meeting the requirements of the building occupants. IEQ as one of the aspects of promoting green buildings initiatives can be properly implemented in hospital buildings where, consistent assessment of IEQ performance through occupants' subjective measures is carried out. This subjective measures should be based on an established level of invariance in the perceived satisfaction derived by all the occupant groups (patient, staff, and visitor) in the hospital buildings. Where the hospital building occupants would have different levels of satisfaction with their IEQ, it will be difficult to rate its perceived performance. Therefore, the need to ascertain the level of invariance in the perception of the three different occupant's groups typical in hospital buildings.

REFERENCES

Bonda, P. & Sosnowchik, K., Sustainable commercial interiors, Hoboken, New Jersey: John Wiley & Sons. 2007.

Fransson, N., Västfjäll, D. & Skoog, J.,. In Search of the Comfortable Indoor Environment: A Comparison of the Utility of Objective and Subjective Indicators of Indoor Comfort. Building and Environment, 42(5), pp.1886–1890. 2007.

Garnys, V.,. Indoor environment quality, design, and the value of facility ecology, Environment Design Guide (Tec 22), Available at: http://www.yourbuilding.org/library/1_TEC22.pdf. 2007.

De Giuli, V. et al., Measured and Perceived Indoor Environmental Quality: Padua Hospital Case Study. Building and Environment, 59, pp.211–226. Available at: http://dx.doi.org/10.1016/j.buildenv.2012.08.021. 2013.

Humphreys, M.A., 2005. Quantifying Occupant Comfort: Are Combined Indices of the Indoor Environment Practicable? Building Research & Information, 33(4), pp.317–325.

Khodakarami, J. & Nasrollahi, N., Thermal Comfort in Hospitals – A Literature Review. Renewable and Sustainable Energy Reviews, 16(6), pp.4071–4077. Available at: http://www.sciencedirect.com/science/article/pii/S1364032112002377. 2012.

Zimmerman, A. & Martin, M., 2001. Post-occupancy evaluation: benefits and barriers. Building Research & Information, 29(2), pp.168–174.Ibe, A.B. and Zuma, B. Title of the manuscript in journal. *Applied Materials and Mechanics* 185 (2013), 517-521.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

A Brief Study on Survey of Housing Policies in Nigeria and Malaysia

Amamata Larai Zakari *[1], Abbas Sa'id El-Nafaty[2], Anosike Dominion[3]
Bilikisu Adamu Aliyu[4]

[1,3] Department Of Estate Management & Valuation Federal Polytechnic Bauchi.
[2]Department of architecture faculty of built environment Universiti Teknologi Malaysia, skudia
[2]Department of estate management, Nuhu Bamalli Politechniic Zaria
(Emails:amazak4real@yahoo.com, elnafatyabbas@gmail.com, domiestate@gmail.com
bilkiadamu001@gmail.com)

ABSTRACT
This study shows a brief survey on the affordability elements in the current low cost housing policies of Malaysia and Nigeria. Where a comparison of the affordability elements in Malaysia and Nigeria were pointed out so as to study the relationship among the low cost housing affordability elements in Malaysia and Nigeria; and propose a sustainable low cost housing affordability policy. The survey discovered that there are no laws, rules or guidelines regulating the affairs of low cost housing. The design does not reflect user need; it did not conform to their culture, family background and size. No provisions for public participation were provided in the policy documents. An example is in the cost houses located in the same neighbourhood with medium and high cost houses in Batu Pahat Malaysia and enjoy all facilities, utilities and services there. However, the situation is not the same in Bauchi town, where low cost houses are located separately at the peripheries outside of the town trekking distances which repel beneficiaries because of the awkward location. Residents in Batu Pahat have higher earnings, less number of dependents than those at Bauchi who have higher number of dependents and lower income level.

Keywords: Affordability, low cost, housing, policy

INTRODUCTION

Housing being a basic need is widely understood in the broader context of the shelter fabric together with the living environment. The significance of housing is manifested in its components of being both an economic and social good. Being an indicator of development and welfare in a country, it has an economic value which makes it an economic investment (Njathi, 2011). In fact housing contributes largely towards poverty reduction through employment generation, raising incomes, improvement of health and increasing productivity of the labour force (Chirchir, 2006).Housing being a relatively labour intensive venture retains the highest employment generation potential in any given developing country necessitating most countries to consider adequate housing as a priority national development Goal (Syagga and aligula, 1993).

Government in a bid to providing housing are relatively limited in the number of policy supported actions they are able to take in supporting the housing needs and aspirations of their citizenry. It is evident over the years, that Nigeria has developed and implemented a number of housing policies and strategies, in an attempt to address the housing situation of its citizens and particularly the low-income groups (LIGs).
Consequently, a fatal failure of the public housing scheme to house Nigerians occurred (Agbola 1990; Awotona, 1990; Ogunshakin & Olayinwola, 1992; Ikeojifor, 1999b; Ogu, 1999). There were writings from the World Bank and allied scholars in propagating the idea that through supporting policies, the private sector can adequately tackle the persistent inadequate response from the supply side (World Bank, 1993; Pugh, 1994a; Ogu, 1999; Ogu & Ogbuozobe, 2001). Nigeria have taken the directives dictated by the international agencies most especially the World Bank, to henceforth

refrain from direct role in housing and adopt market driven policies to enable housing provision in their countries (World Bank, 1993; Sandhu and Aldrich, 1998). In this instance, many of the opponents of neo-liberalism through the World Bank condemn the strategy on the grounds of its likely deepening of exclusionist trends it would further generate on the poor and LIGs in the developing countries (Baken and Linden, 1993; Ortiz, 1996; Mukhija, 2001, 2004). However, from the little available in the Nigerian housing literature, the Organised Private Sector (OPS) are recognized to have much concentration on housing the upper-and medium-income groups (Ikeojifor, 1997) and generally display the tendency of profit maximization (Keivani & Werna, 2001a). Scholars have begun to express cynicism that the desired objective might not be achievable from the participation of the OPS (Keivani & Werna, 2001a; Aribigbola, 2008). In contrast, however, Malaysian housing programs have focused largely on the eradication of poverty and restructuring of the society through the integration of the various ethnic communities. The government has provided a settlement policy to keep pace with Malaysia‘s rapid economic growth to eradicate hard-core poverty, to bring a better quality life to her people and to conserve her forest eco-system for future generations (Ezeanya, 2004). As such, the role of private sector developers became more significant and resulted in the formation of a consultative committee on housing and construction between public and private sectors. The scope of development undertaken by developers has increased from encompassing traditional housing projects to condominiums, townships, towering commercial complexes, shopping malls, state-of-the art golf courses, hospitals, theme parks and industrial estates.

Scope of the survey

The study vehemently focused on low cost housing in Batu Pahat, Malaysia under the Municipal Council and low cost housing in Bauchi, Nigeria also under the Municipal Council. Emphasis was given to elements that negate affordability of the housing units by lower income groups of these two municipalities by assessing their literacy level, dependency level, income level versus expenditure, family tie, ethic and race. This has shown the extent of the achievements and sustainability of the housing policies.

Table 1: Population and Geographical Area of the study area

S/n	Municipal Area	Population	Area (sq.km.)	Similarities
1.	Batu Pahat	417,458	1,873	Municipal council
2.	Bauchi	493,810	3,687	Municipal council

Source: World Guide to Libraries, (2012).

Figure 1. Administrative Map of Batu Pahat, Malaysia. Source: http://zodml.org/Nigeria/Geography/Bauchi%20State/#. (2012).

Figure 2. Administrative Map of Bauchi, Nigeria. Source: Google maps: Google maps:http://www.google.com.my/imgres?imgurl (2012).

Goals of Low Cost Housing Policy

Whichever future policy designed to achieve sustainable housing development for the low cost housing should necessarily be designed to meet the following objectives:

- ✓ Must provide the basis for household improvement. Few poor families fail to notice if the effect of such policy led to an improvement or otherwise in their particular case. That is the acid test for the lower income groups. Site and services failed because it left the lowest onefifth of the income distribution behind, this forgotten fifth integral part of the population participate in the improvement as well (UN Habitat, 2000).
- ✓ Policies could result in sustainable housing development concerned with the improvement of poor people. At least 50% of the urban population in the developing world has been marginalized. Not only they must be heard by decision makers, they must have influence on matters affecting their future destinies (UN Habitat, 2000).
- ✓ Policies must be to psychologically give this lower segment a feeling of self-worth (UN Habitat, 2000).

Concept of Low Cost Housing Affordability for the Low Income Groups

Affordable housing means the need for assistance to lower income household employed (Berry, et.al, 2004). Universal Declaration of Human Rights declared that: ―Everyone has right to a standard of living adequate for health and wellbeing of himself and his family, including food, clothing, housing and medical care and necessary social services‖ (UN-HABITAT, 2002). In the UK housing policy context, in their statement in their White Paper: Fair Deal for Housing in 1971, policy aimed to achieve a ―Decent home for every family at a price within their means‖. However, the Department of Environment, Transport and Regions (DETR, 2000), defined Affordable Housing as follows: Affordable housing can be classified as a social housing at typically low, sub market rents and can also include other forms of sub market housing such as intermediate rent and low cost ownership such as shared ownership.

Low Cost Housing Affordability Plan

Low cost housing unit is the dependent variable in respect of which all the affordability elements which are the independent variables in this study represent the inputs or causes, tested to see the extent to which they determine either affording or otherwise. Smart Home Design enables different people to live a better life (Dewsbury, 2001). It is important to facilitate matching of low cost housing Design to user needs (Curry et al. 2001; Doughty, 2000). Adaptation of culture in new Site & situations (Scott and Tilly, 1998) is equally important in the design of low cost houses for the low income earners. These scholars suggest that low cost housing should be design bearing in mind the family bond of the low income groups or beneficiary of the components. Affordability is the next hurdle for the LIGs as their earning is usually low because of low education level. They opt for any available facility for their mission to be accomplished. No scrutiny whatsoever regarding the interest rate on the facility, they accept the facility, with all the accumulating and hidden charges to gain roof over their heads.

CONCLUSION

Low cost housing Affordability by Low Income Groups is not usually highlighted in the current practiced Housing policies. However, physical and socio-economic elements hinder the sustainability and efficiency of housing policies. This eventually affects the realization of the Goals and affordability of the housing units by lower income groups of both Malaysia and Nigeria. Economic indicators like Income, Literacy level, Dependency ratio, ethics, family ties and race, posed a problem to the housing policies. Family members don‘t seem to leave their ancestral compound to new locations. This survey ensure a sustainable low cost housing policy by the government through the enhancement of sustainability elements such as literacy/income level, dependency burden on the low income groups that impede affordability.

REFERENCES

Abdul-Aziz, W. (2007). *Low-cost housing policy in Malaysia: a challenge in delivery.* Unpublished Ph. D thesis University of Dundee 308 pp.

Ader, H.J. (2008). *Phases and initial steps in data analysis*. In H.J. Adèr & G.J. Mellenbergh (Eds.) (with contributions by D.J. Hand), Advising on Research Methods: A consultant's companion (pp. 333–356). Huizen, the Netherlands: Johannes van Kessel Publishing.

Agbola, T. (1990). Affordability and cost recovery in shelter projects: the case of Nigeria. *Third World Planning Review, 12 (1)*, 59- 73.An analysis of Abuja Master Plan scheme and the revalidation of certificate of occupancy. *Housing Studies Association Conferences, 9th- 10th September*. Belfast, U.K.

Agus, M. R. (1997). Housing the Nation: Historical Perspective on Housing Development. Cagamas Berhad, Kuala Lumpur.

Archambault, S. & Schloesser, N. (2000). Psychology Department, Wellesley College Publishers.

Aribigbola, A. (2008). Housing policy formulation in developing countries: evidence of programme Implementation from Akure, Ondo state, Nigeria. *Journal of Human Ecology, 23 (2)* 125- 134.

Awotona, A. (1990). Nigerian government participation in housing: 1970- 1980. *Habitat International, Vol. 14(1)* 17-40.

Ball, M. & Harloe, M. (1992). Rhetorical Barriers to Understanding Housing Provision: What the Provision Thesis is and is not. Housing Studies (7) No. 1. 3-15.

Baken, R., & Van der Linden, J. (1993). Getting the incentives right. *Third World Planning Review, 15*, 1-22. Batu Pahat, (2012). Batu Pahat Municipal Council. Majlis Perbanderan, Batu Pahat.

Berry, M. Whitehead, C. Williams, P. and Yates, J. (2004). Financing Affordable Housing: A Critical Comparative Review of the UK and Australia. Housing and Urban Research Institute. Swinburne-Monash, Ahuri Research Center, Melbourne.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Factors Impeding Implementation of BOT Highway Projects in Nigeria

Jonathan K. Fabi*, Razali, A. Hamid and Muzani Mustapa
Department of Quantity Surveying, Faculty of Built Environment
Universiti Teknologi Malaysia, Johor Bahru
(Email: kehndefabi@yahoo.com, b-razali@utm.my, muzani@utm.my)

ABSTRACT

The importance of highway infrastructure in the economic development of any nation cannot be overemphasized. Highway infrastructure is the lifeline of any nation. It is important that it is healthy, safe and efficient. Due to dwindling revenues and increasing expenditures of government, private sector participation was being sought by government to reduce the burden of infrastructure provision on government. This paper seeks to evaluate factors impeding BOT highway project implementation in Nigeria. To achieve the main objective of this paper, one hundred and ten (110) questionnaires were administered on major stakeholders in the highway sector, comprising highway engineers, quantity surveyors and private sector participants using stratified random sampling technique. Seventy-two (72) questionnaires were retrieved. The results indicated that the most important factor impeding implementation of BOT highway projects by the public party is, few schemes reached contract stage (4.40). The most important factor impeding the implementation of BOT highway projects by the private party is high cost of finance (4.36). Other factors as rated by respondents have high mean scores which account for lack of visible success in the implementation of BOT highway projects in Nigeria. However, there is no significant difference in the ranking of factors between the public and private parties. The paper concluded that these impeding factors have derailed the successful implementation of BOT highway projects in Nigeria.

Keywords: Build-operate-transfer, highway, public-private partnership.

INTRODUCTION

PPPs are arrangements where the public and private sectors synthesize their expertise, skills to a project with varying levels of involvement and responsibility to bring about public services or infrastructure (Ismail, 2013). This procurement method has made provision of highway infrastructure easier due to the inherent benefits therein (Babatunde et al, 2015). Over the last decade, PPP/BOT has created a rapid interest for the development, financing and operation of infrastructure in more than 40 countries all over the world (Gunnigan & Rajput, 2010). PPPs are important in accelerating economic growth of a country (Inderst, 2016), infrastructure development and delivery, and in achieving quality service delivery and good governance with collaborative effect of both public and private sector influences (Akintoye & Liyanage, 2011. Despite wider acceptance and adoption of PPP/BOT procurement method all over the world, only a few number of countries are properly implementing the procurement system (Levy, 1996). Most developing countries are still performing below expectation due to number of barriers. Thus, identification of barriers in implementing PPPs is crucial for the betterment of future construction developments in highway infrastructure sector (Chan, Lam, Chan, Cheung, and Ke, 2010). Hence the basis of this paper was formed in relation to recognizing the constraints to PPP/BOT highway implementation and evaluating the same in developing countries like Nigeria.

MAIN RESULTS

Table 1: Factors hindering implementation of BOT highway projects

Problems	Mean Score (Public Party)	Rank	Mean Score (Private Party)	Rank
High cost of finance	4.20	3rd	4.36	1st
Incomplete risk transfer	3.90	4th	4.05	4th
Higher costs to direct users	3.70	7th	3.36	13th
Very few schemes reached contract stage	4.40	1st	3.80	8th
lengthy delays in negotiation	3.82	5th	4.20	2nd
lengthy delays because of political debate	3.80	6th	4.00	6th
Participants' lack of appropriate knowledge and skills	4.26	2nd	4.10	3rd
Low competition due to high bidding cost	3.46	9th	3.58	11th
Public oppositions	3.08	13th	3.80	8th
Complex negotiations	3.20	11th	3.66	10th
Non-accountability due to little public information	3.00	14th	3.40	12th
Excessive risks associated with PPPs	3.70	7th	3.94	7th
High participation cost	3.16	12th	4.05	4th
High risk relying of private sector	3.32	10th	3.10	14th

CONCLUSION

The results indicate that few schemes reached contract stage is the most important factor impeding implementation of BOT highway projects by the public party (4.40), high cost of finance (4.36) is the most important factor impeding the implementation of BOT highway projects by the private party in Nigeria. The ratings by the respondents show that most of the impeding factors have high mean scores which accounts for poor performance of BOT highway development in Nigeria. However, there is no significant difference in the ranking of factors among the stakeholders. Hence, the need to look into these impeding factors so as to reduce incidences of poor highway infrastructure in Nigeria.

Acknowledgement:
The authors would like to express their appreciation to UTM Johor Bahru for sponsoring this research work.

REFERENCES

Akintoye, A. and Liyanage, C. (2011). Public Private Partnerships, Paper Presented at the Proceedings of the CIB TG72/ARCOM Doctoral Research Workshop, University of Central Lancashire, 12 October, Preston, United Kingdom.

Babatunde, S., Pereira, S., Zhou, L., & Udeaja, C. (2015). Barriers to public private partnership projects in developing countries. *Engineering, Construction and Architectural Management*, 22(6), 669691. http://dx.doi.org/10.1108/ecam-12-2014-0159.

Chan, A. P. C, Lam, P. T. I., Chan, D. W. M., Cheung, E., and Ke, Y. (2010) Potential Obstacles to Successful Implementation of Public Private Partnerships in Beijing and the Hong Kong Special Administrative Region. *Journal of Management in Engineering*, 26(1): 30-40.

Gunnigan, L. and Rajput, R. (2010). Comparison of Indian PPP construction industry and European PPP construction industry: Process, thresholds and implementation, Paper presented at the proceedings of CIB world congress, 10-13 May 2010, Salford, UK.

Inderst, G. (2016). Infrastructure Investment, Private Finance, and Institutional Investors: Asia from a Global Perspective. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.2721577

Ismail, S. (2013). Critical success factors of public private partnership (PPP) implementation in Malaysia. Asia-Pacific. *Journal of Business Administration*, 5(1), 6-19. http://dx.doi.org/10.1108/17574321311304450

Levy, S. M. (1996). Build Operate Transfer Paving the Way for Tomorrow's Infrastructure. Canada: John Wiley & Sons, Inc.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Cooling Effects of Vegetated Courtyard of Mid-Rise Buildings in Tropical Climate

Modi Sule Zango[1,2], Lim Yaik Wah*[1], Luqman Gwadabe Mohammad[2], Abdullah Isa Adam[2], Abdullahi Sadauki[2] and Markus Bulus[1,3]
[1]Department of Architecture, Faculty of Built Environment, Universiti Teknologi Malaysia.
. (E-mail: modisule18@yahoo.com, *lywah@utm.my)
[2]Department of Architecture, School of Environmental Studies, Nuhu Bamalli Polytechnic, Zaria, Nigeria.
[3]Department of Architecture, Kaduna State University, Kaduna State, Nigeria.

ABSTRACT

Passive design strategies within the microclimate are regarded as crucial. Previously, the heat in the courtyard has been recorded but not much attention has been paid to the cooling effect of the vegetated courtyard of mid-rise buildings. However, evapotranspiration and shade effects are seen as an alternative for mitigating the air temperature, mean radiant temperature, surface temperature and psychological equivalent temperature. Vegetation is the sources of coolants for the microclimate of the surrounding area. Other researchers opined that the vegetation within the courtyard represents the most efficient passive manner of cooling building or urban spaces. This study examines the cooling effects of the vegetated courtyard of mid-rise buildings of tropical climate through simulations. Envi-met is a software that simulates the plant-air-atmosphere with the environment and is used in this study after validating the software. Simulations were conducted under different vegetation scenario using a model. The result shows that there is a positive significance in the performance of the vegetated courtyard. These demonstrate that vegetation changes the environmental factors within the courtyard of the mid-rise buildings.

Key words: Vegetated courtyard , Mid-rise building , Envi-met , Tropical climate, computer models.

INTRODUCTION

Vegetation can play an important role in the topo-climate of towns and the microclimate of buildings too. It is different according to the macro climatic circumstances, but in any case, vegetation can give a significant contribution to the climatic conditions.(Zonneveld, 1989)
However,(Shashua-Bar *et al.*, 2009) and (Shashua-Bar *et al.*, 2011) studied six landscape strategies, using diverse arrangements of trees, grass, and an overhead shade mesh. The effects of these conducts were confirmed during the summer season in two semi-enclosed courtyards sited at a built-up settlement in the arid Negev Highlands of southern Israel. Compared to a non-vegetated exposed courtyard, which on average reached an extreme air temperature of 34 ◦C in mid-afternoon, a related courtyard preserved with shade trees and grass conceded a daytime temperature reduction of up to 2.5 K, whereas shading the courtyard with a material shading mesh, counter-intuitively, caused a comparative rise of almost 1 K. Unshaded grass was found to cause only a small air temperature decrease and had the highest water requirement. Though when the grass was shaded, whichever by the trees or by the shade mesh, a synergic result created more cooling as well as a decrease of more than 50% in total water use.

RESULT AND DISCUSSION

The aim of this research is to assess the cooling effects of the vegetated courtyard of mid-rise buildings of tropical climate through simulation. The following variables were measured:

i. Air temperature
ii. Mean radiant Temperature
iii. Surface temperature

The distribution of the air temperature in the three models shows that the model that has the combination of tree and grass perform better though the air temperature difference is low. It shows that vegetation moderate the microclimate for thermal comfort (Yang *et al.*, 2017) .

The mean radiant temperature shows significant differences between the vegetated and non-vegetated courtyard, with a difference of about 24ºC. The model that has the combination of tree and grass record the lowest temperature followed by the model that has the 100% grass and the worst is the model that has the 100% concrete.

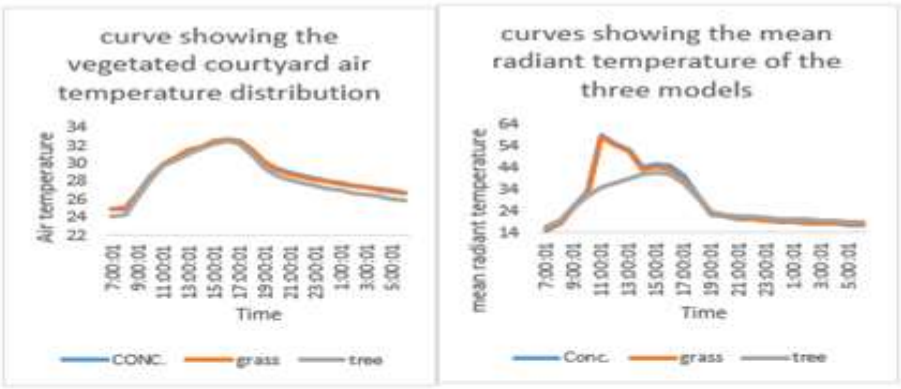


Figure 1: curves showing the air temperature and mean radiant temperature of the vegetated courtyard.

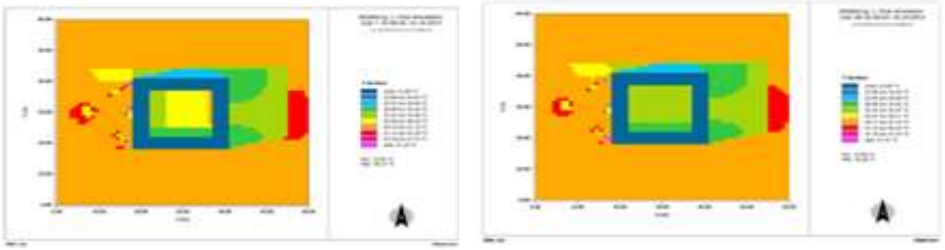


Figure 2: Diagrams showing the surface temperature distribution of the vegetated courtyard at 1600 hours.

CONCLUSION

This study assessed the cooling effect of the vegetated courtyard of the mid-rise building of tropical climate. The results clarify that vegetation has a strong influence in mitigating the air temperature, mean radiant temperature and surface temperature, thereby improving the microclimate. There is an about 24^0C reduction of mean radiant temperature, and 0.18^0C of the air temperature, and also a significant difference in surface temperature.

REFERENCES

Shashua-Bar, L., Pearlmutter, D. and Erell, E., 2009. The cooling efficiency of urban landscape strategies in a hot dry climate. *Landscape and Urban Planning*, 92(3–4), pp.179–186.

Shashua-Bar, L., Pearlmutter, D. and Erell, E., 2011. The influence of trees and grass on outdoor thermal comfort in a hot-arid environment. *International Journal of Climatology*, 31(10), pp.1498–1506.

Yang, A.-S., Juan, Y.-H., Wen, C.-Y. and Chang, C.-J., 2017. Numerical simulation of cooling effect of vegetation enhancement in a subtropical urban park. *Applied Energy*, 192, pp.178–200.

Zonneveld, I.S., 1989. The land unit - A fundamental concept in landscape ecology, and its applications. *Landscape Ecology*, 3(2), pp.67–86.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

A Comparative Study on the Role of Private Partnership Participation in Infrastructural Development: A Case Study of Nigeria and Malaysia

Amamata Larai Zakari*[1], Bilikisu Adamu Aliyu[2] Anosike Dominion[3], Abbas Sa'id El-Nafaty[4]

[1,3] Department Of Estate Management & Valuation. Federal Polytechnic Bauchi.
[2]Department of Estate management, Nuhu Bamalli Politechniic Zaria
[4]Department of architecture faculty of built environment Universiti Teknologi Malaysia, skudia
(E-mail:amazak4real@yahoo.com, bilkiadamu001@gmail.com
domiestate@gmail.com, elnafatyabbas@gmail.com,

ABSTRACT

This is an investigation into the role the private sector plays in infrastructural development of low cost houses in both Malaysia and Nigeria. The study was based on a comparative analysis of certain estate project located in Malaysia and Nigeria, so as to contribute to the development of the housing privatization sector for low income earners. Data for the study were collected using structured and semi-structured questionnaires and were administered on residents and representatives of the respective government agencies and private developers respectively. Interviews, documents and published sources were also used for collecting data. The findings reveal the extent of gap bridged between housing demand and the private sector response in the two countries and the adequacy and affordability of houses developed for the low income earners. The paper concludes that housing policies integration and the demonstrated quality of institutions managing the private sector participation account for the distinct and different outcomes of housing development delivery for low income earners in the two countries. It suggests that the success of private sector depends on the existence of a favourable socio-economic environment and an effective institutional and regulatory framework.

Key words: Private sector, housing, policy, low-income earners, Malaysia, Nigeria

INTRODUCTION

The socio-economic transformation in Malaysia within the last few decades has constituted a new fashionable model among some developing countries. The Malaysia progress, appropriately captured as 'Malaysia's Model' has become reference point for policy reforms in some developing countries (Menon, 2009). In fact, studies on Malaysia development have suggested that the country is a worthy model for the developing countries. In this regard, Ang and Mckibblin (2007) describe the country as rich in financial sector reforms; recognised with economic policies worth emulating (Ritchie, 2005); well-developed financial system (Sriram, 2002); one of the few success stories in the world (Mamman, 2004) and is a developed successful country (Menon, 2009), among others. In many respects these assessment can be considered valid even one consider recent exposures on the country deficiencies (Yusuf and Nabeshima, 2009). This was justified on the reasoning that Malaysia was similar to many developing countries; at independence were very poor economically. But within few decades, Malaysia moved from an economy that was highly dependent on the primary sector to a diversified economy, with industrial sector as the engine of growth through a series of development plans. The New Economic Policy (NEP), in particular, deepens the growth of the economy by attracting international growth in the 1980s and 1990s, especially in the manufacturing and service sectors of the Malaysian economy.

Similarly, in respect of housing for the low income earners. Malaysia has made a huge stride (UN-Habitat, 2005). Specifically, on the practice of public-private partnership in the housing sector, it is celebrated as a success story, particularly as it relates to housing the vulnerable groups of poor (Abd Aziz, 2007; Abd Aziz et al., 2008; Abdul-Aziz and Jahn Kassim, 2011; Singaravelloo, 2010). Even its practice in other sectors of the society (Kaliannan et al., 2010) and the privatization policy has been successful in Malaysia (Bruton, 2007). On the other hand, the outcome from Nigeria with adoption of public private partnership to house Nigerians, particularly low costing housing

development, studies have expressed that the desired objective are yet to be achieved (Aribigbola, 2008; Ibem, 2011; Ndubueze, 2009, 2010; Nubi and Oyalowo, 2010). Therefore, this paper aims to compare the experiences of Malaysia and Nigeria modalities of private participation through in meeting housing needs of low income earners, emphasising underlying factors of success and failure and secondly, to draw out lessons learnt from the experiences of the two countries.

RESEARCH METHODOLOGY

This study adopted the multiple case studies instead of single case in developing an understanding of the differences among the study areas as suggested by Yin (2009) and Alam (2011). The case study method allows us to examine the private sector participation in housing development for low income earners in Malaysia and Nigeria. The context of PPP implementation is considered an important issue in exploring its nature and impact on low income housing (Yin, 2009). The context in our case is identified to be socio-economic context peculiarities in housing policy of the two countries as crucial factor in explaining the nature and outcome of the partnership. A pilot study was first conducted in Malaysia on two private developed low-cost housing estates in June, 2009. A total of 60 questionnaires were administered on the occupants of the identified low cost housing. The fieldwork data is generated from the structured and semi structured questionnaires administered to the residents and directors of stakeholder organisations carried out with the assistance of the field assistants in both countries between September, 2009 and March, 2010.In addition, secondary sources of data on the two countries were explored.The study examines five completed and occupied housing estate in Kuala Lumpur and four completed and occupied housing estates completed and occupied in Abuja, the federal capitals of Malaysia and Nigeria respectively. A total of 500 and 400 structured questionnaires were administered to the households of the selected housing estates in Kuala Lumpur and Abuja respectively. The head of the household is used as unit of the study. Since the questionnaires were administered to the head of household or his representative personally, all the completed 900 questionnaires are used for the analysis. On the other hand, the semi-structured questionnaire was administered to the public and private sectors stakeholder's agencies and departments. The interviewees were chosen from the management staff of the public and private sectors. These are considered very relevant to this study since they are intensely involved in the partnership implementation. The research methods of qualitative together with descriptive statistical method were used to present the findings of the study.

FINDINGS AND DISCUSSION

The housing policy roles for partnership show similarities and differences between the two countries. For instance, in Malaysia income limits are set at levels which permit access by low income earners. In Nigeria, on the other hand, there have not been explicit specific targets to the low income earners. However, the housing shortage brings about the convergence on the need to adequately cater for low income earners. Nevertheless, low income earners in Malaysia enjoys equal opportunity in accessing low-cost housing regardless of their social background and achieving equal outcome among such group in the country, in sharp contrast to Nigeria's low income earners. Housing policy public private partnership strategies indeed differ. Such explanation of the differences could be found in the "variable levels of prosperity, contrasting ideologies about market and non-market systems as well as variety in governance and institutional arrangements" (Maclennan and More, 2001).In comparison between Malaysia and
Nigeria, it is evident from the implementation that Malaysia promotes collective rights that places much value to the country to realise a home owning society in contrast to individualism right in Nigeria. Also, in Malaysia, there is culture of social obligation built in the housing policy, where the rich is subsidising the poor through 'cross subsidisation' and Abdul- Aziz and Kassim (2011) identified such policy as success feature of Malaysia's Public Private partnership. The rules and scale of private sector were very different in the two countries. In Malaysia, the developers took a centre stage in the low income earners housing provision, because of the government regulations, controls and incentives offered. The Housing Developers Regulations (Buang, 2008) defined the private developers, registration, rules of participation, sales price, eligibility of allocation, institutional framework to monitor the implementation. Malaysia is relatively on high level of

implementation of private sector participation through private developers. It has a legal definition of private developer legislation and low income earners housing is allocated within an institutional define structure. Allocations are done according to standing rules and guidelines. All these are contrary to what obtains in Nigeria.

CONCLUSION

The investigation examined the private sector participation and its impact on the development of low cost housing for low income earners in both Malaysia and Nigeria. Both countries have adopted the partnership as a strategy to the provision of housing to low income earners. In Malaysia, the strategy has demonstrated that with a policy of government presence, institutional framework of regulation, with favourable socio-economic structure that enhanced income generation, and available and favourable terms of housing loans from financial institutions, and vibrant private sector combined, significantly boost the success of the partnership.

Public private partner in Abuja MHS fell far short of its stated goals of providing decent and affordable houses. The explanation to the dismal performance of the FCTA in MHS is the misconception that the scheme entails the withdrawal of state in housing provision, while in reality the strategy of partnership require more "government involvement in framing successful policies" (Mukhija, 2004). Unlike Malaysia, in Nigeria, there is absence of effective institutional framework to direct, regulate, monitor and coordinate the scheme to success. Rather than addressing the acute shortage of housing, most especially among the poor and low income earners in Abuja, the Private partners poor implementation has contributed immensely to the exclusion of low income earners participation and densification of informal settlements in Abuja.

REFERENCES

Abd Aziz WNW (2007). Low-cost housing policy in Malaysia: a challenge in delivery. Unpublished Ph.D Thesis, University of Dundee.

Abd Aziz WNW, Hanif N, Ahmad, F (2008). The state intervention in achieving a quality urban living standard: a case study of rehabilitation of squatters' colony in Kuala Lumpur. Int. J. Hous. Markets Anal., 1(4): 337-351.

Abdul-Aziz AR, Jahn KPS (2011). Objectives, success and failure factors of housing public-private partnerships in Malaysia. Habitat Int., 35(1): 150-157.

Acar M, Guo C, Saxton GD (2007). Managing effectively in a networked world. Public Manage. 36(2): 33-38.

Bruton M (2007). Malaysia: the planning of a nation. Kuala Lumpur: Persada.

Buang S (2008). Malaysian law on housing development. Petaling Jaya: Sweet and Maxwell, Asia.

Bunnell T, Barter P, Morshidi S (2002). Kuala Lumpur metropolitan area: a globalizing city region. Cities, 19(5): 357–370.

Buttimer L (2006). Achieving public sector outcomes with private sector partners- a New Zealand perpective. Int. J. Govern. Audit. 33(4), 22-25.

Cartlidge D (2006). Public- private partnership in construction. Oxon: Taylor and Francis.

Department of Statistics Malaysia. (2009). Department of Statistics, Malaysia of 15th May, 2009. Retrieved from www.statistics.gov./my

Egbu AU, Olomolaiye P, Gameson R (2008). A neo-institutional economic critique of the system for allocating urban land and development rights in Nigeria. Habitat Int., 32(1): 121-135.

Endan IB (1984). Public housing policy in peninsular, Malaysia. Unpublished Ph.D, Texas A and M University.

Federal Capital Territory Administration. (2007). Quarterly report of FCT, mass housing monitoring committee. Abuja: Federal Capital Territory Administration.

Federal Capital Territory Administration. (2008). Report of the committee on the review of mass housing scheme in the Federal Capital Territory (FCT). Abuja: Federal Capital Territory Administration.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Problems Associated with the Implementation of Private Partnership in Financing Infrastructure in Nigeria

Amamata Larai Zakari[1], Anosike Dominion[2] Hannatu Abdullahi Idris[3] Abbas. S Elnafaty[4]

[1 & 2] Department of Estate Management Federal Polytechnic Bauchi.
[3]Department of Architecture, Faculty of Environmental Design, Ahmadu Bello University Zaria
[4]Department of Architecture Faculty of Built Environment UTM Skudai
(E-mail:amazak4real@yahoo.com, domiestate@gmail.com, hannyidris@gmail.com, elnafatyabbas@gmail.com).

ABSTRACT

The poor acceptance of the implementation of the private sector partnership in the financing of infrastructures in Nigeria was discussec in this paper, where it was identified that skill and competence, unethical practice, low political influence and capacity building were some of the challenges facing Estate managers in discharging their statutory roles in implementing private partnership on infrastructure financing in Nigeria. The policy implication of this is that, if these challenges are not urgently checked and corrected within the shortest time, the home based professionals may lose its relevance in practical sense in core service areas. If we want to claim monopoly of our role as prescribed by the law and not doing things right, I want to bring to our notice that some multinationals have been importing Valuers/assessors from overseas since they are not satisfied with the home- based service provider.
Keywords: Private, infrastructure, partnership, Estate

INTRODUCTION

Private Partnership is a contractual agreement which gives a private organization responsibility to provide a facility or service that has traditionally been provided by a public entity, (Federal and state agency or a local government). The responsibilities of public entity can include design, construction, renovation, operation, maintenance or finance of practically any service or facility that benefits the public. These has resulted to greater private sector participation in the financing and delivery of public services and facilities than the normal traditional procurement practices Authors have used various terms to describe PPP, such as synergy, collaboration, privatization, delegation, government divestment and PFI (Bello 2012; Olawore 2004; Adetola, Goulding and Liyanage 2011; Dahiru 2012). Estate Surveyors and Valuers have contributed their professional services in the financing of Infrastructural activities through the public private partnership. In Nigeria with the introduction of PPP and in years back, there has been substantial growth in the development of infrastructure but despite the introduction of the PPP and better sourcing for financial support introduced by the scheme, there have been various challenges that have been faced in achieving these goals Olawore (2004).

FUNCTIONS OF ESTATE SURVEYORS AND VALUERS

It is usually a common thing to assume that everyone understands who an Estate Surveyor and Valuer is but on the contrary people just believe that he is an estate agent whose role is limited to the collection of rent i.e. 'letting' as well as the selling of houses.

However, an Estate Surveyor and Valuer is just more than this general term of rent collector. He is someone who had undergone the studies of estate management& valuation which is a discipline concerned with the management and development of land and other natural resources and with the economic, legal sociological and technological factors which affect the ownership of proprietary interest there in (Asaju, 1995).

According to the Nigerian Institution of Estate managers, some of the scope of professional services of an Estate managers include but not limited to the following:

- ✓ Valuation of interest in land and buildings for all purpose, sale, mortgage, insurance, acquisition, probate, stocks and shares etc.
- ✓ Valuation of plant machinery, equipment, fixtures and fittings, stock-in-trade, furniture, motor vehicles, engineering installations, system and infrastructure.
- ✓ Valuation of Construction projects
- ✓ Valuation of oil and gas installation
- ✓

ROLE OF ESTATE MANAGERS IN THE IMPLEMENTATION OF PRIVATE PARTNERSHIP

Where there is an investment opportunity in real estate, there is service and business potential for an estate manager. An Estate manager is advisor to the public and private sectors alike and he has skills related to the development, management, valuation and economics of property in view and in use (Olawore 2004). Olawore (2004) further averred that, specifically some of the roles of Estate Surveyors and Valuers in the PPP conception, conclusion, execution and management chain include and not limited to the under listed:

- ✓ Identification of community need – market study
- ✓ Identification of PP investment opportunity – the project
- ✓ Identification and sourcing of target investors- private sector
- ✓ Development of statement of client requirement- document the need
- ✓ Advice on the feasibility and viability of the proposal- appraisal of the need
- ✓ Advice on land and building values for preparing outline business case/plan – valuation
- ✓ Planned strategic management of client real estate holding under PPP and forward maintenance plans – management plan for the project
- ✓ Exit/terminal value appraisal

PROBLEM OF IMPLEMENTING PRIVATE PARTNERSHIP IN NIGERIA: THE ESTATE MANAGERS PERSPECTIVE

The challenges facing Estate managers in implementing PP infrastructure project can be summarized in this form:

I. **Skill and competence**: PPP project involves multinational investors and financial institution that require high skilled technical and managerial services which some of us lack. A research carried out by Atilola (2008) revealed that 55% of the Valuers are not aware of the contemporary risk analysis and mitigation techniques. The study of Ogunba and Ajayi (2007) on client sophistication requirement revealed the bank's collapse in UK was linked to valuation report and there was agitation that the Valuers should be held liable for the bank's collapse, because the report of the valuation does not reflect the market situation when the properties mortgaged were put for sales. Part of the findings of Ogunba and Ajayi (2007) and Ogunba and Ojo (2007) was that most Valuers in Nigeria do have their opinion of value in 'point value' and there is no analysis of risk in the report. Aluko (2000 & 2007); Oluwunmi (2008) and Oluwunmi, Ajayi, Olaleye and Fagbenle (2011) established that our clients were not satisfied with our services, particularly on valuation report which is one of our statutory preserved functions. If our statutory services rendered to our clients are deficient/faulty, it then suggests that we have not met the expectation of our clients as our services are questionable. This then means that we have not rendered necessary service on core area before talking of PPP where international standard must be met. Another dimension to look at the challenge of skill and competence is fund. Oyedele (2013) averred that the source of financing PPP must be secured and sustainable. Estate Surveyors and Valuers should be able to identify and secure financier that would provide secure and sustainable fund for the project. The problem with the Lagos-Ibadan Expressway concession can be linked to the deficiency in the appraisal of project finance, as in the words of Oyedele (2013) "Bicourtney concession exercise to develop and manage Lagos-Ibadan Expressway into five lanes failed because Bicourtney could not get a financier".

II. **Un-ethical Practice**: The profession of Estate Surveying and Valuation is being managed and regulated by the Nigerian Institution of Estate Surveyors and Valuers and Estate Surveyors (NIESV) and Estate Valuers Registration Board of Nigeria (ESVARBON). These Bodies provides get guide line, rules and regulations for the standard practice of the profession in Nigeria. However, it has been observed that some of our members do engage in unethical practice or what can be called professional misconduct. This act has brought disrepute to the image of the profession. This act is evidenced by series of professional misconduct cases brought before the Profession Practice Committee

(PPC) of NIESV and ESVRBON for determination. Some of the allegations are non-remittance of rents by Valuers and over-valuation of assets.

III. **Political Influence**: Estate Surveyors and Valuers in Nigeria have distanced themselves from politics. When those in corridors of power need professional advice that are peculiar to ESV in the aspect of PPP, other alien professionals that have more political influences are consulted to speak on our behalf. This had made some PPP project that ought to enjoy Estate Surveyors and Valuers professional touch, suffer from lack of such touch and the projects are then subjected to litigation in the law Court and many time subsequently abandoned. Such project constitute nuisance to our beautiful and healthy environment. In another view, the non-participation in politics has been preventing us from getting our legitimate right.

IV. **Capacity Building**: Sani (2011) evaluated some PPP arrangements in Kwara State that were targeted toward housing delivery, but most of the arrangement failed. The reason that can be adduced to the failure as it relates to the roles of Estate Surveyors and Valuers particularly in the public sector are: "I know it all"; "What I take home matters"; "Succession plan"; "quantity of man power" and "he/she is our child". Inability to 'speak in one voice' has been a challenge to professionals in public and private sectors.

CONCLUSION AND RECOMMENDATION

The paper so far identified skill and competence, unethical practice, low political influence and capacity building as challenges facing Estate Surveyors and Valuers in discharging their statutory roles in implementing PPP on infrastructure financing in Nigeria.

The policy implication of this is that, if these challenges are not urgently checked and corrected within the shortest time, the home based professionals may lose its relevance in practical sense in core service areas. If we want to claim monopoly of our role as prescribed by the law and not doing things right, I want to bring to our notice that some multinationals have been importing Valuers/assessors from overseas since they are not satisfied with the home- based service provider.

In view of the foregoing, the followings are recommended for urgent implementation by all stakeholders in the profession of estate surveying and valuation if this profession wants to remain relevant:

i. **Training on contemporary issue**: The stakeholders (the academia,
Professionals in private and public sectors) should from time-to-time update their knowledge through seminars, workshops and conferences so that they can be at bar with their counterparts across the globe.

ii. **Enforcement and Sanction**: The ESVARBON Decree 24 of 1975, now Cap E 13
LFN 2007 has empowered the Board to regulate the practice of estate surveying and valuation throughout Nigeria and the operation of NIESV is recognized by the Board. The Board and Professional Practice Committee should put all machinery in place to check sharp practices and sanctioned erring members accordingly.

iii. **Politics**: Members of this noble profession should be engaged actively in politics directly and indirectly. While those in public sector should contribute objectively to government policy and be at all government functions to advise them accordingly on pertinent issues that relate to our profession and those in private sector should be directly involved in politics.

iv Capacity Building: There should be a sustainable capacity building that will
Address the issues of 'I know it all', 'what I take home matters,' 'succession plan' and 'availability of man power', e.t.c. by our colleagues in the public sector. The professionals in the public and private sectors should collaborate to speak with one voice on the ethics and professional standard of the Institution and regulations of the Board.

REFERENCE

Adegoke, S.A.O. (2011). "Evaluation Public Private Partnership in Housing Delivery in Nigeria". Being a lead paper presented at the Mandatory Continuing Professional Development Workshop Organized by the Kwara/Kogi States Branch of the Nigerian Institution of Estate Surveyors and Valuers in Conjunction with Estate Surveyors and Valuers Registration Board of Nigeria,

Adetola, A., J. Goulding, and C. Liyanage (2011). "Collaborative Engagement Approaches for Delivering Sustainable Infrastructure Projects in the AEC Sector: A Review"; International Journal of Construction supply chain management 1(1).

Aluko, B. T. (2000). "A Study of Appropriateness of Mortgage Valuation for Institutional Lending in Nigeria". Unpublished Ph.D Dissertation, Department of Estate Management, Obafemi Awolowo University, Ile Ife,Nigeria.

Aluko, B. T. (2007). "Implications of the Current Trends in Mortgage Valuation Practice in Nigeria". International Journal of Strategic Property Management, 11, 17-31.

Aihie, O.G. (2013). "The Role of Estate Surveyors and Valuers in Infrastructure Development". Being a paper presented at the 43rd Annual Conference of the Nigerian Institution of Estate Surveyors and

Valuers; held at Best Western Home Ville Hotel, Benin-City, Edo State, between 12th and 16th March. Pp 92 – 108.

Asaju. A.S (1995).”Theory and practice of Estate Surveyors and Valuation Profession in Nigeria Achievement, Problem and Prospects.” Paper Presented at 25th Annual Conference of NIESV 21th March, 1995 at Ilorin.

Atilola, M.I. (2008). “Practitioners’ perception of risk in Viability Studies: A Study of Lagos Based Estate Surveyors”. Seminar paper on Project Appraisal submitted to the Department of Estate Management, University of Lagos, Akoka, Nigeria.

Bello, M.O. (2012).” Synergy and Collaborations in Teaching and Practice of Estate surveying and Valuation in Nigeria”:. Being a lead Paper presented at the second National Education Summit of NIESV at Yusuf Grillo Auditorium, Yaba College of Technology, Yaba; Lagos; 29th - 30th.

ENGINEERING

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Potential of FRP Strengthening of Marine Riser: Dynamic Behavior and Fatigue Damage

A. B. M. Saiful Islam

Department of Construction Engineering, University Of Dammam,
Dammam 31451, Saudi Arabia.
(E-mail: asislam@uod.edu.sa)

ABSTRACT

During the recent decades, the increasing demand of hydrocarbon consumption is resorting the offshore industry to invent advanced sustainable technology. The oil and gas exploration is shifting towards deep-ocean because of hydrocarbon depletion at lower water depths through floating structure. Riser system is an integral part of the drilling and production activity of petroleum extraction of such floater. As they provide a means for drill strings and production tubing to reach the oil well deep down in the ocean floor, the marine risers need to be precisely employed. Strengthening of marine riser is becoming an essential alternative so. The incorporation of the strengthening material, fiber reinforced polymer (FRP) for deep water riser has drawn extensive curiosity in offshore engineering as it might offers potential weight savings and improved durability. Big complexities in design of risers are prediction of proper loading and responses of the structure due to combined action of all applicable forces along with its quality enhancement. The design for FRP strengthening requires local design for critical loads as well as global analysis under all possible nonlinearities and hydrodynamic loads like platform motion, gravity, buoyancy, hydrostatic pressure, wave and current for computing and evaluating critical locations. The responses of un-strengthened and FRP strengthened risers under static and dynamic environment loads forms the basis of the present study. Finite element analysis using ABAQUS/AQUA is found to be the best tool to predict the response of such riser under the expected hydrodynamic loads. The requirements in design and the operating conditions are also studied so that the models are in best representation of the ones in practical use offshore. The responses and fatigue damage characteristics of the risers are explored as well for the effects of FRP strengthening under the environment loads acting upon it. The detail cram on structural configuration, properties, characteristics, methodology and analyses procedures of strengthened riser is described in advancement along with its behavior in ocean environment. Rigorous reckoning illustrated the strengthening of riser as very potential idea and suitable in marine structures to conduct the function of oil and gas exploration in deep sea. This study also assists in designing and strengthening similar offshore structures in hydrodynamic environment.
Key words: Marine riser; Strengthened riser; FRP strengthening; Fatigue damage; Nonlinear analysis.

INTRODUCTION

Risers are essential components of the offshore drilling and production activities of petroleum exploration. Through these conduits materials are being transferred from the bottom of the deep ocean to the production and drilling facilities over the surface of water, also from the facility to the seabed. The improvement of its quality and costing is an essential concern. Strengthening of riser with fiber reinforced polymer (FRP) might be its feasible solution. The static and dynamic behavior (Figure 1) and nonlinearity in riser dynamics under environmental loads are evaluated (Morooka, 2006). Rustad *et al*. (2008) have stated significant effect of top tension on the riser system. As strengthening of riser (Figure 2) is still young, treatment methods need to be identified with offshore riser configuration (Islam, *et al.* 2013; Jameel, *et al.* 2012). The anticipated mechanical properties and low density of advanced FRP offers significant weight savings which reduces reduction of platforms' operation cost due to its low tension requirement (Venkatesan, *et al*. 2002; Ochoa and Salama, 2005). Compared to steel, FRP have improved thermal insulation characteristics, corrosion and fatigue resistance offering less maintenance cost. Sparks *et al.* (1988) incorporated glass FRP and carbon FRP with Buna liner capable against static burst and tension tests, fatigue damage and creep tests. Static and cyclic fatigue tests confirmed the composite risers as economic and efficient in performance (Wang *et al*., 2011). Existing composite designs and assessment have revealed that the FRP composites for riser can undeniably afford structural and economic benefits. Hence, the present study focus on the enhancement of riser system performance

by FRP along with its feasibility. The riser parameters can be obtained through nonlinear time domain analysis using finite element modeling. Assessment on the technical expansion of strengthening riser, including the dynamic response characteristics is illustrated along with its behavior in deep ocean environment.

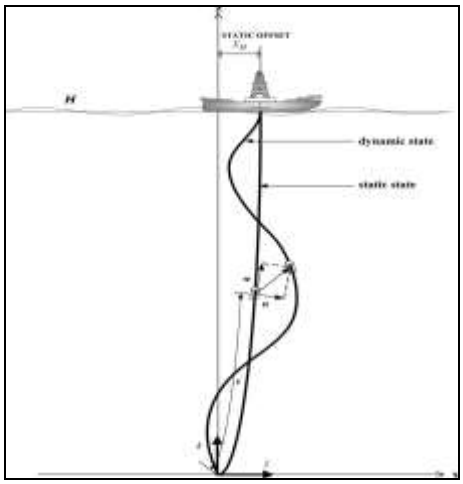


Figure 1. Rigid riser in static and dynamic state

Figure 2. Strengthening for composite riser tube

MATERIALS AND METHOD

Strengthening structural element now-a-days is covering a wide range of arena in offshore industry practical application such as strengthening of offshore platforms, terminals, members and assemblies, capacity enhancement of piles and structures in soil–structure interaction, seismic retrofit etc. Several composite overwrap strengthening systems may be implemented especially for pipeline/riser strengthening, their differences being in fibers, adhesive, resin and method of application. Carbon fiber, glass fiber and aramid fiber are usually used in these composite systems to provide required strength and stiffness. The simulation of strengthened riser and its detail consequences can be obtained by the activities as mentioned here. The assessment of the strengthening of riser can be sequentially carried out through the subsequent steps.

1) Finite element modelling of marine riser for stregnthening by FRP in ABAQUS/ AQUA (2006) code.
2) Mathematical idealization capable of simulating the hydrodynamic loading on riser.
3) Generation of FEM-based time-domain response simulation of composite riser be carried out.
4) Developing efficient response prediction algorithm using ANN to study the behaviour.
5) Evaluating response behaviours of composite riser under vulnerable sea state
6) Performing stability analysis of marine riser under frequent environmental and structural variations.

RESULTS AND DISCUSSIONS

For offshore hydrocarbon exploration, strengthening of riser system will offer added benefit to the structure and economy. Though there is a few configuration of marine riser concerning FRP strengthening and the existing modeling treated the configurations to be some sorts of arbitrary element type under assumption, its advancement proves its poetical in offshore industry. The FRP strengthening in the riser is composed of two phases: preliminary local design based on critical local load cases (LCs) and global analysis of the full length composite riser under global loads like platform motion, hydrostatic pressure, gravity, buoyancy, wave and current to determine and assess critical locations. Big complexities in design of marine risers are prediction of proper loading and responses of the structure due to combined action of all applicable forces along with its quality enhancement. The mechanical and hydrodynamic properties of a typical riser are given in Table 1.

Table 1. Mechanical and hydrodynamic properties of riser

Parameter	Value	Parameter	Value
Stiffness (EA)	1.0706E11 N	Riser pre-tension	1.20E+07 N
Wall thickness	0.01588 m	Material	Steel wire rope
Elastic modulus	2.068E11 N/mm^2	Element type	Hybrid beam element
Torsional shear modulus	1.034E11 N/mm^2	Hydrodynamic coefficients	Drag 1.1; Inertia 2.5; Added mass 1.2

Desirable mechanical properties and low density of FRP may give efficient manufacturing of riser systems leading to significant weight savings (Wang *et al.*, 2015) as shown in Figure 3 leading to reduced operation expenses. The enhancement of structural performance will expedite oil and gas extraction from greater depths. Its good thermal insulation properties, corrosion and fatigue resistance will lessen the maintenance cost. The wave loading produces stress on drilling riser which cause fatigue damage. Creation of reasonable and precise drilling riser fatigue damage model is critical to guarantee the safety of drilling operation. For riser affected by alternating stress with different amplitudes, the total fatigue damage can be obtained through accumulating the individual damages. The nonlinear finite element method offers less expensive solution for modeling and fatigue analysis with sufficient accuracy of composite riser. Precise modeling of composite riser can overcome the needs of structural and economic constraints.

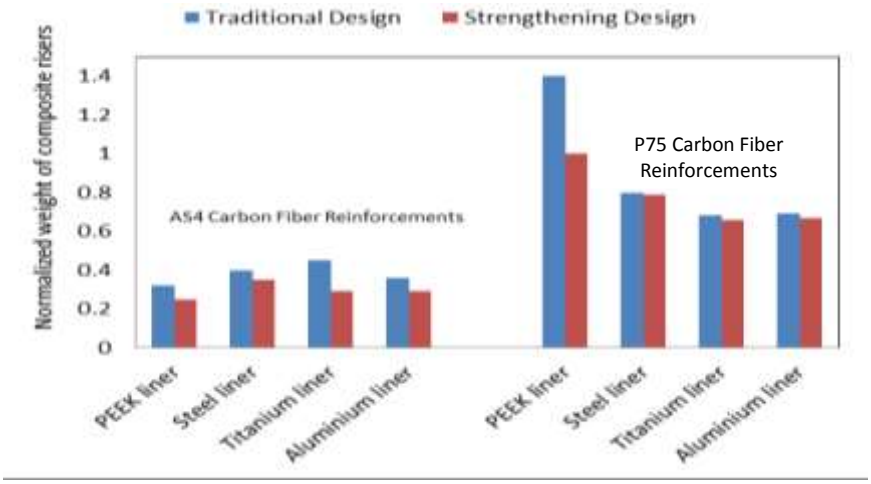


Figure 3: Comparison of normalized structural weight for strengthening of risers

CONCLUSION

The usage of fiber reinforced polymer (FRP) is a potential arena in offshore engineering for deep sea riser systems. The responses of un-strengthened and FRP strengthened risers under static and dynamic environment loads forms the basis of the present study. The requirements in design and the operating conditions are also studied so that the models are in best representation of the ones in practical use offshore. The study includes describing the methodology, LCs, analysis procedure and the local design of the composite riser. The responses and fatigue damage characteristics of the risers are also explored as well for the effects of FRP strengthening under the environment loads acting upon it. A detail assessment on the technical development of riser strengthening with FRP has been presented including the inquiries on dynamic responses and salient behavior of its own. The kinds of operational riser systems have been critically explored. This study also addressed thorough cram on structural configuration, properties, characteristics of riser structures for offshore strengthened riser. FE analysis is the compatible tool to predict the response of oil exploration pipes under the expected hydrodynamic loads. Arduous reckoning exemplifies the strengthened riser as very innovative and suitable part in marine structures to conduct the function of oil and gas exploration in deep sea. The FRP strengthening of riser shows its huge potential in future; it is

expected to greatly promote operations on the sea and stability by improving technical parameters, economic and safety concern.

Acknowledgment:
The authors gratefully acknowledge the Deanship of Scientific Research (DSR), University of Dammam for providing the fund 2017-212-Eng to continue the study.

REFERENCES

ABAQUS, ABAQUS documentation version 6.9, In, *Karlson & Sorensen, Inc*, (2006).

Jameel, M., Islam, A.B.M.S., Khaleel, M. and How, T.L.T., Nonlinear analysis of marine riser for energy exploration in shallow and deep water regions, *Energy Education Science and Technology Part A-Energy Science and Research* 30 (2012) 641-660.

Islam, A.B.M.S., Jameel, M., Ahmad, S., Jumaat, M.Z. and Kurian, V.J., Structural behaviour of fully coupled spar–mooring system under extreme wave loading, *Journal of Civil Engineering and Management* 19 (2013) S69-S77.

Morooka, C.K., Coelho, F.M. and Shiguemoto, D.A., Dynamic Behavior Of A Top Tensioned Riser In Frequency And Time Domain, *Proceedings of the Sixteenth (2006) International Offshore and Polar Engineering Conference, San Francisco, California, USA* (2006) 31-38.

Ochoa, O.O. and Salama, M.M., Offshore composites: Transition barriers to an enabling technology, *Composites Science and Technology* 65 (2005) 2588-2596.

Rustad, A.M., Larsen, C.M. and Sørensen, A.J., FEM modelling and automatic control for collision prevention of top tensioned risers, *Marine Structures* 21 (2008) 80-112.

Sparks, C., Odru, P., Bono, H. and Metivaud, G., Mechanical testing of high-performance composite tubes for TLP production risers, In: Offshore Technology Conference Proceedings, Paper No. OTC, (1988), 2-5.

Venkatesan, R., Dwarakadasa, E. and Ravindran, M., Study on behavior of carbon fiber-reinforced composite for deep sea applications, In: Offshore Technology Conference, Houston, TX, (2002).

Wang, C.G., Shankar, K. and Morozov, E.V., Tailoring of composite reinforcements for weight reduction of offshore production risers, *Applied Mechanics and Materials* 66 (2011) 1416-1421.

Wang, C., Shankar, K. and Morozov, E.V., Tailored local design of deep sea FRP composite risers, *Advanced Composite Materials* 24 (2015) 375-397.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Small-Scale Palm Oil Processing in West and Central Africa: Development and Challenges

Hassan, M. A.*[1], Njeshu, G[1], Raji, A.[1], Zhengwuvi, L[1] and Salisu, J.[2]

[1]Department of Mechanical Engineering, Modibbo Adama University of Technology, Yola, Nigeria,
[2]Department of Chemical Engineering, Modibbo Adama University of Technology, Yola, Nigeria
*mahassan@mautech.edu.ng

ABSTRACT

The extraction of palm oil from oil palm fruits is practiced in many countries in Africa. The technologies for these processes are, in most cases, either still traditional or very modern. Traditional technologies usually have the advantage of requiring low investments, but are labour-intensive, inefficient and time-consuming. Sophisticated large scale technologies, on the other hand, are generally beyond the financial reach of the rural population. The present review aims at throwing more light on a third option: small scale or intermediate technologies for palm oil processing in West and Central Africa. These technologies have been developed by various institutions to varying degrees of success, and are presented in the hope that it will spur up research for the development of more appropriate designs, find solutions and generate additional income for families, entrepreneurs, common initiative groups and co-operatives, in these regions.

Keywords: appropriate solution, extraction efficiency, free fatty acid, fresh fruit bunches, palm oil processing, small scale, traditional technologies.

INTRODUCTION

The origin of oil palm (Elaeis guineensis Jacq.) is traced to the tropical rain forest region of Africa with the main belt running through the southern latitudes of Cameroon, Côte d'Ivoire, Ghana, Liberia, Nigeria, Sierra Leone and Togo into the equatorial region of Angola and the Congo. (Ajani *et al*., 2012). Originally growing in grooves in the wild in these localities, the oil palm is today grown in plantations and has become an important crop for both industrial, retail and consumer markets. Despite its numerous industrial uses, palm oil is still indispensible in traditional life in Africa. It is extensively used in its cuisine, in local and industrial soap making, and in the food industry. In 2013, West Africa's palm oil output was 2.2 million metric tons (MT), and this accounted for only 3.5% of global output. Today, the demand for palm oil in the West African region exceeds its supply, and the region is a net importer of palm oil, with a deficit of between 850,000 to 900,000 tons, per year that is provided for by imports from countries such as Malaysia and Indonesia. Cote D'Ivoire is the only net exporter in West Africa, and exports an estimated 275,000 MT with about 75% of its export going to West Africa. (SAHEL, 2015).
This paper thus attempts an assessment of small-scale palm oil processing in West and Central Africa with the view of highlighting the socio-economic importance of this activity, both to those involved as individuals, and to the economy as a whole. Steps to improve on the activity have equally been suggested.

The Evolution of Small Scale Palm Oil Processing in West and Central in Africa

Before the colonial masters introduced plantation agriculture to Africa, palm oil production was carried out by the use of rudimentary tools. This is a very laborous process and in fact the UN Economic Commission for Africa (1983), after studying traditional palm oil production in three African countries namely Cameroon, Cote D'Ivoire and Sierra Leone, qualified the activity as

'long, tedious and laborious'. Various authors (Ukwuteno, 2011; Olagunju, 2008; Gilbert, 2013; Nchanji *et al.*, 2013; Nkongho *et al.*, 2014a, 2014b) have described the process for different localities in the continent. Generally, the palm bunches are quartered and left overnight for easy separation of fruits from the spikelets. With the rapid increase in population and a consciousness of industrialization in the continent, came the introduction of simple machines to reduce labour requirements and increase oil yield from a given quantity of fruit. Mechanical devices worth mentioning here include the Duchscher press, the perforated cylindrical metal cage, the Colin expeller, the screw press, the hydraulic press (by Stork of Amsterdam), etc. These presses gained widespread acceptance in all of west and central Africa and provided a relatively efficient process (compared to the manual process that existed), for the step of pressing out the oily liquid during oil production. The other unit operations in the crude palm oil processing business however, remained labour-intensive.

Ghana has recorded similar advances by small-scale palm oil producers who use the WACAPOL mini mills which is available in throughputs ranging from 1.0 to 4.0 tonnes FFB per hour. This mill, manufactured in the United Kingdom, has oil extraction efficiency greater than 90% and produces crude palm oil with Free Fatty Acid (FFA) content less than 5.0% (www.wacapol.com). Despite the disadvantages of small scale palm oil processing, the following factors still favour its promotion in West and Central Africa:

1. Smallholders are geographically dispersed and oil palm is intercropped with other crops, there are high transaction and transportation costs involved in assembling and conveying harvested fruits in accordance with the mill processing capacity. These factors make modern, high-scale processing mills uneconomical.
2. Domestic consumers prefer palm oil produced using traditional processing methods, which yield oil with higher levels of fatty acids than in modern mill-processed palm oil. In other words, environmental factors and the lack of coordination mechanisms would have made it difficult for the voluntary emergence of large scale, modern processing mills. (Kajisa *et al*., 1997).
3. The rapid increase in FFB production as a result of an increase in the surface area planted.
4. The irregular payment of smallholder dues by agro-industries in some countries.
5. The very poor state of roads in rural areas of the continent makes crop transportation very difficult and expensive. This leads to delays in the transportation of smallholder crop by agro-industries, leading to payment of penalties at the weighbridge by smallholders
6. Low FFB prices offered by the agro-industries, despite the fact that they will equally use by-products like kernel, fiber and kernel shells.
7. The complete absence of an industrial plant in some localities to process the FFB from small scale farmers.

Problems of Small Scale CPO Producers in the Sub-Region

Orewa *et al.* (2009) and Adjei-Nsiah, Zu & Nimo (2012) identified low oil extraction rate and high FFA content as the major problems of palm oil from small scale producers. The same author puts the national annual estimate of palm oil losses in Nigeria as result of inefficient processing methods/techniques at about 42% of total possible production in the country. This fact is directly reflected by what obtains in other countries of the sub region.

SUGGESTIONS AND CONCLUSION.

The Western and Central African sub-Region needs to move away from palm oil production by purely artisanal traditional methods. The ideal in productivity is to move over on to the agro-industrial scale but there exist lots of technical, geo-political and socio-economic factors that limit this choice. The development of appropriate small-scale oil production technology thus becomes imperative. To develop suitable appropriate systems, a multidisciplinary approach is required. This should entail in the study of not only activities in the technical field aimed at improving processes, equipment, realization of local manufacturing of the required equipment as well as establishment of maintenance policies, but also compulsorily include activities in the socio-economic arena during which the actual socio-economic performance of proposed technologies would be monitored and

evaluated in real-life social settings of the proposed locality where the oil palm production venture is envisaged.

REFERENCES

Adeniyi O. R., Ogunsola G.O. and Oluwusi D. (2014). Methods of Palm Oil Processing in Ogun state, Nigeria: A Resource Use Efficiency Assessment. American International Journal of Contemporary Research Vol. 4, No. 8. Pp 173-179.

Adjei-Nsiah S., Sakyi-Dawson O. and Kuyper T. W. (2012). Exploring Opportunities for Enhancing Innovation in Agriculture: The Case of Oil Palm Production in Ghana. Journal of Agricultural Science; Vol. 4, No. 10. pp 212-223.

Adjei-Nsiah, S., Zu, A. K. S., & Nimo, F. (2012). Technological and financial assessment of palm oil production in Kwaebibrem District, Ghana. Journal of Agricultural Science, 4 (7), 111-120. http://dx.doi.org/10.5539/jas.v4n7p111.

Ajani E. N; Onwubuya E. A.; and Nwalieji H. U. (2012): Assessment of oil palm production and processing among rural women in Enugu North agricultural zone of Enugu State, Nigeria. International Journal of Agricultural Sciences ISSN: 2167 – 0447 Vol 2 (12), pp. 322-329.

ICSESS2017
3rd International Conference on Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Oxy-Fuel Combustion Characteristics of Fuel-Grade Petroleum Coke for Enhanced Energy Recovery

Bemgba Bevan Nyakuma*[1], Moveh Samuel[2], Olagoke Oladokun[1], Muhamad Arif Mislet[3]

[1]Faculty of Chemical & Energy Engineering, Universiti Teknologi Malaysia,
81310 Skudai, Johor Bahru, Malaysia (E-mail: bbnyax1@gmail.com)
[2]Department of Mechanical Engineering, Modibbo Adama University of Technology,
Yola, Adamawa State, Nigeria (E-mail: smoveh@mautech.edu.ng)
[3]University-Industry Research Laboratory (UIRL), Universiti Teknologi Malaysia,
81310 Skudai, Johor Bahru, Malaysia (E-mail: m.arifmislet@utm.my)

ABSTRACT

The oxy-fuel combustion (OFC) of waste carbonaceous streams such as Petroelum Coke (Petcoke, PCK) presents significant prospects for combined heat, power and energy production. In addition, the OFC process can be efficiently utilized to address the challenges associated with low conversion efficiencies, product yields and heat recovery associated with current waste valorisation and management processes. Therefore, this study seeks to examine and highlight the potential of oxy-fuel combustion of fuel-grade PCK. The study also presents the physicochemical, thermal and calorific fuel properties of PCK. The results indicated that PCK contains high proportions of combustible elements; carbon, fixed carbon and calorific heating value. The oxy-fuel thermal analysis of PCK yields 99.76% conversion indicating high thermal conversion efficiency and low waste potential (< 0.21%) during OFC. The temperature profile characteristics (TPC) for PCK were; initial decomposition temperature, T_{on} = 482.93 °C; burn out temperature T_{off} = 615.19 °C and peak temperature T_{max} = 561.87 °C. The DSC plots for PCK oxy-fuel combustion revealed a single endothermic peak with heat evolution of 28.14 MJ/kg and energy recovery potential (ERP) of 76.65%. Overall, the results demonstrated that OFC is a potentially promising technology for energy recovery from PCK for future applications.

Keywords: Oxy-Fuel Combustion, Petroleum Coke, Energy Recovery, Thermogravimetric Analysis.

INTRODUCTION

The production of petroleum coke (petcoke, PCK) has soared significantly over the years due to increasing demand for energy around the globe. It is a waste by-product of thermal cracking of heavy residues and accounts for 3.1% of the waste generated during petroleum refining (Nemanova *et al.*, 2014). However, it is a potentially viable feedstock for energy applications due to wide availability at low cost, low ash content, and high heating values (Jayaraman and Gokalp, 2015). Currently, it is utilized in metallurgy and electrochemistry to manufacture high-value products. Furthermore, it is used as pulverized fuel for heat and power production albeit at low conversion efficiencies. Similarly, petcoke gasification and co-firing are problematic due to its high fixed carbon, low volatile matter and low reactivity (Zhan *et al.*, 2010). Moreover, PCK combustion is plagued by significant fly ash formation which hampers efficient valorisation (González *et al.*, 2009). Alternatively, oxy-fuel combustion (OFC) is a practical approach for valorising wastes due to its efficient heat recovery, flue gas recycling and carbon capture potential (Wang *et al.*, 2008). Therefore, this study seeks to investigate the oxy-fuel combustion of PCK for efficient valorisation. The physicochemical, thermal and calorific properties of PCK will be presented in detail.

EXPERIMENTAL PPROCEDURE

The fuel-grade petroleum coke (PCK) was sourced from the PETRONAS Penapisan (Melaka) Sdn Bhd refinery and supplied by Cemerlang Coke Industrial Sdn Bhd, Batu Pahat, Malaysia. The PCK was subsequently sieved using the 250 μm Retsch™ analytical sieve prior to characterization. Next, PCK was characterized by ultimate, proximate, and bomb calorific analyses techniques. The oxy-fuel combustion (OFC) was conducted by thermogravimetric analysis under oxygen rich atmosphere. For each test, about 8 mg of PCK was heated in an alumina crucible from 50 – 850°C with a heating rate of 10 °C/min in an oxygen-rich atmosphere (flow rate 20 mL/min). The thermal analysis was based on non-isothermal thermogravimetric analytical procedures of the Perkin Elmer Simultaneous Thermal Analyser (Model: STA 8000). The weight loss (TG), derivative weight loss (DTG) and differential scanning calorimetric analysis of the PCK was analyzed in the Pyris™ software to examine its thermal decomposition behavior and temperature profile characteristics (TPC).

RESULTS

The fuel properties of petroleum coke (PCK) are presented in Table 1. The results indicate that PCK possesses high *C*, *FC*, and HHV. However, the values *N*, *S*, and *O* were low in comparison with other elements in PCK. Proximate analysis revealed low A, M, and VM whereas FC was significantly high. Lastly, the HHV was significantly high compared to other solid fuels in literature. Overall, the fuel properties in this study are in good agreement with the typical reported values for fuel-grade PCK (Vassilev *et al*., 2015; Parvez *et al*., 2017).

Table 1: Physicochemical and Caloric Properties of Fuel-grade Petroleum Coke (PCK)

Elemental/ Fuel Property	Symbols	SI Units	This Study	Range of Literature Values	Average Literature Values
Carbon	C	wt.%	91.45	86.40 - 92.30	89.16
Hydrogen	H	wt.%	4.35	2.74 - 4.20	3.57
Nitrogen	N	wt.%	1.59	0.05 - 1.90	1.19
Sulphur	S	wt.%	1.19	1.17 - 7.84	4.14
Oxygen	O	wt.%	1.42	0.01 - 4.80	1.49
Moisture	M	wt.%	0.79	0.00 - 7.59	2.62
Volatiles	VM	wt.%	14.53	6.00 - 13.9	10.60
Ash	A	wt.%	0.56	0.25 - 4.60	1.09
Fixed Carbon	FC	wt.%	84.12	81.70 - 92.10	86.31
Higher Heating Values	HHV	MJ/kg	36.71	32.60 - 36.40	35.46

The oxy-fuel combustion of PCK was examined by TG-DTG and DSC analyses as presented in Figures 1 and 2. Based on the curves, the temperature profile characteristics (TPC); initial decomposition temperature, T_{on}, burn out temperature T_{off}, and peak decomposition temperature, T_{max}, for PCK were determined. As observed, the plots display the typical weight loss (TG-DTG) behavior of thermally decomposing materials during thermal analysis. The OFC process resulted in complete decomposition (99.76% or 7.92 mg) of the fuel. This indicates the fuel exhibited high thermal efficiency resulting in minimal waste (< 0.21%) during combustion. The TPCs for oxy-fuel combustion of PCK are; T_{on} = 482.93 °C; T_{off} = 615.19 °C and T_{max} = 561.87 °C. The DSC plots revealed a single endothermic peak of equivalent area A = 223.38 J. Hence, the heat released from the combustion of PCK was 28,140 J/g (or 28.14 MJ/kg). This indicates the energy recovery potential (ERP) of PCK is 76.65% based on HHV.

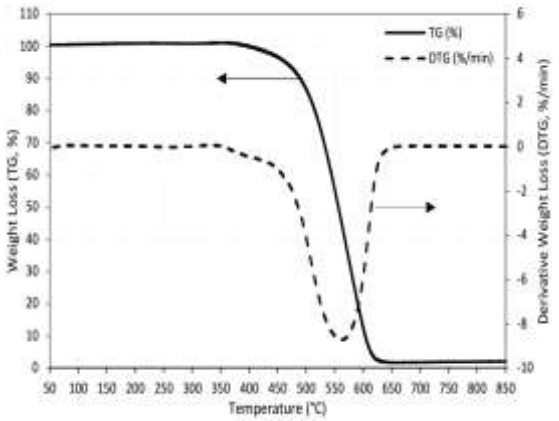


Figure 1: TG-DTG Plots for Oxy-Fuel Combustion of Petroleum Coke (PCK).

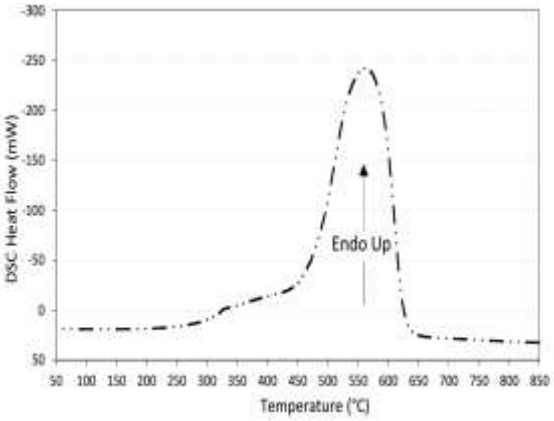


Figure 2: DSC Plot for Oxy-Fuel Combustion of Petroleum Coke (PCK).

The net difference can be ascribed to thermal losses during oxy-fuel combustion. Based on the overall physicochemical, calorific and oxy-fuel combustion properties, fuel-grade petroleum coke (PCK) is a promising feedstock with potential for energy applications in the future.

CONCLUSION

The study examined the physicochemical, calorific and oxy-fuel combustion of fuel-grade petroleum coke (PCK). The results indicated that PCK contains high proportions of the requisite combustible elements and significantly high calorific heating value for future combustion. In addition, the results indicated PCK possesses high energy recovery potential despite its high TPCs initial decomposition temperature, T_{on}, burn out temperature, T_{off} and peak decomposition temperature, T_{max}.

Acknowledgment: The authors gratefully acknowledge the financial support of Universiti Teknologi Malaysia. Many thanks also accrue to Messrs Benson Yap and Gan Eng Teck of Cemerlang Coke Industrial Sdn Bhd for generously supplying the petroleum coke (PCK).

REFERENCES

González, A., Navia, R. and Moreno, N. Fly ashes from coal and petroleum coke combustion: current and innovative potential applications, Waste Management & Research, 27 (2009) 976-987.

Jayaraman, K., Gokalp, I. Gasification characteristics of petcoke and coal blended petcoke using thermogravimetry and mass spectrometry analysis, Applied Thermal Engineering, 80 (2015) 10-19.

Nemanova, V., Abedini, A., Liliedahl, T. and Engvall, K. Co-gasification of petroleum coke and biomass, Fuel, 117 (2014) 870-875.

Parvez, A.M., Hong, Y., Lester, E.H. and Wu, T. Enhancing the reactivity of petroleum coke in CO2 via co-processing with selected carbonaceous materials, Energy & Fuels, (2017).

Vassilev, S.V., Vassileva, C.G. and Vassilev, V.S. Advantages and disadvantages of composition and properties of biomass in comparison with coal: An overview, Fuel, 158 (2015) 330-350.

Wang, C., Jia, L., Tan, Y. and Anthony, E. Carbonation of fly ash in oxy-fuel CFB combustion, Fuel, 87 (2008) 1108-1114.

Zhan, X., Zhou, Z. and Wang, F. Catalytic effect of black liquor on the gasification reactivity of petroleum coke, Applied Energy, 87 (2010) 1710-1715.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Process Simulation of Bis (2- hydroxyethyl) terephthalate and Its Recovery Using Two – stage Evaporation and Crystallization Systems

Ademola Bolanle Raheem[1,2], Azman Bin Hassan[3,4*], Zainura Zainon Noor[1,5], Sani Amril Bin Samsudin[3,4], Mohd Kamaruddin Abd Hamid[1,6], Ahmad Shamiri[7], Aliyu Abdulhammeed Bello[1], Olagoke Oladokun[1], Ali Hussein Sabeen[1].

[1]Department of Chemical Engineering, Faculty of Chemical and Energy Engineering, Universiti TeknologiMalaysia,81310Skudai,Johor,Malaysia.
(abraheem2@live.utm.my),(abaliyu2@live.utm.my)(aoolagoke2@live.utm.my)(hhsali2@live.utm.my)
[2]Department of Chemical Engineering, Faculty of Engineering, "University of Port-Harcourt, Port-Harcourt, Rivers State, Nigeria (rahbol_debven@yahoo.com)
[3]Department of Bioprocess & Polymer Engineering, Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia (azmanh@cheme.utm.my) & (saniamril@cheme.utm.my)
[4]Enhanced Polymer Research Group, Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia (azmanh@cheme.utm.my) & (saniamril@cheme.utm.my)
[5]Center of Environmental Sustainability and Water Security, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia (zainura@cheme.utm.my)
[6]Process Systems Engineering Center (PROSPECT), Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia (kamaruddin@cheme.utm.my)
[7]Department of Chemical Engineering, University of Malaya, Kuala Lumpur, Malaysia (ahmadshamiri@gmail.com)

ABSTRACT

Process simulation of depolymerization of polyethylene terephthalate (PET) waste was done using plug flow reactor that handles continuous and large scale process as a target for commercial production of pure bis (2-hydroxyethyl) terephthalate (BHET). This is done to reduce or eliminate the environmental problems peculiar to PET bottles littering the environment. Excess ethylene glycol (EG) reagent was used to degrade PET waste with zinc acetate [$Zn(Ac)_2$] as active catalyst. The optimum operating conditions of the reaction were mean particle size PET of 127.5 μm, EG:PET (w/w) ratio of 5:1, 196 ^oC temperature, 1 atm pressure, 35.24 min. residence time, 1.06576 x 107 W plug flow reactor heat duty, to achieve 100 % depolymerization of PET, 85.24 % yield of BHET and 14.76 % Oligomer (dimer). The product mixtures consists of 78.34 % EG, 18.80 % BHET, 2.86 % Oligomer (Dimer). Purification of BHET was done using crystallization or two stages evaporation processes using ASPEN PLUS to simulate these operations. Product removal crystallizer and flash columns were used to model the processes. The operating temperatures and pressures considered were 353 – 463 K and (1.1843076 – 108.56153) x 10^{-3} atm. for running first stage evaporation while second stage evaporation was run at 383 – 463 K and (0.5921538 – 2.5659998) x 10^{-3} atm. with crystallizer at 278 – 303 K. The outcome of different operating temperatures and pressures on the efficiency of evaporator and product quality were explored. The optimum operating conditions for first evaporation were 373 K and 1.18431 x 10^{-3} atm. with 8.28319032 x 10^5 W heat duty. Second evaporations optimum conditions were 393 K, 0.493462 x 10^{-3} atm. with 0.65446128 x 10^5 W heat duty. Crystallization optimum conditions were 300 K and 0.493462 x 10^{-3} atm. and 1.648 89069 x 10^6 W heat duty. The optimum operating conditions of the processes were determined based on the higher EG removal, higher BHET recovery and lower heat duty needed. Higher temperature and lower pressure were observed to increase the efficiency of the evaporators, but the heat duties increased as well and momentarily reduced the BHET recovery. BHET recovery was observed to decrease with increase in temperature in the case of crystallization operation. This work achieved a higher yield and purity of BHET, a higher EG removal for re-use and less heat duties demanded in comparison to previous works. The processes with its operating conditions can be used for future scaling up commercial processes.

Keywords: Polyethylene terephthalate recycling, kinetics of reactions, chemical recycling, catalytic depolymerization, Process simulation.

INTRODUCTION

The focus of this work is study on how to solve pollution and hazardous materials environmental problems by reduce drastically or eliminate PET waste that is considered stubborn, non-biodegradable, but of high quantity in the waste stream and applies the same scenario to other types of the plastics. A success in solving PET problems in solid waste stream would be a breakthrough in alleviating plastics problems in the waste streams (Yoshioka and Grause, 2015). The available PET recycling methods are primary recycling, secondary or mechanical recycling, tertiary or chemical recycling, and incineration with energy recovery (Al-Salem *et al.*, 2009); (Al-Sabagh *et al.*, 2016). Out of all available recycling methods, chemical recycling is the one with potential to recycling PET plastics to produce high purity demand products such as food packaging etc. (Hopewell *et al.*, 2009). It is a process that resulted into degeneration and purification of monomer that are used in the production of PET or other useful products (Kato and Fujimoto, 2005). The prepared PET bottle waste is treated with reagents to produce monomer, dimers, trimers, tetramers, oligomers and its mixtures for further use. Synthesizing of BHET can be done using glycolysis method for chemical depolymerization of PET with ethylene glycol (EG) (Imran *et al.*, 2010). Wide range of glycolytic process conditions of 150 – 250 ^{o}C temperature and 0.5 – 8 h reaction time (depend on heating medium) were reported (Voncina, 2016); (Allen *et al.*, 2015); (Allen *et al.*, 2016).

A conventional means of purifying BHET is reiterated crystallization process (Keck, 1971); (Goh *et al.*, 2015). This method can enhance the quality of BHET, but unhealthy substances such as polymer additives and foreign chemicals still virtually present in it and cause the high quality products attainment to be hard (Inada and Sato, 2007a); (Ekart and Pell Jr, 1997); (Inada and Sato, 2007b); (Devraj, 2016); . Glycolysed PET products (BHET) purification can also be done by drying (Ichikawa *et al.*, 1972); distillation (Inada and Sato, 2004); decolonization, deionization and evaporation to achieve a higher purity of BHET. BHET purity measurement was done by (Inada and Sato, 2006). Two stages evaporation process is an advance method of BHET purification. This is based on the principle of removing contaminants and EG that have lower boiling point compared to BHET.

This research work presents the optimum conditions for glycolytic depolymerization of PET to obtain higher yield of BHET. It also considered the results of changing pressures and temperatures to enhance the efficiency or performance of two-stage evaporation in terms of separating EG and BHET. It improves the quality of final BHET product acquired in term of purity. It also compared the sole crystallization and the two-stage evaporation methods in terms of BHET recovery.

RESULTS

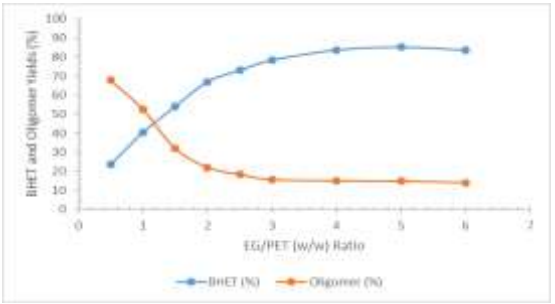


Figure 1: EG/PET (w/w) ratio effect on the BHET and Oligomers (Dimer) with the Catalyst/PET result for BHET purification(w/w) ratio of 0.001:1 and residence time of 35.24 min.

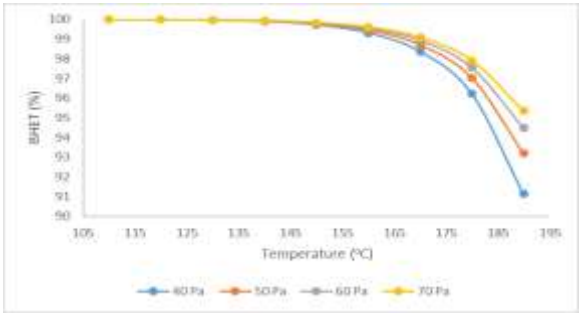


Figure 2: Second evaporation proces simulation

.

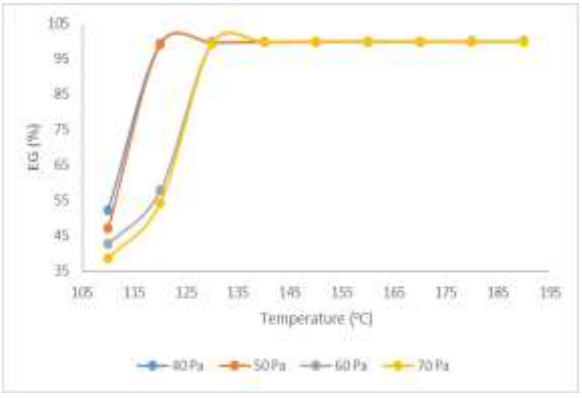


Figure 3: Second evaporation process result for EG removed.

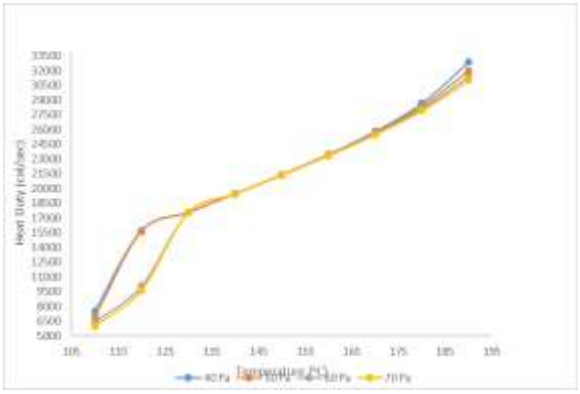


Figure 4: Second evaporation process result for Heat duty

CONCLUSIONS

PET waste glycolytic depolymerization process requirements to obtain higher yields of BHET (monomer) were explored by modeling using ASPEN PLUS simulator. RPlug flow reactor was used to target commercial production. Increase in residence time, reactants ratio of EG:PET, and catalyst:PET ratio increases the BHET yield up till the attainment of reaction equilibrium. The optimum operating conditions for this process were residence time of 35.24 min., 5:1 weight ratio of EG:PET, and 0.01:1 ratio of $Zn(Ac)_2$: PET. 100 % conversion of PET was achieved with 85.24 % yield of BHET (monomer), 14.76 % oligomer (mainly dimer) and excess EG obtained as product mixture. BHET selectivity was 86.80 % and that of oligomer was 13.20 %. Two stages evaporator and crystallizer were modeled using ASPEN PLUS software to purify the BHET product and recovered the excess EG in the system. The effectiveness of the methods at different operating conditions were investigated. For the first separator, 99.99 % BHET recovery and 97.08 % EG removal were achieved from the main product stream. While the second separator also recovered 99.99 % of BHET and 99.09 % of EG from the separator 1 product stream. Crystallizer has final product of 99.96 % BHET recovered and 99.96 % EG removed. It was observed that lower temperature and higher pressure favors the recovery of higher BHET yield. Whereas, higher temperature and lower pressure enhanced the higher EG removal. This work achieved a higher yield and purity of BHET, a higher EG removal for re-use and less heat duties demanded in comparison to previous works. The two stages evaporator provide us with different pairs of temperatures and pressures with their respective percentages of BHET recovery and EG removal as a guide to the optimal production of our products of interest. It provide guide for easier and save operation. It can serve as good replacement for conventional crystallization of BHET purification and EG recovery for industrial applications.

Acknowledgment

The contributions of Universiti Teknologi Malaysia for providing ASPEN PLUS simulation software as well as that of University of Port-Harcourt, Nigeria for this work is highly appreciated

REFERENCES

Al-Sabagh, A., Yehia, F., Eshaq, G., Rabie, A. & Elmetwally, A. 2016. Greener routes for recycling of polyethylene terephthalate. *Egyptian Journal of Petroleum,* 25**,** 53-64.

Al-Salem, S., Lettieri, P. & Baeyens, J. 2009. Recycling and recovery routes of plastic solid waste (PSW): A review. *Waste management,* 29**,** 2625-2643.

Allen, R. D., Bajjuri, K. M., Breyta, G., Hedrick, J. L. & Larson, C. E. 2015. Methods and materials for depolymerizing polyesters. Google Patents.

Allen, R. D., Bajjuri, K. M., Hedrick, J. L., Breyta, G. & Larson, C. E. 2016. Methods and materials for depolymerizing polyesters. Google Patents.

Devraj, S. 2016. Flakes of ester mixtures and methods for their production. Google Patents.

Ekart, M. P. & Pell Jr, T. M. 1997. Process including glycolysis and subsequent purification for recycling polyester materials. Google Patents.

Goh, H., Ali, S., Abdullah, N. & Idris, A. 2015. Time, Temperature and Amount of Distilled Water Effects on the Purity and Yield of Bis (2-hydroxyethyl) Terephthalate Purification System. *Bulletin of Chemical Reaction Engineering & Catalysis,* 10**,** 143-154.

Hopewell, J., Dvorak, R. & Kosior, E. 2009. Plastics recycling: challenges and opportunities. *Philosophical Transactions of the Royal Society of London B: Biological Sciences,* 364**,** 2115-2126.

Ichikawa, Y., Suzuki, N., Tokashiki, M. & Yamashita, G. 1972. Process for drying bis-({62-hydroxyethyl) terephthalate. Google Patents.

Imran, M., Kim, B.-K., Han, M. & Cho, B. G. 2010. Sub-and supercritical glycolysis of polyethylene terephthalate (PET) into the monomer bis (2-hydroxyethyl) terephthalate (BHET). *Polymer Degradation and Stability,* 95**,** 1686-1693.

Inada, S. & Sato, K. 2004. Process for production of high-purity bis-β-hydroxyethyl terephthalate. Google Patents.

Inada, S. & Sato, K. 2006. Bis-β-hydroxyethyl terephthalate. Google Patents.

Inada, S. & Sato, K. 2007a. Bis-β-hydroxyethyl terephthalate production process and purification process. Google Patents.

Inada, S. & Sato, K. 2007b. Processes for the purification of bis (2-hydroxyethyl) terephthalate. Google Patents.

Kato, J. & Fujimoto, K. 2005. Ester-forming monomer. Google Patents.

Keck, M. H. 1971. Process for crystallizing bis (beta-hydroxyethyl) terephthalate. Google Patents.

Voncina, B. 2016. Recycling of textile materials.

Yoshioka, T. & Grause, G. 2015. Recycling of Waste Plastics. *Topical Themes in Energy and Resources.* Springer.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Sustainable Neighbourhood Elements (Grey Elements) for the High Rise Low Cost Housing in Malaysia

Noraziah Wahi*[1], Rosli Mohamad Zin[1], Vikneswaran Munikanan[2], Ismail Mohamad[3], Syahrizan Junaini[4] and Saeed Balubaid[1].

[1]Faculty of Civil Engineering, University of Teknologi Malaysia Malaysia
(Email:belle_rusd@yahoo.com),
[2]Faculty of Engineering, National Defence University of Malaysia
[3]Science Faculty, University of Technology Malaysia
[4]Brooke Dockyard and Engineering Works Corporation, Malaysia

ABSTRACT

The sustainable development is a vital measure to alleviate the greenhouse gas effect, global warming and any other environment issues. The sustainable neighbourhood concept is not new in Malaysia, However, the concept still needs attention and awareness from the stakeholders. This paper discusses on the sustainable neighbourhood elements specifically green elements application on the high rise low cost housing in Malaysia. Malaysia should have focused sustainable neighbourhood planning and design especially on the high rise low cost housing generation therefore the future can be benefited from this type development.

Key words: Sustainable Development, Sustainable Neighbourhood, Low Cost Housing

INTRODUCTION

In recent years, as a result of developments in the globalisation era, the world has witnessed environmental, social, economic and urban planning changes. These changes have affected the living conditions of the population, natural resources, environment and economy (Alqahtany *et al*., 2013). However, the environmental principle requires that society protect its environmental resources. It assumes that ecosystems have limited regenerative capability and that the earth's land, air, water, and biodiversity will be compromised by irresponsible actions. Population growth combined with excessive consumption, pollution, and depletion of natural resources has pushed the limits of the earth's carrying capacity (Bansal, 2002).

According to the Merriam-Webster Online Dictionary the meaning is, 'capable of being sustained', and 'of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged', and from the Collins English Dictionary, '(of economic development, energy sources, etc) capable of being maintained at a steady level without exhausting natural resources or causing severe ecological damage'(Burnett, 2007). While according to Ibrahim *et al*. (2015), the word sustainability derived from Latin word where it means to hold. Hence, sustainable development can be seen as a development that meets the needs of the present without compromising the ability of future generations to meet their needs.

Sustainable development requires a balance between economic growth, social expansion and environmental protection. In order to pursue sustainable development, the construction industry itself has to be sustainable and give emphasis to environmental matter in addition to economic gains and social obligations (Hussein *et al*., 2010). It also seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future. Far from requiring the cessation of economic growth, it recognizes that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits (World Commission on Environment and Development, 1987). During the past decade, the concept of sustainable development attracted significant attention from

researchers, governments of different countries and international environmental organizations. The reason is clear, that is, the increased rate of environmental pollution and degradation (Jalil, 2010).

MAIN RESULTS

Table 1. Percentage of 'strongly agree and agree' level on the high rise low cost housing elements

No	Green elements	Strongly agree	Agree	Strongly Agree & Agree	Percentage
1	Shady trees	344	123	467	91.6%
2	Diversifying landscaping	334	86	420	82.4%
3	Preserved greenery	165	166	331	64.9%
4	Green network	188	131	319	62.5%
5	Garden	266	43	309	60.6%
6	Green roof	186	120	306	60.0%
7	Building orientation	195	111	306	60.0%
8	Community agriculture	177	122	299	58.6%
9	Tall trees	89	97	186	36.5%
10	Natural ponds	71	114	185	36.3%

CONCLUSION

Globalization era has reshaped the needs for the provision of sustainable development in order to cater for the demand in providing better living conditions, preserving the environment and natural resources and at the same time continue on with the development. Malaysia is not left behind in terms of efforts and commitment in dealing with environmental issues. Policies, guidelines and targets had been set by public and private sector to ensure environmental issues is addressed in every development phase of construction.

REFERENCES

Bansal, P., 2002. The corporate challenges of sustainable development. *Academy of Management Executive*, 16(2), pp.122–131.

Burnett, J., 2007. Sustainability and Sustainable Buildings. *The Hong Kong Institution of Engineers Transactions*, 14(3), pp.1–9.

lqahtany, A., Rezgui, Y. & Li, H., 2013. A proposed model for sustainable urban planning development for environmentally friendly communities. *Architectural Engineering and Design Management*, 9(3), pp.176–194.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Implementation of Building Information Modeling in Construction Project: How Prepared are Subcontractors in Saudi Arabia?

Mahmoud Sodangi

Department of Construction Engineering, University of Dammam, Dammam, Saudi Arabia.
(E-mail: sodangimahmoud@gmail.com)

ABSTRACT

Despite the obvious benefits of the Building Information Modeling (BIM) technology; implementation has been quite slow in the subcontracting sector than anticipated in the Saudi Arabian construction industry. The awareness and preparedness levels of the subcontractors towards implementing BIM are not known. Remarkably, there has been no published work that aimed at determining the level of subcontractors' awareness and preparedness for BIM implementation in construction projects in the Saudi Arabian construction industry. Thus, this paper presented methodical assessment of subcontractors' readiness level for implementing Building Information Modeling in construction projects in Saudi Arabia. Survey questionnaire was designed and administered across the subcontracting sector of the construction industry to obtain data for the subject under study. Findings of the study suggest clear lack of will amongst the subcontracting companies to implement BIM in their construction projects, which could be attributed to the drawbacks of BIM implementation across subcontracting sector of Saudi Arabian construction industry. These drawbacks or difficulties could be related to poor knowledge of the BIM technology amongst the subcontracting companies; lack of obvious proof of financial benefits, high cost of training, shortfall on government guidelines and strategies, social and typical refusal to accept change and most importantly, construction clients are not demanding the usage of BIM on construction projects. Another important finding of this study is the clear indication of the wide gap that exists among the same class of construction subcontracting companies. While very few of the technology driven companies are making commendable efforts to adopt BIM in operations and maintenance management stage; to a large extent, the subcontracting sector is still battling with BIM awareness. Above all, this paper provides original contribution to knowledge through a methodical investigation of the readiness levels of the subcontracting sector of the Saudi Arabian construction industry in applying the functions of BIM technology in construction projects. Consequently, the current problems limiting the subcontracting sector from full adoption of BIM in construction projects were identified and valuable strategies were suggested to overcome the highlighted limitations. In essence, the paper presents a pioneering attempt and methodology that highlighted the poor knowledge and clear lack of will amongst the subcontracting companies to implement BIM in construction projects.

Key words: Building Information Modeling, BIM readiness, BIM technology, Construction Industry, Subcontractors

INTRODUCTION

Incessant issues related to design and poor performance of subcontractors in Saudi Arabia are obvious calls for action to boost the competitiveness of the local construction industry; render high quality service to project clients and end-users, reduce disputes and move the industry forward. Building Information Modeling (BIM) facilitates the building development, construction and building operation (Aranda-Mena *et al*., 2008). Mom and Hsieh (2012) acknowledged that BIM is gradually changing how construction projects are being executed worldwide. With BIM's exclusive ability to enhance organization amongst operators, contractors and design teams; its implementation reduces project time, cost, material consumption and carbon emissions while improving contractors' productivity and quality performance (Mom and Hsieh, 2012). The efficiency and economic benefits of BIM to the construction industry worldwide are generally recognized and increasingly well understood. More so, the technology to implement BIM is readily

obtainable and quickly evolving. Developed nations in Asia, Europe and North America are now reaping the benefiting of BIM adoption in ongoing asset management along with construction project delivery.

OBJECTIVE OF THE STUDY

In spite of the benefits plus the availability of efficient BIM tools, implementation of BIM has been quite slow amongst local subcontractors than anticipated in Saudi Arabia. The readiness level of the subcontractors towards implementing BIM is not known. Remarkably, there has been no published work that aims at determining the level of subcontractors' readiness for applying Building Information Modeling in construction projects in Saudi Arabia. For that reason, a Saudi Arabian construction industry wide survey was conducted to examine subcontractors' readiness for implementing Building Information Modeling in their construction projects.

METHODOLOGY

A Saudi Arabian construction industry wide survey was conducted to examine subcontractors' preparedness for implementing Building Information Modeling in their construction projects. Judgmental sampling was adopted in carefully selecting the subcontracting companies for the survey. The sampling frame for the targeted subcontracting companies predominantly have their core business operations in the areas of architectural engineering, structural engineering, geotechnical engineering, and building services (mechanical and electrical works) was formed from a recent list made available to the researchers by the Saudi Arabian Ministry of Housing and Public Works. Initial information on the subcontractors was obtained from the Ministry. A total of one hundred and twenty six questionnaires were distributed to the subcontracting construction companies. An e-mail based questionnaire was chosen for the survey considering its reduced response time, better response quality, low costs and the respondents' access to the internet. An introductory e-mail containing the study aim was sent to the respondents in which the link for the questionnaire survey was provided. The respondents required not more than 15 minutes to respond to the questions online and their responses were collated in a Google supported database. The survey period lasted for 12 weeks.

In administering the questionnaires, the questionnaire was designed in two parts; Part A contains questions that bring out information about the respondents' background. The questions in this section were closed ended but provisions were made, in case none of the options provided was appropriate to the respondents. Respondents were required to choose only one option from the various alternatives provided except where otherwise specified. The second part of the questionnaire was largely closed ended questions (see Table 1), which assess the respondents' level of preparedness for implementing Building Information Modelling in their construction projects. Respondents rated their readiness levels according to a five-point Likert scale. The scale for assessing readiness levels is as follows; 5 stands for very high extent; 3 for moderate extent and 1 for very low extent. In many previous studies, similar scales have been adopted by various authors (Kometa et al., 1994; Proverbs et al., 1999; Tam et al., 2000; Sodangi et al., 2014). Frequency analyses and severity index were used to rank the subcontractors' levels of awareness and preparedness for implementing Building Information Modelling in construction projects. The analysis of severity indices is a nonparametric statistical technique commonly used by researchers in the field of engineering and technology management to examine data obtained from questionnaire respondents concerning ordinal assessment of attitudes (Proverbs et al., 1999). The analysis of severity indices involves using weighted percentage scores to compare and prioritize severity levels of the subcontractors' readiness under study.

RESULTS ANALYSES

Table 1 presents the summary of the severity indices and ranks of factors used in assessing the respondents' level of preparedness in implementing BIM in construction project. A closer look at

the table would show that 8 out of the entire 9 factors used for assessing the respondents' readiness for BIM adoption within the four BIM implementation aspects (technology, people, process, and management aspects) obtained low severity index values (0.20 – 0.49) from the rating done by the respondents, which indicates low level of readiness for BIM implementation in construction among the respondents. The only factor that obtained *moderate* severity index value (0.50) is "the provision of adequate information technology infrastructure in place and use the infrastructure to improve communication and closer working relationship", which was categorized under the technology aspect.

Table 1 Level of subcontractors' preparedness in implementing BIM

Implementation Aspects	**Questions (Factors) for assessing readiness for BIM implementation**	**Valid Percentage (%) for Score of**					**Severity Index**	**Weighted Average**	**Rank**
		1	**2**	**3**	**4**	**5**			
Technology aspect	Extent to which the companies have adequate information technology infrastructure in place and use the infrastructure to improve communication and closer working relationship	25.9	24.1	33.3	7.4	9.3	**0.50**	**0.45**	**4**
	Extent to which the companies use the infrastructure to improve communication and closer working relationship	29.6	37.0	18.5	11.1	3.7	**0.44**		
	Extent to which the companies focus on ICT skills development and employ ICT experts	40.7	37.0	9.3	3.7	9.3	**0.41**		
People aspect	Extent to which the companies employees are willing to adopt innovative approaches and to use proven technologies, tools and practices	59.3	29.6	5.6	3.7	1.9	**0.32**	**0.34**	**2**
	Extent to which the companies provide specific training and technical assistance to their employees in implementing BIM	40.7	53.7	0.0	1.9	3.7	**0.35**		
Process aspect	Extent to which the companies have problems in adopting information systems and ICT into their work practices	46.3	33.3	9.3	5.6	5.6	**0.38**	**0.38**	**3**
	Extent to which the companies would conduct in-house self-evaluation before implementing BIM?	50.0	33.3	5.6	5.6	5.6	**0.37**		
Management aspect	Extent to which the companies would introduce BIM after planning and evaluation their capabilities to implement it	59.3	35.2	3.7	1.9	0.0	**0.30**	**0.28**	**1**
	Extent to which the senior managers of the companies would be willing to support the necessary maintenance costs during BIM implementation	70.4	29.6	0.0	0.0	0.0	**0.26**		

Nonetheless, going by the weighted average values of all the factors' severity indices in each implementation aspect in Table 1, then it is clear that all the severity index values fall within the low severity range. This suggests low level of readiness for BIM implementation in construction among the respondents. This seeks to emphasize clear lack of will and motivation amongst the subcontracting companies towards implementing BIM in construction projects. This could be linked to the fact that there are some drawbacks to BIM implementation across subcontracting sector of Saudi Arabian construction industry. These drawbacks or difficulties could be related to poor knowledge of the BIM technology amongst the subcontracting companies; lack of obvious proof of financial benefits, high cost of training, shortfall on government guidelines and strategies, social and typical refusal to accept change and most importantly, construction clients are not demanding the usage of BIM on construction projects.

CONCLUSION

The paper presented assessment of subcontractors' readiness level for implementing Building Information Modeling in construction projects in Saudi Arabia. It was found out that there is clear lack of will amongst the subcontracting companies to implement BIM in their construction projects, which could be attributed to the drawbacks of BIM implementation across subcontracting sector of Saudi Arabian construction industry. These drawbacks or difficulties could be related to poor knowledge of the BIM technology amongst the subcontracting companies; lack of obvious proof of financial benefits, high cost of training, shortfall on government guidelines and strategies, social and typical refusal to accept change and most importantly, construction clients are not demanding the usage of BIM on construction projects. Another important finding of this study is the clear indication of the wide gap that exists among the same class of construction subcontracting companies. While very few of the technology driven companies are making commendable efforts to adopt BIM in operations and maintenance management stage; to a large extent, the subcontracting sector is still battling with BIM awareness. Thus, implementation of BIM across the subcontracting sector of Saudi Arabian construction industry requires collaborative strategies involving all key stakeholders. While some of the big construction companies in the Kingdom's construction industry are making efforts to adopt BIM in operations and maintenance management stage, to a large extent, the subcontracting sector is still battling with BIM awareness. This suggests a possible wide gap exists between these two contracting sectors in the adoption of BIM in construction projects. BIM adoption depends on top down collaborative approaches involving the government (regulatory body) clients, and the subcontractors, and other relevant key players in the construction industry. The government being the biggest public client and the clear leader in project developments especially infrastructure projects has to take the initiative and lead by example in some of the following ways:

- The government may consider providing financial incentives to subcontractors who apply BIM in their construction projects. This would serve as one of the key motivations for BIM adoption.
- The government may consider reducing the levy and other project development administrative fees for small & medium contractors that implement BIM.
- Small & medium contractors that implement BIM may be given higher advance payments and lowering the percentage of retention for contractors' progress payments especially for public projects.
- BIM certification and clear evidence of BIM application in construction projects could be made a prerequisite for construction license renewals for small & medium contractors.

As for the subcontractors, top management of the companies should create organizational structure that will support BIM adoption, employ staff with high ICT literacy and mandate BIM training for staff. Above all, this paper provides original contribution to knowledge through a methodical investigation of the readiness levels of the subcontracting sector of the Saudi Arabian construction industry in applying the functions of BIM technology in construction projects. Consequently, the current problems limiting the subcontracting sector from full adoption of BIM in construction projects were identified and valuable strategies were suggested to overcome the highlighted limitations. In essence, the paper presents a pioneering attempt and methodology that highlighted the poor knowledge and clear lack of will amongst the subcontracting companies to implement BIM in construction projects.

REFERENCES

Aranda-Mena, G., Crawford, J., Chevez, A., Froese, T., 2008. Building Information Modeling Demystified: Does it make Business Sense to Adopt BIM? Paper Presented at W078 - Information Technology for Construction: 25th International Conference on Information Technology in Construction, Santiago, Chile, July 15-17.

Baldwin, M., 2013. BIM in the Middle East - a need for open BIM Guides, Standards and Manuals. http://iug.buildingsmart.org/resources/ (accessed 21.03.14).

Chan, D.W.M., Kumaraswamy, M.M., 1997. A comparative study of causes of time overruns in Hong Kong

construction projects. International Journal of Project Management, 15(1), 55-63.
Chen, Y., Okudan, G. E., Riley, D. R., 2010. Sustainable performance criteria for construction method selection in concrete buildings. Automation in construction, 19 (2), 235-244.
Enshassi, A., Mohamed, S., El Karriri, A., 2010. Factors affecting the bid/no bid decision in the palestinian construction industry. Journal of financial management of property and construction, 15(2), 118-142.
Issa, R., 2013. Survey Findings, BIM in the Middle East – The Reality and the Way Forward. http://www.bimjournal.com/wp-content/ (accessed 20.04.14).
Kometa, S. T., Olomolaiye, P.O., Harris, F. C., 1994. Attributes of UK construction clients influencing project consultants' performance. Journal of Construction Management and Economics, 12, 433-443.
Mom, M., Hsieh, S., 2012. Toward performance assessment of BIM technology implementation, 14th International Conference on Computing in Civil and Building Engineering. Moscow, Russia, June 2012.
Proverbs, D.G., Holt, G.D., Olomolaiye, P.O., 1999. Factors influencing the choice of concrete supply methods. Building Research and Information, 25 (3), 116-26.
Sodangi, M., Khamidi, M. F., Idrus, A., Hammad, D. B., Umar, A. A., 2014. Best Practice Criteria for Sustainable Maintenance Management of Heritage Buildings in Malaysia. Procedia Engineering, 77, 11-19.
Sodangi, M., Salman, A.F., Shaawat, M.E., 2016. Exploring the Challenges in Utilization of BIM in Maintenance Management of Mosques. Proceedings of the First International Conference on Mosque Architecture (pp.31 - 48), Saudi Arabia: University of Dammam.
Tam, C.M., Deng, Z.M., Zeng, S.X., Ho, C.S., 2000. Quest for continuous quality improvement for public housing construction in Hong Kong. Construction management and economics, 18(4), 437-46.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Reciprocating Compressor Valves Condition Classification Using Acoustic Emission Parameters and Back Propagation Neural Network

Salah M. Ali*[1], K.H. Hui[1], L.M. Hee[1], M. Salman Leong[1], Mahdi A. Al-Obaidi[2] and Ahmed M. Abdelrhman[3]

[1]Institute of Noise and Vibration, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia.
(E-mail: salahmtc@yahoo.com, huikarhoou@gmail.com, mhlim.kl@utm.my, salman.kl@utm.my)
[2]Energy and Renewable Energies Technology Center, University of Technology, Baghdad, Iraq.
(E-mail: mahdiobaydi@yahoo.com)
[3]Department of Mechanical Engineering, Faculty of engineering and Science, Curtin University of Technology, Sarawak, Malaysia.
(E-mail: ahmed.mohammed@curtin.edu.my)

ABSTRACT

Reciprocating compressor is one of the most popular classes of machines used with wide applications in the industry. However, valve failures in this machine often result in dire consequences. Therefore, the effective and accurate valve condition monitoring and diagnosis technique is always demanded by diagnostician to ensure maximum productivity and to reduce from unnecessary maintenance tasks. This paper present an artificial intelligence (AI) model to classify the valve condition in reciprocating compressor using Acoustic Emission (AE) parameters measurement and Back Propagation Neural Network (BPNN). For the modeling purpose, a set of experiments were conducted on an industrial reciprocating air compressor with several operational conditions including good valve and faulty valve to acquire AE signal. A classification model was then developed from the combination of healthy-faulty data using MATLAB (ANN tool box). The results of the model validation demonstrated accuracy of valves condition classification exceeding 99%. Eventually, the authors intend to do more efforts to programme this model in smart portable device which can be one of the innovative engineering technologies in the field of machinery condition monitoring in the near future.

Keywords: Acoustic Emission, Back Propagation Neural Network, Condition Monitoring, Reciprocating Compressor.

INTRODUCTION

The valves consider a crucial component in any reciprocating compressor due to the essential role that the valves play it in terms of compressor efficiency and reliability. Consequently, design optimization and development to extending the lifetime of the valves have been studied by many researchers (Damle *et al*., 2011; Ma *et al*., 2012; Li *et al*., 2013). Several other approaches for modeling reciprocating compressor performance, efficiency and power consumption have been done by other researchers (Link and Deschamps, 2011; Duprez *et al*., 2007; Navarro *et al*., 2007). Nevertheless, the valves still sited; among other components, as the main reason of unplanned shut down for the reciprocating compressor (Foreman, 2002; Goebel, 2014; Tran *et al*., 2014). Therefore, efficient valves condition monitoring method is extremely important to help in maintenance decision and to ensure maximum machine productivity.

Many studies investigated AE technique for fault detection and diagnose in rotating machines. They illustrated that AE technique can detect the fault in the initial stage at lower speed, while conventional vibration technique is not able to detect it (Al-Ghamd *et al*., 2006; Widodo *et al*., 2009). Several scholars investigated the viability of AE technique

to detect valves fault in reciprocating compressors. For instant, Wang *et al*. (2015) studied an integrating method using AE signal and simulated valve motion for valve faults diagnosis in reciprocating compressors. Alfayez *et al*. (2005) investigated the AE application for cavitation detection in large scale centrifugal pump, they observed a clear relationship between AE RMS and the incipient cavitation. Sim *et al.* (2014) investigated the AE signal to identify the valve failure in reciprocating compressors. They use wavelet transform to decompose AE signal into different frequency ranges. This paper proposes new valve monitoring model based on AE signal parameters and BPNN approach.

MAIN RESULTS

The classification ability of the detection model was evaluated based on the receiver operating characteristic (ROC) curves and the confusion matrix (Provost and Kohavi, 1998).

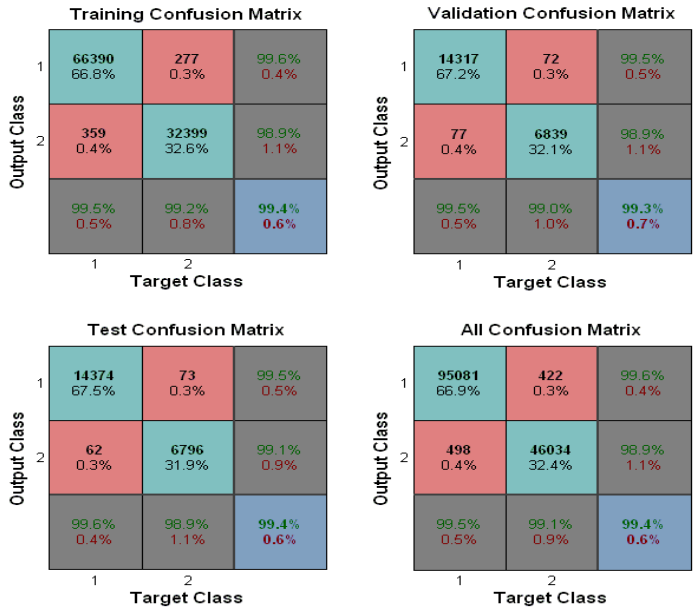


Figure 1: Confusion matrix of model 1.

CONCLUSION

A classification technique based on AE parameters and ANN method was proposed to classify reciprocating compressor valve condition with high accuracy. The results showed that FFBP was effective and this suggested technique attained 100% success in prediction and classification at high speed during training. The FFBP gave a very good result in both prediction and classification. The architecture and topology of the network can be used for online monitoring of reciprocating compressor valve to classify the failure of valves. Eventually, the authors intend to do more efforts in programming this model to smart portable device which can be one of the innovative engineering technologies in the field of machinery condition monitoring in the near future.

Acknowledgment:

The authors would like to express their appreciation for the support of the Institute of Noise and Vibration – Universiti Teknologi Malaysia for funding the study under the Higher Institution Centre of Excellence (HICoE) Grant Scheme No. R.K130000.7843.4J228.

REFERENCES

Alfayez, L., D. Mba, and G. Dyson, *The application of acoustic emission for detecting incipient cavitation and the best efficiency point of a 60kW centrifugal pump: case study.* Ndt & E International, 2005. **38**(5): p. 354-358.

Al-Ghamd, A.M. and D. Mba, *A comparative experimental study on the use of acoustic emission and vibration analysis for bearing defect identification and estimation of defect size.* Mechanical Systems and Signal Processing, 2006. **20**(7): p. 1537-1571.

Damle, R., et al., *Object-oriented simulation of reciprocating compressors: Numerical verification and experimental comparison.* International Journal of Refrigeration-Revue Internationale Du Froid, 2011. **34**(8): p. 1989-1998.

Duprez, M.E., E. Dumont, and M. Frere, *Modelling of reciprocating and scroll compressors.* International Journal of Refrigeration-Revue Internationale Du Froid, 2007. **30**(5): p. 873-886.

Foreman, S., *Compressor valves and unloaders for reciprocating compressors- an OEM perspective*. 2002, Dresser-Rand Technology Report.

Goebel, D., *Reciprocating compressor suction and discharge valve monitoring*. 2014, PROGNOST Systems GmbH.

Li, D.C., H.Q. Wu, and J.J. Gao, *Experimental study on stepless capacity regulation for reciprocating compressor based on novel rotary control valve.* International Journal of Refrigeration-Revue Internationale Du Froid, 2013. **36**(6): p. 1701-1715.

Link, R. and C.J. Deschamps, *Numerical modeling of startup and shutdown transients in reciprocating compressors.* International Journal of Refrigeration-Revue Internationale Du Froid, 2011. **34**(6): p. 1398-1414.

Ma, Y., et al., *Experimental investigation of the discharge valve dynamics in a reciprocating compressor for trans-critical CO2 refrigeration cycle.* Applied Thermal Engineering, 2012. **32**: p. 13-21.

Navarro, E., et al., *A phenomenological model for analyzing reciprocating compressors.* International Journal of Refrigeration-Revue Internationale Du Froid, 2007. **30**(7): p. 1254-1265.

Provost, F. and R. Kohavi, *Guest editors' introduction: On applied research in machine learning.* Machine learning, 1998. **30**(2): p. 127-132.

Sim, H., et al., *Empirical investigation of acoustic emission signals for valve failure identification by using statistical method.* Measurement, 2014. **58**: p. 165-174.

Tran, V.T., F. AlThobiani, and A. Ball, *An approach to fault diagnosis of reciprocating compressor valves using Teager–Kaiser energy operator and deep belief networks.* Expert Systems with Applications, 2014. **41**(9): p. 4113-4122.

Wang, Y., et al., *Fault diagnosis of reciprocating compressor valve with the method integrating acoustic emission signal and simulated valve motion.* Mechanical Systems and Signal Processing, 2015. **56-57**: p. 197-212.

Widodo, A., et al., *Fault diagnosis of low speed bearing based on relevance vector machine and support vector machine.* Expert Systems with Applications, 2009. **36**(3): p. 7252-7261.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Features of Chicken Slaughterhouse Wastewater

A.Y. Maizatul, R.M.S.R. Mohamed *, A.A. Al-Gheethi, N.M. Jais and A.H. Mohd Kassim

Micro-pollution Research Centre (MPRC), Department of Water and Environmental Engineering, Faculty of Civil & Environmental Engineering, Universiti Tun Hussein Onn Malaysia,86400 Parit Raja, Batu Pahat, Johor, Malaysia
(E-mail: maizatulazrina@gmail.com, maya@uthm.edu.my*, adelalghithi@gmail.com, noormaisarajais@gmail.com, amir@uthm.edu.my)

ABSTRACT

The chicken slaughterhouse wastewater is a class of wastewater which is heavily polluted with organic matters including proteins, blood residues, fats and lard. Therefore, the direct discharged of untreated slaughterhouse wastewater into the environment is associated with the occurrence of eutrophication phenomenon. In the present study, the characteristics of slaughterhouse wastewater were investigated and parameter tested included biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solid (TSS), total nitrogen (TN), total organic carbon (TOC), orthophosphate (PO_4^{3-}), temperature and pH. In this study, concentration of BOD is 1341-1821 mg L^{-1} which is higher than standard A (20mg L^{-1}) and B (50mg L^{-1}), respectively. Then, COD values obtained from this study is 3154.19-7719.3 mg L^{-1} that exceed standard limit and within range as reported by Bustillo-Lecompte et al. (2016) which is 1250-15900mg L^{-1} . Then, TSS is 377.67-5461.67 mg L^{-1} which have exceeded the EQA1974 standard limits A (50mg L^{-1}) and B (100mg L^{-1}) for disposal of wastewater into the environment and Bustillo-Lecompte et al. (2016), 300-2800mg L^{-1} respectively. The concentrations of TN obtained in this study is 165.07-557.43 mg L^{-1} and PO_4^{3-} is 1.14- 13.55 mg L^{-1} were within the range as reported by Bustillo-Lecompte et al. (2016) which is 50-841mg L-^{1}. The nutrients in slaughterhouse wastewater are required for microalgae growth, however excessive nutrients level will cause the occurrence of eutrophication phenomenon. It can be concluded that the direct discharge of chicken slaughterhouse wastewater contributes negatively on the environmental biodiversity and thus they should be subjected for an effective treated before the final disposal. Wastewater can be treated with microalgae to reduce level of pollutant as reported by Jais et al. (2016) and Gani et al. (2016).

Keywords: Characteristics, COD, BOD, TN & TP

INTRODUCTION

Slaughterhouse wastewater had been characterizing as highly polluted wastewater due to high biological oxygen demand (BOD), chemical oxygen demand (COD), and total suspended solid (TSS), blood and nutrient (nitrogen and phosphorus) from slaughtering and cleaning activities (Santos and Robbins, 2004; Bustillo-Lecompte et al. 2016). Presence blood and complex mixture of fats, proteins and fibres in chicken slaughterhouse wastewater contribute effectively in the increasing organic matter which induce the occurrence algal bloom (Rajakumar et al., 2011; Kundu et al., 2013). The increasing demand of chicken production for human consumption had increase the slaughterhouse wastewater discharged in Malaysia. According to statistic by Department of Statistic Malaysia (2015), there is 289,996,253 chickens had produced in year 2014 compared to 272,451,321 number of chicken in year 2013 with increasing about 6.4%. As a consequence, the effluent from slaughterhouse had increase dramatically and generates large quantities of wastewater. Hence, the treatment of slaughterhouse wastewater should be implemented in order to protect nature from deterioration and prevent disease outbreak of pathogenic bacteria from animal wastes (Sobsey et al. 2006). The variations in physical wastewater characteristics effect on the

parameters of these wastes due to their role in biological and chemical reactions. The high concentration of COD indicates the presence high chemical reaction between organic substances in wastewater while BOD mean available high microbial loads in the wastewater. The characteristics of different types of the wastewater have been reported in literature. However, lacking of studies have been performed on the chicken slaughterhouse wastewater. Therefore, the present work aimed to investigate the characteristics of these wastes in order to determine presence or absence the adverse effects for their disposal into the environment and natural water system.

MATERIALS AND METHODS

The chicken slaughterhouse wastewater was collected from Parit Haji Abdul Kadir, Parit Raja directly from effluent drain. The samples were collected in bottles (10 L) and transported immediately for the chemical and physical analyses. The chicken slaughterhouse wastewater was analysed for nutrient composition included TN, TOC and orthophosphate (PO_4^{3-}). PH was measured by using 4500-H-B method with Oakton pH 700 Benchtop Meter (Oakton, USA). TN was measured according to 4500-NH_3-B method by using DR 6000 Spectrometer (UV-VIS Hach, USA), while PO_4^{3-} was determined based on Method 1060. The concentrations of heavy metals were conducted by inductively coupled plasma mass spectrometry (ICP-MS) and mercury analyser. BOD, COD, TSS and temperature are determined according to APHA (2012).

MAIN RESULTS

The slaughterhouse wastewater composition obtained from this study was compared to one of the recent study (Bustillo-Lecompte et al. 2016) and Malaysia standard for industrial effluents (2009) as presented in Table 1.

Table 1. Characteristic of chicken slaughterhouse wastewater (n=12)

Parameter	This study	Bustillo-Lecompte et al (2016)	EQA 1974	
			Standard A	Standard B
pH	7.3-8.4	4.90-8.10	6.0-9.0	5.5-9.0
BOD	1341-1821	610-4635	20	50
COD	3154.19-7719.3	1250-15900	50	100
TSS	377.67-5461.67	300-2800	50	100
TN	165.07-557.43	50-841	NR	NR
TOC	196.77-641.83	100-1200	NR	NR
PO_4^{3-}	1.14- 13.55	NR	NR	NR
Cd	0.003	NR	0.01	0.02
Cu	0.049	NR	0.20	1.0
Hg	0.002	NR	0.005	0.05

*All parameters are expressed as mg L-1 except for pH, N/R = Not Reported; Cadmium (Cd); Copper (Cu); Mercury (Hg).

The ratio of COD to BOD is used to select the appropriate treatment methods. In this study the COD: BOD ratio which is 3154.19-7719.3:1341-1821mg/L was 4:1 which indicate the presence high concentration of organic compounds resulted from the presence of detergents in chicken slaughterhouse wastewater. BOD have correlation with TSS. High BOD will disturb organic matter decomposition in the wastewater, thus cause suspended solids in the wastewater failed to be digested under anaerobic conditions (Henze and Comeau, 2008). Thus, this study showed that when BOD is high, the TSS also high., with BOD (1341-1821 mg L^{-1}), and TSS (377.67-5461.67 mg L^{-1}) respectively.

TN and TP are related to the microbial contamination in the wastewater, and high microorganism in the wastewater may lead to pathogenic activity (Pahazri et al., 2016). In this study, the TN, TOC and PO_4^{3-} in the investigated chicken slaughterhouse wastewater were between 165.07-557.43 mg L^{-1}; 196.77-641.83 mg L^{-1} and 1.14- 13.55 mg L^{-1}, respectively. These findings confirm that the discharge of nitrogenous chicken slaughterhouse wastewater into the natural water system would contribute effectively in the occurrence of eutrophication phenomenon and may deterioate the

water qualityy (Nguyen et al , 2012;Kundu et al., 2013). Heavy metals are transition elements and some heavy metals such as Hg, Cd and Cu are highly toxic. However, the heavy metals concentration in chicken slaughterhouse wastewater in this study were extremely low compared to Malaysia effluent standard A and B, which values for Cd, Cu and Hg are 0.003 mg L^{-1}, 0.049 mg L^{-1}, and 0.002 mg L^{-1}, respectively. Heavy metals have negative correlation with pH of wastewater ($p<0.001$) and it can determine the solubility and biological availability of chemical constituents. The higher level of heavy metals in wastewater will lower the pH values of wastewater and the water are highly toxic and polluted which can kill aquatic lives (Johansson et al., 1995).

CONCLUSION

Characterization of chicken slaughterhouse wastewater is importance in order to determine the impact of discharged wastewater to the environment and suitable method for wastewater treatment which is low cost, effective and do not harm the environment. By considering the characteristics of slaughterhouse wastewater, the appropriate treatment method can be applied based on their level of pollutant.

Acknowledgment:

The authors would like to thank University Tun Hussein Onn Malaysia, Ministry of Higher Education of Malaysia and MOSTI for financial support and priority necessary infrastructure to carry out research work.

REFERENCES

Bustillo-Lecompte,C., Mehrvar, M., Quinones-Bolanos, E. Slaughterhouse wastewater characterization and treatment: An economic and public health necessity of the meat processing industry in Ontario, Canada. *Journal of geoscience and environmental protection*, 4 (2016), 175-186.

Department of statistic Malaysia. Selected agricultural indicator in Malaysia by sub sector, 2015. Retrieved on 10 January 2016, from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=72&bul_id=T2Z3NkhLSFk2VjZ5dkdUL1JQUGs4dz09&menu_id=Z0VTZGU1UHBUT1VJMFlpaXRRR0xpdz09.

Gani, P., Sunar, N.M., Matias-Peralta, H., Jamaian, S.S., and Latiff, A.A.A. 2016. Effects of different culture conditions on the phycoremediation efficiency of domestic wastewater. *Journal of environmental chemical engineering*, http://dx.doi.org/10.1016/j.jece.2016.11.008.

Henze, M., and Comeau, Y. Biological Wastewater Treatment: Principles Modelling and Design. (2008), 33-52.

Jais, NM., Mohamed, R.M.S.R., Apandi, W.A.W.M and Matias-Peralta, H.M. 2015. Removal of nutrients and selected heavy metals in wet market wastewater by using microalgae scenedesmus sp. *Applied mechanics and materials*, 773-334:1210-1214. doi:10.4028/www.scientific.net/AMM.773-774.1210.

Johansson, K., Bringmark, E., Lindevall, L., Wilander, A. Effects of acidification on the concentrations of heavy metals in running waters in Sweden. *Water, air and soil pollution* 85 (1995), 779-784.

Kundu, P., Debsarkar, A., and Mukherjee, S. 2013. Treatment of Slaughter House Wastewater in a Sequencing Batch Reactor: Performance Evaluation and Biodegradation Kinetics. *Biomed Res. Int.* (2013), 1-11.

Nguyen, H.T.A., Ngo, H.H., Guo, W., and Nguyen, V.T. 2012. Phosphorus removal from aqueous solutions by agricultural by-products: A critical review. *Journal of water sustainability*, 2(3) (2012), 193-207.

Pahazri N.F., Mohamed R.M.S.R., Al-Gheethi A.A., Amir Hashim. 2016. Production and harvesting of microalgae biomass from wastewater, A Critical Review. *Environmental Technology Review*. 5(1) (2016), 39-56.

Rajakumar, R., Meenambal, T., Banu, T.R. and Yeom, I.T. Treatment of Poultry Slaughterhouse Wastewater in Up Flow Anaerobic Filter Under Low Up Flow Velocity. *Int. J. Environ. Sci. Tech*. 8(1) (2011), 149-158.

`

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Modeling of Copper (II) Ions Adsorption Onto Treated Rice Husk Using Fixed-Bed Mode

Abdurrahman Garba[1, 2], Hatijah Basri*[1], Umar Hayatu Siddiq[3, 4] and AbdulRasheed AbdulRahman[3, 5]

[1]Department of Science, Faculty of Science, Technology and Human Development, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia.(E-mail: hatijah@uthm.edu.my)
[2]Federal Government Girls College Bakori, P.M.B 6030 Funtua, Katsina State. Nigeria. (E-mail: agarba2008@yahoo.com)
[3]Waste-To-Wealth Program, UTM-MPRC Institute for Oil and Gas, Resource Sustainability Research Alliance, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia.
[4] Department of Chemical Engineering Technology, School of Engineering Technology, Federal Polytechnic P.M.B 35 Mubi, Adamawa State, Nigeria. (E-mail: hayatusiddiqi@yahoo.com)
[5]Chemical Engineering Department, Abubakar Tafawa Balewa University, Tafawa Balewa Way, PMB 0248 Bauchi, Bauchi state, Nigeria. (E-mail: abdulcranfield@gmail.com)

ABSTRACT

Rapid growth of agricultural sector creates millions of tons of agricultural waste materials which in turn could be used as potential adsorbent for heavy metals abatement in water. Rice husk treated with NaOH was used as adsorbent for the removal of copper (II) ions from aqueous solution using fixed-bed adsorption mode. This study investigated the effects of different parameters such as flow rate (3 mL/min and 9 mL/min), bed height (0.9 cm, 1.8 cm and 2.8 cm) and initial copper concentration (5 mg/L and 15 mg/L) on the uptake capacity of the treated rice husk in a fixed-bed mode. The highest uptake of 75%, using 15 mg/L of the copper solution, was obtained from a flow rate of 9 mL/min and a bed depth of 2.8 cm. The experimental data were correlated with Thomas, Adams–Bohart and Yoon–Nelson models. The results indicated that, the Adams–Bohart model fitted the data more than the other models.

Keywords: Rice Husk, Adsorption, Fixed-bed mode, Copper ions, Modeling

INTRODUCTION

Rapid growth of the agricultural sector in Malaysia creates millions of tons of agricultural wastes annually (Ghani *et al*., 2010). These wastes cause menace environmentally. Amongs such wastes is rice husk. Additionally, excessive discharge of industrial and municipal wastes, laden with heavy metals, cause environmental pollution which is a serious problem that needs immediate attention. Heavy metals such as copper were regarded as environmental pollutants, and were listed by US Environmental Protection Agency (EPA) largely due to their irreparable effects on the environment. Several methods were adopted for its removal from solutions, which include, precipitation, evaporation, filtration, membrane separation, ion exchange, coagulation, complexation, electrochemical operation and adsorption. Adsorption process has been adopted because it is cost–effectiveness and sustainability (Garba *et al*., 2016).

The aim of this study is to explore copper (II) ions removal using inexpensive, sustainable and efficient adsorbent that undergoes simple treatment. The treatment requires the use of little amount of chemicals in order to reduce chemical pollution and at same time keep the cost of the adsorbent as cheap as possible.

MAIN RESULTS

Fourier transform infrared spectroscopy (FTIR)

The FTIR analysis is an important tool for identification of surface functionalities. The FTIR results (Figure 1) of the raw rice husk indicated bands at 3370, 2920, 1423 and 1048 cm^{-1} which corresponds to peaks for –OH stretching vibration with range between 3100 - 3500 cm^{-1}, –CH2 asymmetric stretching vibration, –COO vibration or the aromatic ring absorption for C=C–C arising from lignin since it contains aromatic rings and stretching vibrations related to C–C–O from carbohydrates or Si–O–Si stretching vibration (Zhang *et al*., 2013).

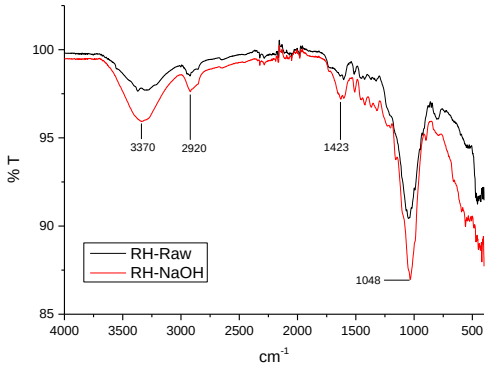


Figure 1. FTIR spectra for raw (RH-Raw) treated rice husk (RH-NaOH)

The SEM image of the raw rice husk (Figure 2) indicated that the raw rice husk has no developed pores, but NaOH treated rice husk surface was converted to a more ordered surface with heterogeneous pores. On the other hand, the EDS spectra of the untreated rice husk surface contains only elements C, O and Si. After treatment of the rice husk with NaOH solution, Na was fixed on their surfaces and the peak intensity of Si increase (Wang *et al*., 2013).

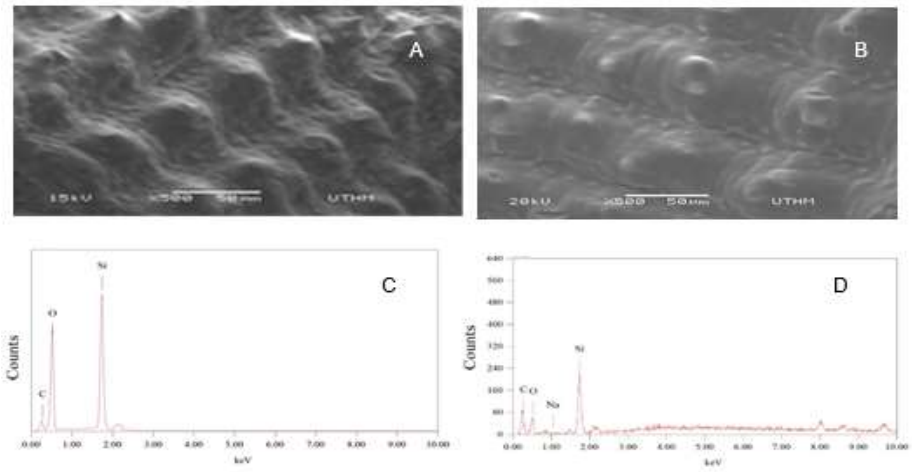
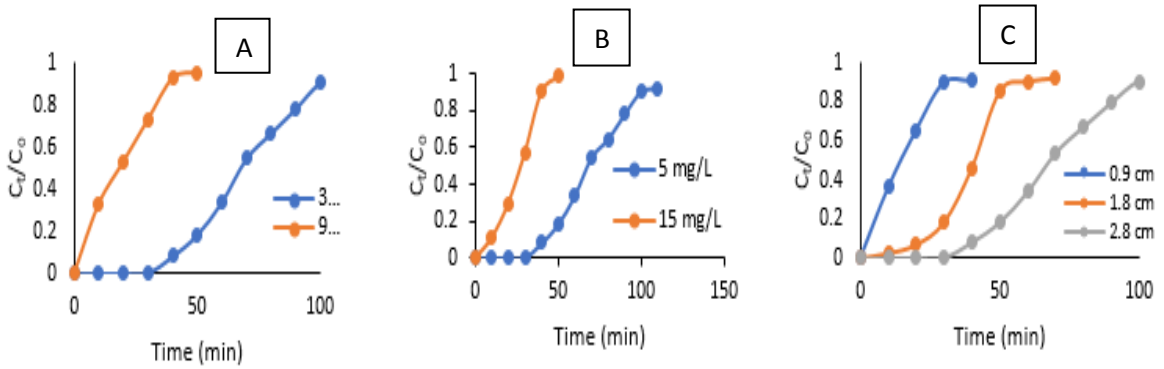


Figure 2. SEM-EDS for the raw (A and B) and treated (C and D) rice husk

Effects of adsorption parameters

The efects of adsoption parameters were investigted which include increase in initial copper solution concentration (A), initial copper solution flow rate (B) and decrease in adsorbent height (C). Increase in the parameters led to decrease in adsorption of the ions, except for increase in adsobent height which result into increase in adsorption of the ions.



Also, modeling of the experimental data indicated that, Adams – Bohart model fitted the data more than the other models.

CONCLUSION

The study explored the ability of treated rice husk as low cost adsorbent for adsorption of copper ions in fixed-bed mode. The copper uptake was affected by column parameters such as initial copper ions concentration, adsorbent depth and solution flow rate. The Adams–Bohart model fitted the experimental results well over the other models employed. That indicated the potentials of using rice husk as cheap adsorbent which requires small amount of treatment, but gives a reasonable removal capacity for copper ions.

Acknowledgment:

The authors would like to acknowledge the office for research, innovation, commercialization and consultancy (ORICC) of University Tun Hussein Onn Malaysia for the graduate researcher incentive grant (GIPS) given to Abdurrahman Garba with vote number 1253.

REFERENCES

Garba, A., Nasri, N. S., Basri, H., Ismail, R., Abdul Majid, Z., D. Hamza, U., & Mohammed, J. Adsorptive removal of phenol from aqueous solution on a modified palm shell-based carbon: fixed-bed adsorption studies. Desalination and Water Treatment, 57(60) (2016), 29488-29499.

Ghani, W. A. W. A. K., Abdullah, M.S.F., Matori, K. A., Alias, A. B., and Da Silva, G. Physical and Thermochemical Characterisation of Malaysian Biomass Ashes. Journal - The Institution of Engineers, Malaysia. 71(3) (2010), 9-18.

Wang, X. S., Chen, L. F., Li, F. Y., Chen, K. L., Wan, W. Y., & Tang, Y. J. Removal of Cr (VI) with wheat-residue derived black carbon: Reaction mechanism and adsorption performance. J Hazard Mater, 175(1–3) (2010), 816-822.

Zhang, Z. Q., Zhang, C., Lei, H., Zhao, L. L., Yang, R. H., Shuai, C., Chen, J. C., & Qu, P. A Novel Biomaterial from Acrylamide Graft on NaOH-Urea Modified Rice Husk. *Advanced Materials Research*, 634 (2013), 879-882.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Electrical Energy Conservation and Energy Auditing in a Bungalow Residential Building in Abuja, Nigeria

Akanmu, W.P.*, Ojobo, C.O.

Department of Building, School of Environmental Technology
Federal University of Technology, Minna, Niger State, Nigeria.
(E-mail: willyakams@yahoo.com)

ABSTRACT

Electrical energy plays a vital role in our day to day life. Modern living cannot be imagined without electricity. There is a limit to the amount of resources that can help us generate electricity, so it becomes our necessary duty to save these resources or save electricity for our further use and this too is only possible by doing an energy audit on different aspects of the Nigerian economy. Energy audit is a primary study that identifies energy use among various services and provides opportunities for energy conservation. Energy auditing like management, is an integral part of energy conservation. It is an initial study in establishing an energy management programme. The paper show and discusses the results of an energy audit carried out on a bungalow residential building located in Abuja over a period of one year. The energy consumption pattern in the bungalow residential building was identified and the processes of reducing the energy consumption per unit established in order to make the building more energy efficient. The data gathered was analysed using a quantitative method by employing the walk-through system of auditing where physical observation, measurement of the building space and facilities and the monthly energy bill over the period of one year. The result shows that there would be a 59% savings or more in the monthly energy bill of the building. It is recommended that the practice of retrofitting, good housekeeping, usage of renewable energy system and continuous education of building end users will further lead to more savings.
Keywords: Energy audit, Energy Conservation, Energy Consumption Pattern, Energy Management, Residential Building.

INTRODUCTION

There are many models for energy audits, the scope and the thoroughness of an energy audit depends on the audit model applied and on the available human and financial resources. Energy audit can be defined as: "a procedure to show how energy is used in an audited target and what are the measures to save energy or to improve energy efficiency in the said target" (Teuvo, *et al.*, 2001). Energy audit can be seen as a part of building conditions surveys – surveys that are targeted on the energy performance of a building. As condition surveys, energy audits are a useful tool for long term building renovation planning. Other ways to use energy audits are as follows;

i. A statement of the energy quality of a building. A building energy certificate and energy labelling of the building are easily produced based on the audit reports. They are valuable for example when a building is for sale.
ii. One outcome of an energy audit is a list of energy saving measures and ways to increase the energy efficiency of a building. A house owner can reduce energy and other costs by applying these measures.
iii. An energy audit may be advantageous when applying for a loan for a building renovation.
iv. In future, CO_2 emissions are very likely to become more and more important. Energy audits will be one tool to abate CO_2 emissions.

There are several definitions of an energy audit. Some guidebooks define energy audit as a systematic, documented verification process of objectively obtaining and evaluating energy audit

evidence, in conformance with energy audit criteria and followed by communication of results to the client (CIPEC 2006). In the Indian Energy Conservation Act 2001 (BEE 2008), an energy audit is defined as the verification, monitoring and analysis of the use of energy and submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. However in Malaysia, it was defined as a process which is very much central for conducting an energy management project or in general an energy audit is a study conducted to identify where, when and how much energy is being used in the business and how to reduce the cost of energy for the business. Even though there are several definitions, the objective or goal is the same which is to reduce the energy consumption without compromising comfort and quality of the building.

Over the years the quest for sustainable energy efficiency can never be overemphasized. This has given rise to the society deliberating in conferences, seminars, symposiums, exhibitions and summits on how this energy can be sustained. Promulgation of a carbon neutral environment is necessary. Significantly in one of Chartered Institution of Building Services Engineers CIBSE, (2011), it identified an adopted policy by England and Wales for a Zero carbon policy from 2010 – 2016 for both domestic and non-domestic buildings.

The problem still has been education of end-users and how to raise their awareness. However, advocating for the auditing of the energy performance of a building is a major step to how energy use can be enhanced in a building. This is so because large chunk of the use and waste of energy is enhanced in buildings and more pertinent in domestic houses.

Energy efficiency is the cleanest, cheapest and fastest energy resource available and is not conservation or deprivation; "it is getting what you want for less". The primary and secondary energy input into a typical residential building would come from electricity, oil, coal, biomass, gas, wind, solar photovoltaic and diesel generators. Energy use by household appliances, office equipment and consumer electronics is an important fraction of total electricity use in both households and workplace. Undoubtedly, appliances on a primary energy basis constitutes a larger portion of total energy use for residential than for commercial buildings. The great shift in home sizes over the years having a large influence on the size of appliances, nos. of occupants and lifestyle has had a great impact on energy consumption. As many things affecting energy performance can go wrong in homes and apartments the need for transformation becomes important. A well-considered communication strategy is essential otherwise the "low-hanging fruit of home energy efficiency will remain on the tree" Palmer, *et al.,* (2011). The paper aimed at auditing the energy performance of the household appliances and its pattern of usage while objectively achieving a well energy efficiency practice suggested for residential buildings and creating awareness of the possible waste in energy consumption. Due to the limited time and the high cost of measuring devices available for auditing out of the three auditing procedure available; walk-through audit, standard audit and computer simulation (Kinney, *et al.,* 2006). The paper hence deployed a quantitative process of an energy audit using the walk-through audit system where the energy content of electricity and gas versus costs were determined using the energy bills of a domestic building gathered for a period of 12 months and also analysing the power of the appliances its usage period and its pattern of energy supply. The data gathered can reveal useful trend between hourly, day/night, weekly/weekend over the period of data collection. This should let operators to compare actual consumptions with targets;

i. Spot things going wrong before it is too late
ii. Maintain a monthly moving average to see which way trends are going.

METHODOLOGY

For this paper some selected bungalow residential buildings with low energy consumption in Abuja, Nigeria was taken as a reference buildings.

MAIN RESULTS

The data was gathered from a residential building where several steps were taking to approach the auditing process. A survey on the household appliances and the energy available to power them were determined. The following data were therefore retrieved from the building envelope

SURVEY OF THE BUILDING

a. Home energy audit

The following appliances were observed to be in place for use by the household that uses one form of energy or the other.

Table 4: List of appliances hours of usage per week and their power rating

S\N	DESCRIPTION	QUANTITY	POWER RATING (kWh)	HOURS OF USAGE	TOTAL POWER
1.	Television sets	3	0.050	60	9.000
2.	Electric kettle	1	2.400	21	50.400
3.	Dstv decoder	1	0.025	60	1.500
4.	Wi-Fi cd player	1	0.065	12	0.780
5.	Pressing iron	1	2.200	28	61.600
6.	Dvd player	1	0.035	4	0.140
7.	Play station 3	1	0.038	6	0.228
8.	Ceiling fan	7	0.080	70	39.200
9.	Standing fans	4	0.085	30	10.200
10.	Air-conditioners	2	1.119(1.5hp)	18	40.284
11.	Laptop	2	0.076	14	2.128
12.	Desk top computer	1	0.312	14	4.368
13.	Printer	1	0.100	2	0.200
14.	Deep freezer	1	0.385	168	64.680
15.	Standing fridge	1	0.306	168	51.408
16.	Blender	1	0.230	0.17	0.039
17.	Security lights	13	0.015	84	16.380
18.	Bedroom lights	8	0.015	35	4.200
19.	Toilet lights	4	0.015	14	0.840
20.	Lobby lights	3	0.009	84	2.268
21.	Dinning lights	1	0.015	14	0.210
22.	Store lights	1	0.015	7	0.105
23.	Kitchen lights	1	0.022	35	0.770
24.	Sitting room lights	4	0.015	35	2.100

b. Pattern of energy supply

The energy been supplied to the building is electrical energy which comes into the building from the mains. Various tariffs are allotted to different classes of buildings and according to environs. The building is located in Abuja Disco and as a residential building using one phase meter is expected to be among the R_2 classes of residential single or three phases with a fixed monthly charge that covers for both maintenance and other cost with an expected 5% VAT for the total cost. This is the major energy supply to the building and it is supplied by the Power holding company of Nigeria (PHCN). Because of the unstable energy supply system an alternative of the PMS generator is been used to power the appliances in the building. The bill revealed that from January to June the charges rate were N500 fixed charge and N11.74 per kWh for residential buildings under the code R_2 while from July the charge for fixed became N702 and N12.62 per kWh.

c. Graphics display of building energy bills

The following where the data of the energy bills collected for a period of 12 months from January 2013 to December 2013.

Table 5**:** Building energy bills

Months	Fixed charge (N)	Cost per kWh (N)	Energy units (kWh)	Cost of Units (N)
January	500	11.74	159.7	2500
February	500	11.74	200.2	3000
March	500	11.74	240.6	3500
April	500	11.74	240.6	3500
May	500	11.74	240.6	3500
June	500	11.74	200.2	3000
July	702	12.62	207.9	3500
August	702	12.62	207.9	3500
September	702	12.62	207.9	3500
October	702	12.62	245.5	4000
November	702	12.62	245.5	4000
December	702	12.62	170.2	3000

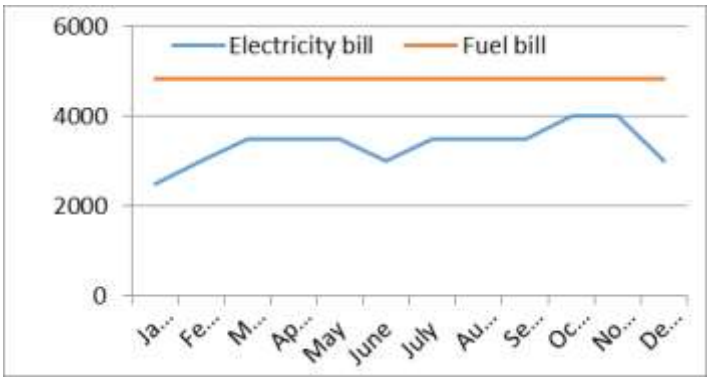


Figure 1: Graphical display of monthly building energy bills

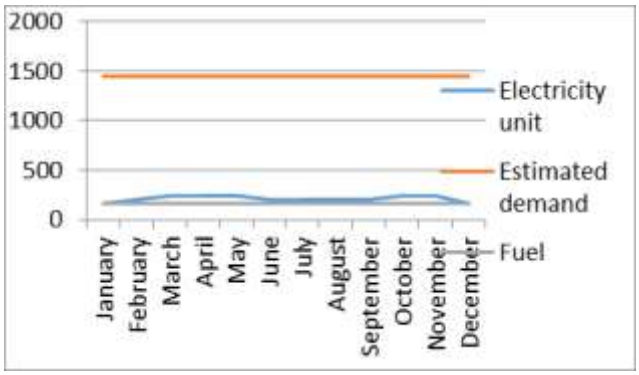


Figure 2: details of energy consumption in a year.

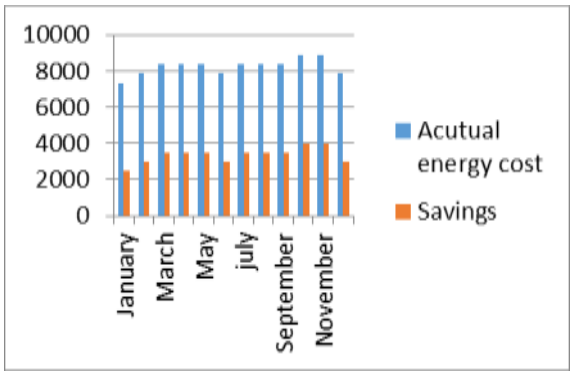


Figure 3: Table on actual energy cost and savings

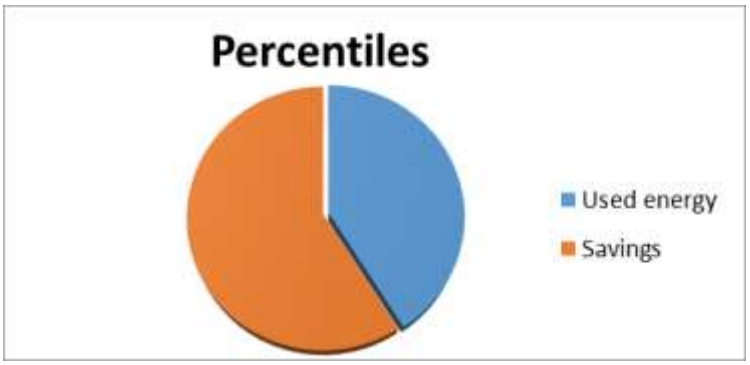


Figure 4: Percentiles on monthly energy savings after an efficiency strategy

d. Physical survey of interior spaces, power and distribution system

The building is a 12.6mx11.2m (141.12m^2) in dimension structure which gets its supply from the service line with a voltage of 415V fed directly to the meter box for a three phase line. From the meter box it supplies energy to the distribution box where it is now been feed to every sockets and switches in the building. A 13Hp alternative power supply generator is provided to power the household facilities which are expected to carry all loads except for the Air conditioners, pressing iron and water heaters.


View of the meter


Ariel view of the building


Ariel view of the generator set


View of the service line

Figure 5: Views of interior spaces, power and distribution system

e. Details of annual fuel and electricity consumption from utility bills.

Monthly from the survey, it was discovered that due to the unstable power supply an average of 50litres of premium motor spirit (PMS) also commonly known as petrol is been purchased at a cost of N4,850 for an emergency use with an annual cost of N58,200.
The results shows that the actual energy consumption from a residential building is not fully ascertained because of the inadequate and inconsistent power supply as the supply isn't guaranteed at all time and each day supply period differs from another. An average of 15 hours was discovered from the observation as the periods of which power is stable in a day and at its time of availability not most of the facilities are at use. This simple denotes that diversity principle is applicable in this case. Where an average of 213.9 kWh units is estimated to be used in the house monthly but if the energy as estimated by the users timing is to be used up as a result of stable supply then the energy bill would be extremely high. Therefore and energy savings of 59% would be achieved if only a renewable energy strategy is introduced and the use of fuel eliminated and more also achieved when retrofitted from the public power supply.

CONCLUSION

The findings shows that the problem of inadequate power supply has a great impact on the high consumption of fuel as an alternative supply and this means a high cost and a great greenhouse gas emission into the environment. The difference in the costs is almost twice its normal supply cost from PHCN. The analysis proved that most energy is been used up from the heating, cooling and lighting appliances of which water heating is in most times done by using fossil fuel due to power outage as at when needed. It would thus be deduced that, although there are compliance to energy star appliances but there are no automated energy control systems Building Energy Management System (BEMS) and some appliances still need to be efficiently used and installed appropriately thereby maintaining a quality housekeeping attitudes for the conservation of energy. Also the building end-users are not informed of any energy audit in building neither has the building been audited before.

REFERENCES

CIPEC (2006). Energy Savings Toolbox–an Energy audit Manual and Tool, http://oee.nrcan.gc.ca/sites/oee.nrcan.gc.ca/files/files/pdf/energy-auditmanual-and-tool.pdf.

Kinney, L., Belshe, R., Cler, G., Cler, W. and Wilson, T. (2006). Residential energy auditing techniques. Synertech Systems Corporation. SYNTN06-514. www.synertechsystemscorp.com. Pgs. 1-3.

Palmer, K., Margaret, W. and Todd, G. (2011). forthcoming. Energy Efficiency Financing: Assessing Market Barriers and Evaluating Government and Utility Programs. Discussion paper. Washington, DC: Resources for the Future. www.rff.org Pgs. 1-4.

Teuvo, A. Laila, H. Andris, B. Villu, V., Karl, I. and Ivan, K. (2001). Energy Audit Guide for Buildings. Finnish Ministry of the Environment Tallinn Technical University, Tallinn. English/Russian edition.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May

Seed Germination of Mung Bean on Different Vermicompost Extracts of Palm Oil Wastes

P.F. Rupani[1], A. Embrandiri[2], M. H. Ibrahim[2], and *C.T. Lee[1]

[1] Faculty of Chemical and Energy Engineering, University Teknologi Malaysia, Skudai, Malaysia.
(E-mail: parveenrupani@gmail.com, *ctlee@utm.my)
[2] School of Industrial Technology, Universiti Sains Malaysia, Penang, Malaysia
(E-mail: ashanty66@googlemail.com)

ABSTRACT

The rapid rise of palm oil production has made it the largest edible oil worldwide in the last few decades. A large amount of waste is generated and could lead to serious environmental issues if not treated properly. Among the different biological waste treatment methods, vermicomposting has proven to be a cost effective and sustainable technolgy. The present study evaluated the effect of Palm Oil Mill Effluent (POME)-Palm Press Fibre (PPF) mixture on the seed germination and seedling growth of mung bean plant. Mung bean seeds were raised in petri plates irrigated at various ratios of POME-PPF (50:50, 60:40 and 70:30, labelled as 50 %, 60 % and 70 %). The results show that the 50% POME-PPF vermicompost provided the longer roots and shoots lengths elucidating that 50 % vermicompost is more efficient for seedling without any further dilutions.

Keywords**:** Palm oil mill effluent; Palm pressed fibre; Vermicomposting, Mung bean; Seed germination

1. INTRODUCTION

Pollution caused by different industries is a serious concern worldwide. Water resources are often affected by industrial pollution as they release their effluent with or without treatment in nearby water bodies. The rapid rise of palm oil production has made it the largest edible oil worldwide in the last few decades [1]. Research has shown that these by-products have the potential to become the raw material for natural fertilizers due to the presence of available nutrients [2]. Among different biological treatments, vermicomposting is an innovative technology that does not call for expensive laboratories or sophisticated industrial equipment. Vermicomposting is an environmentally friendly treatment that meets the sustainability goal of Millennium Development Goal 7 (MDG7) and fulfilling the ecological sanitation concept [3, 4]. A number of researchers effectively demonstrated the ability of earthworms (vermicomposting) to process the municipal solid waste and industrial wastes [5, 6]. The vermicomposting of oil palm wastes (fibre, trunk and frond) with significant outcome was established [7], indicating that vermicomposting is a suitable technology for the decomposition of lignin-based materials.

The current study demonstrated the effect of different vermicompost extract obtained from palm oil mill effluent (POME) and palm pressed fibre (PPF) mixture for the germination of mung bean seed. It is hypothesised that the nutrient properties of POME is valuable and its use as a liquid fertilizer for irrigation and fortification is viable. The purpose of the seed germination is to assess the seed quality or viability [8] in response to three different POME-PPF extract mixtures (50:50, 60:40, 70:30) and to predict the performance of the seed in the field.

METHODS AND MATERIALS

A total of three mixtures were set up using the wet weight combination of POME and PPF (50% POME + 50% PPF, 60% POME + 40% PPF and 70% POME + 30% PPF) for the vermicomposting process. These would be referred to as 50%, 60% and 70%. Each mixture consisted of 500 g set and prepared in triplicates. After 15 d of pre-composting, 10 clitellates earthworms of *E. eugeniae* species (each of
3.10 ± 1 g) were added to each container for 30 d of vermicomposting [9] placed at room temperature (26 ± 2 °C). The collected samples were dried in an oven at 100 °C, ground and stored in the labelled plastic bags for further analysis using standard methods [10]. Extracts were obtained as explained in with the controls (distilled water) [11]. The extracts were used to evaluate the germination of 15 mung bean seed (Vigna radiate) in each petri dish. The root and shoot length of the mung bean were recorded at every interval of 24 h [11].
The germination index (GI) was calculated as follows:

$$GI = RSG * RRG / 100 \quad (1)$$

where
RSG= Relative seed germination
RRG= Relative Root growth.

Results

The effect of vermicompost extracts, comprising of 50, 60 and 70 % POME-PPF mixtures, was tested on the germination of mung bean (*Vigna radiata*) seeds. The results are presented in Fig. 1. Fig.1 indicates that there is no definite trend for the germination at 50 %, whereas for 60 % there is a significant increase in germination at the higher dilution rates and likewise for 70 % POME-PPF mixtures.

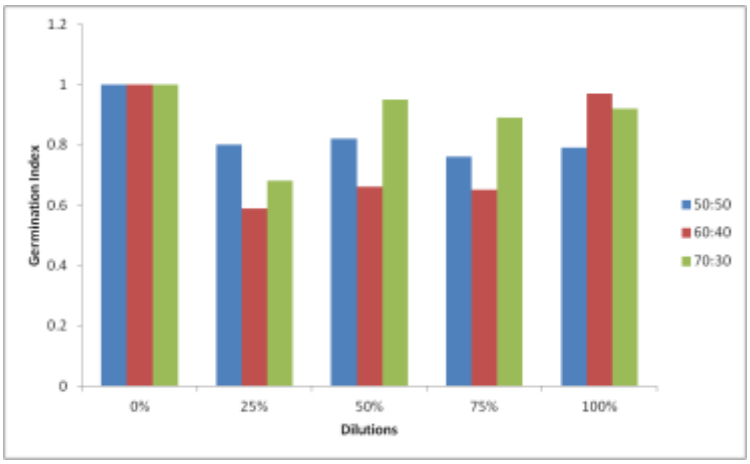


Figure 1. The germination indices at three different ratios of POME-PPF vermicompost mixtures (50:50, 60:40, 70:30).

On the contrary, 50 % POME-PPF vermicompost extract resulted in longer root length at different extracts dilutions as compared to 60 and 70% vermicompost extracts (Fig.2a). The effect of the vermicompost extract on shoot length shows that 60 and 70 % vermicompost extract seeds grew longer in the lower % of the extract (25 and 50%) while the seeds in the 50 % vermicompost extract grew longer in the higher concentrations of vermicompost extracts (75 and 100%) as shown in Fig. 2b.

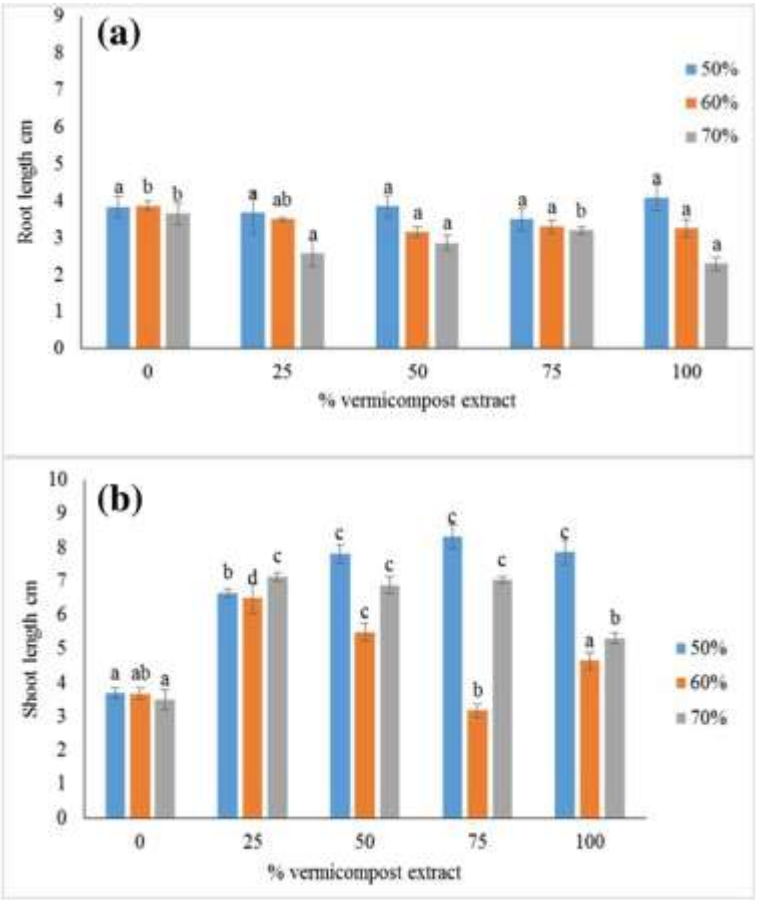


Figure 2. Effect of 50, 60 and 70% POME-PPF vermicompost extracts at different dilutions (0, 25, 50, 75 and 100%) of extract on the root (a) and shoot length (b) of mung bean seed (different letters in each treatment shows significant difference at $p < 0.05$).

CONCLUSIONS

The vermicompost obtained from 50 % POME-PPF mixture provided longer root and shoot lengths for mung beans. This shows that 50 % POME-PPF vermicompost is found to be more effective as a growth promoter rather than for boosting germination.

Acknowledgment

Rupani P.F and Embrandiri A., would like to thank University Science Malaysia for the support during the doctorate study.

REFERENCES

Singh, R. P., Ibrahim, M. H., Esa N., Iliyana, M. S. "Composting of waste from palm oil mill: A sustainable waste management practice". *Review in Environmental Science and Biotechnology*. Vol 9, 2010, pp331–344.

Rupani, P.F., Embrandiri, A., Quaik, S. and Ibrahim, M.H Waste minimization: Utilization of Palm Oil Mill Wastes by Vermicomposting Technique, in ICEST 2012, IPCBEE, Vol 30, ISSN: 2010-4618.: Chennai-India.

Arancon NQ, Edwards CA, Babenko A, Cannon J, Galvis P, Metzger JD(2008) Influences of vermicomposts, produced by earthworms and microorganisms from cattle manure, food waste and paper waste, on the germination, growth and flowering of petunias in the greenhouse. Appl Soil Ecol 39(1):91–99

Gunadi B., C.A. Edwards, Blount C. 2003. The influence of different moisture levels on the growth, fecundity and survival of Eisenia fetida (Savigny) in cattle and pig manure solids. European Journal of Soil Biology 39:19–24.

Suthar S (2010) Recycling of agro-industrial sludge through vermitechnology. Ecol Eng 36:1028–1036.

Yadav A, Garg V (2013) Nutrient recycling from industrial solid wastes and weeds by Vermiprocessing using earthworms. Pedosphere 23(5):668–677 .

Hayawin ZN, Khalil HA, Jawaid M, Ibrahim MH, Astimar A (2010) Exploring chemical analysis of vermicompost of various oil palm fibre wastes. Environmentalist 30(3): 273–278.

http://seednet.ap.nic.in/Stl/htmlpages/GerminationTesting.htm

Deka H, Deka S, Baruah C, Das J, Hoque S, Sarma N (2011a) Vermicomposting of distillation waste of citronella plant (Cymbopogon winterianus Jowitt.) employing Eudrilus eugeniae. Bioresour Technol 102(13):6944–6950.

Macci C, Masciandaro G, Ceccanti B (2009b) Vermicomposting of olive oil mill wastewaters. Waste Manag Res 28(8):738.

Rupani, P.F., Embrandiri, A., Ibrahim, M.H., Shahadat, M., Hansen, S.B., Ismail, S.A. and Kadir, M.O.A., 2017. Recycling of palm oil industrial wastes using vermicomposting technology: its kinetics study and environmental application. Environmental Science and Pollution Research, pp.1-9.

Dhanam S (2009) Effect of dairy effluent on seed germination, seedling growth and biochemical parameter in Paddy. Botany Research International 2(2):61–63.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Improvement of Saudi Arabian Sand with Environmental Friendly Additives

Zaheer A. Kazmi
College of Engineerring, University of Dammam, Dammam,
Kingdom of Saudi Arabia

(E-mail: zaheer989@gmail.com)

ABSTRACT

In Kingdom of Saudi Arabia, shallower depth of the earth's crust is composed of lose dune or beach sand with soluble salts. This type of soil in its natural condition, along with shallower and fluctuating depth of ground water table, offers a wide variety of geotechnical problems under applied loading. Kingdom of Saudi Arabia is at highest pace in developing infrastructure facilities, particularly road network to connect sparse settlements. Despite of spending money, time and other resources on repeated repair and maintenance, no significant attention has been paid towards the excessive differential settlement and frequent damages to these facilities. Different techniques and material for mechanical and chemical stabilization of the soil have been studied however; their application has been limited for local soil conditions, availability and use of the material for mass scale, and direct impact on the environment. In this regard, a soil improvement technique with low cost, locally available and environment friendly additives (high and low density shredded polyethylene) has been investigated in this study. The study has shown a remarkable increase in the shear strength of naturally existing soil, consequently reducing the settlement under applied loading. Such a long lived solution will reduce maintenance and repair cost of the infrastructure facilities laid on problematic soil along with reduction of environmental pollutants.

Keywords: Loose sand, geotechnical problems, shredded plastic, shear strength

INTRODUCTION

Soil improvement is a technique that aims at improving load bearing capacity and/or strength, reducing absolute and differential settlements, and mitigating liquefaction during a seismic activity. Physical properties of the soil can be enhanced either by mechanical or chemical stabilization processes. Mechanical stabilization includes different approaches towards effective compaction, and inclusion of non-degradable fibers and Geosynthetic reinforcement to improve strength properties [1-4]. In the chemical stabilization, different cementitious additives (like cement, lime, bitumen, polymers, fuel ash and other chemicals) are used to react with the soil minerals and meet required strength properties (Raj, 2015; Alawaji, 2001; Viswanadham *et al*., 2009). The basic stabilization principals have remained same since the first introduction of both the aforementioned techniques however; development of new material and equipment has been taking place of old practices.

Uses of traditional practices and materials in both mechanical and chemical stabilization techniques have some cons, if not many. For example, compaction based mechanical stabilization will significantly affect ground water condition, a disturbance to roots and consequently the vegetation growth (DeJong, 2006). Similarly, use of traditional chemical additives (like cement and lime) are expensive as well as their production and utilization is not environment friendly due to emission of carbon dioxide and pollution of ground water (Qureshi *et al*., 2014). It has been reported that 5% of the global carbon dioxide emissions are induced by the cement industries (Worrell *et al*, 2001). When soil treated with lime or any calcium-based additives containing soluble sulfate salt, soil distress, heaving and disintegration may occur, resulting in strength loss (Mitchell, 1986; Hunter, 1988). Behavior of excessive soluble salts in the surface soil is quite different and challenging towards the cementitious additives.

Shallow soil profiles of the Arabian Peninsula show that this is covered up mainly by dune or beach sand. Soil in the shallower depth in this region, bearing foundations for most of the infrastructures, is in loose state with soluble salts. Fluctuation of ground water table highly effects strength and compressibility of this soil and results in differential settlement of the supported structures. Kingdom of Saudi Arabia is at highest pace in developing infrastructure facilities, especially roads. However, very little attention has been paid to the excessive differential settlement and frequent damage to these roads. This costs a lot of money, time and other resources. Therefore, enhancement of the strength and durability properties of the supporting soil is a pressing need and this study is laying first step towards that.

In this article, an idea has been proposed to improve strength and durability properties of the abundantly available sandy soil by the addition of shredded polyethylene bags, an environment friendly and locally available additive. This idea has dual benefit of improving soil properties, minimization of maintenance cost and time, and reducing environmental waste.

MAIN RESULTS

The soil samples for this study were collected from three (03) representative construction sites for roads and buildings. The soil used at all the construction sites, in its natural condition, is poorly graded with low compaction and shear strength characteristics. Therefore, there is an immense need for the improvement of gradation and strength parameters of the soil to achieve its satisfactory performance under different loading and environmental conditions. To triumph the said purpose, shredded low to medium density plastic bags are used as an additive for mechanical stabilization of the soil. Plastic bags are shredded into 5mm by 10mm pieces and thoroughly mixed in the soil.

The direct shear test performed on the soil improved with shredded plastic (1% by weight of soil sample) showed a remarkable increase in shear strength and decrease in the normal settlement. Experiments performed with 10Kg, and 40Kg normal loads showed an increase in shear strength of 82kPa, and 295kPa, respectively. Figure 1 shows shear stress versus normal stress plots for the soil with and without improvement. The slope of the line represents angle of internal friction. By adding one percent of shredded plastic bags, an increase in angle of internal friction from 37degrees to 44 degrees has been observed.

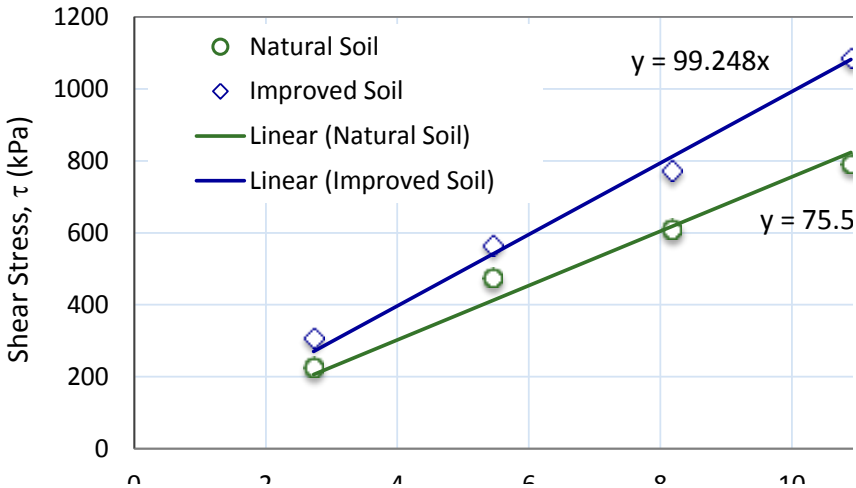


Figure 1: Normal stress versus shear stress plot for the soil in its natural condition and improvedwith shredded polyethylene. The slope of linearly fit line shows angle of internal friction

CONCLUSION

In Kingdom of Saudi Arabia, shallower earth's crust is composed of poorly graded loose sand with soluble salts. This soil with low srength and durability characterics, with further extrapolated adverse conditions in the coastal region, observes excessive differential settlement unde applied loading rendering strength and servecibiliity of supported structures.

In this article, a mechanical stabilization technique has been proposed. With low cost, locally availabe and environment friendly shredded paslit additive, a remarkable increase in shear strngth and normal settlement has been observed. The additive (1% by the weight of soil sample) increases angle of internal friction from 37 degrees to 44 degrees.

In the kingdom, polyethylene pastic bags are most abundently used. There is neither any culture of separataing plastic and non-palastic wastes, nor any effective recycling system in place. This approach of strengthening the soil with shredded plastic bags will be like killing two birds with one stone. It will increase the strength of the soil as well as reduce the environmental pollutants.

Acknowledgment:

The author would like to express his appreciation for the support and funding provided by the University of Dammam with Project No 2016-437-Eng.

REFERENCES

Alawaji, H.A. Settlement and bearing capacity of geogrid-reinforced sand over collapsible soil. Geotext. Geomembranes, 19(2001): 75-88.

Azadegan, O., Jafari S.H., and Li, J. Compaction characteristics and mechanical properties of lime/cement treated granular soils. Electron. J. Geotech. Eng., 17 (2012), 2275-2284.

DeJong, J. T., Fritzges, M. B., Nüsslein, K. Microbially Induced Cementation to Control Sand Response to Undrained Shear, Journal of Geotechnical and Geoenvironmental Engineering, 132(2006), 1381-1392.

Hunter, D. Lime-induced heave in sulfate bearing clay soils. J. Geotech. Eng., 114(1988), 150-167.

Mallela, J., Harold Von Quintus, P., Smith, K.L., and Consultants, E. Consideration of Limestabilized Layers in Mechanistic-empirical Pavement Design. The National Lime Association, Arlington, Virginia, USA (2004).

Mitchell, J.K. Practical problems from surprising soil behavior. J. Geotech. Eng-ASCE, 112(1986), 255-289.

Qureshi M. U., Bessaih N., Al-Sadrani K., Al-Falahi S., Al-Mandhari A. Shear strength of Omani sand treated with biopolymer. 7th International Congress on Environmental Geotechnics (2014), 1158-116.

Raj P. P. Ground improvement techniques. Laxmi Publicationss Pvt. Ltd. (2005).

Ramadas, T., Kumar, N.D., and Yesuratnam, G. Geotechnical characteristics of three expansive soils treated with lime and flyash. Int. J. Earth Sci. Eng., 4(2011), 46-49.

Viswanadham, B.V.S., Phanikumar, B.R., and Mukherjee, R.V. Swelling behaviour of a geofiber-reinforced expansive soil. Geotext. Geomembranes, 27(2009), 73-76.

Worrell, E., Price, L., Martin, N., Hendriks, C., Media, L. O. Carbon dioxide emissions from the global cement industry. Annu Rev Energy Env, 26(2001), 303–329.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

The Influence of Silicon Carbide Particulate Loading on Tensile, Compressive and Impact Strengths of Al-Sic$_p$ Composite

Hassan, M. A.*[1], Ofor, T.C.[2] Babakano, A.[3], Moveh, S.[4]
[1,2,3]Department of Mechanical Engineering, Modibbo Adama University of Technology, Yola, Nigeria,
[4]Department of Mechanical Engineering Faculty of Mechanical Engineering Universiti Teknologi Malaysia Skudia 81310 Johor
*mahassan@mautech.edu.ng

ABSTRACT
Metal matrix composites reinforced with silicon carbide are potential materials for various applications owing to their good mechanical properties. This study investigated the effect of silicon carbide particulate loading on the tensile, compressive and impact strengths of Aluminium (6063) –silicon carbide composite. The silicon carbide particulates were loaded at 10%wt interval between 10%wt and 50%wt SiC_p with the 0% loading as control. The composites were produced by stir casting. Tensile strength, compressive strength and impact strength tests were conducted on samples of the produced composites. The result revealed a general pattern of increase in the tested parameters with increase in percentage loading of SiC_p up to a certain level after which declines were observed. The tensile strength increased from 131MPa to a peak of 194.6MPa after which it declined, compressive strength increased from 163.6 MPa to a peak value of 233.5 MPa and the impact strength increased from 140kJ/mm2 to 250 kJ/mm^2 as the silicon carbide content increased from 0%wt to 40%wt. The parameters observed for the 50%wt loading were10.40%, 21.87% and 8.96% less than the peak values for tensile, compressive and impact strengths respectively. The 40%wt loading of SiC_p in Aluminium 6063 alloy produced the best observed effect on the tensile, compressive and impact strengths of the composite studied. It was concluded that the composition of the studied composite with 40%wt silicon carbide content is the more suitable for high performance applications.

Keywords: composite, compressive strength, impact,, loading, reinforcement, stir casting, tensile strength

INTRODUCTION
Advances in production and manufacturing technologies are close-knitted with availability of advanced materials which are required for use in high performance conditions and often with tailorable properties. In the last three decades, a lot of studies have been carried out on composite materials which, owing to their nature, are best suited to allowing designers to tailor the material used to the required properties in application

Most of the studies on metal matrix composites (MMC) have focused on Aluminium (Al) as the matrix metal (Kon and Hoon, 2002). According to Davis (1993), the combination of lightweight, corrosion resistance and adequate mechanical properties has made aluminium and its alloys very popular in making composites. Discontinuous Al-SiC and Al-Al_2O_3 MMC have found widespread applications in aerospace, transport, military, energy and electric industries; for example, they have been used in electronic packaging, aerospace structures, aircraft and internal combustion engine components and a variety of recreational products (Abhijit and Krishna, 2015).
Conventional processing methods include powder metallurgy and molten metal methods (Ibrahim et al, 1991; Davis, 1993; Janghorban, 1993; Jayaraman, 2003, Lee and Pyo, 2007; Hassan et al, 2014). The basic limitation of this method is the poor wetability of ceramic reinforcement particles with liquid Al alloys (Kim and Han, 1992; Vedani et al, 1994; Zhou and Xu, 1997; Kaynak and Boylu, 2005; Neelima et al, 2012; Mandal and Viswanathan, 2013). Poor wetability presents a great challenge to the production of cast metal matrix composites normally resulting in poor distribution of reinforcement particles, high porosity, and poor mechanical properties (Choh and Oki, 1987; Cornie and Russel, 1989; Cui et al, 1998; Daniel et al, 1993; Kobashi and Choh, 1993; Karnezis et al, 1998; Kelly and Davies, 2000). Wetability can be improved by introduction of suitable additives or by using other methods of production.
This study investigates the effects of SiC_p loading on tensile, compressive and impact Strengths of Al-SiC_p composites produced using stir casting. To enhance wet-ability and increase the speed of

incorporation of the two phases, the reinforcement material was preheated before pouring into the molten matrix material.

EXPERIMENT

In this study, Aluminium 6063 was used as the matrix while silicon carbide particulate was used as the reinforcement. The matrix was heated in a carbolite furnace to a temperature of 800°C. In order to enhance the wetability and speed of incorporation, the reinforcement material was also separately heated to 800°C. After the melt was obtained it was stirred vigorously at a speed of 450rpm with a graphite stirrer while required quantity of the preheated SiC_p was introduced. The homogenized mixture was then cast in a sand mould. The composite samples were produced with SiC_p loading varying between 10% and 50% at 10% intervals. The samples produced were subjected to tensile, compressive and impact tests.

Tensile Test

Tensile test samples were machined according to ASTM D638 standard. The tests were conducted at room temperature with the aid of Universal Instron Machine, model 3369 in the physics laboratory of Obafemi Awolowo University Ile-Ife, Nigeria. The stress-strain graphs were plotted automatically from which the percentage elongation at yield and tensile strength were calculated.

Compressive Test

Compressive test was carried out to determine the amount of force required to crush or fracture the specimen during application of pressure. The test was conducted using samples cut to a size of 20 mm x 20 mm x 20 mm on a Mosanto Hounsfield Tensiometer testing Machine, a graph paper was fixed on a cylindrical roller at the head of the machine, then a load of 2000 kg was applied at the load segment at the head of the machine. The sample was then placed in the machine and load was applied by rotating the handle of the machine in a clockwise direction, with the pointer was plotting the graph through perforation as the graph paper rotates in the process.

Impact Test

The samples for impact tests were machined to a thickness of 6.5 mm based on ASTM D256 standard. The samples were notched with a fill to a depth of about 3 mm at an angle of 45°. Thereafter, the impact test was conducted in an Izod machine.

RESULTS AND DISCUSSION

The results of tensile strength test are given in Table 1.

Table 1: Result of Tensile, Compressive and Impact Strength tests

Specimen (% SiC_p Loading)	Tensile strength (MPa)	Compressive strength (MPa)	Impact strength (kJ/mm^2)
0	131.2308 ± 0.45	163.640 ± 0.58	140.09 ± 0.33
10	145.8732 ± 0.19	175.049 ± 0.62	157.51 ± 0.92
20	156.9462 ± 0.69	188.335 ± 0.42	183.94 ± 0.82
30	182.1433 ± 1.03	218.572 ± 0.44	210.59 ± 0.98
40	194.6022 ± 2.17	233.522 ± 0.26	250.37 ± 0.83
50	174.3477 ± 0.44	182.446 ± 0.27	227.93 ± 5.58

Table 1 reveals that the tensile strength increases with increase in the percentage weight of silicon carbide particulate content up till a peak value of 194.60 MPa after which the tensile strength value starts to decrease. The observed rtrend conforms to observations of Usman et al (2014a) which reported similar trends for tensile strength of Al-Bagasse ash MMC. In another work, Usman et al (2014b) reported a similar observed trend on the effect of rice husk ash loading on the tensile strength of a composite formed using rice husk ash as reinforcement. The 40% wt loading of silicon carbide was observed to have the highest tensile strength value after which it was observed to decrease. The decrease could be due to embrittlement of the material as a result of reduced bonding at the matrix-reinforcement interface (Henriksen and Johnsen, 1990; Foo et al., 1994; Doel and Bowen, 1996; Tham et al, 2001; Shao, et al, 2011; Mandal and Viswanathan, 2013).. All the samples tend to conform to a general stress-strain shape with a clear suggestion that the samples

increase in brittleness with increase in SiC_p loading which is also an expected tendency as the increased quantity of the ceramic reinforcement reduces the material ductility.

Compressive strength tests also reveal a behaviour similar to that shown by tensile strength tests in terms of relationship of strength values with percentage SiC_p loading. The compressive strength improved gradually with increased SiC_p loading by up to 233.522 MPa for the sample containing 40%wt SiC_p as compared to the control which has a compressive strength of 163.64 MPa after which a decline in the compressive strength is observed. The decline could be explained by the phenomenon of interfacial debonding which gets more pronounced with increase in the quantity of reinforcement particles beyond a given limit (Agarwal and Broutman, 1990; Henriksen and Johnsen, 1990; Shao, et al, 2011; Mandal and Viswanathan, 2013).

Impact strength of the studied materials also depend on the quantity of the reinforcement particle present in the composite with the dependence showing an initial improvement of impact strength with increased SiC_p loading up to a certain loading level and then a decline in strength which could equally be explained as above. The observed impact strength values increased with SiC_p loading up to 250.37 kJ/m^2 at 40%wt loading after which it declined to 227.93 kJ/m^2 for the 50%wt SiC_p loading. The observed trend in impact behaviour after reaching a peak value could be explained by particle clustering, particle cracking and weak interface bonds which all tend to increase with increase in reinforcement loading. This is in conformity with results reported in literature (AKM and Dewan, 2016; Ozden, Ekici and Nair, 2007; Hamouda et al, 2007). Najeeb (2013), however, reported that impact strength of Al-SiC composite decreased with increasing SiC loading which observation could be as a result of the fact that he added Si particles in the process of making the composite to improve solubility.

CONCLUSION

This study revealed that the extent of SiC_p loading in Al-SiC_p composites has influence on the resulting strength characteristics of the material. Generally, increase in the quantity of silicon carbide increases the tensile, compressive and impact strengths of the produced metal matrix composite. The strength characteristics however, start declining after the optimal loading value is exceeded. For the material studied, it was found out that the optimal load level of SiC_p is 40%wt at which point average strength values of 194.64 MPa, 233.52 MPa and 250.37 kJ/m^2 were obtained respectively from tensile, compressive and impact tests of the material.

REFERENCES

Abhijit, D and Krishna M.P (2015) Magnesium metal matrix composites – A Review. Rev. Adv. Mater. Sci. 42 58-67.

Choh T and Oki .T, (1987) Wettability of SiC to Aluminum and Aluminum Alloys. *Materials Science and Technology Journal*, *3*, 378-385.

Davis J.R, (1993). Aluminium matrix composites, ASM specialty handbook: Aluminium and Aluminium alloys, ASM international, pp 160-179.

Abhijit, D and Krishna M.P (2015) Magnesium metal matrix composites – A Review. Rev. Adv. Mater. Sci. 42 58-67.

Agarwal.C.R and Broutman M.M (1990) Mechanical Properties of Composites. Composite structure, 5, 86-92.

AKM, A. and Dewan M.N (2016) Effect of Reinforcement on the mechanical properties of Aluminium metal matrix composite: A Review. International journal of applied Engineering research, Volume 11, Number 21, 10408-10413.

Choh T and Oki .T, (1987) Wettability of SiC to Aluminum and Aluminum Alloys. Materials Science and Technology Journal, 3, 378-385.

Cornie J.A. and Russell K.C. (1989). Wetting of Ceramic Particulates with Liquid Aluminium Alloys Metallurgical Transactions., 20,527-541.

Cui Y., Li X., PENG H. and Yao, Z., (1998).Interface characterization of the discontinuously reinforced metal matrix composites based on wavelet analysis of acoustic emission behavior. Chinese Science Bulletin Vol .43 No. 9.

Davis J.R, (1993). Aluminium matrix composites, ASM specialty handbook: Aluminium and Aluminium alloys, ASM international, pp 160-179.

Daniel T.K, Do-Suck Han, Jones H. and Atkinson H.V. (1993). The Wetability of Silicon Carbide by Liquid Aluminium: The Effect of Free Silicon in the Carbide and of Magnesium, Silicon and Copper Alloy Additions to the Aluminium, Journal of Materials Science 6, 2654-2658.

Doel T.J.A. and Bowen P. (1996). Tensile Properties of Particulate-Reinforced Metal Matrix Composites. Composite 27,655-665.

Folgar, F. (1988). "Fiber FP/Metal matrix composite, 9, 561.

Foo K.S., Banks W.M., Craven A.J. and Hendry A., (1994). Interface characterization of SiC particulate/6061 aluminium alloy Composites, Journal of Applied Science and Engineering Research 25(7), 677-683.

Hassan M.A., Ofor T.C., Usman A.M. and Godi N.Y. (2014) Development of Aluminium Metal Matrix Composite Using Stir Casting Method. The International Journal Of Engineering And Science (IJES), Volume 3, Issue 8, Ver. II, 36-39.

Henriksen B.R and Johnsen,T.E. (1990).Influence of microstructure of Fiber/Matrix interface on Mechanical Properties of Al/SiC Composites. Materials Science and Technology. 6, 857-863.

Ibrahim I.A Srivatsan T.S.,., Mohamed F.A., Lavernia E.J (1991). Processing techniques for particulate-reinforced metal aluminium matrix composites, Journal of Materials Science, 26, 596-598.

Janghorban K. (1993). Processing of Ceramic Matrix SiC-Al Composites. Journal of material Processing Technology 38(1-2), 361-368.

Jayaraman (2003). International Reports on Advanced Technologies: Metal Matrix Composites: Technology and Industrial Application 11, 128-130.

Karnezis P.A, Durrant G and B.Cantor (1998). Characterization of Reinforcement Distribution in cast Al-alloy/SiCp Composites. Materials Characterization, 40, 97-109.

Kaynak, C. and Boylu, S.,(2005). Effects of SiC particulates on the fatigue behaviour of an Al-alloy matrix composite, Journal of Material & Design, 4, 22-26.

Kelly A. and Davies G. J. (2000). Optimum Parameters for Wetting Silicon Carbide Aluminium Alloys. Metallurgical and Materials Journal, 31, 565-573.

Kim Y.H., Lee C.S. and Han K.S (1992).Fabrication and Mechanical Properties of Aluminium Matrix Composite Materials. Journal of Composite Materials 26, 1062-1086.

Kobashi M. and T.Choh, (1993).The Wettability and the Reaction for SiC Particle/Al Alloy System. Journal of Materials Science 4, 684-690.

Kon Bae Lee and Hoon Kwon(2002).Strength of Al-Zn-Mg-Cu Matrix Composite Reinforced with SiC Particles. Metallurgical and Materials Transactions, 33, 455-465.

Lee, H.K.; Pyo, S.H. (2007). Micromechanics-based elastic damage modeling of particulate composites with weakened interfaces. Int. J. Solids Struct., 44, 8390–8406.

Mandal, D.; Viswanathan, S. (2013). Effect of re-melting on particle distribution and interface formation in SiC reinforced 2124Al matrix composite. Mater. Charact., 86, 21–27.

Najeeb, S.A. (2013) Experimental study of the mechanical and metallurgical behaviour of Al-SiC composite. Academic research international, Vol. 4 No 5, 22-29.

Neelima Devi C., Selvaraj N., and Mahesh V. (2012) Aspects of microstructure in Aluminium-SiCp composite. Int. Journal of Applied Sciences and Engineering Research, 2, 251-252.

Ozden, S., Ekici, R. and Nair, F. (2007) "Investigation of impact behaviour of Aluminium based silicon carbide reinforced metal matrix composites", Composites: Part A, 38, 484-494.

Polmear (1995) Metal Matrix Composite. Material Science and Engineering Journal 4, 29-38.

Shao, J.C.; Xiao, B.L.;Wang, Q.Z.; Ma, Z.Y.; Yang, K. (2011). An enhanced FEM model for particle size dependent flow strengthening and interface damage in particle reinforced metal matrix composites. Compos. Sci. Technol., 71, 39–45.

Tham L.M., Gupta M. and Cheng L.(2001). Effect of limited matrix reinforcement interfacial reaction on enhancing the mechanical properties of aluminium–silicon carbide composites, Int. Journal of Applied Science and Engineering Research, 49(16), 3243-3253.

Usman A.M., Raji A., Hassan M.A. and Waziri N.H.(2014) A Comparative Study on the Properties of Al-7%Si-Rice Husk Ash and Al-7%Si-Bagasse Ash Composites Produced by Stir Casting. The International Journal Of Engineering And Science (IJES), Volume 3, Issue 8, Ver. I, 1-7.

Usman A.M., Raji A., Waziri N.H. and Hassan M.A.(2014). Production and Characterization of Aluminium Alloy-Bagasse ash composites. IOSR Journal of Mechanical and Civil Engineering. Vol. 11 Issue 4. Ver. III, 38-44.

Vedani, M., Gariboldi, D., Silva. G. et al., (1994). Influence of interface properties on mechanical behaviour of particle reinforced metal matrix composite, Mateial Sctence Technology, 10(2) : 132.

Zhou W. and Z. M. Xu, (1997). Casting of SiC Reinforced Metal Matrix Composite. Journal of Materials Processing Technology, 63, 358-363.

Zweden C. (1992). The attractive properties of metal matrix composite. Journal of metals, 44, 15-18.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Effect of Noise and Measurement Distance on Wavelet Transform-Based Damage Detection

Muyideen Abdulkareem*[1], Najiyu Abubakar[2], Ogunbode E. Babatunde[3] and Ernest I. Egba[4]

[1] Faculty of Civil Engineering, Universiti Teknologi Malaysia, 81310, Johor, Malaysia
(E-mail: muyikareem@gmail.com)
[2] Department of Civil Engineering, Kano State University of Science and Technology Wudil, Nigeria.
(E-mail: najiyyuaj@gmail.com)
[3] Department of Building, School of Environmental Technology, Federal University of Technology, Minna, Nigeria.
(E-mail: ezekiel@futminna.edu.ng)
[4] Department of Technology and Vocational Education, Ebonyi State University, Abakaliki, Nigeria.
(E-mail: letschartup@gmail.com)

ABSTRACT

Wavelet Transform (WT) has been proven to be a reliable method of damage detection in structures. This is partly due to its ability to detect local damage. However, the effect of noise may result to false detection of damage, thus affecting the reliability of the method. Moreover, the location of sensors also plays an important role in providing good quality dynamic response data of structure, where a small number of sensors may lead to inadequate data for accurate estimation of the structural damage, while a large number increases the financial cost of the monitoring system and causes higher computational time. In this view, this study investigates the effect of noise and different sensor distance to Continuous Wavelet Transform (CWT) for damage detection through the decomposition of mode shape differences. In this study, a numerical model of a plate with all four sides fixed is used as an example. To analyse the noise effect, various noise levels are added to the mode shape difference signal before decomposition. The effect of the sensor distance is done by using different sensor measuring distances. The results indicate that the increase of noise reduced the detectability of damage. It is also observed that excessive sensor distance increment significantly effects damage detectability.

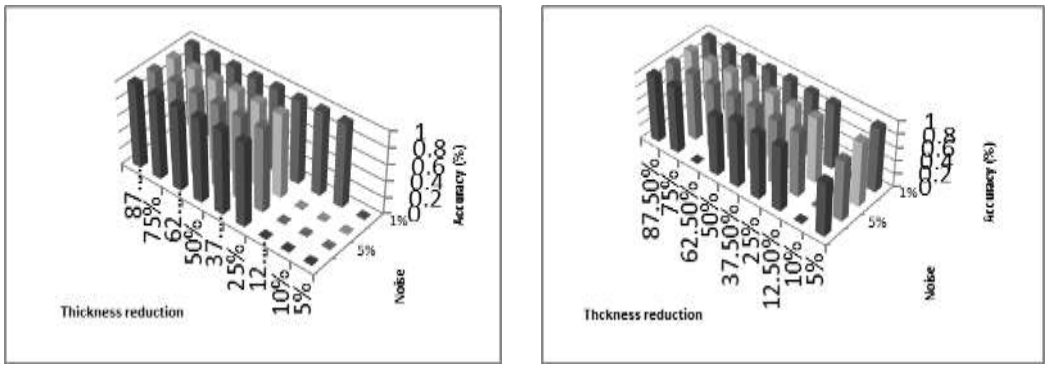
Keywords: Plate, Wavelet Transform, Damage detection, Noise, Measurement Distance

INTRODUCTION

The distance between the sensors may also influence the degree of accuracy of damage identification (Vafaei and Alih, 2015). When the number of sensors is small, the distance between sensor are larger, thus lead to less accurate estimation of the structural damage, while a large number increases the financial cost of the monitoring system and causes higher computational time (Saïd and Djamel, 2013). However, study on the effect of different sensor distance to damage detectability focusing on WT method is quite limited. Therefore, this study investigates the sensitivity of CWT to noise and sensor's measurement distance for damage detection in a plate-like structure. For the purpose of damage detection, the mode shape difference before and after damage served as the input rather than conventional mode shape of the damaged structure (Lee *et al.*, 2005). The vibration data obtained from the numerical analysis of the plate structure is used in computing the mode shape difference. To detect and locate the damage, the mode shape differences are then decomposed using CWT. The effect of noise and sensors' distances to CWT in detection of different degrees of damage severity in a plate structure is analysed in this study. To study the effect of noise to damage detectability, various levels of noise are added to the values of the mode shape differences. The effect of the sensor distance is investigated by varying the distance between the measurement nodes. The effects of noise and sensor distance are evaluated based on damage detectability by applying a damage index and pictorial representation of the decomposed signal.

MAIN RESULTS

Figure 1 summarises the result (middle and side damages) for i5 with noise level varying from 1% to 10%, and damage severity from 5% to 87.5%. When the noise level increases (and damage severity decreases), it is observed that the sensitivity to damage decreases. Take figure 13(a) for example (middle damage), when noise is increased (to 2%, 5% or 10%), damage is not detectable until the severity is up to 25%. Also, when the damage severity is 12.5%, damage is detectable when the noise is reduced to 1% The reason for this is that the sensitive damage features in the data have been submerged by noise. It is also observed that the accuracy of the detectability is high, close to 100%, and on the other hand, the non-detected damages are completely undetectable.



(a) Middle damage (b) Side damage

Figure 1. Measurement at 5mm (i_5)

CONCLUSION

The study presents an investigation on the Wavelet Transform (WT) sensitivity and attributed uncertainties for damage detection of plate-type structures using mode shape difference. The results have shown the sensitivity of WT to damage and its ability to accurately detect damage in the presence of noise. It is observed that damage is either detected accurately or it's not detected at all. For all studied cases, damage was not detectable when the measurement distance was 80mm. In most cases, the presence of noise, increment of measurement distance and decrease of damage severity reduced the detectability of damage. Measurements at i_5, i_{10}, i_{20} and i_{40} are adequate for mode shape difference analysing with WT for damage detection.

REFERENCES

Lee, J.J., Lee, J.W., Yi, J.H., Yun, C.B., Jung, H.Y. Neural networks-based damage detection for bridges considering errors in baseline finite element models. *Journal of Sound and Vibration* 280(3-5) (2005), 555-578.

Saïd, A. and Djamel, B. Optimal sensor placement for fault detection and isolation by the structural adjacency matrix. *International Journal of the Physical Sciences* 8(6) (2013), 225-230.

Vafaei, M. and Alih, S.C. An Ideal strain gage placement plan for structural health monitoring under seismic loadings. *Earthquakes and Structures* 8(3) (2015), 539-551.

1.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Cost Estimation Approaches for Industrialised Building Systems

Mohamed Murtaza Gulamhussein Moledina, Goh Wei Pin and Wallace Imoudu Enegbuma*

Faculty of Engineering, Computing and Science, Swinburne University of Technology, Kuching, Malaysia.
(4314077@students.swinburne.edu.my, wgoh@swinburne.edu.my, wenegbuma@swinburne.edu.my)

ABSTRACT

Project costing is pivotal to success in attaining set project objectives. As costing models continue to steer towards the use of new wave costing models, the paradigm shift in the Industrialised Building System (IBS) and Building Information Modeling (BIM) usage in Malaysia invariably affect the costing techniques. This paper examines the various types of cost estimation methods from traditional to current new wave practices. Data was collected via questionnaire from registered quantity surveying companies with the Board of Quantity Surveying Malaysia (BQSM). The results revealed that bill of quantity (BOQ) ranked top of the traditional cost estimation models. Monte carlo simulation ranked top for non-traditional cost estimation while web based tools ranked top for new wave cost estimation models. This results highlights the gradual shift by cost estimators towards new wave cost estimation methods such as automatic quantity take off with BIM. Subsequent research will examine the factors influencing IBS project costing.

Keywords: Building Information Modelling (BIM), Cost Estimation, Industrialised Building Systems (IBS), Malaysia.

INTRODUCTION

Malaysia stiring towards an advanced economy by 2020 possesses several development projects which are ongoing and more planned to be embarked on. However, during the work progress there are constant modifications and delays experienced which are the major drawbacks that increases total cost; causing this to be one of the expensive and serious problem in the construction industry in Malaysia. Adoption of innovative technology by construction professionals is much slower than other sectors (Enegbuma *et al*., 2015). Cost estimation is a vital activity in any construction project which has to be checked at various phases of the construction and it is also a precise process that is made to give the project cost (Akintoye and Fitzgerald, 2000). Ismail (2014) found that IBS has been used in Malaysia since 1964 and has recently gained more attention due to the advancement of the technology. There are 5 diverse types of IBS such as pre-cast concrete, steel framing, steel formwork, prefabricated timber framing and block work system. Pre-cast concrete and steel structures are mainly used in Malaysia with cost playing a key role in IBS use (Ojoko *et al*., 2016). Cost estimating is an essential activity that is checked at various stages of the structure construction process, that is beginning from the initiation and feasibility study stage of the project to the preliminary and detailed design stages, and finally at the project completion stage. several researchers have accredited that to ensure the construction project is successful and effective; selecting the right type of cost estimation method or procedure is vital apart from good management (Bari *et al*., 2012). Cost estimation in construction projects is a genuine procedure intended to give a reliable forecast of the financial costing (Akintoye, 2000).

MAIN RESULTS

Figure 1 shows the distribution of working experience in the construction industry of the respondents, whereby 36% have 1-10 years, 33% have above 30 years and 31% have 11-30 years'

experience. It can be determined that the respondents working experience in the field is almost balanced such that 53% have below 20 years and 47% have above 20 years' experience.

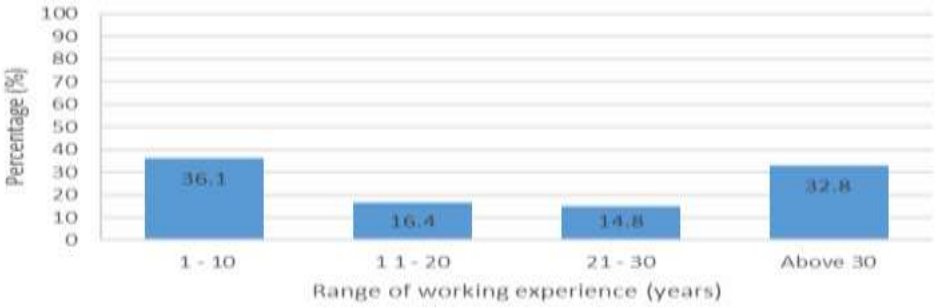


Figure 1. Respondents' working experience in the Construction Industry

Table 1 revealed that one of the top most used model is "Bill of Quantities" which has a high mean (4.85) and low standard deviation (0.511) indicating that most estimators prefer to use this method compared to others. The other models like conference, financial method, functional unit and superficial are least used as indicated by the results.

Table 1. Traditional Cost Estimation Models

Models	Frequency	Mean	*SD*	Rank
Conference	56	1.13	0.574	9
Financial Method	55	1.20	0.678	8
Functional Unit	57	1.54	0.983	7
Superficial	57	1.72	1.161	6
Superficial Perimeter	57	2.00	1.018	5
Cube	58	2.21	1.022	4
Storey Enclosure	58	2.24	1.081	3
Approximate Quantities	60	3.85	1.039	2
Bill of Quantities	61	4.85	0.511	1

The responses of the survey for the non-traditional models shown in Table 2 for the mean values indicate that most of the models are never used by most of the quantity surveys and only a few of them use the models. However, the model that is used more is Monte Carlo Simulation and least used is Causal Model.

Table 2. Non - Traditional Cost Estimation Models

Models	Frequency	Mean	*SD*	Rank
Regression Analysis	58	1.26	0.48	6
Causal Model	58	1.21	0.45	7
Monte Carlo Simulation	58	1.83	2.767	1
Value Management	58	1.72	0.833	2
Knowledge-based Model	58	1.62	0.813	3
Resource-based Model	58	1.62	0.914	3
Life-cycle Model	58	1.53	0.754	5

On the other hand, Table 3 displays the results for the New Wave models which also shows similar results as non-traditional that most models are never used except for Wed-based Tools seem to be used seldom by the quantity surveyors; such that it has 2.42 mean and a standard deviation of 1.192.

Table 3. New Wave Cost Estimation Models

Models	Frequency	Mean	*SD*	Rank
Neural Network	58	1.47	0.599	3
Fuzzy Logic	56	1.2	0.401	4

Web-based Tools	59	2.42	1.192	1
Building Information Modelling (BIM)	58	1.67	0.98	2
Environmentally and Sustainable Development	58	1.17	0.596	5

CONCLUSION

The survey reveals that traditional cost estimating models are still highly used by the estimator and the non-traditional and new wave models have drawn limited attention and thus, never or seldom used. Furthermore, it can be noted that the least used model are Conference, Environmental and Sustainable development models. Bari (2009) conducted a similar study of cost estimation modelling used by registered quantity surveyors in Malaysia, which indicated that the traditional models were highly used and other models were seldom to never used. The research has revealed that the least used method were Neural Network, Fuzzy Logic and Environmentally and Sustainable development models. Moreover, comparing the results from Bari (2009) and this research results, it indicated that there is a change in the usage of the models and that the non-traditional and new wave models have now started getting the attention but very slowly. The following are some of the reasons as to why the estimator/Quantity surveyors are still reluctant to change and use newer models than the traditional models: (1) Not Familiar with new methods; (2) Time oblige, also lack of knowledge and information; (3) The level of complexity of the methods; especially for small project is seen as too unnecessary; (4) Projects not requiring use of complex methods or permit the study of these methods; (5) Lack of Confidence in the methods due to low availability of the sound information. And also, having doubts that whether the models can be used for other project or not; (6) Lack of Budget for taking courses to learn the new models and; (7) The enormous common of dangers are constructional related or contractual and are equally particular such that they can be allocated with better on the basis of individual experience or from prior projects done by the firm.

REFERENCES

Akintoye, A 2000, 'Analysis of factors influencing project cost estimating practice', *Construction Management and Economics*, vol. 18, no.1, pp. 77-89.

Akintoye, A & Fitzgerald, E 2000, 'A survey of current cost estimating practices in the UK', *Construction Management and Economics*, vol. 18, no. 1, pp. 161-172.

Bari, NAA, Kadir MRA, Ismail, N & Yusuff, RM 2009,'*The incidence-in-use of cost estimation model for Industrialised Building Systems (IBS) projects*', Department of Civil Engineering, Universiti Putra Malaysia, Selangor, Malaysia.

Bari, NAA, Yusuff, RM, Ismail, N, Aini, J & Rizan, A 2012, 'Factors influencing the construction cost of Industrialised Building System (IBS) projects', *Procedia - Social and Behavioral Sciences*, vol. 35, pp. 689-696.

Enegbuma, W.I, Aliagha, U.G & Ali, K.N 2015, 'Effects of Perceptions on BIM Adoption in Malaysian Construction Industry', *Jurnal Teknologi*, vol. 77, pp. 15.

Ismail, N 2014, *'Implementation of Industrialised Building System (IBS) in Malaysia Construction Industry'*, Honours thesis, Universiti Malaysia Pahang, Pahang.

Ojoko, E. O., Osman, M. H., Rahman, A. B., Omar, W. S. and Enegbuma, W. I. (2016). Stakeholders Perception of Project Success Criteria for Industrialised Building System in Nigerian Mass Housing Development. *2nd International Conference on Science, Engineering, and the Social Sciences (ICSESS)*, May 29th – June 1st, Skudai, Malaysia.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Implementation of an Early Drowning Detection System for IoT Applications

Muhammad Ramdhan M. S.*, Paulson E. N. and Kamaludin M. Y.

Advanced Telecommunications Technologies (ATT) research group. Faculty of Electrical Engineering, Universiti Teknologi Malaysia (UTM) 81310, Johor Bahru, Malaysia.
(E-mail: *ramdhansuhaili@gmail.com, enpaulson2@gmail.com, kamalmy@utm.my)

Abstract

Drowning is the leading cause of injury or even death for children aged 1 to 18 years old. Designing a low-cost drowning detection device is becoming an important need in other to ensure the safety of the child. This paper proposes an Early Drowning Detection System (EDDS). The proposed system alerts the parents' smartphone and web page if the detector triggers an abnormal heartbeat and when the child is submerged for a long time. An Arduino Pro Mini microcontroller is used to control the signal received from a pulse sensor (for detecting heartbeat) and time for the signal lost under the water before it is transmitted to the monitoring hub. The Raspberry Pi microprocessor is being used as a monitoring hub. This monitoring hub acts as a web server and also does data forwarding. UART 433MHz RF-Transceiver has been used to send a signal between drowning detection device and monitoring hub. This monitoring hub uses internet connection as a medium to give a warning to the parent's or lifeguard's smartphone. This system will be implemented in a chosen pool in Johor Bahru, Malaysia. Several tests will be carried out to measure the efficiency of the system thus ensuring that the objectives of the project are achieved.

Keyword: Drowning, Internet of Things, Wireless Sensor Network, Early Drowning Detection System.

INTRODUCTION

According to the World Health Organization (WHO), drowning has been defined as the process when the victims are experiencing respiratory impairment due to submersion or immersion in the liquid such as water (Szpilman, 2012). There is no air flow to the lungs because of the blockage in victim's respiratory system. The human brain may be damaged due to the effect of that situation. The human brain cannot survive without enough oxygen and it will cause hypoxia (Szpilman, 2012). The statistics from World Health Organization (WHO) shows that 372,000 people in 2014 die due to drowning and children and young adults contribute the highest percentage of drowning (World Health Organization, 2014). Surprisingly, the male child has the highest rate of fatal drowning (Hss *et al*., 2014). Usually, drowning happened in streams, lakes, bathtubs and swimming pool (Peden, 2008). The chance of drowning among children is high. Factors that contribute to this fatality are that; most of them do not have the ability to swim and did not wear any lifebuoy during their activities in the swimming pool. It's difficult and nearly impossible for a lifeguard to monitor all the swimmers due to poor visibility at the swimming pool. It is the lifeguard's responsibility to seek out every blind spot in the swimming area and to take the necessary action to ensure safety in such areas (Lifeguard-Pro, 2015). The rate of drowning can be reduced if there is an early warning prior to occurrence. The Internet of Things (IoT) is basically a network of sensors, which contain embedded technology, and can communicate and interact with each other via that technology. Wearable computing devices like watches and glasses are also envisioned to be key components in future IoT systems (Gandhimathi, n.d). Wireless Sensor Network (WSN) is currently one of the most develop and research field in electronics as its potential to create an impact on our society through its application. WSN is able to act as a bridge between physical and virtual world (Elson and Estrin, 2004). Application of IoT in drowning

detection system can be used for monitoring children's conditions inside the swimming pools. This paper is focused on developing a system that will give an early warning to the lifeguard and parents a drowning incident occurs. The system is based on the drowning symptoms that can be detected by electronic sensors. Before the victims start drowning, they usually will experience a near-drowning (panic situation). At that particular situation, their heartbeat rhythms will be abnormal (cardiac dysrhythmias) and most of their body temperature will drop below 35 degree Celsius (hypothermia) (Colin Tidy, 2014). The proposed system also reduce the percentage drowning fatalities among children.

PROPOSED DESIGN

An EDDS has been proposed and developed which aims to improve the children safety in swimming pool. Thus, reducing the statistic of drowning accident among children. The system can detect the early symptoms of drowning by using an algorithm (heartbeat) for symptoms detection. This system can be monitored remotely. Figure 1 illustrates the block diagram of the proposed system. The system contains three subsystems which are drowning detection device, access point and monitoring system. The whole system in this project was designed using the suitable size component to make the device smaller and easy for installation. This early drowning detection system uses a wireless medium to communicate between server and drowning detection device. A simple Radio Frequency (RF) communication protocol has been used for this project. This system will detect abnormal heartbeat symptom by using heartbeat sensor. The microprocessor analyzes the algorithm of the symptoms before triggering the warning alarm. The architecture of the first subsystem (Drowning Detection Device -DDD) is shown in Figure 2. This device consists of pulse sensor to detect the heartbeat rhythm from the swimmer. This heartbeat signal from pulse sensor was analyzed by the microcontroller- Arduino Pro Mini 328. 433MHz UART transceiver module was used as a transmitter for the device.

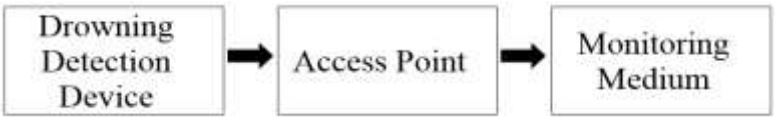


Figure 1. Block diagram of the full system.

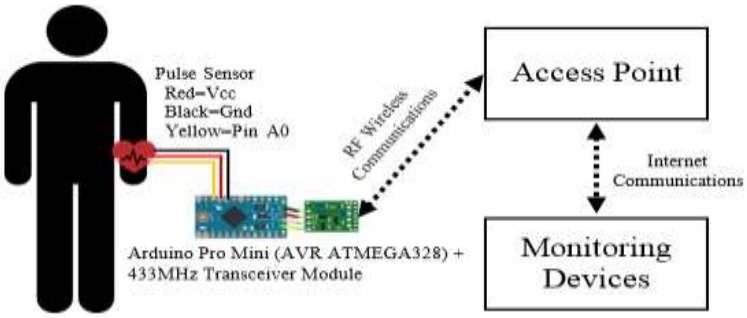


Figure 2. Architecture diagram for drowning detection device.

Figure 3 shows the architecture of the second subsystem (Access Point-AP). AP establishes the communication between the DDD and AP. RF was chosen as a communication medium between these two parts and 433MHz UART transceiver module was used as a receiver at the access point. The access point was developed by using Raspberry Pi 2 because it can be connected to the internet easily using LAN cable or Wi-Fi adapter. It also acts as a gateway to store the data received from the drowning detection device to the database. Figure 4 shows the architecture diagram for monitoring medium. The AP allows the user to monitor the system through android application and web page by connecting it to the internet. The monitoring system will show the real time

application of the system. It can help the lifeguard and parents to monitor the child via a smartphone. This system also needs to be waterproof to ensure that all components used do not damage.

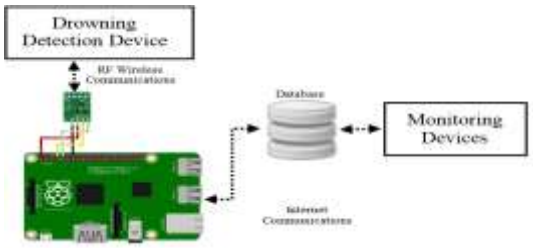


Figure 3. Architecture diagram for the access point.

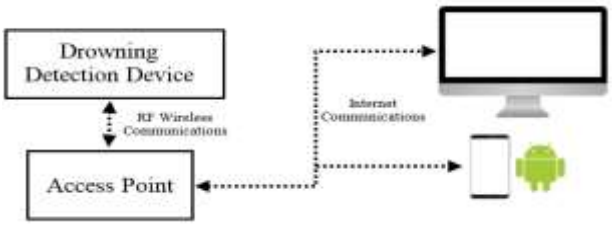


Figure 4. Architecture diagram for monitoring medium.

CONCLUSIONS

An EDDS has been proposed and developed which aims to improve the child safety in swimming pool. Thus, reducing the statistic of drowning accidents among children. The EDDS was developed using a miniature microcontroller, Arduino Pro Mini, to make it small and practical to wear as a headband. 433MHz UART transceiver for this device can function well on long distance, compare to another transceiver module. Silicon sealant was used to seal the circuit to make it waterproof and avoid any damage. The other requirement is to develop an accurate heartbeat algorithm detection for systems. For this system pulse sensor was used to make a measurement of the heartbeat. This algorithm was successfully build to give an accurate and fast reading for the system. These heartbeat rhythms were received wirelessly and were processed by Raspberry Pi before stored in the database. The children safety in the swimming pool must be guaranteed. Thus, the EDDS will help to reduce the statistic of drowning accident among children.

Acknowledgment

The author would like to express the deepest gratitude to Research Management Center (RMC), Universiti Teknologi Malaysia (UTM) for their support with Research Student Grant (RSG) number:" VOT Q. J130000.2623.12J66

REFERENCES

Colin Tidy, D.A.B., *Hypothermia*. 2014, Patient Platform Limited.Elson, J. and D.

Estrin, *Sensor networks: a bridge to the physical world*, in *Wireless sensor networks*. 2004, Springer. p. 3-20.

Gandhimathi, M.M., *INTERNET OF THINGS APPLICATION RANKING USING ARCHITECTURE AND USAGE*.

Hss, A.-S., P.S. Tan, and L. Hashim, *Childhood drowning in Malaysia.* International journal of injury control and safety promotion, 2014. 21(1): p. 75-80.

Organization, W.H., *Global report on drowning: preventing a leading killer*. 2014: World Health Organization.

Peden, M., *World report on child injury prevention*. 2008: World Health Organization.

LIFEGUARD-PRO "America's Leader in Water Safety & Rescue". 2015.

Szpilman, D., et al., *Drowning.* New England journal of medicine, 2012. 366(22): p. 2102-2110.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Identification of Downtime Influence Factors to Naval Ship Operational Availability for Sustainment of Naval Force

Al-Shafiq bin Abdul Wahid[*1], Mohd Zamani bin Ahmad [1], Sunarsih [2], Mohd Najib bin Abdul Ghani Yolhamid[3], Mohamad Abu Ubaidah Amir Abu Zarim[3], Aisha binti Abdullah[4] and Nur Hanani bt Ahmad Azlan[1]

[1]Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Malaysia
(Email: [a]al_shafiq@hotmail.com, [b]drmohdzamani@gmail.com, [g]nhanani4@gmail.com),
[2]Institut Sultan Iskandar, UTM Skudai, 81310, Malaysia
([c]sunarsihutm@gmail.com)
[3]Faculty of Science and Defence Technology, Universiti Pertahanan Nasional Malaysia,
Kem Sungai Besi, 57100, Malaysia
(Email: najib@upnm.edu.my, [e]amir.a@upnm.edu.my)
[4]Enigma Technical Solutions Sdn Bhd, Business Centre, Desa Villas, Section 10 Wangsa Maju, 53300 Kuala Lumpur, Malaysia
(Email: aisha@enigmatechnicalsolutions.com)

ABSTRACT

Achieving high operational availability of the fleet of naval vessels remain the target of all navies around the world. Only navies able to mantain high operational availability can sustain deterrence and naval presence. Navies such as the Royal Australian Navy explore sustainable strategies for their existing and future fleet of vessels. The dilemma is accommodating increased design complexity, mantaining vessel classes at various locations, enduring budget restrictions, whilst achieving high operational availability targets. Sophisticated strategies have been continuously implemented by modern navies such as the United States Navy through improved maintenance concepts, human capital development and optimized fleet response plan. Nevertheless, they continue to face near, medium and long term issues associated with high ship operational tempo. Increasing vessel operational availability to meet presence requirements with existing force structure increases costs and decreases crew and ship readiness in the short term, it degrades the ship material condition over medium and long term with a likely impact on the fleet's intended lifecycle. Therefore efforts in improving availability without identifying and understanding the underlying Downtime Influence Factors (DIFs) are futile as some of these DIFs may be the root cause to the discovered short, medium and long term issues. Due to limited available data and research into naval ship DIFs, an explorative study across various engineering disciplines was carried out to generate generic naval ship DIFs through mixed-method research beginning with comprehensive literature review, followed by Focus Group Discussions and subsequently a survey with experts knowledgeable in naval ship maintenance contracts. The study revealed 50 DIFs involving human and equipment related factors as a stepping stone towards future research in quantifying and ranking the DIFs on vessels worldwide with the ultimate objective of pinpointing the exact key problem areas for prioritisation of efforts by the navies.

Keywords: Naval vessels, navy ship maintenance, operational availability, Downtime Influence Factors (DIFs), Focus Group Discussions.

INTRODUCTION

Navies around the world aspire to improve fleet operational availability. For instance the Royal Australian Navy (RAN) is exploring new strategies for the sustainment of existing and future naval vessels in the fleet. RAN's focus has shifted to building for sustained capabilities and availability in future to provide strategic deterrence and naval presence (Chief Royal Australian Navy, 2016). Availability is seen as a key enabler of future sustainment. Ship availability is defined following Inozu (1996) and Blanchard & Fabrychy (1998) as the probability that the ship is available and capable of performing the intended function at any random point in time.

Studies into modern navies such as Unites States Navy show that continuously implemented sophisticated maintenance strategies, human capital development and optimized fleet response plan provided near-term benefits, nevertheless significant short, medium and long term issues were faced especially when far from home base. Increasing vessel operational availability to meet presence requirements increases costs and decreases crew and ship readiness in the short term, it degrades the ship material condition over medium and long term with a likely impact on the fleet's intended lifecycle (US GAO, n.d).

Therefore efforts in improving availability without identifying and understanding the underlying Downtime Influence Factors (DIFs) are futile as some of these DIFs may be the root cause to the discovered short, medium and long term issues. Due to limited available data and research into naval ship DIFs, an explorative study across various engineering disciplines was carried out to generate generic naval ship DIFs through mixed-method research beginning with comprehensive literature review, followed by Focus Group Discussions (FGD) conducted with 30 panel experts and subsequently a survey with 30 experts knowledgeable in naval ship maintenance contracts.

MAIN RESULTS

The FGD complemented the findings from over hundreds of literatures to populate the factors affecting the operational availability of ships. Table 1 contains the agreed list of 50 DIFs identified. Following on from the FGD a survey was conducted with the same experts to rank the DIFs from most severe to least severe. Figure 1 contains the ranking of DIFS.

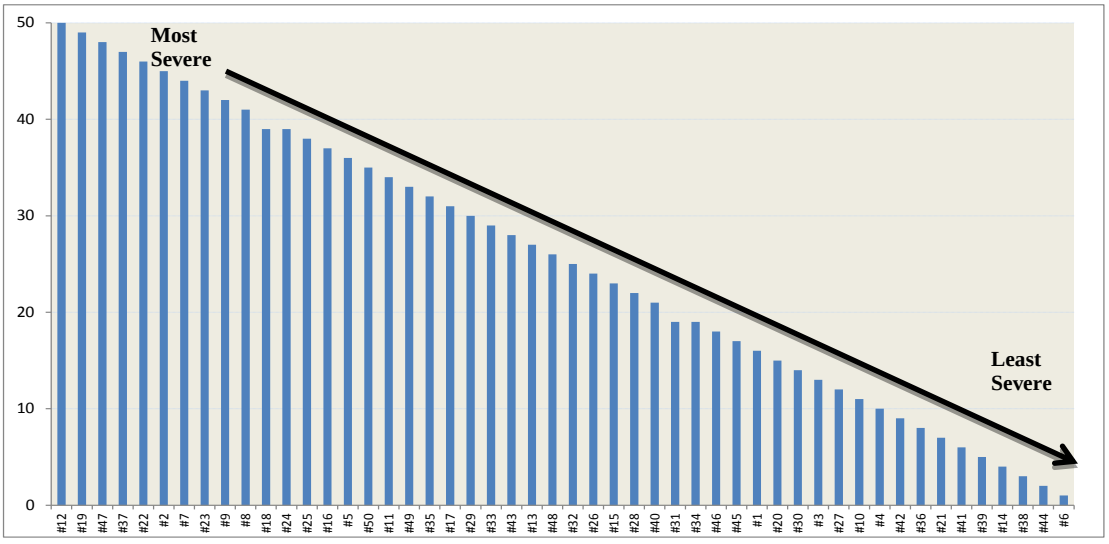


Table 1: The 50 groups of DIFs agreed by Expert's via Focus Group Discussions

No	DIFs for Ship Operational Availability	No	DIFs for Ship Operational Availability
1	Equipment and Systems – Hull and Design	28	Morale & Attitude of Contractor involved in Maintenance
2	Equipment and Systems – Main Propulsion		
3	Equipment and Systems – Electrical	29	Efficiency of Processes, Procedures and reporting structure include Finance
4	Equipment and Systems – Weapon Systems including guns and missiles		
		30	Ship Operational/sailing schedule
5	Equipment and Systems – Auxilliaries	31	Non-Commonality of Equipment issues
6	Equipment and Systems – Outfittings	32	Non Redundancy of Equipment
7	Maintenance Policy - Priority on Type of Maintenance	33	High Turnover of maintenance supervisors
		34	High Turnover of maintainers
8	Awareness of Importance of Maintenance / Attitude – including hiding problems from becoming official.	35	Different location of ships
		36	Statutory requirements
		37	Cashflow Shortages

9	Maintenance Budget Allocation	38	Government Requirements and Policies (i.e. PPE, Offset etc),
10	Information Management		
11	Preventive Maintenance	39	Variation Order and Contract Change
12	Corrective Maintenance	40	Ageing of Equipment Aging
13	Predictive Maintenance	41	Force Majeure
14	Emergency Repair & Docking	42	Accidents & Hazards
15	Equipment Technology / System Complexity	43	Extraordinary Price Escalations (Spares, Consumables, Equipment)
16	Scheduling Issues	44	Pilferage, Theft & Fraud & Cheat
17	Maintenance of Special Tools, Test Equipment	45	OLM, ILM, DLM- Overlap of maint. duties (contractual) and impact if not performed
18	Availability of Facilities	46	Contract Management across a wide range of stakeholders with conflicting interests
19	Spares Availability		
20	Obsolescence Issues	47	Impact of Parallel Contracts to Schedule, Genuinity of Spares, Professionalism of Repair Team etc.
21	Design and Design Change Issues		
22	Knowledge Management incl Training, Knowledge and Skills	48	Supporting of the Vessel outside of home ports (e.g. issue on mob, avail. of materials etc.)
23	Availability of OEM Expert Support		
24	Availability of Local vendor support	49	Exogenous factors (i.e. company profit margin, admin.costs, peripheral costs, support cost)
25	Complexity & efficiency of existing contract		
26	Capability of Customer performing Maintenance	50	Exogenous factors-Contract Concept (Total Maint. Package against segregated orders without interrelationships) & based on recommendations
27	Morale & Attitude of Customer involved in Maintenance		

CONCLUSION

The study revealed 50 DIFs involving human and equipment related factors as a stepping stone towards future research in quantifying and ranking the DIFs on naval vessels worldwide with the ultimate objective of pinpointing the exact key problem areas for prioritisation of efforts by the navies.

REFERENCES

Chief Royal Australian Navy, *Addres to Australian Defence Magazine Conference*, AUS, Feb 2016.

Blanchard, B.S and Fabrychy, W.J., System Engineering and Analysis, Prentince Hall, NJ, USA, 1998.

Inozu, B. *Reliablity, Availability and Maintainability (RAM) Database of Ship Operations Cooperative Programme*. Interim Report, Research Project No.95-18, USA,1996.

United States Government Accountability Office (GAO), Navy Force Structure, Sustainable Plan and Coomprehensive Assessement Needed to Mitigate Long-Term Risks to Ships Assigned to Overseas Homeports, GAO-15-329.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Setting Time of Self-Compacting Concrete Made with Gum Arabic as a Plasticizer

P.W. Zakka*[1], D.Y. Tok[1], E. B. Ogunbode[2], Maxwell S. S[3], W.F. Ndanusa[1] and J.I. Ogolo[1]

[1]Department of Building, University of Jos, Jos, Nigeria
(E-mail: paulzakka.pz@gmail.com, yohannahdaniel@gmail.com, , frankwilly1984@gmail.com, jogolo9@yahoo.com)
[2]Department of Structures, Universiti Teknologi Malaysia, Skudai, Malaysia
(E-mail: ezekiel@futminna.edu.ng)
[3]Department of Building, Mooddibo Adama University, Yola, Nigeria
(E-mail: Ssmaxwell0089@gmail.com)

ABSTRACT
The drive for green materials and desire for cheap sustainable construction additives lead the research to investigate the effects of Gum Arabic in cement paste as used in Self-Compacting concrete. Different samples with varying Gum Arabic dosages and varying W/C were used. The research discovered that Gum Arabic increases the setting time of cement thereby improving the time for transportation and placement of concrete because it takes about twice the amount of time needed for normal concrete to set for SCC made with Gum Arabic to set.

Key words: Setting time, Self-compacting Concrete, plasticizer

INTRODUCTION

When water is added to cement, paste is formed which gradually stiffens and then hardens. The stiffening of cement paste is called setting (Baradan, 1998). Basically, setting is a process of transformation from an initial state, a scattered concentrated suspension, to a final state, a connected and strengthened system of particles (Jiang *et al*., 1995). This transformation in the presence of cement and concrete is obtained by chemical reactions between cement particles and water (i.e., cement hydration). The setting time characteristics of cement is influenced by some factors such as cement type, cement content, water content and to a large degree the amount of additive present as well as its properties in the mixture. The initial setting time of cement represents the time at which a fresh cement paste can no longer be handled or injected properly; and the final setting time is the time that approximately shows when hardening and strength development commences (Tan and Zaimoglu, 2003). Gum arabic (Acacia senegal) is a carbohydrate based compound made up of approximately galactose (44%), rhamnose (13%), arabinose (27%), glucuronic acid and 4-O-methyl glucuronic acid (16%). It also contains 2-3% peptide moieties as an integral part of the structure (Williams and Phillips, 2006).

The aim of the research was to determine the setting time of cement paste made with Gum Arabic as a plasticizer as used in Self-Compacting concrete. The plasticizer proportion adopted was 0.9% and 1.5% by weight of cement. Also, an optimum fly ash content of 20% by volume of cement was found to be the most suitable for this research. The three controls were chosen because the proportioning for normal concrete used on site for structural members usually has more coarse aggregates than fine aggregates. The second and third controls have the same composition of cement, fine aggregates and coarse aggregates as the self-compacting concrete. The initial and final setting times for the various mixes were carried out using the Vicat apparatus. The concrete was hand-mixed for about 6mins. The tests carried out for the fresh normal concrete was the slump test and compaction factor tests. The Gum Arabic used was gotten from acacia senegal which is only native to Nigeria and Sudan and produces a grade I gum as observed by Makwunye and Aghughu

(2010). The high water solubility of the gum Arabic used confirms the findings of Williams *et al*. (1990) that gum arabic can in a concentration of 50% by volume of water, whereas other gums cannot dissolve above 5% the volume of water because of their high viscosity. The samples were given coded identities for easy identification. The following are their identities:
C = Control,
(i) C1= Control 1 (1:2:4; W/C= 0.55), (ii) C2 = Control 2 (1:2 1/2:2; W/C= 0.40)
(iii) C3 = Control 2 (1:2 1/2:2; W/C= 0.45), (iv) SCC = Self Compacting Concrete,
(v) P = Plasticizer (vi) SCC 1= (1:2 1/2:2; W/C= 0.40; P= 0.9%), (vii) SCC 2= (1:2 1/2:2; W/C= 0.40; P= 1.5%), (viii) SCC 3= (1:2 1/2:2; W/C= 0.45; P= 0.9%), (ix) SCC 4= (1:2 1/2:2; W/C= 0.45; P= 1.5%).

MAIN RESULTS

The Table below shows the result for the setting time of the cement paste made for the various types of concrete. The results obtained for the initial setting time for the Ordinary Portland Cement (OPC) sample without gum arabic and a water/cement ratio of 0.55 was 1hour 40minutes and a final setting time of 3hours 30minutes. The initial setting time for OPC paste with a water/cement ratio of 0.40 was 1hour 15minutes and the final setting time was 2hours 50minutes. The initial setting time for OPC paste with a water/cement ratio of 0.45 was 1hour 35minutes and the final setting time was 3hours 15minutes. The initial setting time for the paste made with a water/cement ratio of 0.40 and a gum arabic content of 0.9% content was 3hours 10minutes and a final setting time of 5hours 7minutes. The initial setting time for the paste made with a water/cement ratio of 0.4 and a gum arabic content of 1.5% content was 3hours 40minutes and a final setting time of 5hours 43minutes. The initial setting time for the paste made with a water/cement ratio of 0.45 and a gum arabic content of 0.9% was 4hours 10minutes and a final setting time of 6hours 36minutes. The initial setting time for the paste made with a water/cement ratio of 0.45 and a gum arabic content of 1.5% was 4hours 48minutes and a final setting time of 6hours 54minutes. The setting time for the samples fall within the allowable limits provided by ASTM-C 150 (1994). The table further shows that the initial and final setting times of the cement pastes produced increased with increase in the amount of gum arabic. This result shows that gum arabic increases the setting time of concrete as contained in the findings of AGRIGUM (2006) when gum arabic was used as a plasticizer in concrete as well as the findings of Rico (2000).

Table 1: Setting Time of Cement

Mix Identity	Water/Cement Ratio	Gum Arabic Content (G.A 1)	Gum Arabic Content (G.A 2)	Initial Setting Time (Hour+ Minutes)	Final Setting Time (Hour+ Minutes)
C1	0.55	0	0	1 + 40	3 + 30
C2	0.40	0	0	1 + 15	2 + 50
C3	0.45	0	0	1 + 35	3 + 15
SCC1	0.40	0.9%	-	3 + 10	5 + 7
SCC2	0.40	1.5%	-	3 + 40	5 + 43
SCC3	0.45	-	0.9%	4 + 10	6 + 36
SCC4	0.45	-	1.5%	4 + 48	6 + 54

CONCLUSION

The research concludes that the presence and subsequent increase in the dosage of Gum Arabic in the cement mixture increases the initial and final setting times of cement. Therefore, the presence of Gum Arabic in SCC will increase its setting time thereby increasing the time for transportation and placement of concrete compared to normal concrete.

REFERENCES

AGRIGUM. Gum Acacia. (www.agrigum.com), 2006.
Baradan, B. Construction Materials –II (5th.ED). Dokuz Eylul University, Technical faculty publication section, Izmir Turkey, 1998.

Jiang S. P., Mutin J. C. and Nonat A. Studies on mechanism and phisco-chemical parameters at the origin of cement setting, *Cement & Concrete Research*, 25, (4), 1995, 779 – 789.

Mokwunye, M.U.B. and Aghughu, O. *Restoring Nigeria's Lead in Gum Arabic Production: Prospects and Challenges*, 2010.

Rico, J. R. (2000). Effect of Superplasticizers on the Behaviour of Concrete in Fresh and Hardened States: Implication for High Performance Concretes.

Tan and Zaimoglu. Tagushi Approach for Investigation of the Setting Times of Cement-based Grouts. *Indian Journal of Engineering and Materials Sciences*, 11, 2003, 64-68.

Williams, P.A. and Phillips, G.O. Food and Food Ingredients Journal of Japan 211:181, 2006.

Williams, P., A. and Phillips, G. O. and Stephen, A. M. Spectroscopic and molecular comparisons of three fractions from Acacia senegal gum. *Food Hydrocolloids*, 4, (4), 1990, 305-311.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Severity of Downtime Influence Factors Impacting Naval Ship Operational Availability – A Five-Stage Delphi Consensus Procedure with Snowballing Technique

Al-Shafiq bin Abdul Wahid[*1], Mohd Zamani bin Ahmad [1], Sunarsih [2], Mohd Najib bin Abdul Ghani Yolhamid[3], Mohamad Abu Ubaidah Amir Abu Zarim[3], Aisha binti Abdullah[4] and Nur Hanani bt Ahmad Azlan[1]

[1]Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Malaysia
(Email: al_shafiq@hotmail.com, drmohdzamani@gmail.com, nhanani4@gmail.com),
[2]Institut Sultan Iskandar, UTM Skudai, 81310, Malaysia
(sunarsihutm@gmail.com)
[3]Faculty of Science and Defence Technology, Universiti Pertahanan Nasional Malaysia, Kem Sungai Besi, 57100, Malaysia
(Email: najib@upnm.edu.my, amir.a@upnm.edu.my)
[4]Enigma Technical Solutions Sdn Bhd, Business Centre, Desa Villas, Section 10 Wangsa Maju, 53300 Kuala Lumpur, Malaysia
(Email: aisha@enigmatechnicalsolutions.com)

ABSTRACT

Operational availability of naval ships, which reflects the number of days they are available for operational tasking in a year, is a complex problem. The number of days the ships are able to spend in an area of operations reveals the sustainability of the naval force in showing of presence and deterrent capability. There has been numerous literatures on calculating downtime through Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR) to obtain availability value, however there has been limited literatures pinpointing to the root cause of the various downtime, called Downtime Influence Factors (DIF) for naval vessels. The limited literatures on DIFs of naval vessels are further restricted in the study of a single factor such as obsolescence or spares availability, or two or three factors at most, whilst in reality the DIFs encompasses a wide range of human and equipment related factors that most researchers have not attempted to study. The situation is further complicated by issues of equipment and component redundancies as well as possible interdependencies between each DIFs. The current research uses a five-stage sequential modified Delphi approach including risk analysis and snowballing technique to identify, validate and rank the severity of all DIFs from two sets of experts in naval ship maintenance contracts. The study revealed 15 severe DIFs involving human and equipment related factors impacting naval ship availability. The result complemented and validated the findings of previous study by the authors involving 30 experts. The results enable the navies and supporting industries to focus on pinpointed areas of concern to enable them to increase the operational availabilities of their ships in the fleet. A Severity Index (SI) has been produced to enable various navies to compare indexes of various types of contracts implemented globally on naval ship maintenance.

Keywords: Naval vessels, navy ship maintenance, operational availability, Downtime Influence Factors (DIFs), Delphi method.

INTRODUCTION

Achieving targeted operational availability of equipment and systems can be an arduous task for any organization. Navies worldwide face the same challenges of achieving high asset availability, albeit the situation is aggravated due to the complex nature of warships (Directorate of Maritime Strategy, 2001). The Navy Force Planning Scenarios illustrating the variety of military operations "across the spectrum of conflict", are also complex (Directorate of Maritime Strategy, 2001). Operational availability of naval ships, which reflects the number of days the warships are available for operational tasking in a year (US GAO, n.d), is therefore a complex problem

(Dell'Isola and Vendittelli, 2015). The number of days the ships are able to spend in an area of operations reveals the sustainability of the naval force in showing of presence and deterrent capability (US GAO, n.d). It is interesting to note that availability is still a problem in modern navies including the United States Navy even lately Marais *et al*. (2013).

Given the complexity of the naval vessel itself as an asset (Dell'Isola and Vendittelli, 2015) due to advanced ship designs and the various intricate maintenance contracts under which the vessels belong to Datta and Roy (2009), the race to maximize their operational availability or uptime is hampered by the simple fact that there exists a long list of possible contributing factors creating downtime. These factors are called Downtime Influence Factors (DIFs) as described in AlShafiq *et al*. (2017). Most studies are limited to a single factor such as obsolescence or spares availability (Sandborn, 2013; Koehn *et al*., 2004), or two or three factors at most, therefore new knowledge could be gained if DIFs are studied holistically. This research aims to simplify the complexity surrounding naval ship availability. A holistic study on combined human and equipment related Downtime Influence Factors (DIFs) enables the various stakeholder levels to better understanding of factors and their severity in affecting operational availability.

MAIN RESULTS

The steps of the 5-stage sequential modified Delphi study can be summarized as shown in table 1.

Table 1. 5-Stage sequential. Modified Delphi Summary

Research Stage	Phase, Expert Group & Delphi Round	Activity and Results
1. Focus Group Discussion	Phase 1 Expert Group 1	• Focus Group Discussion conducted • 50 DIFs pooled from various literatures across various engineering fields.
2. Delphi Round 1	Phase 1 Expert Group 1	• 30 Experts identified for survey • 50 DIFs confirmed by experts • Weightage of Severity (Probability versus Likelihood of occurrence) through Risk Analysis obtained
3. Delphi Round 2	Phase 1 Expert Group 1	• Same 30 Experts surveyed • Consensus from previous rounds achieved • Severe DIFs identified with probability of likely (4 and above) and impact (4 and above). • Snowballing to identify Top Management Experts conducted
4. Delphi Round 3	Phase 2 Expert Group 2 (Top Management)	• 5 Top Management Experts surveyed. • Confirmation of 50 DIFs. • Weightage of Severity to identify 15 most severe DIFs.
5. Delphi Round 4	Phase 2 Expert Group 2 (Top Management)	• Same 5 Top Management Experts surveyed • Consensus from Top Management Experts achieved • Reconfirmation of Severe DIFs • 15 most Severe DIFs ranked

The 15 most severe DIFs as evaluated with a high level of consensus by the Top Management experts can be viewed in Figure 1.

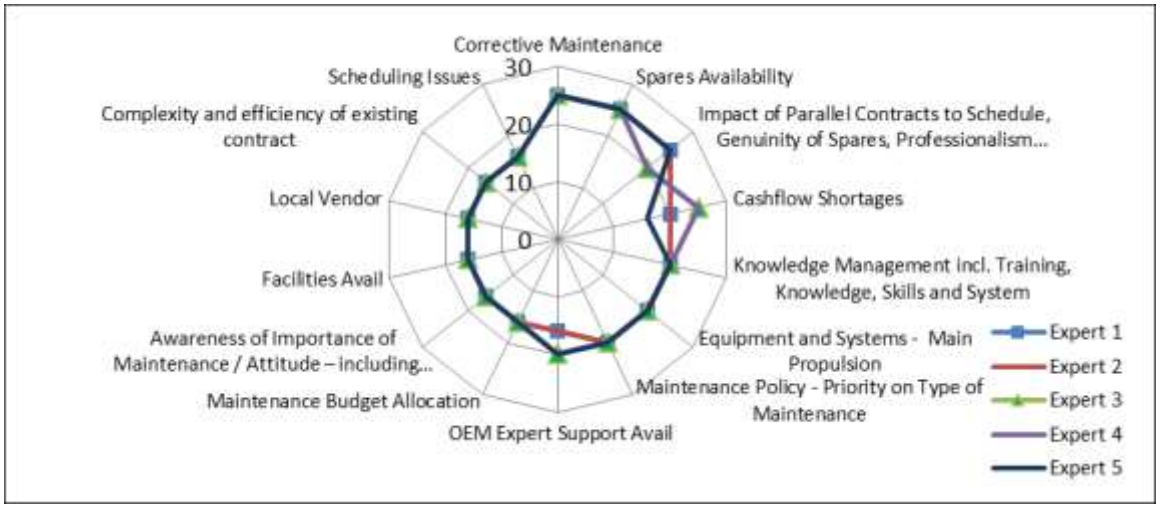


Figure 1. Radar Chart of the Top Management identified Severe DIFs

CONCLUSION

This study concludes with 15 severe DIFs from a range of more than 50 possible factors impacting the operational availability of naval vessels, and the severity of each DIFs. This research may be the most comprehensive study of its nature in consolidating the DIFs specifically in the naval ship domain, but also in the maintenance engineering field in general. The findings of this paper would assist organizations in prioritizing their efforts in controlling specific downtime factors which greatly impacts their organizations. Further focused research on individual factors and especially on various combinations of factors may shed more light on this newly explored area of study. The authors believe that Project Managers and Contract Managers shall be able to manage their contracts better with these identification of constraints and interdependencies, which they will endeavour to implement best practices (Australian National Audit Office, 2012).

REFERENCES

AlShafiq, B.A., MohdZamani, A., Sunarsih, MohdNajib, A.G., Ubaidah, M.A., Abdullah, A.B., NurHanani, A.A. Measuring Severity of Downtime Influence Factors to Naval Ship Operational Availability – A Delphi Study. *Proceedings of the Asia Inter. Multidisciplinary Conference 2017*, Universiti Teknologi Malaysia, 173.

Australian National Audit Office, Developing and Managing Contracts; *Better Practice Guide*, Feb 2012.

Datta, P.P and Roy, R. Cost Modelling Techniques for Availability Type Service Support Contracts: A Literature Review and Empirical Study. *Proceedings of the 1st CIRP Industrial Product-Service Systems (IPS2) Conference*, Cranfield University, 1-2 Apr 2009, 216.

Dell'Isola, A. and Vendittelli, A., "Operational availability (Ao) of warships: A complex problem from concept to in service phase," *2015 IEEE Metrology for Aerospace*, Benevento, 2015, 26-32.

Directorate of Maritime Strategy Canada, Leadmark: The Navy's Strategy for 2020 (2001), CAN, 157.

Koehn, P. Macheret, Y. and Sparrow, D. Improving Reliability and Operational Availability of Military Systems. *Institute for Defence Analysis IDA* Doc: D 3006. 2004.

Marais, K. B., Rivas, J., Tetzloff, I.J and Crossley, W. A., "Modeling the impact of maintenance on naval fleet total ownership cost," *2013 IEEE Inter. Systems Conference (SysCon)*, Orlando, FL, 2013, 801-808.

Sandborn, P., Design for Obsolescence Risk Management. *2nd International Through-Life Engineering Services Conference*. Elsevier B.V. 2013.

United States Government Accountability Office (GAO), Navy Force Structure, Sustainable Plan and Comprehensive Assessment Needed to Mitigate Long-Term Risks to Ships Assigned to Overseas Homeports, *GAO-15-329*.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Mechanical Properties of Abandoned Reinforcement Steel Bars in University Of Jos

Zakka P.W.*[1], Tanko B.L.[2], Tok D.Y.[1], Kure M.A.[3] , Maxwell S. S[4], and. Ndanusa W.F [1]

[1]Department of Building, University of Jos, Jos, Nigeria (E-mail:paulzakka.pz@gmail.com, yohannahdaniel@gmail.com, , frankwilly1984@gmail.com)
[2]Department of Quantity Surveying, Universiti Teknologi Malaysia, Skudai, Malaysia (tankob@unijos.edu.ng)
[3]Department of Building, Niger State Polytechnic Zungeru, Niger State (E-mail: aliyukure@gmail.com)
[4]Department of Building, Moddibo Adama University, Yola, Nigeria (E-mail: Ssmaxwell0089@gmail.com)

ABSTRACT

The quality and reliability of construction materials are essential to sustainability and structural integrity of constructed facilities. In the quest for establishing the reliability and sustainability of abandoned reinforcement steel bars used in the university of Jos, this research studied the mechanical properties of steel reinforcement bars used as reinforcement in concrete structures in the University of Jos. The research consists of field survey for sample selection (16mm and 10mm reinforcement steel bars) and laboratory tests to for yield strength, tensile strength and the elongation as well as the change in diameters of the selected reinforcement steel bars. The yield strength, tensile strength and elongation for the 16mm reinforcing bars abandoned for 3 years are; (405.3N/mm^2, 624.9N/mm^2 and 40.7mm). The yield strength, tensile strength and elongation for the 10mm reinforcing bars abandoned for 3 years are; (485.7N/mm^2, 751.7N/mm^2 and 31.2mm). The yield strength, tensile strength and elongation for the 16mm reinforcing bars abandoned for 7 years are; (301.1N/mm^2, 442.9N/mm^2 and 42.3mm). The yield strength, tensile strength and elongation for the 16mm reinforcing bars abandoned for 7 years are; (411.8N/mm^2, 629.5N/mm^2 and 25.4mm). The results also show that there was a reduction in some of the 16mm diameter reinforcing bars that were abandoned for 3 years.
Key words: Mechanical, Properties, Abandonment, Reinforcement

INTRODUCTION

Steel is an alloy of iron and carbon with carbon as the most common element for its production, other alloying materials such as tungsten, chromium and manganese are also used. The proportions and forms in which these elements are used affect the properties of the reinforcement steel bars produced. Some of the properties of reinforcement steel bars are; ductility, durability, conductivity, etc. (Alabi and Onyeji, 2015).

Reinforcement steel bars are supplied as plain round or square bars, round ribbed bars, square or round ribbed twisted bars and also as woven or electrically welded mesh. Protection against corrosion is provided by the alkaline environment of the Portland cement hydrates within the concrete carbonation, that is, the reaction of the hydrate with carbon dioxide can however break down this protection if it penetrates as far as the steel (Jackson and Dhir, 1988).

Most cases of buildings failure recorded in Nigeria are not necessarily structural design failure, but the inability of the building professionals to check the quality of materials produced and supplied to their sites, the elements to which they are exposed to, and the years of their exposure are also important factors to be considered. Steel as one of the major material is greatly affected by its chemical composition, heat treatment and the method of manufacturing, there are some physical properties that determines the behavior of reinforcement steel bar. The structural Engineer may seem to be more

interested in the physical properties of steel, but these properties cannot be attained without the proper chemical composition of the reinforcement steel bar (Kankam and Adom-Asamoah, 2002).
Akintoye *et al*. (2013) noted that 100 percent of the collapsed buildings in Nigeria were built of reinforced concrete. The true behavior of the reinforcing steel adopted in the Nigerian construction industry still needs to be understood in order to know the true causes of building collapses. Substitution of inferior steel to that specified in reinforcing concrete has been reported as one of the major causes of structural failure. It is also reported that steel reinforcing bars available in the Nigeria's construction industry are obtained from both local and foreign sources. The local sources are mainly from both the indigenous major plants and mini mills located in various parts of the country. Others are those imported for specific uses by multinational Companies for specific projects. These steels however are sometimes used in buildings without being subjected to any test to confirm the adequacy and compliance with the Engineering standards (Ede *et al*., 2014).

MAIN RESULTS

The results obtained from tensile test showed that the ultimate tensile strength, strength at break and yield strength averaging 624.90N/mm2, 532.44N/mm2 and 405.31N/mm2 respectively for 16mm steel bar with an average elongation of 40.742mm (20.88%) which is greater than that specified by BS (Min. UTS=600N/mm2, Min. YS=460N/mm2 and %E=12) and ASTMA706 (Min. UTS=550N/mm2, Min. YS=415N/ mm2 and %E=10) as some of the 16mm bars that lost their diameter did not meet the requirement as specified in both the BS and ASTMA706 for Yield Strength, while the ultimate tensile strength and the percentage elongation have values that are above that specified in BS and ASTMA706 which shows that the 16mm tested is adequate in terms of tensile strength and ductility.

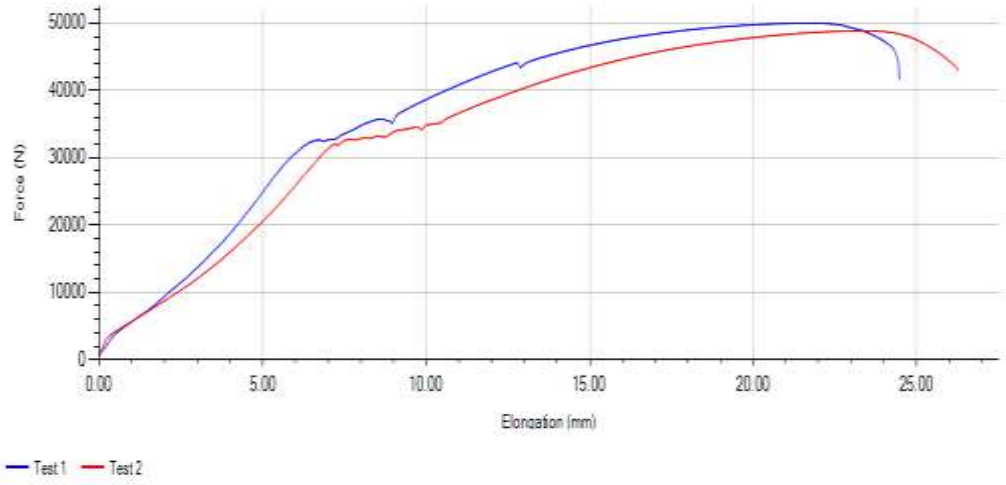


Figure 1: 16mm reinforcement steel bar after 3years of abandonment

CONCLUSION

This research concludes that years of abandonement in the open has a negative effect on the reinforcing bars. It was observed that some of the 16mm bars lost their diameter and also did not meet the minimum requirements for yield strength and tensile strength. Further research on the chemical properties of such reinforcements need to be carried out.

REFERENCES

Akintoye O., Chris F. and Oladimeji D. (2013). Effects of Source of Reinforcement on Microstructure and Strength Characteristics of Reinforced Concrete Beams.

Alabi and Onyeji. Building Collapse in Nigeria: The Causes, Effects, Consequences and Remedies. International Journal of Civil Engineering, Construction and Estate Management vol. 3, No. 4, (2015). Published by European Centre for Research Training and Development UK.

Ede, Michael and Joshua. (2014). Experimental investigation of yield strengths of steel reinforcement bars used in Nigerian Concrete Structures**.** IJSER, Volume 5, issue 4.

Jackson, N. and Dhir, R. (1988). Civil Engineering materials (4th ed.) Macmillan publishers.

Kankam, C.K. and Adom-Asamoah, M. "Strength and Ductility Characteristics of Reinforcing Steel Bars Milled from Scrap Metal", Materials and Design, Elsevier, Vol. 23, 2002.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Optimized Cell Selection For HMP Based Handover

Safa E. Abdalla*[1], Sharifah H. Syed Ariffin [2]

[1, 2] *UTM-ATT Center of Excellence, Faculty of Electrical Engineering*
Universiti Teknologi Malaysia Johor Bahru, , Malaysia.
E-mail: safa@fkegraduate.utm.my, sharifah@fke.utm.my

ABSTRACT

In this paper, the Optimized cell selection for a Hybrid Mobility Prediction OHMP is introduced for both regular and random mobility in femtocell networks. To fulfil the objective of this study in terms of improve the Handover performance for the next 5G femtocell networks, an optimized algorithm based on an intelligent fuzzy logic system is discussed. The history of successful handover (HO) Prediction is coupled with capacity information to effectively select the optimum cell.The performance of the futures cell is un predictable especially form capacity point of view, capacity may degrade because of channel condition. Handover (HO) is expensive in terms of signaling and Bandwidth (BW), so it is better to guarantee sufficient capacity to afford QoS and avoid the frequent HO. The simulation result, which based on real human traces, revealed superiority over the existing methods in reducing the HO delay and unnecessary HO.
.

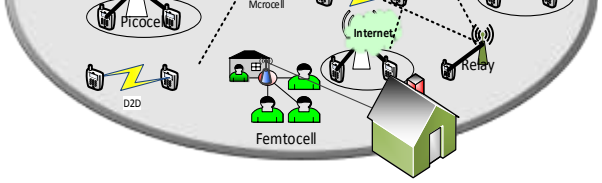
Keywords: 5G, Handover Frequency, Optimized cell selection .

INTRODUCTION

The fifth generation (5G) of mobile communication networks will necessitate a key standard change to fulfil the user's expectations for service continuity any time anywhere. In trying to accomplish these demands, fourth generation (4G) wireless systems engage in collaborating heterogeneous wireless technologies to allow users get connected anywhere and at all times. The densification of femtocells cells in the Heterogeneous (HetNets) are expanding capacity and satisfying the forthcoming data needs. However, seamless mobile access is a major challenge in the next generation networks due to the small cell radii that cause redundant HO which reflect negatively on the end-to-end delay, which is considerably big. Knowing a user's next cell allows more efficient resource allocation and enables new location-aware services. To anticipate the cell a user will hand-over to, Predictions of where the users are moving, the resource allocation can perform prior to the actual handover, thus can reduce delays in resource allocation and finally can reduce the handover latency.[5] This paper proposes to achieve Optimized Hybrid Mobility Prediction(OHMP) scheme to eliminate the scanning overhead incurred in next generation networks, and provide the network system with optimum cell selection. This is achieved by considering multiple characteristics[6] and states of mobile users. This captures the periodic and random behaviour of mobile users[7], integrated with the cell performance to provide accurate optimized next-cell predictions.

OPTIMIZED HYBRID MOBILITY PREDICTION ALGORITHM.

The proposed hybrid algorithm, considers user movement (regular/random), and cell capacity. The optimization process is accomplished by Fuzzy Logic Control (FLC) to apply best selection and avoid rejection due to full cell capacity. By exploit mobility patterns(prediction information), and integrated with cell' and neighbours' capacity information, APs can avoid connecting the users to coverage holes, or to network congested zones.[2]. Besides connecting to proper cell enhance QoS and reduce Ping-Pong effect. Since the prediction output was fair detailed in the previously, the next steps elaborate the estimated capacity using fuzzy logic control.



Step 1. the HOF and capacity are two inputs of the fuzzier. The fuzzification process is done for both inputs in a same manner; see Fig.1. The values between 0 and 1 represent variable probabilities. There are three linguistic values , equivalent to each interval, which are H1="Low", H2="Medium", and H3="High" to represent different regions respectively. Each Hi ($1 \leq i \leq 3$) represent a fuzzy region (set), and its defined in Eq. (1), where the symbol '+' means the region union operator.

$Hi = I1/u1 + I2/u2 + I3/u3$ (1)

Where: uj is a real number ($0 \leq uj \leq 1$) , and represent the membership degree where j : ($1 \leq j \leq 3$) that Ij belongs to Hi ($1 \leq i \leq 3$). Hi is a fuzzy region data = { I1 , I2 , I3} with altered membership degree = { u1, u2, u3} .

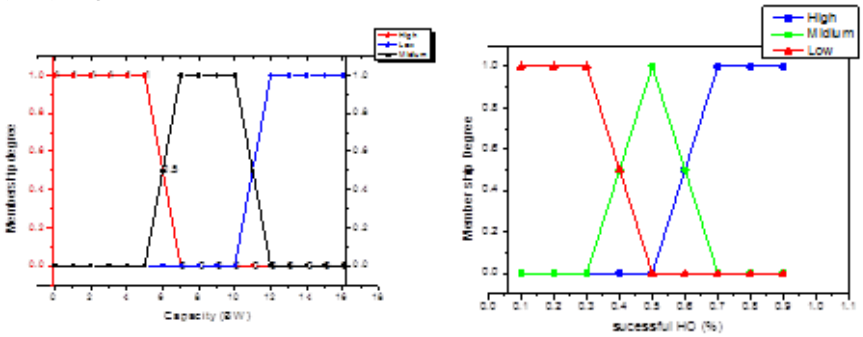


Figure 1: Membership degrees for capacity controller and successful HO.

Step2 : Fuzzify the input data (HOF, Capacity). When data is fuzzifying, means assigning the linguistic value to each data according to the it's belonging interval.

Step 3 :Run IF THEN Fuzzy rule. The Rule for the required selection is to select the cell that has high to fair number of successful HOF priorities by the capacity as shown in table 1. The General rule R is follow the expression below:

$R^{(l)}$: IF x1 is F^{l}_{1} and ... and xn is F^{l}_{n} , THEN y is G^{l} (2)

Where: Fl1 and Gl are fuzzy regions.Table 1 shows all the possible values for an input and output at three different levels (fuzzy sets; i.e., low, medium, and high).

Finally, in the defuzzification stage, the output values of FLP are list of cell selection, which are used to optimize the HO decision, and the new input parameter values reflect in the current network condition, and accordingly the FLP automatically adjusts the new frequency and capacities values.

SIMULATION RESULTS

Figure 2. illustrated the fuzzy logic system output for different input of HO frequency and capacity. The system selects the cell that has middle to high history versus middle to high available capacity. The next figures represented the evaluation of the OHMPA performance.

Figure 3(a) shows the packet delivery ratio in the normal and hybrid scenario. Improvement of 45% is experienced using OHMPA, which enhanced the HO performance and offered a QoE. The Handover delay also improved as shown in figure 3(b), since there is no list of propped channels, only the cell with available resource will connect to.

IF(Capacity)	AND(HOF)	THEN(Selection decision)	weight
LOW	LOW	Strong Reject (SR)	0
LOW	MEDIUM	Weak Rejection(WR)	1
LOW	HIGH	Weak Selection(WS)	2
MEDIUM	LOW	Weak Rejection(WR)	1
MEDIUM	MEDIUM	Weak Selection(WS)	2
MEDIUM	HIGH	Strong Selection(SS)	3
HIGH	LOW	Weak Selection(WS)	2
HIGH	MEDIUM	Strong Selection(SS)	3
HIGH	HIGH	Strong Selection(SS)	3

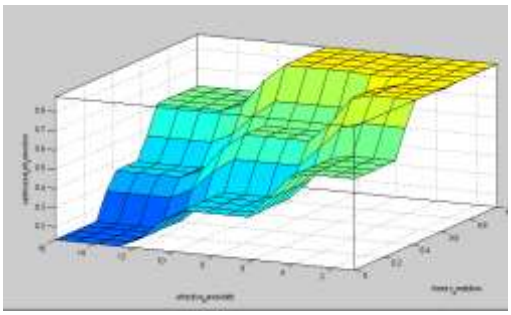


Figure 2: Fuzzy Logic Rules for optimized cell selectionand the FLS output for OHMP.

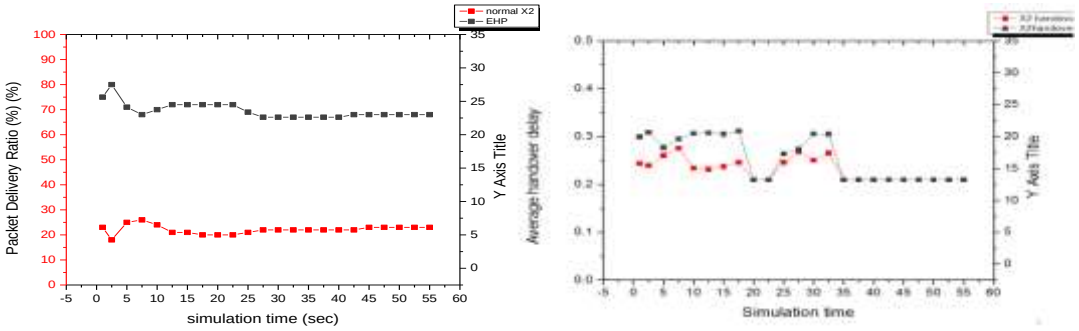


Figure 3: (a) the packet delivery ratio in the normal and hybrid scenario.(b) the Average handover delay in the normal and hybrid scenario.

CONCLUSION

In general, OHMP compromise between the capability of dropping the unnecessary handover rate, (Prediction-based scheme) and decreasing the delay and improving the QoS in real-time application (effective-capacity for MSs after handover, fuzzy-optimization scheme). The result makes logic as IHP scheme can determine the future FAP which has high probability that MS will entrance into and decrease the ping-pong result. It also presents the comparison results of OHMPA with the two schemes in [6], and [4]. These works were chosen as the bench mark because, they are the most related work with respect to designing prediction model for FAPs and most importantly, the details needed to recreate both works for validation purpose were clearly stated. Unlike other works were.

REFERENCES

C. Dhahri and T. Ohtsuki, “Learning-Based Cell Selection Method for Femtocell Networks,” *2012 IEEE 75th Veh. Technol. Conf. (VTC Spring)*, pp. 1–5, 2012.

H. Abou-zeid, H. S. Hassanein, and S. Valentin, “Optimal predictive resource allocation: Exploiting mobility patterns and radio maps,” *2013 IEEE Globecom Work. (GC Wkshps)*, pp. 4877–4882, 2013.

P. Muñoz, R. Barco, and I. De Bandera, “Load balancing and handover joint optimization in LTE networks using Fuzzy Logic and Reinforcement Learning,” vol. 76, pp. 112–125, 2015.

N. D. Hoang, N. H. Nguyen, and K. Sripimanwat, “Cell selection schemes for femtocell-to-femtocell handover deploying mobility prediction and downlink capacity monitoring in cognitive femtocell networks,” in *IEEE Region 10 Annual International Conference, Proceedings/TENCON*, 2015, vol. 2015–Janua, pp. 1–5.

W. Wanalertlak, B. Lee, C. Yu, M. Kim, S. M. Park, and W. T. Kim, “Behavior-based mobility prediction for seamless handoffs in mobile wireless networks,” *Wirel. Networks*, vol. 17, no. 3, pp. 645–658, 2011.

W. Wanalertlak, B. Lee, C. Yu, M. Kim, S. M. Park, and W. T. Kim, “Scanless fast handoff technique based on global Path-Cache for WLANs,” *J. Supercomput.*, vol. 66, no. 3, pp. 1320–1349, 2013.

EDUCATION, HUMANITIES, AND SOCIAL SCIENCES

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Global Development in Science, Technology and Mathematics Education: An Appraisal of Science Teaching in Katsina State, North West-Nigeria

Suleiman Sa'adu Matazu*[1] and Elizabeth Julius[2]

[1]Department of Science and Vocational Education,
Usmanu Danfodiyo University, Sokoto- Nigeria
(Email-greatsaad10@gmail.com)

[2]Department of Science Education,
Kebbi State University of Science and Technology, Aliero-Nigeria
(Email-mummybaffa2000@gmail.com)

ABSTRACT

Science education is considered as an indispensable variable in the civilization and development of any nation. Nation that pays serious attention to the improvement of its Science, Technology and Mathematic Education (STME) will soon be classified as a developed country on the ground that all other developmental aspects will surely be positively affected by STME. The purpose of this study is therefore to assess the happenings/activities of STME particularly in secondary schools of Katsina State, North West Nigeria with the view of comparing them with the global development in STME. The study is guided by four (4) research questions and survey design was used. The sample of the study was made up of six (6) science secondary schools – students and science teachers. Equally important, Focus Group Discussions (FGDs), Personal Observations (POs) and Questionnaire were used as instruments for data collection. It was discovered that contrary to the best global practices on teaching and learning science, condusive STME teaching and learning is lacking and science teachers are not up to date with global practices in STME. Also STME curriculum is hardly covered. It is recommended amongst others that intensive staff development and condusive environment must be provided for Nigerian STME to meet up with the global development.

Keywords: STM Education, Global development, Science Teaching and learning

INTRODUCTION

Science Technology and Mathematic STM Education has an aim of helping the learners to acquire appropriate skills, abilities and competencies that would enable them contribute meaningfully to their lives and to the development of the society. Unfortunately, there is a glaring gap between the above aim and what is produced today by STEM education. The National Policy on Education (2004) stated the necessity of introducing Information and Communication Technology (ICT) into the school system. This is the product of innovation and changes in order to close the existing gap between the aim of STM Education and what is obtainable on ground. The National Policy on Education (2004) recognized the prominent role of STME in advancing knowledge and skills for effective national development.

STM Education literarily means the act of imparting scientific, technological, and mathematical knowledge, competencies and skills for personal survival and overall development of the society. Because of its role in the overall development of any nations, STM Education has become an important area of focus in developmental planning all over the world. Global development in Science, Technology and Mathematics Education STME showed that access to basic education continues to dominate argument world over and that increasing Science, Technology and Mathematics knowledge is part of this basic education. Under the UN Human Rights Charter, the correlation between the number of STM related research personnel and the affluence of a nation is well established Shaikh 2000. It is important therefore to note that global developments in respects to Science, Technology and Mathematics Education STME required countries to have well trained and well-motivated STM

teachers, adequate supply of relevant equipments and facilities for effective teaching and learning of STM including ICT facilities, learner friendly teaching and learning environment, encouragement for positive attitude to STM Education by all and finally development of scientific culture among other things.

In Nigeria, the sciences are taught in school subjects as Biology, Chemistry, and Physics. The National Policy on Education in the National curriculum for Senior Secondary Schools volume 3 identified the objectives of teaching science to include: (i) knowledge of science academic discipline; (ii) to acquire the skills of scientific method; (iii) having clear explanations for societal issues through increasing interest in science literacy and societal goals; (iv) for personal needs; and (v) for career awareness. These objectives could only be achieved by the science teacher through giving the right types of instructions to the students. No matter how well-developed and comprehensive a curriculum is, its success depends on the quality of the teachers implementing it (Ughamadu 2005; Patrick 2009). The Federal Republic of Nigeria (2004) while stressing the importance of teacher quality' in curriculum implementation noted that no nation's educational system can rise above the quality of her teachers.

Patrick (2009) observed that most of the science teachers in Nigerian classrooms failed to put into practice teaching skills acquired. The deficiencies in science teaching range from; non-coverage of contents in schemes of work, non-giving and marking of assignments, non-supervision of instruction, non organization of practical lessons, non-organization of extra lessons to cover lost grounds, non-assessment of learning outcomes regularly, non-application of improvisation knowledge in instruction to non-taking out of students to field experiences. It is against this background that this study investigated the teaching of science in Katsina State North-west Nigeria with the view of comparing it with global development in STM Education.

Research Questions

The following research questions were raised and answered at the cause of this study.

1. What is the nature of interactions in STM classrooms in Katsina State?
2. What instructional techniques do teachers used for teaching sciences in schools of Katsina State?
3. To what extent is coverage of curriculum contents in science in Katsina State schools?
4. To what extent is science practical lessons organized in Katsina State schools?

METHODOLOGY

The design for this study is survey research design and the population includes all science secondary school students in Katsina State, north- west Nigeria. These students are within the age range of 15-18 years. There are fifteen (15) science secondary schools in the state. Eight (8) of them are boys schools while the remaining five (7) are girls schools.

The sample for this study was drawn from the entire population of the study. Stratified random sampling technique was used to select six (6) schools for the study. To select the sample in each school, proportionate sampling technique was used. A sample of three hundred students (300) was selected from the sample schools for this study. This is in line with researchers table for determining sample size. The table stated that for a population of 1,300, a sample of 297 is appropriate.

RESULTS

Table 2: Nature of the Interactions in STM Classroom

Schools	Science Subjects	Teacher-student interaction in %	Student-student interaction in %	Teacher Centered Interaction in %
Sch. 1	Biology	54	19	79
	Chemistry	61	41	81
	Physics	49	27	71
	Mathematics	43	21	69
Sch. 2	Biology	55	42	66
	Chemistry	57	51	72
	Physics	59	16	81
	Mathematics	49	37	90

Table 3: Instructional Technique Employed by Science Teachers in Schools

Schools	Science Subjects	Traditional Lecture Method in %	Discovery Method in %	Inquiry Method in %	Laboratory Method in %
Sch. 1	Biology	82	11	3	2
	Chemistry	91	9	5	3
	Physics	88	13	9	5
	Mathematics	93	26	2	4
Sch. 2	Biology	79	7	11	3
	Chemistry	84	9	7	2
	Physics	77	21	8	2
	Mathematics	87	22	5	3

Table 4: Level of Coverage of Science Curriculum

Schools	Science Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Sch. 1	Biology	√									
	Chemistry		√								
	Physics			√							
	Mathematics										
Sch. 2	Biology						√				
	Chemistry						√				
	Physics							√			
	Mathematics							√			

Table 5: Extent of Science Practical Lesson Organized by Science Teachers

Schools	Science Subject	Never	Twice a Week	Weekly	Monthly	Termly	During WAEC/ NECO
Sch. 1	Biology		√				
	Chemistry		√				
	Physics			√			
	Mathematics	√					
Sch. 2	Biology				√		
	Chemistry				√		
	Physics				√		
	Mathematics	√					

CONCLUSIONS

Based on the findings of this study, the following conclusions were arrived at:-

i. That the nature of interactions among science students in Katsina State is not student-teacher centered.
ii. Instructional strategies employed by science teachers in Katsina State to science related subjects are not students friendly.
iii. Coverage of science curriculum is not up to global acceptable level as less than 75% of the contents are usually covered.
iv. Practical lessons organized in science classrooms are not encouraging.

RECOMMENDATIONS

Based on these findings, the following recommendations are put forward for improvement.

1. Government should ensure adequate training and retraining of science teachers in Katsina State to enable them acquire up to date scientific knowledge. This will boost their moral and enable them have an improved interactions and compete globally.
2. Again training and retraining of science teachers through workshops, seminars, and conferences will acquaint them with latest instructional strategies in line with global standard. So government and Non-Governmental Organizations should look into this aspect
3. Conducive environment must be provided by government for Nigerian STME to meet up with the global development. Well-equipped laboratories, other teaching and learning facilities such as chemicals and reagents, ICT facilities should be made available.

IMPLICATIONS OF THE STUDY

This study revealed a sharp contrast between global development on STME and reality STME in in Katsina State North-west Nigeria. It revealed the application of ineffective teaching methods in science classrooms, uncondusive science teaching and learning environment which negate effectiveness of STME in Nigeria. It is on this ground that this study implies that educational planners and managers should be conscious in planning of education particularly STME which is believe to be the back-borne for national development to make sure that delivery of STME has meet up with the global happenings most especially in a country like Nigeria with a great desire to become scientifically and technologically relevant world-wide.

REFERENCES

Federal Republic of Nigeria (2004). National Policy on Education 4th Edition. Lagos: NERDC Press.

Matazu, S.S. (2014). Relationship Between Self- Concept, School Location and Academic Performance among Science Secondary School Students in Katsina State, Nigeria. Unpublished Ph.D Thesis Usmanu Danfodiyo University, Sokoto, Nigeria.

Patrick, A.O. (2009). Evaluation of Science Teaching in Secondary Schools in Delta State 2 -Teaching of the Sciences. International Journal of Edu Sci, 1(2): 119-129.

Shaikh, K. (2000). UNESCO International Science, Technology and Environmental Education: Newsletter, xxv, 3-4.

Ughamadu K.A (2005). Curriculum: *Concept, Development and Implementation.* Onisha: Emba Printing and Publishing Company Ltd.

Wasagu, M.A. (2001). The Place of Formal Education in Special Reference to Popularizing Science with Teacher Education. *Journal of Science Teachers Association of Nigeria.* 40 (1) pp 6-14.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

The Relationship Between Self-Efficacy and Stress Coping Strategies of Teachers in National Chinese Primary School in Johor Bahru

Tan Ju Keng*, Helen Tan Sui Hong

Department of Business Administration, Faculty of Management,
Universiti Teknologi Malaysia, Skudai, Malaysia.
(E-mail: jktan2@live.utm.my, tansuihong@utm.my)

ABSTRACT

The aim of this study is to to investigate relationship between self-efficacy and stress coping strategies among National Chinese Primary School teachers in Johor Bahru. Survey will be conducted on 300 teachers from seventeen National Chinese Primary School in Johor Bahru. Studies showed that teachers in Malaysia experienced moderate level of stress. The main sources of stress had been identified in previous studies that is students' misbehavious and teachers workload. Self-efficacy refers to the personal beliefs about their capabilities to learn and perform activities at certain level. Therefore, it is neccesary to find out the relationship between self-efficacy and stress coping strategies to help teachers to cope with stress.

Key words: Self-efficacy, Stress coping strategies, National Chinese Primary School

INTRODUCTION

Teaching has been proven as a stressful job (Kyriacou & Sutcliffe, 1978; Shirley & Kathy, 2002) and most teachers would experience some or severe nervous strain at school (Pratt, 1976). Kyriacou (1980) reported that teachers, when compared to people in other professions, had the highest levels of occupational stress. Teachers are generally known with the role of educate the pupils in the classroom. However, in recent times teachers' roles are more than teaching in a classroom. Teachers spend their time on curricular and cocurricular activities, students' affair, professional development sessions and myriad of school-related events and activities.

However, studies in Malaysia showed that most of the teachers experience moderate level of stress (Hadi *et al*., 2009; Samad *et al*., 2010; Jumahat *et al*., 2013). Nevertheless, these studies did not address why teachers experienced moderate level of stress, contrary to the studies conducted in the west. The source of work stress experienced by teachers are roughly equal between male and female teachers, or between teachers of primary and secondary school (Chua, 2004). Chan *et al.* (2010) listed some significant stressors in teachers that is education reform policies, workload and time pressure, students' misbehaviour and indiscipline, working relationships, school management, school violence, redundant teacher-related issues, continuing further education, low salary and others. Studies also found that the main cause of stress in primary school environment is students' misbehaviour where the main issues were bullying, absenteeism and disrespectful (Samad *et al*., 2010).

Jumahat *et al.* (2013) conducted a study to determine the contributing factors of stress among teachers in Missionary Primary Schools in Kuala Lumpur. There were seven sources of stress which included workload, pupils' attitude, time constraint, relationships with colleagues, relationships with parents, appreciation and support and lack of resources. The finding also showed that the stress level among teachers in Missionary Primary Schools in Kuala Lumpur was at a moderate level.

In addition, Ooi and Ismail (2015) conducted a study to investigate work stress in teachers from National Primary School and National Chinese Primary School. The finding showed that the key factors that cause teachers to be stressful are pupils' misbehaviour and teachers' workload. Interestingly the study revealed that teachers from National Chinese Primary School experienced higher work stress than teachers from National Primary School.

There are different ways people cope with stress and it is dissimilar among individuals. According to Lazarus and Folkman (1984), people use problem-focused coping strategies and emotion-focused strategies when they encounter stress. Problem-focused coping strategies focused at actions that must be done to manage or eliminate the stress. Emotion-focused coping strategies focused at the way a person regulating emotional responses about the stressful situation to reduce the uncomplimentary feeling.

Researches showed that there is a significant relationship between self-efficacy and stress coping strategies. Self-efficacy refers to the personal beliefs about their capabilities to learn and perform activities at certain level. Masoudnia (2007) found that students with high self-efficacy use problem-focused coping strategies while students with low self-efficacy use emotion-focused coping strategies and avoidance coping strategies. In addition, Betoret and Artiga (2010) discovered that there is a significant relationship between self-efficacy and stress coping strategies on Spanish primary and secondary teachers.

Since most of the teachers in Malaysia feel stress but not much is known about how self-efficacy influence stress coping strategies especially teachers in National Chinese Primary School which experienced higher work stress than National Primary School teachers. Therefore, this study aims to find a relationship between self-efficacy and stress coping strategies among National Chinese Primary School teachers in Johor Bahru.

RESEARCH METHOD

This is a quantitative study using survey. The population of this study are teachers from seventeen National Chinese Primary School teachers in Johor Bahru. The target population of the study is 300 respondents. Data will be analysed using the Statistical Package for the Social Sciences (SPSS). The data will interpret in both descriptive statistics and then explores in depth using Pearson correlation.

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is presented as Figure 1.

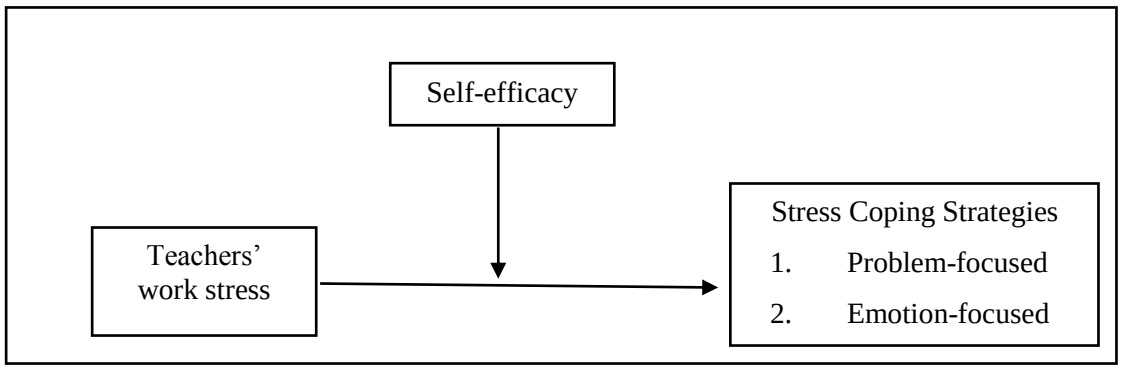


Figure 1. Conceptual framework

CONCLUSION

As most of the teachers in Malaysia feel stress and the number of teachers suffering from mental distress is increasing especially National Chinese Primary School teacher has reached a worrying level, it is important to carry out this study to identify the relationship between self-efficacy and stress coping strategies. The result would give information to related authorities in order to help teachers to cope with stress.

REFERENCES

Betoret, F. D., & Artiga, A. G. (2010). Barriers perceived by teachers at work, coping strategies, self-efficacy and burnout. *The Spanish Journal of Psychology*, *13*(02), 637-654.

Chan, A. H., Chen, K., & Chong, E. Y. (2010). Work stress of teachers from primary and secondary schools in Hong Kong.

Chua, B. S. (2004). Stress Pekerjaan, Kepuasan Kerja, Masalah Kesihatan Mental dan Strategi Daya Tindak: Satu Kajian Di Kalangan Guru Sekolah Di Kota. *Jurnal Teknologi*, 40, 1-18.

Hadi, A. A., Naing, N. N., Daud, A., Nordin, R., & Sulong, M. R. (2009). Prevalence and factors associated with stress among secondary school teachers in Kota Bharu, Kelantan, Malaysia. *Southeast Asian Journal of Tropical Medicine and Public Health*, *40*(6), 1359.

Jumahat, T., Mohd Noor, F., & Ibrahim, M. B. (2013). Faktor-faktor penentu stress dalam kalangan guru: Sekolah Rendah Mubaligh di Kuala Lumpur. *Jurnal Kurikulum dan Pengajaran Asia Pasifik*, *2*(1).

Kyriacou, C. (1980). Coping actions and occupational stress among schoolteachers. *Research in education*, (24), 57.

Kyriacou, C., & Sutcliffe, J. (1978). Teacher Stress: Prevalence, Sources, And Symptoms. *British Journal of Educational Psychology*, *48*(2), 159-167.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Masoudnia, E. (2008). Perceived self-efficacy and coping strategies in stressful situations.

Ooi, C. H., & Ismail, A. (2015). Sokongan Pihak Pengurusan Sekolah Terhadap Tekanan Kerja Guru Di Sekolah Kebangsaan Dan Sekolah Jenis Kebangsaan Cina.. *Jurnal Kepimpinan Pendidikan*, 2(2).

Pratt, J. W. (1976). *Perceived stress among teachers: An examination of some individual and environmental factors and their relationship to reported stress.* Unpublished Master of Arts's thesis, University of Sheffield.

Samad, N. I. A., Hashim, Z., Moin, S., & Abdullah, H. (2010). Assessment of stress and its risk factors among primary school teachers in the Klang Valley, Malaysia. *Global Journal of Health Science*, *2*(2), 163.

Shirley, L. K., & Kathy, M. H. (2002). Stress Hormones: How Do They Measure Up? *Biological Research For Nursing*, *4*(2), 92-103.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Influence of Inquiry and Traditional Methods of Teaching Mathematics on the Academic Performance of Secondary School Students in Sokoto State, North-West Nigeria

Elizabeth Julius*[1] and Abdul Halim Abdullah[2]
[1]Department of Science Education,
Kebbi State University of Science and Technology, Aliero-Nigeria
(Email-mummybaffa2000@gmail.com)
[2]Department of Science and Mathematics Education,
Universiti Teknologi Malaysia, Johor Bahru Malaysia
(Email: p-halim@utm.my)

ABSTRACT

This study investigated the influence of inquiry and traditional methods of teaching mathematics on the academic performance of secondary school students in Sokoto State, northwest Nigeria. A sample of three hundred (300) students of senior secondary II (SSII) was drawn from the population. Performance Test on Certain Topics in Mathematics (PTCTM) developed by the researcher was used as the instrument for the study. The instrument was validated by experts in mathematics education and the reliability index of the instrument was 0.64 which was determined through test-retest method of reliability estimation. T-test was used to test the hypotheses generated for the study. The findings showed that there is significant difference in the performance of students taught mathematics using inquiry and traditional methods, there is significant difference in the performance of male and female students taught mathematics using inquiry method and there is no significant difference in the performance of male and female students taught mathematics using traditional method. It was recommended among others that if performance of students in mathematics should be enhance, then using inquiry method (activity base) should be encouraged in the teaching and learning of mathematics among secondary school students in Sokoto State, northwest Nigeria.

Keywords: Inquiry method, Traditional method, Performance, Mathematics Teaching and Learning

INTRODUCTION

Mathematics is the foundation of science and technology and the functional role of mathematics to science and technology is multifarious that no area of science and technology escapes its application (Okereke, 2006). Mathematics is also considered the bedrock for the development of science and technology of any nation. Its importance to national development makes it a compulsory subject at both basic education and secondary level (FRN, 2013). The implication of this is that there may be no meaningful development in science and technology without corresponding development in mathematics. Mathematics is an inquiry-oriented subject, which requires the use of various teaching methods to effectively teach it. In so doing, the students not only learn the content of mathematics, but also acquire mathematics skills such as classifying, manipulating, interpreting and communicating. FRN, (2013) emphasized the need for the introduction of more practical approach in teaching mathematics in order to encourage mathematical thinking and application among students in order to cope with the demands for scientific and technological development in Nigeria.

Educationists generally agreed that teaching is indeed a complex process (Gbaamanjah, 1991). Teaching effectively at any level of education is measured in terms of the knowledge of what to teach, how to teach it and when to teach (Borasi, 2007). The ‘‘how’’ of teaching constitute of what is called teaching strategies. Teaching strategies are indispensable tools for any successful lesson. The ability of a teacher to select appropriate method in teaching a particular lesson (topic) tells much about his competency. The teaching strategy according to Nigerian Open University (NOU) is defined as accepted formal procedure for transferring knowledge.

One of the most important outcomes of the process of schooling is supposed to be students increased ability to learn more easily and communicate effectively in future and also to acquire certain skills and behave in a way that they had hitherto not behave (Butcher, 2003). This acquisition of skills and

attitudes leads to a change in behaviour, which is the goal of education, referred to as learning. Learning cannot be directly observed but can be manifested in the activities of the individual. Several attempts are currently being made by mathematics educators to see better methods of improving mathematical knowledge through better teaching strategies ranging from inquiring method, investigative laboratory approach, and the use of concept mapping (Harrison & Treagns, 1999). Ajewole, (1997) opined that, there is general lack of materials for teaching mathematics, and where the materials are available some teachers generally shun the use of activity based method or employ inadequate method in teaching the subject.

Traditional teaching method is a teaching technique where an instructor is the central focus of information transfer. Typically an instructor will stand before a class and present information for the students to learn. Sometimes they will write on board or use an overhead projector to provide visual for students to see it. According to Sambo, (2005) the traditional method is sometimes called expository method of teaching, it is probably the first method the teacher uses when students start learning any vocational subject. It is primarily to introduce students to a new subject, but it is also a valuable method for summarizing ideas showing relationship between theory and practice and re-emphasizing main points. It is particularly effective in teaching a skill that can be observed.

Inquiry method on the other hand is a technique of teaching where the learner with minimum guidance from the teacher seeks to discover and creates answer to a recognized problem through procedure of making diligent search (Borasi, 2007; James 2001). Inquiry is a term used in science teaching that refers to way of questioning, seeking knowledge or information or finding out about phenomena. In inquiry situation students learn not only the concept and principles but self-direction responsibility and social communication, it also permits student to assimilate and accommodate information.

In a related development, (Abdullahi, 1982; Apkan, 2009;Olorinoye, 1998) in their separate findings revealed that the prevailing teaching method in most Nigerian secondary schools is traditional method. This method according to them, does not allow active students participation in lessons. Research findings of some scholars have suggested inquiry, demonstration and discussion method are more effective methods of teaching mathematics and other science related subjects in the senior secondary schools (James, 2001; Olorinoye, 1998; Shysmansky, 2010). These approaches according to these researchers can improve performance of students in mathematics. Some teachers are not aware of the significance of suitable method due to inadequate knowledge or perhaps low professional training. Some are not competent enough to adopt hard but suitable method. Considering the statement made by (Sambo, 2005) that ‘‘student will learn more if they are engaged in significant and appealing activities’’. It is against this background that this study examined inquiry approach as against traditional method in the teaching of mathematics in secondary schools in Sokoto state.

Research Questions

The following research questions were raised and answered in this study;

1. Is there any difference in the academic performance of secondary school students taught using inquiry approach and traditional method of teaching mathematics in Sokoto state?
2. Is there any difference in the academic performance of male and female students taught using inquiry approach of teaching mathematics in sokoto state?
3. Is there any difference in the academic performance of male and female students taught using traditional method of teaching mathematics in sokoto state?

Research Hypotheses

For the purpose of this study, the following hypotheses were formulated and tested.

1. There is no significant difference in the mean scores of students taught mathematics using inquiry approach and those taught with traditional method.
2. There is no significant difference in the mean scores of male and female students taught mathematics using inquiry approach of teaching.
3. There is no significant difference in the mean scores of male and female students taught mathematics using traditional method of teaching.

METHODOLOGY

This study used the academic performance of the sampled students to compare two teaching methods i.e inquiry approach and traditional method of teaching. The design for this research was quasi-experimental. The population of the study consists of all the senior secondary school (II) students in Sokoto state, who are within the average age of fifteen (15) to nineteen (19).There are (61) senior secondary schools in sokoto state, some of the schools are single sex schools while others are mixed sex schools, all the schools in the state are classified according to zones.

The sample of the study was drawn from the entire population of the study i.e the whole of SSII students in Sokoto State. The sample of six secondary schools was deliberately taken from the entire population. Fifty (50) students were selected from each of the secondary school by simple random sampling using balloting with replacement in order to ensure selection without bias. The sampled students for this study were three hundred 300. This is because the senior secondary II (SS II) of the sample schools have a total number of 1,576 students, therefore the sample of 300 students is appropriate according (Krejcie & Morgan, 1970) table of determining sample size in a given population.

RESULTS

Table 1: Performance of Experimental and Control Group on post-test

Groups	No of subjects	Mean (x)	S. D	DF	T-cal	T-crit	Sign level
Experimental	150	16.07	1.960				
				298	34.05	1.967	0.05
Control	150	9.57	1.348				

X=0.05

Table 2: Performance of Male and Female Students in the Experimental Group

Groups	No of subjects	Mean (x)	S. D	DF	T-cal	T-crit	Sign level
Males	75	14.57	1.347				
				148	16.752	1.971	0.05
Females	75	17.57	1.164				

X=0.05

Table 3: Performance of Male and Female Students in the Control group

Groups	No of subjects	Mean (x)	S. D	DF	T-cal	T-crit	Sign level
Males	100	9.64	1.336				
				148	0.906	1.971	0.05
Females	50	9.36	1.425				

X=0.05

CONCLUSION

Based on the findings of this study, it was concluded that:

i. Inquiry teaching method enhances higher level academic performance among students in sokoto state. Those taught using his method perform significantly better that those taught using traditional method.
ii. Female students performed significantly better than their male counterpart when taught using inquiry method.
iii. There was no difference in the performance of male and female students when taught using traditional method.

RECOMMENDATIONS

From the findings of this study, the following recommendations are put forward;

1. Inquiry method of teaching should be encouraged in teaching and learning of mathematics in secondary school. This is because the method is proved to be effective in improving students' academic performance.
2. Using inquiry method require more time on the part of the teacher, therefore some incentives in form of encouragement should be given to mathematics teachers to enhance commitment in making mathematics more effective and successful.
3. Mathematics teachers should be trained in the areas that could help them in teaching mathematics using inquiry method so that there will be a shift from teacher centered to student centered approach.
4. Teachers of mathematics at secondary school level should adopt the use of inquiry method, which will definitely influence academic performance of students positively, which will in turn help the society meet up with the educational challenges, hence transform the country into an industrialized nation.

IMPLICATION OF THE STUDY

Over the years there has been a lot of concern at the poor performance of students in mathematics at the SSCE level and general fall in the standard of education. A number of factors have been attributed to this problem. One notable solution to address the problem of poor teaching method is seen in this study. The result has confirmed that inquiry teaching method can positively influence students' performance in mathematics. The result of this study will convince mathematics teachers, to adopt the use of inquiry method of teaching. This method makes students to learn better and the corresponding result is an improvement in academic performance. Therefore for teachers to free themselves from the blame of poor teaching method, they should embrace inquiry method of teaching.

REFERENCES

Abdullahi, A. An investigation into the status of science teaching in Nigeria. *Science Teachers Association of Nigeria*. (1982)20(2):193-194.

Ajewole, G. A. Effect of discovery and expository method of instruction on the attitude of students to biology. *Journal of Research in Science Teaching.* (1997). Pp 34-43.

Akpan, O. E. *Towards creating science teaching and learning in West Africa schools*. Catholic mission press: cape coast. (2009).

Borasi, S. R. Beginning the Process of Rethinking Mathematics Instruction. A Professional Development Program. *Journal of Mathematics Teachers Education*, (2007)2, 49-78.

Butcher, N. Technical infrastructure and use of ICT in education in Africa: An overview, Paris,ADEA *Journal of Mathematical Association of Nigeria*. (2003).37(2), 91-96.

Federal Republic of Nigeria. National Policy on Education (Revised) Lagos NERD Press. (2013).

Gbamanjah, T.N.S.T. *Methods of teaching*. P.H totan press (1991).Pp 5-10.

Harrison, A. and Treagns, D. F. Teaching with analogies. A case study in grade optics. *Journal of Research in Science Teaching*. (1999). 20(10); 129-131.

James, W. S.The effect of activity based learning techniques in teaching high school students. *Journal of Science Education*. (2001).

Krejcie, R. and Morgan, D. W. Determining sample size for Research activities. Educational and psychological measurement. (1970).

Okereke, S. C. Effect of prior knowledge of implication of mathematical task/ concepts to career types and gender on students' achievement, interest and retention. In U. Nzewi (Ed.) *STAN proceedings of the 47th Annual conference*. (2006) 253-259.

Olorinoye, T. D. The inquiry and discovered method of teaching science. *Journal of Science Teachers Association of Nigeria*. (1998). Vol, 21(1); 168-180.

Sambo, A. A. *Research method in Education*. Stirling- Horden publishers Nigeria Limited. Ibadan. (2005).

Shysmansky, J A reassessment of the effect of inquiry-based science curricula of the 60's on the student performance. *Journal of research in Science teaching*, (2010). (2) 127-144.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Innovative Strategies for Improving the Teaching and Learning of Practical Agricultural Science at the Secondary Schools

Ndem, J. U[1], Ogba, E. I.[2], Aneke, C. U.[3], Udensi, E. O[4] & Okpara, C.M[5]

[1,2]Department of Technology and Vocational Education, Ebonyi State University, Abakaliki Nigeria
[3,4]Department of Technology and Vocational Education, Faculty of Education, Enugu State University of Science and Technology, Nigeria.
[5]Department of Vocational and Technical Education Federal University Ndufu-Alike Ikwo, Nigeria
ndemjoseph2010@gmail.com

ABSTRACT

This work was carried out in Cross River State of Nigeria. The work adopted survey research design. Three purposes of study guided the work with three corresponding research questions. Iwo hypotheses were formulated for the study. The sample for the study was 416. The instrument used for data collection was a questionnaire developed by the researchers. The instrument was validated by 5 experts in agricultural education and measurement and evaluation. The reliability of the instrument was determined by the use of Cronbach alpha, which had 0.95 as the reliability coefficient. The researchers collected the data. The data collected were analyzed using mean with standard deviation for the three research questions. t-test statistic was used to test the two hypotheses formulated at 0.05 level of significance. Based on the analysis of the data, it was found that the used of internet, computer, powerpoint and overhead project can be used as an innovative strategy for improving the teaching and learning of practical agricultural science at secondary school level. Based on the findings, the researchers recommended among others that school proprietors should ensure that there is a well-equipped information and communication technology centre with adequate computers, internet system powerpoint and overhead projector for the use of the teachers and students.

Keywords: Innovative; Teaching; Learning; Practical Agricultural Science

INTRODUCTION

Agriculture plays important role in the development of any nation. In Nigeria, before the discovery of oil (petroleum), about 90% of the population of people in Nigeria were engaged in agricultural production. (Okuri, 2004). Agriculture provides income, employment foreign exchange, food, raw-materials for industries, shelter for man and his livestock as well as development of rural areas (Ndem, 2016).

Realizing the importance of agriculture, the subject is taught at the primary, secondary and tertiary institutions. The Federal Republic of Nigeria (2006), recommended effective practical agricultural science in order to develop skills and knowledge needed by the secondary school students for, identification, observation and knowledge of different agricultural products, parts of animals, rock and soil samples.

Okuri and Idris (1991) emphasized that the essence of practical agriculture at the secondary school is to equip the students with practical competencies and skills in observation, identification and recognition which will enable the students pass the practical agricultural science examinations at the senior secondary school examinations. FRN (2006) enumerated the following as some of the objectives of practical agricultural science at the secondary school level;

To equip the students with the skills and competencies in identifying different crops and their parts, to develop in the students, the ability to recognize different crop and animal specimens, to develop the skills and competencies required of students to identify different classes of crops and animals, to equip the students with the skills to recognize different rock and soil samples, to develop the skills and competencies required by the students in recognizing plant diseases and pest.

For the objectives of practical agricultural science to be achieved, there should be effective teaching and learning of agricultural science in the classroom as well as practical demonstrations on the field.

Teaching is giving an instruction to somebody, giving knowledge, skills, attitudes, values and competencies. It is another attempt to help someone change his knowledge and attitudinal skills. The change could be positive or negative. It is positive when desirable change occurs and negative when undesirable change occurs (Ndem, 1996).

Urevbu (1991) explained that teaching is an occupation, profession, an act and an enterprise as well as a science. As an occupation, it means what one does for a living, as a profession, it needs a long period of training formally. It requires a body of specialized knowledge and skills. It needs procedure for certification, a set of standards of performance, intellectual, practical and ethical considerations.

In the context of this study, teaching can be conceptualized as a deliberate effort by someone who is more experienced and qualified to change the behaviour, attitude and knowledge of someone who is less experienced. The teaching of practical agricultural science is carried out by male or female teachers in secondary schools. Alifo (2003) reported that teaching involves an interaction between the teacher and the learner which results to learning. Learning is the result of teacher and experiencing, and it requires the active participation of the learners (Akumma and Ogbonnaya, 2007). Learning according to Uche and Umoren (2003) is the acquisition of knowledge, skills, values, attitudes, competencies and habits, through experience and practice. Ordinarily, practical agricultural science should be properly taught so that the students will possess the required skills in observation and identification and recognition but it is worrisome that the teaching of practical agricultural science at the secondary schools is traditionally being carried out theoretically without the application of the modern technologies. This situation has made it impossible for the students to acquire the required skills in practical agricultural science. Students find it difficult to identify, recognize and observe correctly different agricultural science specimens and as well cannot state the functions of each of the specimens. The inability of the students to identify, recognize and enumerate some of the functions and characteristics of agricultural science specimens has led to poor performance of the students in the senior secondary school practical agricultural science examination (John, 2006). For instance statistics from the West African Senior School Certificate Examination (WASSCE) office (2012), indicated that in Ikom Education Zone in 2007, eighty one (81) candidates who sat for agricultural science practical examination, sixty percent (60%) of them had F9, representing 74.07% failure. In 2008, one hundred and forty eight (148) candidates sat for the examination, seventy four (74) of them had F9, representing fifty percent (50%) failure. In 2009, fifty seven (57) candidates sat for the examination, twenty nine (29), of them had F9, representing 58.87% failure, in 2010, forty seven (47) candidates sat for the examination, thirty (30) of them had F9, representing 63.82% failure and in 2011, one hundred and fifty one (151) candidates sat for the examination, one hundred and three (103) of the candidates had F9, representing 68.21% failure. From this statistics, there is a clear indication that the students are not doing well in agricultural science, especially in the practical aspect of the examination.

This scenario has jeopardized the objectives of practical agricultural science at the secondary school, making students to be devoid of the practical skills required of them from secondary school agricultural science. It is against this background that this work is designed to identify innovative strategies required for improving the teaching and learning of practical agricultural science at the secondary schools.

This situation may be improved if innovative techniques are adopted in the teaching and learning of agricultural science at the secondary schools. Innovative techniques in the context of this study are new technologies, which can be adopted in doing things in order to achieve maximum result and improve the teaching and learning of practical agricultural science at the secondary schools. The question is: how will the teaching and learning of practical agricultural science be improved at the secondary schools? It is on the quest to answer this question that this research is designed to determine the innovative techniques for improving the teaching and learning of practical agricultural science at the secondary school level in cross River State.

METHODOLOGY

The study was carried out in Cross River State of Nigeria. The research adopted survey design method. Three purposes of study and two null hypotheses guided the study. The population of the study was 4173. This comprised of 366 agricultural science teachers and 3, 807 agricultural science students. The sample for the study was 416. The instrument used for data collection was self-developed questionnaire with four rating scales of strongly agree, agree, disagree and strongly

disagree with their nominal values of 4, 3, 2 and 1 respectively. The instrument was validated by 5 experts in agricultural education and measurement and evaluation from the University of Calabar. The reliability of the instrument was determined by using Cronbach Alpha statistics which yielded reliability coefficient of 0.95. The data collected were analyzed using mean with standard deviation for the research questions and t-test statistics for the testing of the null-hypotheses formulated.

DISCUSSION AND CONCLUSION

One of the major finding of this work is that internet can be used to improve the teaching and learning of practical agricultural science. This finding is in agreement with Inije (2011) who reported that one of the modern innovations in teaching and learning is the use of internet. He further explained that teachers utilize the internets to source materials, which are used to teach the students while the students get information from the internet, which aid them to pass their examinations. Oyedele (2011) reported that the use of internet has made it possible for teachers and students to interact effectively either in the presence or the absence of the teacher. The use of internet in teaching and learning promotes information delivery, service, collaboration and sharing of ideas and knowledge. Furthermore, he explained that teachers use internet to source for instructional materials for practical demonstration to the students.

Secondly, the work revealed that computer is useful for improving the teaching of practical agricultural science. This finding is in line with Maffo (2011) who stated that computer is being used by the teacher in adding, subtracting and multiplying figures, as well as in the calculation and analysis of data while teaching. He further explained that computer is useful for the teacher and the students. The students make use of computer to type their assignments, term papers, projects and other vital documents, which improves their learning in the school. The author went on to stress that the use of computer for teaching and learning has to a large extent improved students skills in drawing, ploting of graph especially in practical lessons like practical agricultural science.

Additionally, this study revealed that power point and overhead project can be useful in the teaching and learning of practical agricultural science. This finding is in line with Thomas (2009) who reported that the use of power point and overhead project by the teachers help to magnify images and produce colourful images at size 90 inches to 120 inches diagonal which is far larger than images being produced with that of screen television. He further explained that images, pictures, diagrams and figures can be seen clearly when they are projected with power-point while teaching.

CONCLUSION

In this era of technology innovations and development in knowledge teachers need to adopt the modern technologies in their lesson delivery. The traditional method of teaching and learning should be replaced with these modern technologies in order to make learning more interesting and enjoyable. This work determined the innovative strategies for improving the teaching and learning of practical agricultural science. Based on the data collected, it has been established that the use of internet, computer, power-point and overhead projectors can improve the teaching and learning of practical agricultural science. It is therefore, pertinent that teachers should embrace the findings of this research in order to improve their teaching and students learning abilities.

REFERENCES

Alifo, A. New computer teacher for school. Lagos: Mega-Elipse Computer Services (2003) 36-45.

Charles, P. Christmas is a time for taking from school, Los Angeles Times (2007) 11-26.

Federal Republic of Nigeria. National Curriculum for Agricultural Science. Lagos: Ministry of Education (2006) 48-52.

Inije, G.O. Strategies for increasing the use of ICT in business education. *A paper presented at the 23rd Annual International Conference. Association of Business educators of Nigeria at Faculty of Education Auditorium, University of Lagos, Akoka.* (2011) 63-75.

John, L.T. *The Art of Teaching in Education.* Calabar: New Era Press (2006) 32-43.

Maffo, F. (2011). Role of computer in teaching and learning accounting education. *A paper presented at the 23rd annual international conference of association of business educators at the University of Lagos* (2011) 48-55.

Ndem, J.U. (1996). Evaluation of the status of agricultural science teaching in secondary schools in municipal area council, Abuja. *PGDTE project, Department of Vocational Teacher Education University of Nigeria, Nsukka.* (1996) 68-90.

Okorie, J.U. (2006). *Studies in Nigerian education foundation and methods of education.* Lagos: Juland Education Publishers (2006) 200-215.

Okuri, S.J. & Idris B. (1991). *Agricultural science for junior secondary school.* Lagos: Longman (1991) 633-643.

Oyedele, J.F. The internet a powerful tool for teaching and learning business education subject. *A paper presented at the 23rd annual conferences of association of business education of Nigeria at* University of Lagos Akoka, (2011) 4.

Thomas, W. (2009). Powerpoint Hel. *Small wars Journal* 4(1) (2009) 44-46.

Uche, S. & Umoren, O. B. (2003). *Professional skills effective teaching.* Uyo: Newland Press (2003) 32-39.

Urevbu, I. *Approaches to teaching and learning.* Enugu: New Land Publishers (1991) 55-60.

West African Examination Report Performance of Candidates in WASS/CE, Lagos: *WAEC Publications* (2012) 33-41.

Nwogu, B. G. E*ducational Research Basic Issues and Methodology*. Ibadan: Wisdom Publishers Ltd (1991) 30-4.

Ndem, J. U. *Management of School Farm Garden: Techniques, Principles and Practices.* Enugu: Cheston Agency Press Ltd (2016) 72-80.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17-18 May 2017

Usage af Information Technology in Technical and Vocational Trades for Effective Waste Management

Augustina Chinweoke Anyigor-Ogah[1], Ernest Ituma Egba*[2]

[1]Department of Business Education, Ebonyi State University, Abakaliki, PMB 53, Ebonyi State, Nigeria.
[2]Department of Technology and Vocational Education, Ebonyi State University, Abakaliki, PMB 53, Ebonyi State, Nigeria.
(austing4real@yahoo.com, letschartup@gmail.com)

ABSTRACT

Technical and vocational skilled workmen provides essential services for smooth running of a society. The services add value to the economy and social status of the society. However, the operations of technical and vocational skilled workmen generates wastes that have negative impacts on the environment. There is a research need to determine measures managing the wastes effectively. Therefore, this paper describes ways of enhancing waste management in technical and vocational trades through information technology. Research data are derived from questionnaire survey. The questionnaire seeks opinions of 540 respondents on ways of improving solid waste management in technical and vocational jobs using informational technology. The data are analysed using the relative contribution index. The findings indicate enabling adequate repair of electronic gadgets and the promotion of the use of best practice for technical and vocational jobs are the most significant ways information technology enhance waste management in technical and vocational jobs. Also, promoting the use of machines for optimization of designs, and the application of technologies like LeftoverSwap, LeanPath, FoodStar and Love Food Hate Waste to lessen waste of food are other ways information technology enhances waste management in technical and vocational jobs.

Keywords: Technical trade, vocational trade, information technology, south east Nigeria

INTRODUCTION

Technical and vocational trade is a skilled career that is obtained through a non-university degree training and certification. Some examples of technical and vocational trades are fashion designing, hairstyling, bookkeeping, accounting, auditing, bricklaying, plumbing, electrical and electronics repairing. Others are medical laboratory job, electrician job, auto mechanic job, construction management, business and office management. The trades add economic and social values to the society (CEDEFOP, 2011). However, the continuous generation of solid wastes from the operations of technical and vocational trades and the impact of the solid wastes on the environment (Goorah et al., 2009) have attracted research attentions in the recent times.

CIPS (2007) classified waste into general refuse, paper and paper products, production scraps, building/construction wastes and special wastes. Alam and Ahmade (2013) opined that types of solid wastes are residential, construction and demolition, industrial and municipal services wastes. Sample of solids wastes from technical and vocational trades in Nigeria is presented in Figures 1. The solid wastes, which are non-biodegradable and non-compostable biodegradable, emit greenhouse gases and toxic fumes that causes pollution (Cosmato, 2010). Chadar and Chadar (2017) discussed the causes and effects of solid wastes pollution. They said that solid waste pollution is caused by overpopulation, urbanization, affluence and technology. It causes numerous diseases to humanity. They concluded that effective management of solid waste is vital for adequate reduction of environmental pollution.

(a) (b)

Figure 1: Solid wastes from (a) technical trade, (b) vocational trade

There is insufficient research on the usage of Information Technology (IT) in the management of wastes from vocational jobs in a developing country like Nigeria. Therefore, this paper aims at identifying ways of enhancing waste management in technical and vocational trades using IT.

METHODOLOGY

The survey research approach was used. A questionnaire survey was designed to collect data from the opinions of the respondents on ways of enhancing waste management in technical and vocational jobs through information technology. The target population is all technical and vocational teachers and skilled workmen in Ebonyi state of Nigeria. Two hundred technical and vocational teachers and registered skilled workmen were randomly and carefully drawn across each of the three senatorial zones in Ebonyi state to achieve a good representation of the population. Three technical and vocational experts from the department of Technology and Vocational Education in Ebonyi state University, Abakaliki subjected the 9 statement items that were designed by the researchers to content and construct validation to achieve a significant reliability of the instrument. The questionnaire copies were administered to the six hundred respondents. Five hundred and forty copies of answered questionnaire were returned, found fit, and utilized for data analysis.

MAIN RESULTS

The analysis of ways of enhancing waste management in vocational jobs through information technology is presented in Table 1. The analysis reveals that the registered skilled workmen share the opinion that enabling adequate repair of electronic gadgets, the promotion of the use of best practice for technical and vocational jobs and promoting the use of machines for optimization of designs are the most significant ways information technology enhance waste management in technical and vocational jobs. The three factors mentioned above have average RCI higher than 0.80. Technical and vocational teachers have the same view with registered skilled workmen, but added the promotion of the use of technologies like LeftoverSwap, LeanPath, FoodStar and Love Food Hate Waste to lessen waste of food to the list of the most significant means of enhancing waste management in technical and vocational jobs through information technology. The results imply that information technology is a useful tool for effective waste management in technical and vocational jobs, especially in a developing country like Nigeria. The findings supports the submission of Hannan et al. (2015) that information technologies could add meaningful value to solid waste management.

Table 1: Ways of enhancing waste management in vocational jobs through information technology

Ways IT enhance waste management in technical and vocational jobs	Registered skilled workmen		Technical and vocational teachers	
	RCI	Rank	RCI	Rank
IT promotes the use of best practice in technical and vocational jobs, thus minimising waste	0.82	2	0.81	2
IT enables adequate repair of electronic gadgets in order to reduce waste of material	0.83	1	0.81	2
The use of technology aimed at prolonging life of fresh produce reduces waste of food	0.78	4	0.76	6
IT minimises generation of waste from the traditional system of storing information	0.73	9	0.75	7
The use of machines for optimization of designs reduces material waste	0.80	3	0.82	1
The use of technologies like LeftoverSwap, LeanPath, FoodStar and Love Food Hate Waste lessen waste of food	0.77	5	0.80	4
IT minimizes the chances of reworks, thus reduces waste	0.74	8	0.78	5
IT guides against overproduction of goods in vocational jobs	0.76	7	0.73	9
IT enables optimization of cost of production of goods in vocational jobs for effective waste reduction	0.77	5	0.74	8

CONCLUSION

The paper presents the analysis of measures of enhancing waste management in technical and vocational trades through IT. A questionnaire instrument was used to ascertain the opinions of the respondents. The results demonstrate that enabling adequate repair of electronic gadgets and the promotion of the use of best practice for technical and vocational jobs are the most significant ways information technology enhance waste management in technical and vocational jobs. Other ways are promoting the use of machines for optimization of designs, and the promotion of the use of technologies like LeftoverSwap, LeanPath, FoodStar and Love Food Hate Waste to lessen waste of food. It is recommended that future research be conducted on the development of information technolog-based waste management framework for effective reduction of solid wastes in Ebonyi state Nigeria.

REFERENCES

Alam P., Ahmade K., 2013, Impact of solid waste on health and the environment, *International journal of Sustainability and Green Economics*, 2(2), 165-168.

CEDEFOP, 2011, *The benefits of vocational education and training*, Publications Office of the European Union, Luxembourg.

Chada S., Chada, K., 2017, Solid waste pollution: A hazard to environment, *Recent Advances in Petrochemical Science*, 2(3), 1-3.

CIPS 2007. *How to develop a waste management and disposal strategy*, the Chartered Institute of Purchasing and Supply, Lincolnshire.

Cosmato D., 2010, Understanding the role of solid waste in pollution, *Retrieved from Google, http://www.brighthub.com/environment/science-environmental/article/92943*.aspx, accessed 14.09.2017.

Goorah S., Esmyot M., Boojhawon R., 2009, The health impact of nonhazardous solid waste disposal in a community: The case of the Mare Chicose Landfill in Mauritius, *Journal of Environment Health*, 72(1), 48-54.

Hannan M.A., Mamun M A.A., Hussain A., Basri, H., Begum R.A. 2015, A review on technologies and their usage waste monitoring and management systems: issues and challenges, *Waste Management*, 43, 509-523.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Computational Thinking in Engineering Education: A Review and Direction for Research

Charles A. N. Johnson, Moh'd Fadzil Bin Daud and Mahyuddin Bin Arsat

Centre for Engineering Education, Universiti Teknologi Malaysia, Johor Bahru, MALAYSIA
Faculty of Engineering, Niger Delta University, Wilberforce Island, Bayelsa State, NIGERIA
Faculty of Mechanical Engineering, Universiti Teknologi Malaysia, Johor Bahru, MALAYSIA
Faculty of Education, Universiti Teknologi Malaysia, Johor Bahru, MALAYSIA
canjohnson60@gmail.com, fadzil@fkm.utm.my, mahyuddin@utm.my

Abstract

Computational Thinking (CT) has been identified as a core competency for the engineers. As a concept, it refers to a set of skills required to convert everyday challenges into tasks that can be resolved with the aid of a computer. This conviction is crucial to virtually every engineering problem. Thus, in this paper, we present an up-to-date review of the current status of computational thinking based on the most significant literature and discussions using an inductive qualitative content analysis on 105 papers about CT, selected according to pre-defined criteria from some databases and digital libraries. The researchers highlight on the basic concepts and approaches relevant to the subject. With this comprehensive review, the researchers furnish interested practitioners with valuable insights into the developmental stages of computational thinking in engineering education and some identified challenges. It is our hope that the study assists educators, teachers, and policy makers to make informed conclusions on how computational thinking skills and concepts can be integrated into engineering education.

INTRODUCTION

In the last few years, Computational Thinking (CT) has become a major requirement for the current and future engineers. In an engineering context, problem-solving skills, the creation, and manipulation of computing artifacts are crucial steps for designing digital systems and innovations (Magana *et al.*, 2017). The concept 'Computational Thinking' presents "a fundamental universally applicable attitude and skill set for everyone, not just the computer scientists, would be eager to learn and use" (Wing, 2006). Although, CT might have been existing in the world of engineering education, not much is known about its utilization in engineering practice.
Therefore, this paper articulates the existing research works on the application of computational thinking in engineering education in a view to propose a direction for research attention. It compares CT principles and its applications to problem solving in engineering education. Also, it describes efforts made by researchers on the integration of CT in engineering education.

METHODOLOGY

The procedures of systematic text analysis were performed as qualitative content analysis. The main idea of the inductive development of categories is to articulate a criterion of characterization that emerges from theoretical basis and research question. Following this criterion, the text analysis is examined in detail and where categories are uncertain, they are step-by-step reasoned. "Within a feedback loop those categories are revised, eventually reduced to main categories and checked in respect to their reliability.

CONCEPTS OF PROBLEM SOLVING USING CT STRATEGY

Computational thinking is a strategy for problem solving utilizing thought processes. It is a problem-solving process, a process designing systems, and a human behavior understanding process that

operates by inferring on concepts vital to computer science. Table 1 summaries the comparison of CT principles and its usage in engineering education.

Table 1: Comparison of CT principles and its application in engineering education

Computer Science			Engineering Education [5]
CT Concept [3]	CT Approaches [3]	CT Practices [4]	
Problem Solving			
Abstraction - removing unnecessary detail	*Tinkering* - experimenting and playing	Connecting Computing	Problem definition
Decomposition - breaking down into parts	*Creating* - designing and making	Developing Artefacts	Idea generation
Algorithms - making steps and rules	*Debugging* - finding and fixing errors	Use of Abstraction and Models	Idea synthesis
Logic - predicting and analyzing	Persevering - keeping going	Analysing Problems and Artefacts	Idea evaluation
Patterns Recognition - spotting and using similarities	*Collaborating* - working together	Communicating Process and results	Solution implementation
Evaluation - making a judgment		Working effectively in Teams	
Pattern Generalisation			

(Barefoot Computing http://www.barefootcas.org.uk; The College Board, 2011)

CT IN ENGINEERING EDUCATION

Experts and scholars in the engineering field have worked toward the integration of CT in engineering education. The engineering instructors have accepted Wing's definition (Magana *et al.,* 2017) claiming that for virtually every engineering problem the mindset relays to converting "everyday problems into tasks that can be resolved with the aid of a digital computer and the application of computer-related solutions to immediate questions" Gross *et al* 2014). Other researchers in engineering education Vagara (2009), also proposed a clear alignment between the concepts of computing and disciplinary design and problem-solving skills as a mode of practice-ready CT in engineering. CT elements recognized in their assessment through interviews with 27 human resources senior managers and senior representatives of different engineering fields includes: conceptual and operational problem solving, elementary computational skills, identifying application principles and the limitations of software tools, familiarizing with various software platforms, ability to navigate between physical systems and software abstractions, the use of various CAD programs with 3D modeling, simulation processing packages, mathematical computational platforms, modelling and simulation tools, visualization software, and among others programming capability. The research studies explained above propose that CT in STEM fields might not be distant from the present curricular outcomes required in undergraduate engineering learning.

DISCUSSION AND CONCLUSION

The concepts of CT, specifically as a structure for rigorous thinking about physical systems, could provide a platform for supplementing other intellectual structures. Therefore, in this study, given the importance of CT, the researchers have presented an up-to-date review of the current status of CT based on the most significant literature, official documents, and deliberations in order to unify all options. This review provides fruitful insights into the developmental stages of CT in engineering education. The review reveals that teachers and instructors require the essential skill sets in order to overcome the technical and theoretical problems associated with modelling and simulation. It is our intention that this review will assist educators, teachers and policy makers to make informed conclusions on how CT skills and concepts can be integrated into engineering education.

REFERENCES

Gross, S., Kim, M., Schlosser, J., Lluch, D., Mohtadi, C., and Schneider, D. Fostering computational thinking in engineering education: Challenges, examples, and best practices. Paper presented at the *Global Engineering Education Conference (EDUCON), 2014 IEEE*, 2014.

http://www.computingatschool.org.uk Computing at School, 2014.

Lumsdaine, E. and Lumsdaine, M. Creative Problem Solving. *IEEE Potentials*, 1994.

Magana, A. J., and Silva Coutinho, G. Modeling and simulation practices for a computational thinking-enabled engineering workforce. *Computer Applications in Engineering Education*, 25(1), 2017, 62-78.

The College Board, Computer Science Principles: Computational Thinking Practices, The College Board Report 2011.

Wing, J. M. Computational Thinking. *Communications of the ACM*, 49(3) (2006), 33-35.

Vergara, C. E., Urban-Lurain, M., Dresen, C., Coxen, T., MacFarlane, T., Frazier, K., Paquette, L. Aligning computing education with engineering workforce computational needs: New curricular directions to improve computational thinking in engineering graduates. Paper presented at the *Frontiers in Education Conference, 2009. FIE'09. 39th IEEE*, 2009.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Evaluation Of Control And Accountability Instruments Of Civil Service In Nigeria And Britain

Muhammad Abdullahi*[1] and Chikaji, A.I.[2,3]

[1] Department of Public Administration, University of Maiduguri, Maiduguri, Nigeria (bb2them@gmail.com)
[2] Faculty of Management, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia;
[3] Faculty of Social and Management Sciences, Yobe State University, Damaturu, Nigeria (Aliyuchikaji@Yahoo.Com)

ABSTRACT

Control and accountability instruments are introduced to keep public servants within limits in their operations and service delivery. Both Nigeria and Britain have certain regulatory instruments that checkmates the excesses of their public servants while ensuring transparency. It is against this backdrop that the paper identified and evaluates the various instruments of control and accountability in Nigeria and Britain separately and conceptually tested their effectiveness. The paper employed documentary analyses to arrive at conclusion that adequate instruments exist towards checkmating the excesses of public servants in both countries. However, it is more pronounced in Nigeria but more effective and efficient in Britain. Issues of corruption, nepotism, conservatism, favouritism, redtapism, amongst others have been revealed to be persistent in Nigeria's civil service, while Britain's efficiency has given it lots of commendations over the years. The paper therefore recommends that both countries improve such apparatus, especially Nigeria and create more awareness about them. Nigeria should go beyond that by sensitizing the general public about the availability of such instruments and how they can effectively make a difference in the national development and address corruption, nepotism, conservatism, favouritism, redtapism, amongst others for the civil service to function effectively and efficiently.

Key words: Public Service, Civil Service, Control and Accountability

INTRODUCTION

In every democratic country, the administration is expected to work in accordance with the will of the people which is discovered and formulated in the form of laws. There exist in every country some means where it may be ascertained whether administrative officials are treading the laid out tracks or deviating from it, whether they are using their powers or discretion in conformity with the wishes of the people or abusing them (Mbieli, 2010).

The conflicting views as to how best civil servants can be held accountable can be found in the famous Friedrich- Finer debate of the 1940s (Jackson, 2009). Then, Samuel Finer argued that accountability could only be guaranteed by maintaining hard external constraints, whereas Carl Friedrich argued that self-control is feasible based on a broad array of internal norms and values. Today we find both forms of accountability in operation with civil servants facing numerous external accountability forums as well as internal management and professional accountability standards (Maccarthaigh and Boyle, 2014).

Control and accountability of the public service is in the hands of government. There exist mechanisms through which accountability and control of public servants behaviour and attitudes in their daily operations could be ensured. This can be done legislatively, financially, administratively, politically or through the judicial instruments. In addition, there are other indirect pressure instruments like press, civil society, amongst others.

It is against this background that the the paper identifies the specific existing instruments of control and accountability in the Civil Service system of Nigeria and Britain and evaluates their effectiveness in the two countries with the aim of making a comparative analysis, thereby revealing the weaknesses and strengths of both.

MAIN RESULTS

Nigerian civil service is a colonial legacy. Because of this, it shared the characteristics of the British civil service. Both countries therefore have similar control and accountability instruments despite their differences in governmental systems. Both countries have similar bodies that perform similar functions. For instance, Ombudsman exist as Public Complaints Commission in Nigeria and as Parliamentary Commissioner in Britain. Both countries have Public Accounts Committee in their legislature. They both use Police, Courts, Civil Service Commissions, Civil Service Rules/Codes, Freedom of Information Act, Pressure Groups, Mass/New Media, codified constitution in Nigeria, uncodified constitution in Britain, Citizens Charter in Nigeria, Service Compact (SERVICOM), etc.

Britain has one of the oldest administrative system in the world, and over the years it has remained very stable and tested. Britain is noted for a durable civil service that has developed and improved over the years. Nigerian civil service however has been labelled with lots of negativities including redtapism, conservatism, rigidity and of full corrupt practices. Many of Nigeria's civil servants are old fashioned and like doing things old and same way.

Indications of instruments that control corrupt practices of public servants in Nigeria include the actions of EFCC, ICPC and CCB on several occasions. For instance, most recently, 40 cars were recovered from retired Directors and Assistant Directors of Federal Ministry of Water Resources by ICPC on 26th January, 2017 (Obi, 2017). On Tuesday, 6th May, 2016, EFCC arrested Dr. (Mrs.) Imaobong Akon Esu-Nte, an officer with the Federal Ministry of Finance over corruption allegations, abuse of office and money laundering (Anu, 2016). A press release also by CCB on 29th September, 2016, ministers of Federal Republic of Nigeria, service chiefs and other top civil servants for verification of assets. These are instances where the various agencies play the role of control and accountability in Nigeria.

In Britain, Public Accounts Committee has been noted to have criticized the expenditures on numerous government projects over the years, e.g. the decommissioning of the Sellafield Nuclear Reprocessing site, noting the cost of decommissioning had reach 67.5B and there was no indication of when the cost will stop rising (Moir, 2014). However, in Nigeria, instead of such committee to check the significant financial indiscipline and wastages of national resources, it adds up to the existing ones. Dlakwa (2016) observed that law makers liaise with various Ministries, Departments and Agencies (MDAs) to embezzle resources.

According to the 12th Report of Public Administration Select Committee ordered by House of Commons (2008), Citizen's charter of the United Kingdom had made a valuable contribution to improving public services. In particular, it had led to the improvements in the delivery, culture and responsiveness of many services. It has to a great extent swept away the public's deference towards the providers of public services, and their readiness to accept poor services, and has taught providers to welcome the views of users as a positive assistance to good management. On the other hand, Nigeria's SERVICOM (Service Compact) is akin to Citizen's Charter in the UK. However, in spite its establishment in many MDAs, it remained ineffective and unsound.

Tony Blair of Britain who introduced Freedom of Information Act later expressed regret over the Act, claiming that it impeded the ability of officials to deliberate with a reasonable level of confidentiality (Rosenbaum, 2010). Although it has been a law in Nigeria since 2011, Lear (2014) observed that only two states (Ekiti and Lagos) have adopted the Freedom of Information Act at state level from 7-14 days, though more states are expected to adopt it and come up with their own version. The passing of the law is a victory for Nigerians all over the world if it will be properly implemented as Olodo (2014) asserts. However, it is yet to be pronounced like that of Britain.

Trueman (2016) compiled that in March 1998, around 300,000 people went to London to protest about the labour government's rural policies. The government reacted by announcing plans for a Ministry of Rural affairs and by publishing white paper investigating all aspects of rural life. Nigeria also recorded few successful instances like the Nigerian Labour Congress's protest over the implementation of Orosanye Reform on Rationalisation and Restructuring of Federal Government's Parastatals, which

was an effort to prune the cost of governance in Nigeria. According to the NLC, implementation of the reform agenda will lead to mass loss of jobs by public servants.

CONCLUSION

From the foregoing, it is obvious that adequate instruments of accountability and control exist in both countries. Civil servants are charged with the responsibility of impartiality in implementing government policies, maintaining the operations of efficient and effective administrative machinery for the day to day discharge of government's functions, etc. However, the delivery of such services and functions is more effective and efficient in Britain and categorized as ineffective and inefficient in Nigeria, though there are successes recorded in some ways.

REFERENCES

Anu, A. (May 6th, 2016). *EFCC arrests Abuja civil servant who paid N60million tithe to Redeemed Church.* Retrieved January 26th, 2017 from http://www.nigerianmonitor.com/efcc-arrests-abuja-civil-servant-who-paid-n60m-tithe-to-redeemed-church/

Dlakwa, H.D. (January 20th, 2017). Public policy analysis. Lecture presented at PAD 802 Class in University of Maiduguri, Maiduguri

House of Commons (2008). From citizen's charter to public service guarantees: entitlements to public services. *Twelfth Report of Public Administration committee select committee.* London, UK: The Stationery Office Limited

Jackson, M. (2009). Responsibility versus accountability in the Friedrich-Finer debate. *Journal of Management History, Vol. 15* (1), pp. 66-77.

Lear, E. (May 14th, 2014). *Nigerian freedom of information Act.* Retrieved January 25th, 2017 from http://www.bentelevision.com

Maccarthaigh, M. and Boyle, R. (2014). *Civil service accountability: Challenge and change.* Ireland, UK: Institute of Public Administration

Mbieli, P. (2010). *Public administration: A broadview.* Lagos, Nigeria: West African Books Publishers Limited.

Obi, P. (January 26th, 2017). *ICPC recovers 40 cars from ministry officials, directors.* Retrieved on January 26th, 2017 from http://www.thisdaylive.com/index.php/2017/01/26/icpc-recovers-40-cars-from-ministry-officials-directors/

Olodo, T. (May 14th, 2014). *Nigerian freedom of information Act: A partial guide for Nigerians.* Retrieved January 25th, 2017 from http://www.temitopeolodo.co.uk

Rosenbaum, M. (September 29th, 2009). *How big is COINS database?* Retrieved January 24th, 2017 from http://www.bbc.co.uk/blogs/opensecrets/2009/09/how-big is-coins-database.html

Trueman, N. C. (August 16th, 2016). *What are pressure groups?* Retrieved January 25th, 2017 from http://www.historylearningsite.co.uk/british-politics/pressure-groups/what-are-pressure-groups/

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

The Relationship of Fund Campaign Toward Seat Won on House of Representatives in Indonesia

Lita Kusumasari[1] and Shita Lusi Wardhani[2]

[1]Accounting, STIE YKPN School of Business, Yogyakarta, Indonesia
(E-mail: Lkusumasari@yahoo.com)
[2] Management, STIE YKPN School of Business, Yogyakarta, Indonesia
(E-mail: lusi.wardhani@gmail.com)

ABSTRACT

Fund campaign is always critical due to money politics. Political parties with higher profile of fund campaign will have advantages towards others to win the seat. On the other side, voters can decide whether the political parties would be corrupt in the future or not based on the revenue and spending. The research aim is to analyze whether there is relationship between fund campaign and seat won by house of representatives in Indonesia. The population is 12 political parties and was analyzed using multiple regression. There is significant relationship between fund campaign and seat won in house of representatives of Indonesia. The fund campaign consists of sources from political parties, candidates, individual donators, group and company donators. Only candidates and individual donators have significant relationship to the seat won. Based on the finding, the government should regulate the maximum spending on campaign to avoid money politics.

Keywords**:** fund campaign, fund campaign sources, seat won, candidates fund

INTRODUCTION

Indonesia has been through reformation since 1998 with the fall of President Suharto. His regime was characterized by impressive rapid and sustained economic growth but also well-known for its corrupt nature. The first general election after reformation was in 1999. General Election Commission (KPU) was born to regulate fair election. The responsibilities include deciding which parties can contest elections, organizing the voting and announcing the results and seat won in the various branches of the government. Including the task is set up regulation for campaign and fund campaign accounting (Wikipedia, 2017). The demand for reform ushered in new leaders who had pledged to fight for a democratic government and for an end to corruption, collusion and nepotism (KKN). Progress was made on several fronts. In Suharto era, there were only three parties with Golkar as a ruling one. After reform there were growing number of political parties. There were 12 parties in the general election to vote the house of representatives in 2014.

Tremendeous effort has been made since reform to disminish corruption, collusion and nepotism. It gave enlighting era that according to corruption perception index 2016, Indonesia is number 90 with score of 37 and rise up from 36 in 2015. The position is still under the average of global which is 43 (Corruption perception Index, 2016). There is a big urge from the Indonesian people to eradicate corruption in Indonesia. The popular urge to tackle corruption means that being anti-corrupt is actually an important vote-gainer for aspiring politicians. Being involved or mentioned in a graft case can seriously damage a career as popular support declines.

Financing is at the core of party and candidates activities. The way funding is organized has a huge impact on internal party structures (Ufen, 2014). Most parties have underdeveloped internal structures that leave them vulnerable to unethical practices (Manikas and Thorton, 2003). Most parties have not yet developed well-defined rules or policies, or internal disciplinary mechanisms, for regulating the conduct of their members. They also lack of clear procedures for raising and speding funds.

Financing is at the core of party and candidate activities. The way funding is organized has a huge impact on internal party structures. A transparent, rule-based financing will lead to accountability. There are some criticized on funding such as under-reported party campaign, financial regulations should be reviewed and regular audit has not be conducted properly, still the fund campaign reporting is important. It is resemble of accountability and transparency. The report shows the revenue from the donors and the expense incurred. Voters can decide whether the political parties would be corrupt in the future or not based on the revenue and spending.
People associates to win the campaign, candidates will play money politics. The higher the fund campaign will lead to the higher seat won. People may choose based on others such as religion, figure candidate, or program offered but money still play great roles. Candidates and political parties with extra resources will more easily to socialize program using social media, television, and general meeting. There is still famous under table of giving money to buy votes although it is illegal.
Based on the premise above, the research will conduct is there any relationship between fund campaign resources toward seat won on house of representatives.

MAIN RESULTS

The population of political parties in Indonesia is 12. The fund campaign sources are divided into political parties, candidates, individual donators, group donators, and company donators. The relationship between seat won on house of representatives (dependent variable) and campaign sources (independents variables) will be analyzed using multiple regression with $\alpha = 5\%$.

The hypothesis are
Ho = There is no relationship between fund campaign sources toward seat won on house of representatives
Ha = There is relationship between fund campaign sources toward seat won on house of representatives
The result of regression can be seen on table 1.

Table 1. Result of regression

Model Summary

R^2	0.848
Std. Error	17.62
F	6.72
Sig	0.19

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.872	12.322		-.558	.597
	polparties	3.109E-11	.000	.026	.102	.922
	candidates	2.988E-10	.000	1.036	2.760	.033
	individual	-8.113E-9	.000	-.588	-2.883	.028
	group	-2.634E-10	.000	-.061	-.195	.852
	company	1.288E-9	.000	.338	1.556	.171

a. Dependent Variable: seat

Based on the result, the value of F is 6.720 higher than critical F of 4.39. The Ho is rejected. There is relationship between fund campaign sources toward seat won on house of representatives and it is significant. Look at the R^2, The fund campaign can describe 84.8% of seat won on house of

representatives.

The fund campaign sources of candidates and individual donators are significant, while sources from political parties, group and companies donators are not. It can be seen from t coloumn. The critical t is 2.447 and candidates fund and individual donators have t value higher than critical t. Those are significant.

CONCLUSION

Fund campaign will always be scrutinized as tool to win the seat on house of representatives in Indonesia. Voters can decide whether the political parties would be corrupt in the future or not based on the revenue and spending. There is relationship between fund campaign sources toward seat won on house of representatives. It can be concluded that political parties with high profile of fund will have advantage toward others. Government should regulate the maximum spending on campaign so that there will no race on money politics. The future research can explore more on the relationship between candidates fund campaign toward the winning seat.

Acknowledgment:

The authors would like to express their appreciation for the support of the Indonesian Higher Education Ministry (DIKTI) for supporting this research on competitive research grants scheme.

REFERENCES

Corruption perception Index (2016). Retrieved May 8, 2017 from http://transparancy.ord/news/feature/corruption_perception_index_2016

Manikas, P. M., & Thorton, L. L*Political Parties in Asia Promoting Reform and Combating Corruption in Eight Countries.* United States of America: National Democratic Institute for International Affairs 2003.

Ufen, A. *Funding of Political Parties and Election Campaigns*. International IDEA, Sweden. 2014.

Wikipedia. (2017, April). Retrieved April 12, 2017, from Wikipedia: https://id.wikipedia.org/wiki/Komisi_Pemilihan_Umum

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Personality Antecedents of Status Consumption

Zia ur Rehman and Rohaizat Baharun
Faculty of Management, Universiti Teknologi Malaysia (UTM),
Skudai, Johor, Malaysia.
(E-mail: zia.uaar@gmail.com, m-rohaizat@utm.my)

ABSTRACT

The objective of this study is to develop a conceptual model by identifying the personality antecedents of status consumption. After a detailed review of the literature, it is found that many researchers studied status consumption with the perspective of antecedents however one can rarely find a study based on personality characteristics as antecedents. The current research intends to fill this gap. It is based on the Mowen's metatheoretic model that this model was developed over the pillars of evolutionary psychology, trait theory, and control theory. It describes personality in the form of a hierarchy of motivational factors starting from the higher level of traits (Elemental) towards lower level traits called surface traits. In the current model, five big personality traits along with materialism, need for body resources and need for arousal will act as antecedents or independent variables while status consumption is a dependent variable. It is proposed to empirically test this model in Pakistani clothing industry.

Key words: Materialism, status consumption, personality traits, Arousal.

INTRODUCTION

According to Mowen (2000), elemental traits are the broadest and most abstract reference points that guide human behaviour. In 3M model, there are eight elemental traits:

i. Openness to experience
ii. Conscientiousness
iii Extroversion (measured as introversion)
iv. Agreeableness
v. Emotional instability
vi. The need for body resources
iv. The need for material resources
v. The need for arousal

The first five traits are derived from very popular, universal and fundamental model of personality known as five factor model (McCrae and Costa Jr, 1997; McCrae and Costa Jr, 1999). However many researchers like Goldberg (1993) argued that more than five traits which describe human personality may exist. Evolutionary psychology further fuelled this argument. Consequently, Mowen (2000), decided to add last three traits along with big five to constitute reference level four of the 3M model.

Compound Traits (Reference Level-3)

Compound traits constitute the second category in 3M model. These are defined by Mowen (2000) as "unidimensional dispositions emerging from the interplay of elemental traits, from the culture in which an individual lives, and from the learning history of the individual". These are more abstract and narrowly defined as compared to elemental traits. These may be even dozens in number. Allport (1961), used the terms of cardinal and central however Mowen and Spears (1999) replaced them with elemental and compound traits. The term 'compound' was derived again from natural science as these traits are compounds made out of elements (elemental traits). Although these result from elemental traits combinations, however, own their own characteristics or properties. Mowen (2000) discovered many compound level traits like task orientation, need for learning and competitiveness, need for play

and self-efficacy etc. As he argued that many other compound level traits may also be discovered. Hence this study will treat status consumption as a compound trait which is supported by Flynn et al. (2016) and will be further explained later on.

REFERENCES

Allport, G. W. Pattern and growth in personality. New York: Holt. 1961.

Flynn, L. R., Goldsmith, R. E. and Pollitte, W. Materialism, Status Consumption, and Market Involved Consumers. Psychology & Marketing. 33(9), 761-776. 2016

Goldberg, L. R. The structure of phenotypic personality traits. American psychologist.), 48(1), 26. 1993

McCrae, R. R. and Costa Jr, P. T. Personality trait structure as a human universal. American psychologist. 52(5), p. 509. 1997,

McCrae, R. R. and Costa Jr, P. T. A five-factor theory of personality. Handbook of personality: Theory and research 139-153. . 1999

Mowen, J. C. The 3M model of motivation and personality: Theory and empirical applications to consumer behavior. Springer Science & Business Media. 2000.

Mowen, J. C. and Spears, N. Understanding compulsive buying among college students: A hierarchical approach. Journal of Consumer Psychology. 8(4) 407-430. 1999.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

The Moderator Role of Eco-Innovative Preventive Practices

Al-Samet M.A.S[1]*, Masa Goto[1], Al-Dubai M.M.M[2], Mazen Farea[2], and Zakarya Alhodiyany[2]

[1]Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia.
(E-mail: alsamet.mohammed@gmail.com, goto@utm.my)
[2]Faculty of Finance and Administrative Sciences, Al-Madinah International University, Selangor, Malaysia.
(E-mail: maged.mahyoub@mediu.edu.my, mazen.farea@mediu.edu.my, zakarya.mohsen@mediu.edu.my)

ABSTRACT

The objective of this study is to examine the moderating effect of Eco-innovative Preventive Practices (EPP) employed by companies in the oil and gas sectors in Yemen, and their impacts on the relationship between the enviornmental management practices and employees' environmental behaviors. The study was conducted on the Pro-active Environmental Management Practices (PEMP), and Employee's Eco-efficient Behaviors (EEB) in six petroleum companies operating in Yemen. The driving factors of EEB were first investigated using a theoretical framework. In the study, a quantitative method by surveying employees of the production departments of these companies was applied. The relationship between PEMP and EEB was analyzed using SPSS, while the moderating effect of EPP was tested using Smart PLS. The statistical analyses show that EPP moderates the effects of PEMP on EEB. Our results revealed the need for further investigation for the other elements of eco-environmental practices, which improve the level of environmental commitment and develop a sense of environmental responsibility among employees in the oil and gas sectors in Yemen.

Keywords: Eco-innovative Preventive Practices, Pro-active Environmental Management Practices, Eco-efficient Behaviors, Oil and gas industries, Yemen.

INTRODUCTION

The dramatic increase in energy demand, which is mainly depending on non-renewable sources, is impacting humans lives aspects from food to energy resources (Friedman, 2009 and Sachs, 2015). In addition to the rapid growth of global economy, the issues on resources and the environment have aroused common concerns (Ar, 2012). The global trend now is focusing on renewable and sustainable resources to reduce the dependency on fossil fuels (Obergassel, *et al*.,2016) which have been proven to cause harm to environment (IPCC,2007) .Hence, promoting more sustainable and energy-efficient behaviors are of substantial interest (Lo. *et al.*,2013). In order for firms to achive a progress in this arena, better contributions to respond to environmental issues by the implementation of effective environmental management are needed (Craig and Dibrell, 2006; Huang *et al.*, 2009). This will be an advantage for firms to lessen their environmental impact, and improve their financial performance (King & Lenox , 2001).

In this vein, environmental innovation has been recognized as one of the key factors affecting financial growth, environmental sustainability and quality of life (Bansal & Gao, 2006; Dangelico & Pujari, 2010). Eco-Innovation differs from general innovation because it requires a level of management attention and commitment. According to La *et al.*, (2003), this category of innovation includes the technological innovations that are involved in energy conservation, pollution prevention, waste recycling, green product design, and corporate environmental management and extends beyond regulatory compliance (Aragon-Correa et al. 2013). Improving overall firm's

efficiency by introducing green innovation will enhance prevention pollution, enabling a firm to save on operating costs and reuse materials through recycling. Those firms are more likely to acquire a more positive ecological reputation (Christmann, 2004).

In order to set long term plans to improve emplyees' environmental behavior in firms, an understanding for the factors contributing to environmental management practices should be well adressed. In this study, the effect of Eco-innovative Preventive Practices (EPP) as a moderator is intended to extend the discussion of Employees' Environmental Behavior (EEB) as a consequence of Proactive Environmental Management Practices (PEMP) .

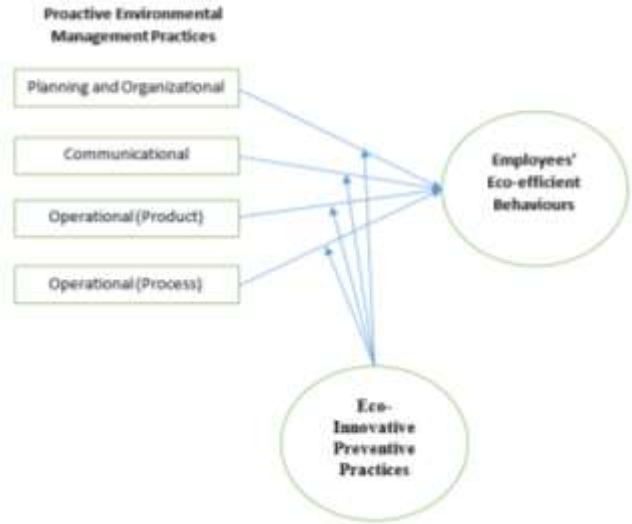


Figure 1. Study Framework

METHODS

The questionnaire was used as the main data gathering instrument for this study. A five-point scale was utilized. Purposive sampling was applied to collect the data within the location of the targeted companies. Data used in the research was collected from employees from the departments of production in six petroleum companies in Yemen. Data was analyzed using SPSS for the hypothesis between PEMP and EEB, while the moderating variable was analyzed using Smart PLS.

MAIN RESULTS

Table 1. Model summary for Multiple Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.653[a]	.427	.395	4.41028

a. Planning and organizational, process related, product related, communicational

Table 2: Summary of coefficients

	Unstandardized Coefficients		Standardized Coefficients		Sig.
Model	**B**	**Std. Error**	**Beta**	**t**	
Organizational and Planning	.660	.263	.318	2.507	.014
Operational (Process)	.525	.325	.148	1.616	.110
Operational (Product)	.458	.513	.081	.892	.375
Communicational	.607	.234	.330	2.591	.012

Table 3: Summary of coefficients for moderating variable

Variable	t
Organizational and Planning	2.6
Operational (Process)	2.2
Operational (Product)	2.2
Communicational	2.4

CONCLUSION

The proposed research framework of this study has defined 42.7% of the variations in dependent variable (EEB). Nevertheless, there is still left 57.3% undefined in this study The results shown encourage firms to identify what elements of environmental practices improve the level of environmental commitment and develop a sense of environmental responsibility among their employees. This frwamwork can be utilized in assessing the level of firms in their implementations for their environmental policies and put long-term environmental objectives to develop the organizational and planning policies in a way to conserve the environment.

REFERENCES

Sachs, J. D. (2015). *The age of sustainable development*. Columbia University Press.

Ar, I. M. (2012). The impact of green product innovation on firm performance and competitive capability: the moderating role of managerial environmental concern. *Procedia-Social and Behavioral Sciences*, *62*, 854-864.

IPCC. 2007. Summary for Policymakers Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

Obergassel, W., Arens, C., Hermwille, L., Kreibich, N., Mersmann, F., Ott, H. E., & Wang-Helmreich, H. (2016). Phoenix from the Ashes—An Analysis of the Paris Agreement to the United Nations Framework Convention on Climate Change. *Wuppertal Institute for Climate, Environment and Energy*, *1*, 1-54.

Lo, S. H., van Breukelen, G. J., Peters, G. J. Y., & Kok, G. (2013). Proenvironmental travel behavior among office workers: A qualitative study of individual and organizational determinants. *Transportation Research Part A: Policy and Practice*, *56*, 11-22.

Huang, Y. C., Ding, H. B., & Kao, M. R. (2009). Salient stakeholder voices: Family business and green innovation adoption. *Journal of Management & Organization*, *15*(03), 309-326.

Craig, J., & Dibrell, C. (2006). The natural environment, innovation, and firm performance: A comparative study. *Family Business Review*, *19*(4), 275-288.

Buysse, K. & Verbeke, A., 2003. Proactive environmental strategies: a stakeholder management perspective. *Strategic Management Journal*, 24(5), pp.453–470.

King, A. & Lenox, M., 2002. Exploring the Locus of Profitable Pollution Reduction. *Management Science*, 48(2), pp.289–299.

COMPUTING AND SCIENCES

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

A Digital Technology Framework for Promoting Nutritional/Health Benefits of West African Diet

Idris O. Muniru*[1], Nalweyiso Shifulah[1], Oluwatomilayo O. Petinrin[1], Nugraha P. Utama[2]

[1]Faculty of Computing, Universiti Teknologi Malaysia, Malaysia.
(E-mail: idrismunir@gmail.com, hudah.shifrah24@gmail.com, olutomilayo.petinrin@gmail.com)
[2]Faculty of Biosciences and Medical Engineering, Universiti Teknologi Malaysia, Malaysia.
(E-mail: utamakun@gmail.com)

ABSTRACT

Human beings the world over share a common need to require some fundamental conditions for survival. One of these needs is securing of a proper diet which will provide energy as well as nutrients necessary for metabolic function. It is a belief that people should have access not just to food, but to the traditional foods and feeding habits that have been inherited from generation to generation. Traditionally, the west Africa sub-region boast of some of the world's healthiest diet, however, there is a gradual adoption of the high-calorie, high-fat, high-sodium and highly processed unhealthy foods from the western countries. This has been identified as a major cause of the increase in cases of diabetes, cancer and hypertension across Africa. In this study, we report factors that are responsible for this trend. Aggressive transatlantic promotional offerings which are leveraging on the growth of digital technology in the subregion has been a major enabler of this transition. We, therefore, make a call-to-action, for the development of a digital technology framework for promoting nutritional/health benefits of the west African diet.This will consequently facilitate healthy food production and consumption

Keywords: Healthy Diet, Digital Technology, West Africa, Nutrition

INTRODUCTION

Modern feeding habits have increased the prevalence of life-threatening health issues including obesity, hypertension, diabetes mellitus, cancer and cardiovascular disorders. Poor and inadequate nutritional patterns are associated with significant burdens of disease, premature death, and huge medical costs (Imamura *et al*., 2015; Lim *et al*., 2013; Lopez *et al*., 2006). Non-communicable diseases such as cancer, cardiovascular diseases (CVD) and respiratory infections are expected to account for 75 out of 100 global deaths by 2020; decrease in diet quality (food and nutrient choices), sedentary and urban lifestyles have been identified as major causes (Imamura *et al*., 2015). The more danger is that diseases such as diabetes and high blood pressure which were commonly associated with old age are beginning to manifest in the younger ones. De Onis *et al*. (2004), Lozano *et al*. (2013) in separate studies reported that poor pregnancy and foetal growth outcomes positively correlates with suboptimum nutritional patterns.

West Africa boasts of diets with high nutritional benefits and ranked better than foods from wealthier regions in Europe and North America (Imamura *et al*., 2015). Whereas high consumption rate of highly processed food is prevalent in these wealthier regions, the diet structure across the west African region is whole foods, which typically comprises cereals, roots, and tubers, green bananas or plantain serving as main dishes, and often supplemented with some kind of soup; often made from vegetables, legumes, fish or meat, condiment and spices (Oniang *et al*., 2003). However, Imamura *et al*. (2015) in their study on the evaluation of the dietary patterns of adults in 187 countries between 1990 and 2010 revealed that there is an increase in the consumption of

unhealthy foods in low-income habitats; west Africa inclusive. This gradual adoption of westernised diet of high-calorie, high-fat, high-sodium and highly processed foods of African descent is responsible for the increase in diabetes, cancer and hypertension cases across the continent (Imamura *et al*., 2015; Smith-Barrow, 2012; Prentice, 2006). Data from the Institute for Health Metrics and Evaluation shows that countries in sub-Saharan Africa have the lowest number of obese population, about 100 to 110million (see fig. 1), however, the case-specific deaths and disabilities from diabetes and hypertension in Africa are very high due to inadequate healthcare facilities and services.

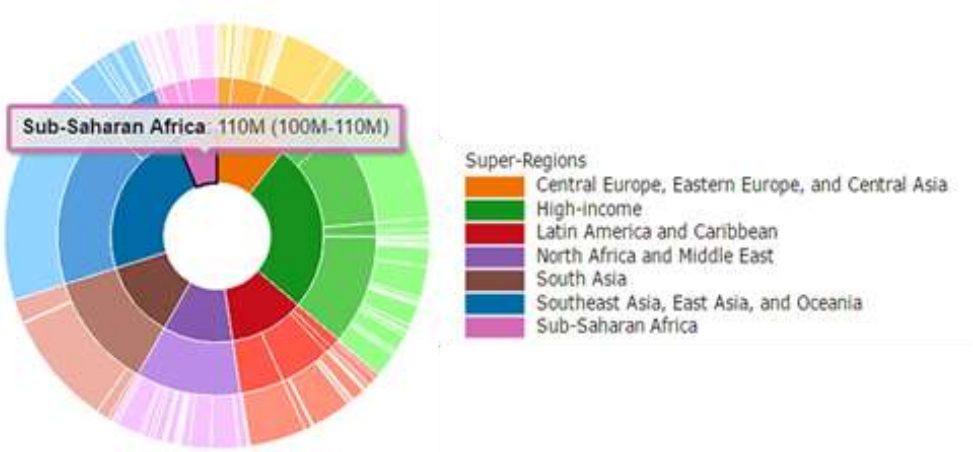


Figure 1: Global overweight and obese people in 2013 [13]

In this study, we report some factors responsible for the transition in the dietary pattern in west African sub-region. We examined the importance of cultural relevance in diets and the current implementation of Information Communication Technology (ICT) or digital technology for diet-related purposes. We finally make a call-to-action for the development of a holistic digital technology framework for promoting the nutritional/health benefits of the west African diet.

MAIN RESULTS

I. Food, nutrition and the relevance of culture

The adoption of new diet pattern across cultural divide does not often yield a favourable result. Therefore, people should have access not just to food, but to the traditional foods and feeding habits that echo their cultural heritage (Oniang *et al*., 2003; Smith-Barrow, 2012; Stevenson, 2014).

II. Aggressive Transatlantic Promotional Strategies for processed foods

Transnational promotions and investment, primarily from the developed to developing economies play a central role in the increase in the consumption rate of unhealthy foods in west Africa. The digital media has been a major enabler; it is used in various ways for aggressive marketing of these unhealthy foods. For instance, the effect of vision and digital photography on the brain have been used to make unhealthy foods appealing (Spence *et al*., 2016).

III. ICT/Digital Technology implementation for nutrition-related purposes in West Africa.

The ICT revolution in Africa has recorded huge success relatively to other sectors of the economy, and due to increase access to mobile technology and broadband services it has been improving steadily for the past twenty (20) years (Chavula, 2014; Van Zyl *et al*., 2014). However, its major impact for diet-related purposes has largely been for the economic purpose only; such as economic

farming. This has promoted entrepreneurship, novelty and economic growth in the agricultural sector (Van Zyl *et al*., 2014), however, not much emphasis has been placed on the nutrition and health implications.

CONCLUSION

The need for a concerted effort towards promoting cultural sensitivity in foods, diets and nutrition has been emphasised. Leveraging on the continuous growth of digital technology to harmonise the various stakeholders will help promote the nutritional/health benefits of traditional west African diets.However, in order to place these diets on a global scale that will attract huge investments, their nutritional and health advantages needs to back by scientific research. In our future works, we will be conducting empirical studies on the health benefits of selected west African diets using the power of digital technology.

REFERENCES

De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. and Morris, R. "Estimates of global prevalence of childhood underweight in 1990 and 2015," *Jama*, vol. 291, no. 21, pp. 2600–2606, 2004.

Chavula, H.K. "The role of ICTs in agricultural production in Africa," *J. Dev. Agric. Econ.*, vol. 6, no. 7, pp. 279–289, 2014.

Imamura, F. *et al.*, "Dietary quality among men and women in 187 countries in 1990 and 2010: a systematic assessment," *Lancet Glob. Heal.*, vol. 3, no. 3, pp. e132--e142, 2015.

Institute for Health Metrics and Evaluation, "Overweight and Obesity Viz," 2014. [Online]. Available: http://vizhub.healthdata.org/obesity/.

Lim, S.S. *et al.*, "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990--2010: a systematic analysis for the Global Burden of Disease Study 2010," *Lancet*, vol. 380, no. 9859, pp. 2224–2260, 2013.

Lopez, A.D., Mathers, C.D., Ezzati, M., Jamison, D.T. and Murray, C.J.L. "Measuring the global burden of disease and risk factors, 1990--2001," *Glob. Burd. Dis. risk factors*, vol. 1, pp. 1–14, 2006.

Lozano, R. *et al.*, "Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010," *Lancet*, vol. 380, no. 9859, pp. 2095–2128, 2013.

Oniang, R., Mutuku, O.J. and Malaba, S.J. "Contemporary African food habits and their nutritional and health implications," *Asia Pac. J. Clin. Nutr.*, vol. 12, no. 3, pp. 331–336, 2003.

Prentice, A.M. "The emerging epidemic of obesity in developing countries," *Int. J. Epidemiol.*, vol. 35, no. 1, pp. 93–99, 2006.

Smith-Barrow, D. "Tambra Raye Stevenson: Mixing food, faith and black power to teach about health," *Washington Post*. 2012.

Spence, C., Okajima, K., Cheok, A.D., Petit, O. and Michel, C. "Eating with our eyes: From visual hunger to digital satiation," *Brain Cogn.*, vol. 110, pp. 53–63, 2016.

Stevenson, T. R. : A 'Right-Brain' Approach," *Food & Nutrition Magazine*, 2014. [Online]. Available: http://www.foodandnutrition.org/January-February-2014/Tambra-Raye-Stevenson-A-Right-Brain-Approach/.

Van Zyl, O., Alexander, T., De Graaf, L. and Mukherjee, K. "ICTs for Agriculture in Africa," 2014.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Influence of Dy^{3+} on Physical and Optical Behavior of Calcium Sulfo-Phosphate Glass

Aliyu M. Aliyu*[1,2], R. Hussin[1,2] Karim Deraman[1] S.A. Dalhatu[1] and Y. A.Yamusa[1]

[1]Department of Physics, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor, Malaysia.
(roslihussin@utm.my)
[2]Department of Physics, Bauchi State University,65 Gadau, Bauchi, Nigeria.
(aliyualiyuphy@gmail.com)

ABSTRACT

To examine the influence of trivalent dysprosium ion (Dy^{3+}) on physical and optical properties prepared by melt quenching method. The samples composition of $20CaSO_4$ $(80 - x)$ $P_2O_5 - xDy_2O_3$, where x = 0.3, 0.6, 0.9, 1.2 and 1.5mol% were prepared and analyzed. Materials were characterized by X-ray diffraction, UV visible and photoluminescence spectroscopy, amorphous nature of the samples was confirmed by X-ray diffraction technique, UV-Vis for optical absorption and luminescence for excited state dynamics. The UV absorption spectra of the glass sample correspond to $^6H_{11/2}$ (1673 nm), $^6H_{9/2}$ (1262 nm), $^6F_{9/2}$(1087 nm), $^6H_{5/2}$ (899 nm), $^6F_{5/2}$ (796 nm) and $^6F_{3/2}$ (753 nm). Physical properties comprise of glass density, molar average molar volume, ion concentration, dielectric constant and molar refractive index was determined. The band gap (E_{opt}), Urbach energies and refractive index lie in range and decreases with increase in Dy^{3+} concentration. Therefore, Dy3+ compositional changes were examined and indicate that dysprosium phosphor could serves as a potential candidate for laser application.

Keywords: Phosphate, Dysprosium ion, Melt quench method, Absorption spectra, Luminescence

INTRODUCTION

Luminescence is the system decay from an excited state by fluorescence or phosphorescence. Many years back, research on rare earth ions -doped glasses are given priorities and consideration for optical devices of distinctive properties identified in color displays and laser materials (Jiménez, 2015), optical fiber communication (Szymański and Sobczyk, 2016), light-emitting materials (Chen *et al*., 2016) as well as IR to visible converters (Biju *et al*., 2004). This ions (REI) -doped glass systems considered as valuable luminescent materials for solid state lasers within the spectral region (visible and near IR).

Dysprosium is one of most fundamental rare earth materials -doped phosphate glasses that attract more attention especially for laser when compare with other ions. For optical amplifier and lasers materials, phosphate, fluoro-borate and bismuth-borate glasses are of great importance (Amjad *et al*., 2016). Considering the transitions in dysprosium ions, most well known hypersensitive transitions in Dy^{3+} at $^4F_{9/2}\rightarrow{}^6H_{13/2}$ are strongly dependant on the nature of glass former, but the sensitivity of magnetic dipole's intensity at $^4F_{9/2}\rightarrow{}^6H_{15/2}$ transition is less to the host. Therefore, a doped trivalent dysprosium will generate white light at a suitable environment. Furthermore, Phosphate based glasses to a certain extent possess greater thermal expansion coefficients and low processing temperatures used as glass sealant, with some interesting optical properties for optical waveguides, as biomaterials and also for immobilization of radioactive wastes. Ultra-,Ortho- and Pyrophosphate preparation on calcium phosphate glasses ($CaO/P_2O_5 \geq 2$ molar ratio) were achieved using higher percentage of other oxides to modify the phosphate structure such as MgO, SiO_2 or Na_2O.

MATERIALS AND METHODS

$20CaSO_4$ $(80 - x)$ $P_2O_5 - xDy_2O_3$ where x = 0.3, 0.5, 0.7, 0.9 and 1.1 mol%, glasses were prepared by conventional melt method. Reagent grade of calcium sulfate ($CaSO_4$), Phosphoric acid (H_3PO_4) and Dysprosium oxide (Dy_2O_3) serve as starting materials for 20g batch/melt having 99.98% purity. The samples were mixed and preheated in an alumina crucible at 300℃ for 30 min then melted at 1200℃ for 1h where the oxygen was bubbled and eliminated. Subsequent annealing at appropriate temperature at 300℃ for 5hrs to release the mechanical and thermal stresses, the melt were then allowed to cool down to room temperature. After which the sample were finely polished and grinded to certain dimension for further characterization then stored in a desiccators prior to assessment.

RESULTS AND DISCUSSION

UV-Vis-NIR Spectroscopy

The absorption spectra of the sample (Dy^{3+}) doped 0.3CSP to 1.5CSP were measured and recorded at normal room temperature as presented in Fig.3. The spectra comprise of six transitions as the prominent absorption spectra originating from $^6H_{15/2}$ as ground state corresponding to Dy^{3+} -doped glasses all energies absorbed lies within NIR region as previously investigated meanwhile, there is low intensities in the UV-Vis region caused by a spin forbidden transition, all the absorption band were allotted at 753, 796, 899, 1087, 1262 and 1673nm of origin $^6H_{15/2}$ Dy^{3+} ground state. The absorption band apportions to $^6H_{11/2}$, $^6H_{9/2}$, $^6F_{9/2}$, $^6H_{5/2}$, $^6F_{5/2}$ and $^6F_{3/2}$ as reported work, the idea of transition correspond to carnell *et al*. Intensities observed were change with dopant (Dy^{3+}) concentration where $^6F_{9/2}$+ $^6H_{9/2}$ act as the hypersensitive transition that follows the selection rule $|\Delta S| = 0$, $|\Delta L| \leq 2$ and $|\Delta J| \leq 2$.

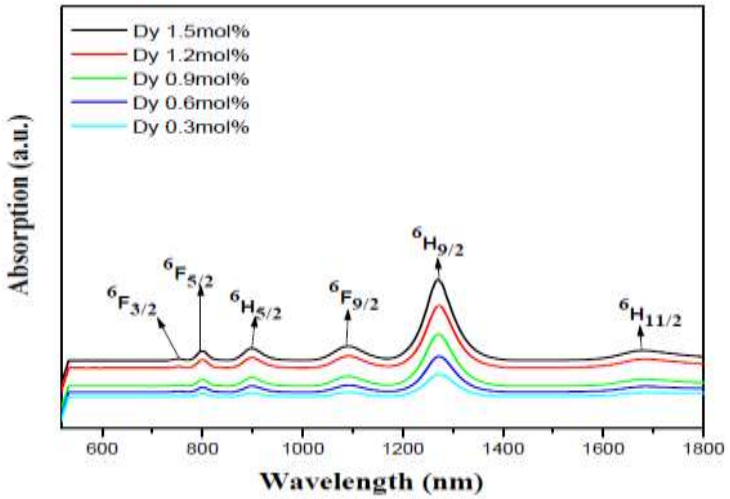


Figure 1. Optical absorption spectra of $20CaSO_4$ $(80 - x)$ $P_2O_5 - xDy_2O_3$ glasses

CONCLUSION

Dysprosium oxide (Dy^{3+}) doped calcium sulfo-phosphate was properly prepared and achieved using conventional melt quench method and the structure was verified by XRD pattern. Therefore, the influence of Dy^{3+} on physical and optical properties was investigated. In physical properties, it indicates that the density and refractive index increases while molar volume decreases with increase in Dy^{3+}ion concentration. The optical values for direct and indirect transitions observed by Tauc's plot are obviously depending on composition that is sensitive to dopant (Dy^{3+}). Larger bang gap range from 4.087 – 4.169 eV indicate that the glass is fit for optical applications, since most glasses with visible luminescence in yellow for Dysprosium, orange for Samarium have potential application in opto-electronic and displays.

Acknowledgment:

The authors will like to acknowledge and grateful to Ministry of Higher Education Malaysia and UTM for providing financial assistance through the Fundamental Research Grant Scheme (FRGS), Vote number (QJ130000.2526.03H97), also to appreciate the effort of Bauchi State University Gadau, Nigeria.

REFERENCES

Biju, P.R., Jose, G. Thomas, V. Nampoori, V.P.N. and Unnikrishnan, N.V. Energy transfer in Sm^{3+}:Eu^{3+} system in zinc sodium phosphate glasses, Optical Materials 24 (2004) 671–677.

Chen, G., Yao, L., Zhong, H. and Cui, S. Luminescent properties and energy transfer behavior between Tm^{3+} and Dy^{3+} ions in co-doped phosphate glasses for white LEDs, Journal ofLuminescence178 (2016) 6–12.

Jiménez, A. Photoluminescence of Eu^{3+}-doped glasses with Cu^{2+} impurities, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 145 (2015) 482–486.

Raja J., Amjad, M.R., Sahar, S.K., Ghoshal, M.R., Dousti, R. Arifin, Synthesis and characterization of Dy^{3+} doped zinc–lead-phosphate glass, Optical Materials 35 (2013) 1103–1108.

Szymański, D. and Sobczyk, M. Optical and structural investigation of dysprosium doped- Y2Te4O11, Journal of Luminescence 173 (2016) 11–18.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Performance Analysis of Heuristic Algorithms in Workflow Scheduling on IAAS Cloud Computing Environment

Salihu Idi Dishing*[1], Md Asri Ngadi [2] and Mohammed Abdullahi [3]

[1, 2, 3] Department of Computer Science,
Faculty of Computing, Universiti Teknologi Malaysia,
81310, Johor Bharu, Malaysia.
E-mail: dishingsalihu@gmail.com, dr.asri@utm.my, muham08@gmail.com
[1, 3] Department of Computer Science,
Ahmadu Bello University, Zaria, Nigeria,
E-mail: sidishing@abu.edu.ng, abdullahilwafu@abu.edu.ng

ABSTRACT

Cloud computing is becoming the darling computing model for executing complex aplications of various scales in several domains. This is owing to its on-demand mode of provisioning compute resources like processing elements, Memory, storage, network, etc, which are deployed to users over the internet in a virtualized form as Virtual Machines of various configurations, for use on a pay-per-use basis; thereby relieving the user/organization from unnecessary costs that could result from maintaining owned computing facilities. Complex scientific and business applications are usually described through workflows - a sequence of tasks having dependencies in form of data or function; resulting in intermittent processing, transient data storage and transmissions. In Infrastructure as a Service (IaaS) Cloud, workflow scheduling is the process of assigning each workflow task to the most appropriate VM within a user's resource pool- that is, the number and categories of VMs leased by a user at any time; so that certain objectives are fulfilled. The performance as well as cost of using a VM per unit time is proportional to its configuration. Users can grow or shrink their resource pool when need be. In addition, they are responsible for orchestrating the execution of their jobs (workflow) on these VMs in line with their scheduling objectives. However, workflow scheduling is in general, known to be NP-complete (non polynomial-time complete) problem. Therfore, several heuristic algorithms have been, and are still being proposed for adressing it. This work examines the performances of five popular task scheduling heuristics: FCFS (First-come-first-serve), RR (Round-robin), MCT (Minimum Completion Time), Min-min, and Max-min, on different data sizes of select scientific workflow types; Montage, Epigenomics, Cybershake, Inspiral, and Sphit. Results from simulation experiments using workflowsim toolkit revealed workflow structure, rather than size, as the major influencer of a heuristic performance in terms of makespan (total execution time) and execution cost.

Key words: Workflow, Scheduling, Heuristic, Iaas, Cloud

INTRODUCTION

Cloud computing generally, enables end users or consumers to have control over how their aplications or jobs are executed on the resources (virtual machines) they have provisioned. Thus a user is responsible for orchestrating the execution of tasks which constitute his application or job, hence the need for scheduling of these tasks onto appropriate resources throughout the execution period.

Often times, the tasks constituting a job depend on data or functions from some (earlier) tasks. This imposes a precedence constraint on the order of their execution, since the execution of a (latter) task can only commence when all the data it requires have been fully admitted by it. Also, a task can depend on more than a single predecessor, with its predecessors having different task Execution Times. This forces the task (current) at hand to wait, even after receiving part of the results from some of its predecessors. The resultant of all the wating times especially in large scale applications significantly increases the makespan of the application, which could inturn increase a

user's cost of executing his job, particularly when platform of execution is cloud, since additional time spent translates to additional cost . Applications of this nature, usually occuring in large scale and requiring distributed computing environments like grid, clusters, and cloud for thier execution are referred to as workflow applications. They are common in scientific and business domains and the process of orchestrating their execution is known as workflow scheduling.

PROBLEM BACKGROUND AND FORMULATION

Workflow scheduling problem is generally known to be NP-complete (non polynomial-time complete), that is, there is no exact solution to the problem in a polynomial time. Therefore only approximate solutions exist in polynomial time. In order to determine, as well as facilitate the attainment of an optimal approximation (solution), some rules of thump or heuristics are necessary.
In IaaS cloud, VMs are presented to prospective users in various configurations by providers, resulting in categories (Rodriguez *et al.*, 2014; Meena *et al.*, 2016). Also, the billing model operated by most providers considers the ceiling function of the time units spent by a user (Rodriguez, *et al.*, 2014). That is, every fraction of time spent is billed as a whole time unit (usually, an hour). However, users are constraint by such factors as the amount of money they are willing and able to spend for the execution of their applications, usually considered as cost or budget, and a time boundary within which the execution of their job (workflow) must be completed referred to as deadline. These and other issues (dynamic, scalable resource pool, on-demand procisioning, VM performance variability etc) characteristic to cloud, compounds the challenges of scheduling workflows on it as a platform. Thus workflow scheduling on cloud comprises two stages: Firstly, the appropriate number and types of VMs at any time must be provisioned. Secondly, each of the various tasks (components) of the workflow (job) is properly assigned to the most deserving/appropriate resource or VM. All these must be done within the boundary of the user's constraints.

$$\min\ (TET_{t_l} = \sum_{i=1}^{n} ET_{t_i}) \qquad subject\ to \qquad (1)$$

$$0 \le TET_{t_l} \le K$$

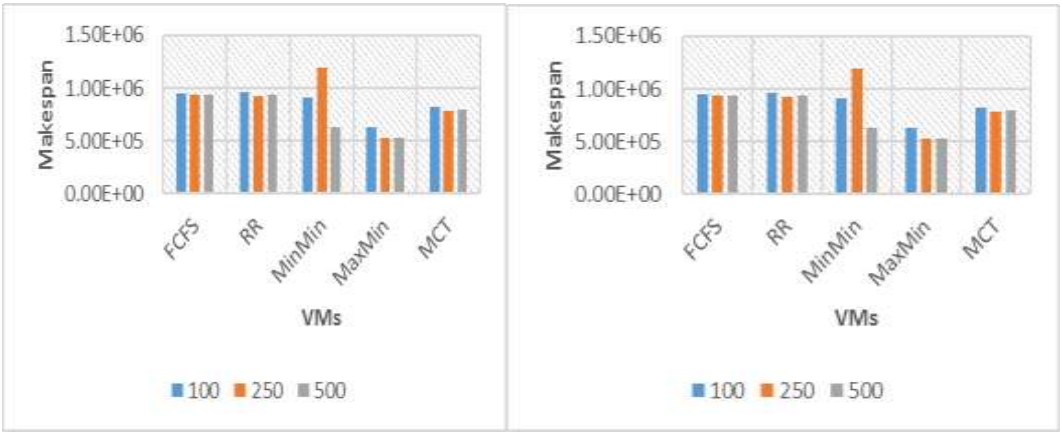
$$Where: TET = total\ execution\ time,\quad ET = a\ task\ execution\ time,$$

$$K = \max imun\ allowable\ TET\ boundary,\quad t_l = last\ task\ of\ the\ workflow,$$

$$and\quad t_i = the\ i^{th}\ task\ of\ the\ workflow,$$

The formulation of a workflow scheduling is dependent on the scheduling objectives (Rodriguez *et al.*, 2014) . The most common and basic objective is the minimization of makespan under certain constraints like deadline (equation 1). This type of formulation is said to be a single objective with a single constraint (Casas, 2016). Several other formulations leading to multiple objectives and mutiple constraints of various degrees exist. In this work, we considered a multi-objective scenario where both makespan and cost are targeted for minimization concurently in the face of growing problem size.
There are a number of heuristic algorithms in existence which are targeted at various workflow task-level schedulings on grids and Clusters (3), with remarkable successes in their effectiveness to certain problems. However, as cloud model continues in its maturity and dominance, its peculiarities (resource-pool, dynamic, scalable, pay-per-use, VM performance variability) could constitute a challenge to the efficacy of these algorithms. Hence the need to investigate the impact of workflows' execution on the performance of heuristic algorithms in terms of both monetary cost of execution and makespan.

MAIN RESULTS



(a) cost (b) Makespan

Figure 1. Cost (a) and Makespan (b) performances of various heuristics on Montage workflow data.

CONCLUSION

This paper highlighted the prevailing issues in scheduling of workflows on an Iaas cloud platform through heuristics. Simulation results reveal absence of versatility in heuristic algorithms to workflows of various kinds. It is also worth stating that most of the algorthms used exibited irregular performances in terms of the variables (makespan and cost) as the problem size and nuber of VMs was increased. Thus suggesting that optimal performance of a particular heuristic largely depends on both problem structure (type) as well as size. This is perharps the reason why more recent works are focusing towards metaheuristic and hybrid algorithms which is in our future consideration.

REFERENCES:

Buyya R, Yeo CS, Venugopal S, Broberg J, Brandic I. Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. Future Generation computer systems. 2009;25(6):599-616.

Casas I, Taheri J, Ranjan R, Wang L, Zomaya AY. GA-ETI: An enhanced genetic algorithm for the scheduling of scientific workflows in cloud environments. Journal of Computational Science. 2016 Sep 4. Journal of Computational Science. 2016 Sep 4..

Meena J, Kumar M, Vardhan M. Cost Effective Genetic Algorithm for Workflow Scheduling in Cloud Under Deadline Constraint. IEEE Access. 2016;4:5065-82.

Rodriguez MA, Buyya R. Deadline based resource provisioningand scheduling algorithm for scientific workflows on clouds. IEEE Transactions on Cloud Computing. 2014; 2(2):222-35.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Teachers as Guild on the Side: Students Perspective about the Pedagogy

Ireti Hope Ajayi[1], Noorminshah A.I [*2] and Norasnita Ahmad[3]

[1]Faculty of Computing, Universiti Teknologi Malaysia, 81310
Skudai, Johor, Malaysia.
(E-mail: iredoc4real1@yahoo.com)
[2, 3]Faculty of Computing, Universiti Teknologi
Malaysia, 81310 Skudai, Johor Bahru, Malaysia.
(E-mail: minshah@utm.my, norasnita@utm.my)

ABSTRACT

The continued growth in the field of Information Technologies (IT) has accounted for massive shift of both teaching and learning methods away from the traditional face to face teaching method to a more sophisticated and IT supported system of active learning among which is flipped classroom. The model, though an evolving concept in the developing countries has continued to gain ground especially in higher institutions in view of its significant contributions in the field of education. Therefore, this study investigates the students' perception about flipped classroom wherein teachers' roles were described as "guide on the side" as against what was traditionally known before as "sage on the stage". Survey was conducted for the research with a population size of thirty-five (35) students out of which thirty-three (33) responded. Descriptive statistics was used to interpret the results of the test. Findings however revealed that sizeable number of students believed that their performance improved significantly in course that was flipped than those offered in the conventional method. Meanwhile, due to the accessibility of classes offering flipped learning method presently and the Universiti Teknologi Malaysia.

Key words: Flipped Classroom, Conventional Classroom and Students Perspective

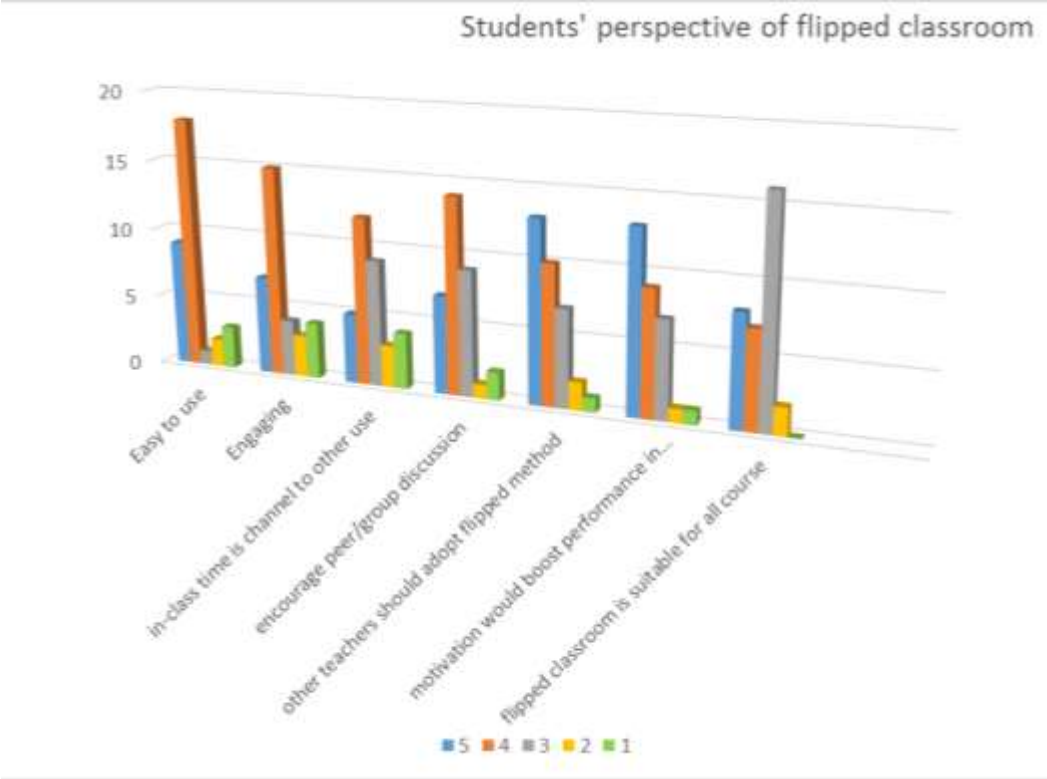
INTRODUCTION

Flipped classroom in other words called "*Inverted classroom"* is an evolving method of active learning in today's world and has reversed the teaching method from the traditional face-to-face approach (Flaherty *et al*., 2015). The concept can be traced back to the 90s when Earie Mazar, a Professor of Physics at Harvard University, first used it in his research Mazur, Peer Instruction (1997). Thereafter, Bergmann (2012) applied the model in K12 education practice for the purpose of affording learners opportunity to perform their individual assignments as well as assist those that find experiment difficult access to instructional materials through videos and listening to explanation behind the classroom with the aid of technology. This explained that the typical in-class activities done in the conventional day to day class are now taken as home assignment, while the supposed home task is now review and/or discuss during the in-class session. The foregoing was the reason flipped classroom is called inverted classroom. Flipped classroom on this account has therefore continued to gain fast relevance in education, especially in higher institutions considering some of its merits including; ability to learn at own pace, promote students-centered learning and collaboration, efficient, support peer interaction amongst others (Anger *et al*., 2012; Guan *et al.*, 2015 and Tucker, 2012). However, there are some delusions on what inverted class is or not. Some taught that students spend all their precious time in front of their computer device(s), teaching materials replace teachers, or that inverted classroom is an online course Raymond (2014).

FINDINGS

In the study, a survey was conducted on students of the Faculty of Built Environment, Universiti Teknologi Malaysia to know their perspective on flipped classroom as compared to the traditional

classroom. A total of thirty-five students were provided a survey questionnaire out of which thirty-three (94%) students responded and returned the survey test. See column chart below for the result of the study which is rated according to the 5 Likert scale (strongly agree: 5, agree: 4, neither agree nor disagree:3, disagree:2 and strongly disagree: 1)



Investigation revealed that eighteen (55%) of the students agreed that learning in flipped classroom is not difficult, while 22 (67%) students admitted that in-class time in flipped classroom is devoted to discussion, research and question and answer session. Similar, fifteen (45%) of the students are poised that flipped classroom is engaging, just as thirteen (39%) and the highest number of students submitted that other teachers should adopt flipped approach. Concerns is however the submission of student who could not at the moment formed their views of flipped classroom including it suitability for all courses, peer discussion and that performance could be boosted in flipped classroom if there is motivation. This view may be connected to some of the observed challenges in flipped classroom such as boringness, disengagement, technological gap amongst others.

CONCLUSION

On the overall, the students' responses have clearly shown that performance of students in flipped classroom is relatively better than the traditional face to face class. The study has thus far shown that students' performance in flipped classroom is relatively high, while substantial number of student beliefs that the approach is free of difficulty and as such would want other instructors to adopt the model. However, the level of students who at the moment could not really form their opinion on some of the features of the learning approach as raised a concern. This position may be as a result of the fact that the concept is still an evolving model which is yet to be fully incorporated into learning. It is therefore suggested that both the teachers and the students should make concerted efforts to develop their capacity to adopt the teaching method into the curriculum. In conclusion, following observations and outcomes of the study, it can be said that flipped instructional model has positively influence learning capabilities of students. Meanwhile, attentions need to be placed on some of the weakness of flipped classroom with a view to ensuring that students are well engage. Future research would focus on measuring students' level of engagement in flipped classroom.

REFERENCES

Anger, B., & Roulet, T. (2012). What is the flipped classroom model and why is it amazing? Forbes Business. Retrieved from http://www.forbes.com

Bergmann, J., & Sams, A. Flip your classroom: reach every student in every class every day. Washington, DC: *International Society for Technology in Education* 2012.

Bergmann. J. & Waddell, D. (2012). To flip or not to flip. Learning & Leading with Technology, 39(8), 6. Retrieved from http://www.iste.org/Content/Navigation/Menu/Publications/ LL/L_L.htm

Guan, L., Yuan, N., Xie, Y., Feng, J., & Li, L. A study on the Application of Flipped Classroom Teaching in Higher Vocational Education, (Iccse), 819–823. 2015.

Flaherty, J., & Phillips, C. The use of flipped classrooms in higher education: A scoping review. *Internet and Higher Education*, *25*, 85–95. 2015. https://doi.org/10.1016/j.iheduc.2015.02.002

Mazur, E. Peer Instruction (1997). A User's Manual Series in Educational Innovation, NJ : Prentice Hall.

Morgan, H. Focus on technology: Flip your classroom to increase academic achievement. Childhood Education, 90(3), 239-241. (2014). http://dx.doi.org/10.1080/00094056.2014.912076

Raymond Szparagowski, (2014). The Effectiveness of the Flipped Classroom 2014.

Tucker, B, (2012). The flipped classroom. Education Next, 12(1), 82-83.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Telemedicine Acceptance amongst Nigerian Clinicians: Intra - Organizational and Inter-organizational Issues.

Kayode I. Adenuga*, Noorminshah A. Iahad and Suraya Miskon

Deaprtment of Information Systems
Faculty of Computing, Universiti Teknologi Malaysia
Johor Bahru, Malayisa
(Email: Kayodeadenuga@yahoo.ca, minshah@utm.my, suraya@utm.my)

ABSTRACT

There is a huge shortage of skilled clinicians in Nigeria. The ratio of patients to doctors in Nigeria is worrisome. It is about 1 Physician to 8,000 people compare to USA and UK where it is 1 to 100 people. The scarcity was further worsened by the migration of a number of physicians to countries like United States, Britain and other countries where medical personnel are given better incentives. This has affected people particularly in rural areas to have access to quick medical intervention. Nevertheless, Nigerian government had tried to address this shortage by installing telemedicine units in few government hospitals; however, the obvious issue is if clinicians are willing to use this technology. The research is exploratory qualitative study in nature. Structured in-depth interview involving two specialists 5 General Practitioners/Medical officers and a Nurse was conducted at two government hospitals. The interviewees were earlier approached and letter of introduction signifying interview intention was given to them. The findings of the interview was transcribed and thematized for further analysis.

Keywords: Telemedicine, Implementation, Clinicians

INTRODUCTION

It is an undeniable fact that information technology is changing the way medicine is being practiced both in the developed and developing countries. It is therefore necessary to introduce alternative channels of ameliorating the healthcare delivery in order to ensure that people particularly in the rural area are not deprived timely and effective specialist healthcare (Ahlan and Ahmad, 2014). The application of information technology in healthcare sectors most especially hospitals has brought about great potentials for improving the quality of healthcare services provided and which further enhances the efficiency and effectiveness of medical practitioners. This has been observed to have ultimate effect of healthcare cost reduction on the part of health care decision makers or organization. However, in spite of huge benefits inherent in telemedicine, the adoption rate has been very slow among clinicians in Nigeria. In Nigeria, however, dearth of medical specialist brought about the need to look towards telemedicine adoption to bridge the gap, most especially between the rural healthcare and urban hospitals. Currently a gap in knowledge exists about Telemedicine adoption in developing countries; in Nigeria for instance the intuitive data project less than 5% utilization of any form of hospital information system in a country of more than 150 million people (Benson and DHA, 2011). The existing literature agrees that discrepancies exist in the implementation of telemedicine in developing and developed countries and hospital information systems (Koch, 2006; Isabalija *et al*., 2011; Isabalija *et al*., 2013). Possible factors for low implementation include the continual evolution of technology, confidentiality problems with use of hospital information systems, and the poor technological background of the Nigerian society (Justice, 2012) and lack of proper telemedicine implementation policy that is all-inclusive. Aside factors affecting telemedicine Implementation and adoption both in developed and developing countries in particular, the study of clinicians' perception under volitional circumstances with respect to telemedicine usage; most especially if the technology is perceived as a burden which calls for intrinsic motivation is an important factor which has received

little academic attention. The objective of this study therefore is to investigate the perception of Nigerian clinicians towards telemedicine acceptance in Nigeria context.

METHOD

The research is exploratory qualitative study in nature. Structured in-depth interview involving two specialists 5 General Practitioners/Medical officers and a Nurse was conducted at two government hospitals. The interviewees were earlier approached and letter of introduction signifying interview intention was given to them. The unit of analysis was at hospital level as highlighted to understand the perspective of clinicians who are the principal users of telemedicine. For confidentiality purpose, the participants' names were not revealed; though, each participant was coded according to their cadre. "S1, S2" (One Obstetrics/Gynecologist and Orthopedic surgeons) for specialists, 5 "GP1, GP2……GP5" for General Practitioners/Medical officers and a "N1" for Nurse. It was quite difficult getting all of them together in group due to individual job engagements. Notes were taken for all the interviews and some of the interviews were audio taped. All interview sessions were transcribed for further analysis.

MAIN RESULTS

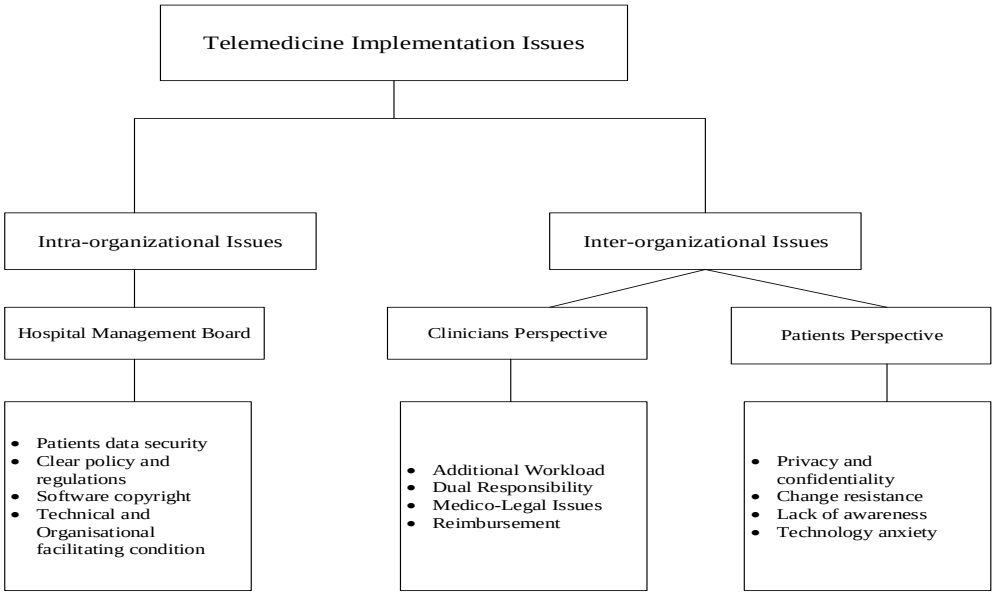


Figure 1. Telemedicine Implementation Framework

The researcher carefully segmented the transcribed interviews based on the research objectives of this study using thematic analysis. The outcome of this traditional thematic analysis which led to the formulation of the telemedicine service implementation framework which highlights the challenges confronting telemedicine in Nigeria as highlighted in Figure 1.

CONCLUSION

The study has been approached as an exploratory study to investigate why telemedicine adoption is low amongst clinicians and why implementation has equally failed in Nigeria learning from clinicians' perspective. This exploration produces a framework for telemediicne implementation in Nigeria. However, it is their hope that if most of the issues highlighted in the framework are considered, there is likelihood that telemedicine adoption will have a quick acceptance than it is presently. There is urgent need for organization to establish an all-inclusive telemedicine implementation policy. Considering the outcome of the interviews, it was observed that the clinicians are quite aware of immense benefits inherent in the use of telemedicine. However, User acceptance is critical to any technological implementation and adoption. Therefore an organization

need to make available a conducive environment by providing adequate assistance and necessary stimulus to prospective users in order to escalate technology usage. According to the interviews, Medical clinicians' claimed they are not so comfortable as to ascertain the qualification and expertise of the practitioners at the other end and fear of professional impersonation. There is need to ensure telemedicine system is robust enough to ensure a safe platform that identifies and authenticates clinicians at both ends. Aside these provision of infrastructural facilities, reliable internet connectivity and regular power supply issues needs to be addressed. Consequently. there is need to comprehend the perceptions of prospective clinicians towards telemedicine usage which is seen as extra burden considering their present over saturated working condition and that which is perceived as dual responsibility which might necessitate absolute positive reinforcement.

REFERENCES

Ahlan, A.R. and B.I.E. Ahmad, *User Acceptance of Health Information Technology (HIT) in Developing Countries: A Conceptual Model.* Procedia Technology, 2014. 16: p. 1287-1296.

Benson, M. and A.C. DHA, *Hospital Information Systems in Nigeria: A Review of Literature.* The Journal of Global Health Care Systems, 2011. 1(3).

Koch, S., *Home telehealth—current state and future trends.* International journal of medical informatics, 2006. 75(8): p. 565-576.

Isabalija, S.R., et al., *Factors affecting adoption, implementation and sustainability of telemedicine information systems in Uganda.* Journal of Health Informatics in Developing Countries, 2011. 5(2).

Isabalija, S.R., V. Mbarika, and G.M. Kituyi, *A framework for sustainable implementation of e-medicine in transitioning countries.* International journal of telemedicine and applications, 2013. 2013: p. 8.

Justice, E.O., *E-Healthcare/Telemedicine Readiness Assessment of Some Selected States in Western Nigeria.* International Journal of Engineering and Technology, 2012. 2(2).

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Mobile Computing Based on Context-Aware in Higher Institutions: A Critical Review

Aliga Paul Aliga[1*], Sadiq Fatai Idowu[2] and Ojieabu, Eghosa Clement[3]

[1, 2] Department of Computer Science,[3]Department of Electrical/Electronics Engineering, Ambrose Alli University, P. m. B 14, Ekpoma, Edo State, Nigeria. [2]Faculty of Computing, Universiti Teknologi, 81310 UTM Johor Bahru, Johor, Malaysia.
(E-mail:aligapa2010@gmail.com[1,*], fisadiqcscdpt@aauekpoma.edu.ng[2], and bishopeghosa@yahoo.ca)

ABSTRACT

Context-aware is a key player in ubiquitous mobile computing research. It is geared towards pervasive and ubiquitous environment where devices, software agents and services integrate to support human needs. Context-aware's relevance demands proper understanding of what it can offer, its techniques and possible weaknesses. In this paper, we conducted a critical literature review to investigate the contributions of previous studies and identified parameters and datasets used for evaluation. The study investigated existing techniques used in a mobile computing based on context-aware in higher institutions and highlight their limitations. It also identify contributions of research done so far in higher institutions, parameters and datasets used for evaluation in the domain to know area of future research. Search terms with relevant keywords were used to identify primary studies that relate to the topic of discussion. 131 primary studies were identified during the search process in the reviews. Consequently, 31 context-aware techniques were identified and analysed. Ontology techniques were mostly utilized in the study. The application of the techniques to explicit representation of knowledge was inadequate. Information and service abundance is a major challenge in the society and world at large. Most research contributions presented still suffer setbacks especially with the use of multi-agent concept as they were used by few studies. Larger percentages of the researches in context-aware target software product as a real life application; and 48 were identified in the study.

Keywords: context-aware computing, techniques, mobile computing, contribution type, and evaluation.

INTRODUCTION

The term context-aware is a property of mobile computing. Context-aware originates as a term from ubiquitous or pervasive computing (Neves *et al*., 2014), which is an act of linking changes in the environment with computer system that is static. The present target of pervasive computing, is how to integrate intelligent agent that is capable of knowledge empowerment and reasoning in order to understand the local context and shared information to support intelligent application and interfaces (Chen *et al*., 2001). It is very rare, to see disciplines and industries where context-aware related applications will not fit in, as a result of context and its relationships with environmental and situational changes in our daily life. This statement support previous research in the literature from (Dey, 2001), with explanations provided for context and the origin of 'context-aware computing' as proposed in Schilit and Theimer (1994) also cited in Al-Bashayreh *et al*. (2013). Several concepts have been proposed in the various disciplines such as education (Neves *et al*., 2014; Gallego *et al*., 2013), building automation (Han *et al*., 2013), health care (Fenza *et al*., 2012), library management (Shatte *et al*., 2014), movie industry (Hariri *et al*., 2013), business (Xiong and Wojciechowski, 2007), Restaurant (Lukkari *et al*., 2004), banking institution (Vico *et al*., 2012) to mention just a few.

METHODOLOGY

The various stages of a critical literature review will be followed in this paper. The steps comprise of planning, conducting and documenting of the review (Kitchenham and Charters, 2007). Each step involves combinations of the procedures that will guide to achieve the objective of this paper. The paper will focus on the investigation of several issues concerning research on context-awareness and the extent to which it has been used to handle disaster management. To achieve the purpose of this study. Three research questions (RQ) were proposed and presented as follows:

RQ1: what are the existing techniques used for mobile computing based on context-aware with regard to education domain?
RQ2: what are the limitations and contributions of the existing techniques used for mobile computing based on context-aware in the education domain?
RQ3: what parameters and datasets did the previous research use for evaluation in mobile computing based on context-aware in the education domain?

MAIN RESULTS

Fig.1, summarized the entire publications used in this paper based on research contributions, focus and types.

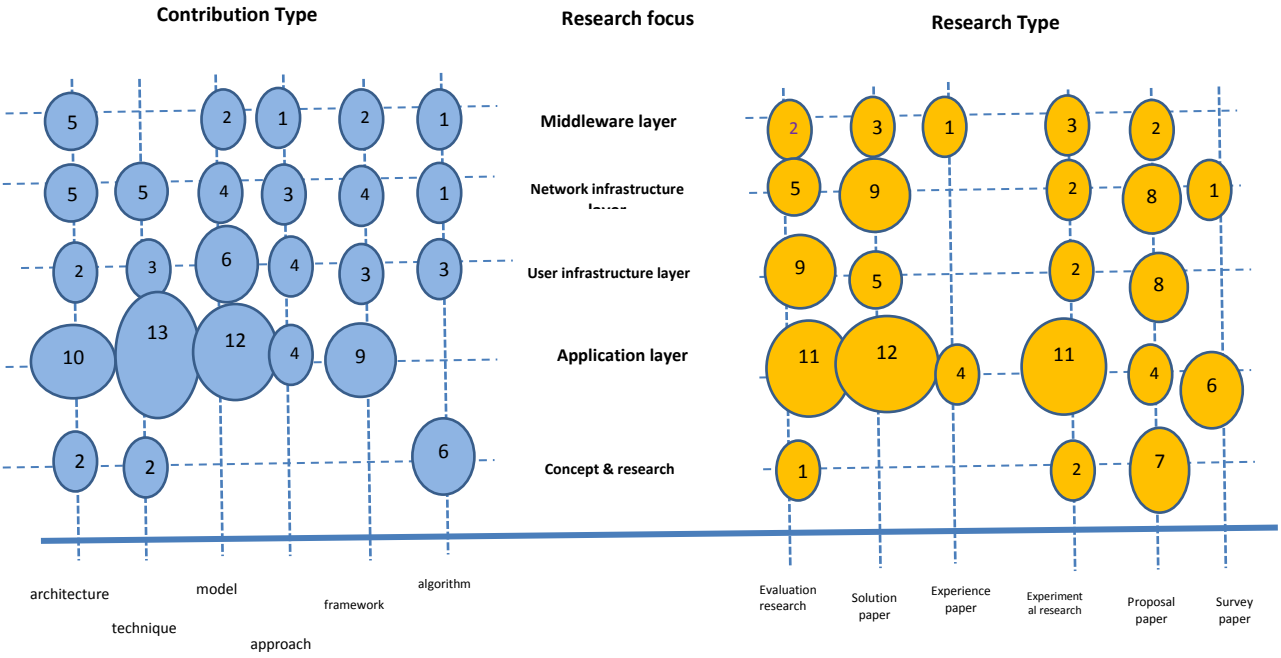
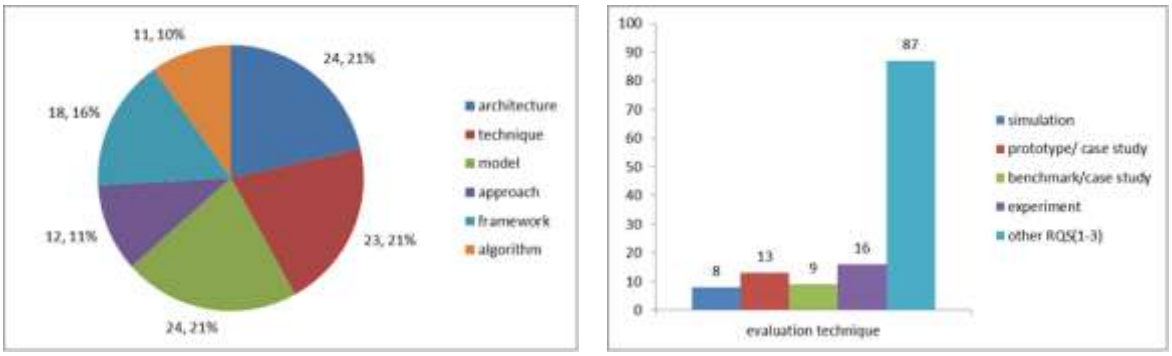


Figure 1: Pie chart showing the Mapping of research; contributions, focus and types in mobile computing with regards to context-aware between (2000-2016)

However, Figure 2a shows the research contributions based on the techniques found in literature. Finally, Figure 2b depicts the summary of parameters and evaluation criteria in the domain under review.



2a 2b

Figure 2: (a and b). Existing techniques by contributions type, parameters and evaluation techniques used in the previous research based on (RQ 1-3).

CONCLUSION

The paper aimed at summarizing the current state of the art concerning context-awareness mobile computing research. In order to achieve this aim we carried out a critical literature review, which is assumed to be the first step of evidence-based research paradigm. It was discovered that, although a lot of contributions have been made-both application and system development-despite that, further improvements are still required in existing research. Some of these improvement border on interoperability, scalability, ambiguity, ease of use, reliability of results, data extraction from unstructured sources (unstructured data), validation in real life settings and need to access relevant datasets from different organizations. Therefore, further studies on large scale framework, architecture and appropriate technique adoption can resolve the aforementioned limitations.

Acknowledgment:

The authors would like to express their appreciation to the Management of Ambrose Alli University, Ekpoma under Teriary Education Trust Fund (TETFund) for the academic staff development and Universiti Teknologi Malaysia for the provision of conducive atmosphere to one of the authors for his Doctoral research in Faculty of Computing.

REFERENCES

Al-Bashayreh, M.G., Hashim, N.L. and Khorma, O.T. "Context-Aware Mobile Patient Monitoring Frameworks: A Systematic Review and Research Agenda," *Journal of Software (1796217X)*, vol. 8, 2013.

Chen, H., Finin, T and Joshi, A. "An ontology for context-aware pervasive computing environments," The Knowledge Engineering Review, vol. 18, pp. 197-207, 2003.Ibe A. K. Dey, G. D. Abowd, and D. Salber, "A conceptual framework and a toolkit for supporting the rapid prototyping of context-aware applications," *Human-computer interaction*, vol. 16, pp. 97-166, 2001.

Dey, A.K. "Understanding and using context," *Personal and ubiquitous computing*, vol. 5, pp. 4-7, 2001.

Fenza, G., Furno, D. and Loia, V. "Hybrid approach for context-aware service discovery in healthcare domain," *Journal of Computer and System Sciences*, vol. 78, pp. 1232-1247, 7// 2012.

Gallego, D., Barra, E., Gordillo, A. and Huecas, G. "Enhanced recommendations for e-Learning authoring tools based on a proactive context-aware recommender," in *Frontiers in Education Conference, 2013 IEEE*, 2013, pp. 1393-1395.

Han, S., Lee, G. and Crespi, N. "Semantic Context-aware Service Composition for Building Automation System," *Industrial Informatics, IEEE Transactions on*, vol. PP, pp. 1-1, 2013.

Hariri, N., Mobasher, B. and Burke, R. "Query-driven context aware recommendation," in *Proceedings of the 7th ACM conference on Recommender systems*, 2013, pp. 9-16.

Kitchenham, B.A. and Charters, S. Guidelines for performing systematic literature reviews in software engineering. Ver 2.3, EBSE Technical report, (2007).

Lukkari, J., Korhonen, J. and Ojala, T. "SmartRestaurant: mobile payments in context-aware environment," in *Proceedings of the 6th international conference on Electronic commerce*, 2004, pp. 575-582.

Neves, A. R. D. M., Carvalho, A.M.G. and Ralha, C.G. "Agent-based architecture for context-aware and personalized event recommendation," Expert Systems with Applications, vol. 41, pp. 563-573, 2/1/ 2014.

Schilit, B.N. and Theimer, M. M. "Disseminating active map information to mobile hosts," *Network, IEEE*, vol. 8, pp. 22-32, 1994.

Shatte, A., Holdsworth, J. and Lee, I. "Mobile augmented reality based context-aware library management system," *Expert Systems with Applications*, vol. 41, pp. 2174-2185, 4// 2014.

Vico, D.G., Huecas, G. and Rodríguez, J.S. "Generating context-aware recommendations using banking data in a mobile recommender system," in *ICDS 2012, The Sixth International Conference on Digital Society*, 2012, pp. 73-78.

Xiong, J. and Wojciechowski, M. "A middleware supporting context-aware services based on context business objects," in *Grid and Cooperative Computing, 2007. GCC 2007. Sixth International Conference on*, 2007, pp. 379-386.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Finger-Vein Feature Extraction Using Slantlet Transform and Its Application to Personal Recognition

Kayode A. Akintoye*, Mohd Shafry Mohd Rahim and Abdul Hanan Abdullah

Department of Computer Science, Faculty of Computing,
Universiti Teknologi Malaysia, Johor Bahru, Malaysia
(Email: *****kintos20@yahoo.com, shafry@utm.my , hanan@utm.my**)**

ABSTRACT

Biometric system based on finger-vein features for personal recognition has been successfully used in many applications. The finger-vein pattern has highly discriminative features that are difficult to forge because of its subcutaneous position in the finger. Despite considerable progress and its practical uses, extraction of finger-vein features has become issue in getting accurate finger-vein based biometric system for human recognition. The Slantlet Transform method is proposed in this work for better finger-vein features extraction. This method is an improved version of orthogonal Discrete Wavelet Transform (DWT), which is to provide superior time localization with simultaneous achievement of shorter supports for the filter. Therefore, the features extracted from finger-vein pattern are used to train a support vector machine (SVM) based binary classifier that automatically infers whether the image is impostor or genuine. An excellent classification ratio of 100% is expected to be achieved for a set of benchmark finger-vein images, which is significantly better than the results reported in a recent research work employing combination of different feature extraction and classification tools.

Keywords: Finger Vein, Feature Extraction, Slantlet Transform, Support Vector Machine

INTRODUCTION

In the last decade, there is a considerable increase the area of application of biometrics (Kataria *et al*., 2013) that rely on the accurate identification of individuals for safety. It is expected that in the near future, there will be more uses of biometry in daily activities such as getting in the car, opening the door of house, accessing to bank account, shopping by internet, accessing to PDA, mobile phone, and laptops. Depending of where the biometrics is deployed, the applications are categorized in the following five main groups: forensic, government, commercial, health-care, traveling and immigration. However, some applications are common to these groups such as physical access, PC/network access, time and attendance. Figure 1 illustrate the application area of biometry.

The research shows that there are two major challenges in relationships of biometrics systems. The verification or identification is the first main element by which the identity is accessible and forgeable, and the second challenge is that the rate of reliability of the any biometric systems in terms of having a satisfactory accuracy rate is not acceptable. However, finger vein recognition is more secure and convenient than any other biometric systems in the sense that the human veins are mostly invisible and located inside the body; therefore, it is difficult to be forged or stolen. In addition, it is more acceptable for the user as capturing finger vein images is noninvasive and contactless. Finally, the finger vein data can only be captured from a living individual. Thus, a convincing proof that the subject whose finger vein (Bishop, 2006) is successfully captured is alive.

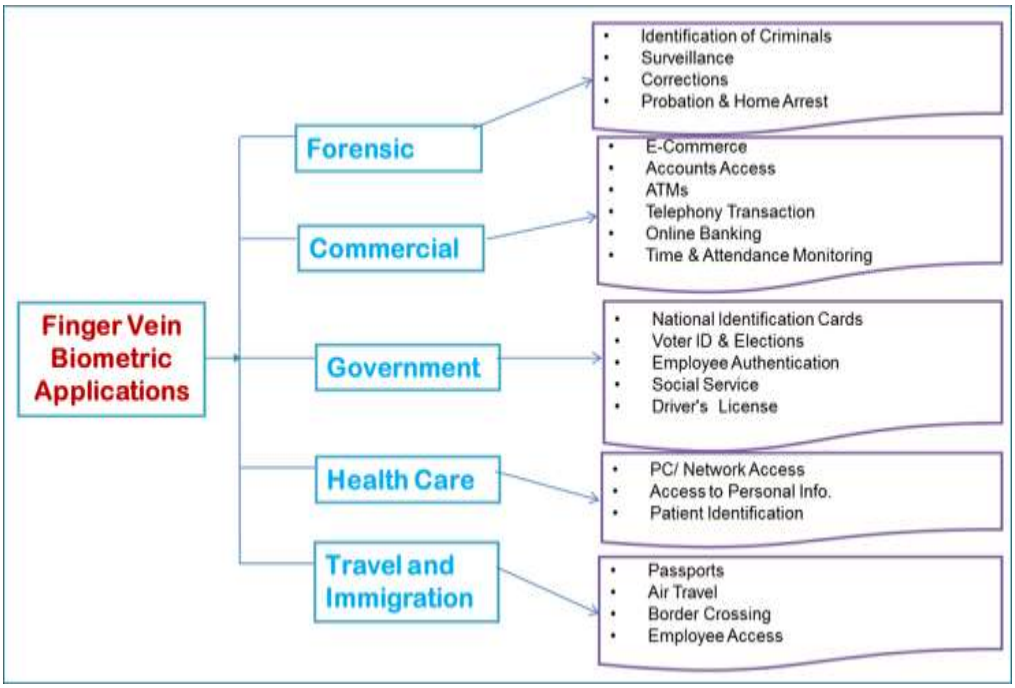


Figure 1: Application area of finger-vein biometric system

PROPOSED APPROACH

The feature extraction from finger vein images can be carried out using several image analysis methods already available, such as two-dimensional principal component analysis (Damavandinejadmonfared and Varadharajan, 2014), Fourier transform based techniques (Nguyen *et al*., 2013), and wavelet transform based techniques (Wu and Liu, 2010). While determination of meaningful features is an extremely important requirement, another important factor is the determination of as small number of relevant features as possible to characterize the complete system, so that the subsequent computational burden of the classifier to be developed can be reasonably light; thus, slantlet transform method is proposed.

Feature Extraction by Slantlet Transform

The discrete wavelet transform (DWT) is particularly useful for image processing in the fields of de-noising, compression, estimation etc. However, it cannot yield an optimal discrete-time basis, from the point of view of time localization. The slantlet transform (ST) has been recently proposed as an improvement over the classical DWT, which can provide better time localization (Selesnick, 1999). They are inspired by an equivalent form of DWT, where the filterbank structure is implemented in a parallel form, employing different filters for each scale. It has been successfully demonstrated that ST can be implemented employing filters of shorter supports and yet maintaining the desirable characteristics like orthogonality and an octave-band characteristic, with two zero moments.

To provide a mathematical perspective of Slantlet transform, let us fall back on a generalized representation of figure 2, for l scales. Let $g_i(n)$, $f_i(n)$ and $h_i(n)$ be the filters employed in scale i to analyze the signal, where each of these filters has an exact support of 2^{i+1}. For l scales, ST filterbank employs l number of channel pairs, i.e. a total of $2l$ channels. Therefore, the low pass filter $h_l(n)$ is paired with its adjacent filter $f_l(n)$, where each filter is followed by a down-sampling by 2^l. Each of the other (l-1) channel pairs constitutes of a $g_i(n)$ filter and its shifted time-reversed version (i = 1, 2, …., l-1), followed by a down-sampling by 2^{i+1}.
As the filters $g_i(n)$, $f_i(n)$ and $h_i(n)$ implement piecewise linear forms, they can be represented by following expressions:

$$g_i(n) = \begin{cases} a_{0,0} + a_{0,1}n, & \text{for } n = 0,\ldots 2^i - 1 \\ a_{1,0} + a_{1,1}n, & \text{for } n = 2^i \ldots 2^{i+1} - 1 \end{cases} \quad (1)$$

$$h_i(n) = \begin{cases} b_{0,0} + b_{0,1}n, & \text{for } n = 0,\ldots, 2^i - 1 \\ b_{1,0} + b_{1,1n}, & \text{for } n = 2^i \ldots 2i^{+1} - 1 \end{cases} \quad (2)$$

$$f_i(n) = \begin{cases} c_{0,0} + c_{0,1}n, & \text{for } n = 0,\ldots 2^i - 1 \\ c_{1,0} + c_{1,1}n, & \text{for } n = 2^i, \ldots, 2^{i+1} - 1 \end{cases} \quad (3)$$

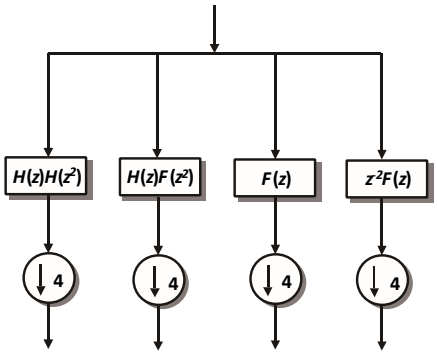


Figure 2(a)

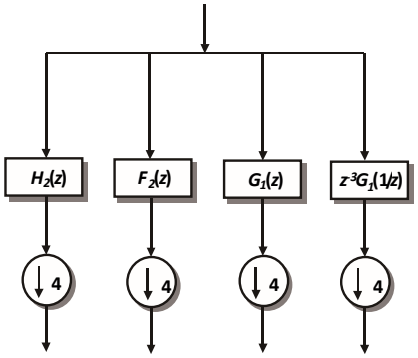


Figure 2(b)

Figure 2: (a) two-scale iterated D_2 filterbank and (b) corresponding two-scale slantlet filterbank.

CONCLUSION

The scheme employs a two-stage algorithm with ST performing feature extraction based on the intensity histogram, computed from each image. In the second stage, a binary classifier, SVM, performs the image classification. The performance results show an excellent classification of 100% by utilizing as low as six features only, for the classifier input.

REFERENCES

Bishop CM. Pattern recognition and machine learning: Springer; 2006.

Damavandinejadmonfared S, Varadharajan V, editors. Finger Vein Recognition in Row and Column Directions Using Two Dimensional Kernel Principal Component Analysis. Proceedings of the International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV); 2014: The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Kataria AN, Adhyaru DM, Sharma AK, Zaveri TH, editors. A survey of automated biometric authentication techniques. Engineering (NUiCONE), 2013 Nirma University International Conference on; 2013: IEEE.

Nguyen DT, Park YH, Shin KY, Kwon SY, Lee HC, Park KR. Fake finger-vein image detection based on fourier and wavelet transforms. Digital Signal Processing. 2013; 23(5): 1401-13.

Wu J-D, Liu C-T. Finger-vein pattern identification using principal component analysis and the neural network technique. Expert Systems with Applications. 2011; 38(5): 5423-7.

Selesnick I.W. The slantlet transform. IEEE transactions on signal processing. 1999; 47(5):1304-13.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

A Reliability Investigation of Modified Utaut Model for Mobile Commerce Usage in Malaysia

Mohamad A. Alrawi*, Samy G.N. and Yusoff R.C.M.
Advanced Informatics School, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia.
(E-mail: m_alrawi2005@yahoo.com, ganthan.kl@utm.my, rasimah.kl@utm.my)

ABSTRACT

One of the definitions of a Mobile commerce has been: Mobile-commerce offers superior chances for more rapid access, more efficient, more strong and certainly reachable programs anytime everywhere for its users. Mobile-commerce was initially anticipated to experience a tangible increase for more than one reason, excluding the accelerated proliferation of mobile device acceptance and the clear benefits of anytime-anyplace connectivity and meet as many needs of residents as possible.Over the past years a several of academic studies have been conducted on electronic commerce. Nevertheless, those focusing on the mobile commerce are still rare, there is much to explore and investigate in the case of Malaysia. The aim of this paper is to present findings on the factors that determinants of mobile commerce usage in Malaysia. This study adopted pilot approach among consumers Malaysia. This research shows that Effort Expectancy, Performance Expectancy,Social Influence,Facilitating Condition ,Compatibility,Mobility,Personal Innovativeness, Perceived risk , Perceived trust.

Key words: mobile commerce, technology acceptance , Malaysia , UTAUT

INTRODUCTION

Mobile commerce, frequently called M-commerce, mostly designates using wireless devices to ride E business transactions, including merchandise order, fund transport, and stocks trading (Kalakota and Robinson, 1999; Kalakota, *et al*., 2002). Nowadays Mobile-commerce is the most recent trend to run business instead of ecommerce (Joubert and Van Belle, 2013). Mobile-commerce offers superior chances for more rapid access, more efficient, more strong and certainly reachable programs anytime everywhere for its users. Mobile-commerce was initially anticipated to experience a tangible increase for more than one reason, excluding the accelerated proliferation of mobile device acceptance and the clear benefits of anytime-anyplace connectivity (Joubert and Van Belle, 2013; Al-Jabri and Sohail, 2012; Khalifa and Ning Shen, 2008). Measurements done by International Telecommunication Union (ITU) estimates that there were 4.77 billion mobile cellular subscribers worldwide by the end of 2017. Mobile-Commerce is a new area arising from the marriage of electronic commerce with emerging mobile and pervasive computing technology and especially when it comes to the information system specifically with the development of technology such as third 3G,4G and LTE (Niranjanamurthy *et al*., 2013).

Mobile-Commerce resulted as Electronic-Commerce was growing its services and improving on ways of reaching purchaser, so as they can be able to get them in a new and powerful computing ways. Nowadays Mobile-Commerce is the most recent trend to run business instead of ecommerce (Niranjanamurthy *et al*., 2013). Mobile-Commerce offers greater chances for more rapid access, more efficient, more is likely to be the next enormous advanced technology after electronic commerce. Mobile-commerce has been adopted by

different nations in the world. However, its adoption is low in Malaysia compared to other nations (Swilley *et al*., 2012).

MAIN RESULTS

Table1. Cronbach's Alpha Value of the Instruments

Dimension	Number of Items (n=30)	Cronbach's Alpha (Pilot study)
EE	5	0.941
SI	7	0.813
PE	5	0.748
COMP	4	0.806
PI	3	0.786
MOB	4	0.910
PR	6	0.788

CONCLUSION

The purpose of this study is to discover invoices that Impact Malaysians to adopt mobile commerce mobile.Trade has the characteristics of mobility and Wide range. This shows the potential of mobile Trading in Malaysian market is very large. In the Development phase, this study on consumer behavior Problems appear to be suitable for researchers as well as reference And practitioners. As the result of this study shows that,Social relationships, Social Media and networks are important criteria Mobile trade adoption in Malaysia. This study can be expanded to be more relevant Construct, as there is still 36% of the variance Explained in this theoretical framework. The result Can be interesting, both for research and practice, to Discover predictors that can encourage users to take mobile Trade in Malaysia.

Acknowledgment:

The authors would like to thank the Ministry of Education, Government of Malaysia and Research Management Centre, Universiti Teknologi Malaysia for supporting this work through the Fundamental Research Grant Scheme (FRGS) via vote number 4F237.

REFERENCES

Al-Jabri, I.M. and M.S. Sohail, *Mobile banking adoption: Application of diffusion of innovation theory.* Journal of Electronic Commerce Research, **13**(4): (2012), p. 379-391.

Joubert, J. and J. Van Belle, *The role of trust and risk in mobile commerce adoption within South Africa.* International Journal of Business, Humanities and Technology, (2013), **3**(2): p. 27-38.

Kalakota, R. and M. Robinson, *e-Business*.: Addison Wesley Roadmap for Success,1999.

Kalakota, R., M. Robinson, and D.R. Kalakota, *M-Business: the race to mobility*.: McGraw-Hill New York, NY, 2002.

Khalifa, M. and K. Ning Shen, *Explaining the adoption of transactional B2C mobile commerce.* Journal of enterprise information management,. **21**(2): p.(2008), 110-124.

Niranjanamurthy, M., et al., *Analysis of e-commerce and m-commerce: advantages, limitations and security issues.* International Journal of Advanced Research in Computer and Communication Engineering, (2013), **2**(6).

Swilley, E., C.F. Hofacker, and B.T. Lamont, *The evolution from e-commerce to m-commerce: pressures, firm capabilities and competitive advantage in strategic decision making.* International Journal of E-Business Research (IJEBR),. **8**(1): p. (2012), 1-16.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Finite Element and Finite Difference Numerical Simulation Comparison for the Solution of One Dimensional Boundary Value Problem

Olaiju O. Adeyemi*

[1]School of Applied Science, Department of mathematics, Federal Polytechnic Ilaro
(E-mail: olaiju@yahoo.com)

ABSTRACT

Numerical solutions to partial differential equations are usually obtained using any of the numerous numerical methods. The most common among these methods are the finite difference (FD) method and the finite element (FE) method. A detailed comparison of these methods shows that the main difference between them is in how the numerical schemes spatially average the variation of material properties. Further differences are also observed in the way that flux boundaries are represented in FE and FD methods. The FE algorithm provides an improved approximation to the partial differential equation over the usual FD approach while FD being computationally simpler to implement than the FE solution. The comparison results show that the FE solution can avoid the erroneous results encountered in the FD solution for coarsely discretized problems.
Keywords: Finite difference; Finite element; Numerical solution

INTRODUCTION

Numerical accuracy is one of those major areas of scientific computing that Researchers are trying to enhance by using different numerical schemes. In general, more bits of precision are better and acknowledging when dealing with numerical computation and too low a precision can introduce non-physical objects into physical simulations, and this might cause significant criticality phenomena to be missed, or result in the application exhibiting other undesirable or unreasonable behaviour. Partial differential equations are so important in various fields, from engineering to Finance and so many other disciplines. As important as these equations are, sometimes it is not so quite easy or not possible at all to find an explicit solution to them especially when they have general boundary conditions, so approximation is necessary. There are various numerical methods which can be used to approximate partial differential equation solution. Some of these numerical methods are accurate than the others while some are computational time efficient than the others depending on the problem at hand. Since both accuracy and time efficiency are highly required in the solution of differential equations hence our interest in searching for a numerical scheme that has both accuracy and time efficiency. This paper is going to compare the accuracies and computational time efficiencies of two powerful numerical schemes, Finite element and finite difference methods. The abilities of these two numerical methods will be tested on one dimension Laplace problem given as;

$$-u''(x) = f(x), \quad 0 < x < 1, \qquad u(0) = 0, \quad u(1) = 0 \tag{1}$$

Many researchers have done numerous work in the area of using numerical methods in solving physical problems, for example, In their work, Mehra *et al.*(2010) solved the one-dimensional advection-diffusion equation using an adaptive-step algorithm for the analysis of pollutant dispersion and compare it with other recent work, obtaining very similar results for two solute dispersion scenarios, one along steady flow through inhomogeneous medium and another along uniform flow through homogeneous medium. their method was characterized by low computational time and simplicity of the code. Jaime Rodrigues, Maria do Carmo,(2011), presented a detailed study of a specific algorithm based on the moving finite element methoods to solve Stefan problems in one dimensional space domain. They numerical test to demonstrate the accuracy and robustness of their formulation of M FEM to solve moving boundary problems with accurate results and acceptable computational time.

Finite Difference Scheme

Finite Difference Method (FDM) is the oldest and most direct approach to discretizing partial differential equations is also the most commonly used method to solve Ordinary Differential Equations (ODEs) and PDEs in a bounded domain. The basic idea of finite difference methods is simply to write derivatives in differential equations in terms of discrete quantities of dependent and independent variables, resulting in simultaneous algebraic equations with all unknowns prescribed at discrete nodal points for the entire domain. The different unknowns are defined by their values on discrete grid and differential operators are replaced by difference operators using neighbouring points. (Mehra *et al.*, 2010). The finite-difference method is typically defined on a regular grid and this fact can be used for very efficient solution methods. (Sjodin, 2016)

The Finite Element Method

The quest for the solution of complicated problems especially elasticity and structural mechanics modelling in engineering brought about the development of Finite element (FE) method. Presently the applications of FM are very wide. The Finite Element Analysis (FEA) is a numerical method for solving problems of engineering and mathematical physics. Useful for problems with complicated geometries, loadings, and material properties where analytical solutions cannot be obtained. Design geometry is a lot more complex; and the accuracy requirement is a lot higher. We need (1) To understand the physical behaviours of a complex object (strength, heat transfer capability, fluid flow, etc.). (2) To predict the performance and behaviour of the design; to calculate the safety margin; and to identify the weakness of the design accurately; and –(3) To identify the optimal design with confidence.(Ferreira, 2014). Finite element methods model body by dividing it into an equivalent system of many smaller bodies or units (finite elements) interconnected at points common to two or more elements (nodes or nodal points) and/or boundary lines and/or surfaces.

MAIN RESULTS

Consider the problem: $-u''(x) = 12x^2 - 6x, \quad 0 < x < 1, \qquad u(0) = 0, \quad u(1) = 0,$
Exact solution $u = x^3(1-x)$

By using both finite difference and finite element methods, the following results were obtained From Figure 1, It is clear that for the 1D BVP, if few meshes are used finite element is more accurate than finite difference method. Although, having an infinite number of nodes can result to higher accuracy in which all the numerical results by FDM and FEM and the exact solution will be coincidental.

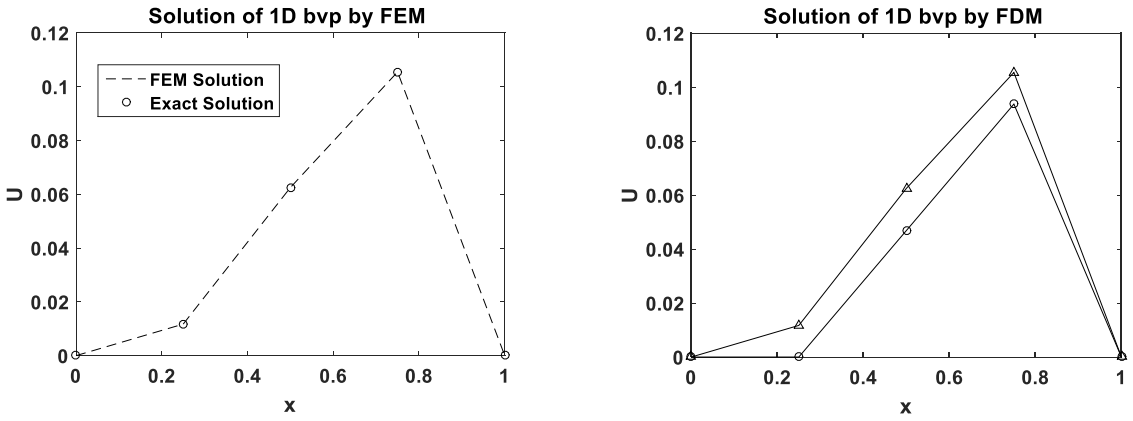


Figure 1. Solution of 1D BVP by FEM and FDM

CONCLUSION

The work showed that it is essential to use numerical methods to find solutions to partial deferential equations. It also showed how powerful and indispensable software like Matlab and C program are. These types of tools simplify the solution process of complex equations which result from the application of the Finite Difference Method and Finite Element Method and allow us to obtaining reliable results in a relatively quick and efficient way. The results also showed how the discretizing process of the meshes can influence the numerical results, and how the refinement of those meshes can enhance accuracy of the numerical solutions. Thus, having an infinite number of nodes can result to higher accuracy in which all the numerical results by FDM and FEM and the physical reality will be coincidental. However, this will have a negative effect on running time of the software i.e the running time of the software will also be infinite, which is one of the limitations of the numerical approach for solving these problems. In conclusion, it is essential to know accurate and numerical schemes to give us an improved capacity to evaluate, compare, and discuss the physical problems around us.

REFERENCES

Ferreira, G.A., 2014. Integrated Masters in Mechanical Engineering Application of the Finite Difference Method and the Finite Element Method to Solve a Thermal Problem Available at: http://estudomec.info/files/SPT_Analise_Termica_MEF_MDF.pdf.

Jaime Rodrigues, Maria do Carmo, A.. R., 2011. Moving Finite Element Methods for Investigating Stefan Problems. *Chemical Engineering Transactions*, 24(1), pp.337–342.

Mehra, M., Patel, N. and Kumar, R., 2010. Comparison Between Different Numerical Methods for Discretization of PDEs-A Short Review. *Computer Physics Communications*, pp.599–602.

Sjodin, B., 2016. What's The Difference Between FEM, FDM, and FVM? http://machinedesign.com/print/fea-and-simulation/what-s-difference-be... print | close., pp.1–5.

Numerical Precision: How Much is Enough? www.scientificcomputing.com/article/2009/06/numerical-precision-how-much-enough, accessed: 12022017.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Liquid Chromatography for the Determination of Chitin in Pathogenic Fungal Isolates

Ahmad Sh. A. Lafi*[1], Fahrul Huyop[2] , Jacinta Santhanam [3], Tzar Mohd Nizam Khaithir [4], Nur Fashya Musa[5]

[1, 2] Department of Biotechnology and Medical Engineering, Faculty of Biosciences and Medical Engineering, University Teknologi Malaysia, Johor, MALAYSIA.
(E-mail: ahmed.lafi2000@gmail.com, fzhutm@gmail.com)

[3] Department of Medical Sciences, Faculty of Health Sciences, University Kebangsaan Malaysia, Kuala Lumpur.
(E-mail: jacinta@ukm.edu.my)

[4] Department of Medical Microbiology and Immunology, Medical Centre, University Kebangsaan Malaysia, Kuala Lumpur.
(E-mail: tzar@ppukm.ukm.edu.my)

[5] Institute Bioproduct of Development, University Technology Malaysia, Johor. Malaysia.
(E-mail: fashya@ibd.utm.my)

ABSTRACT

A method to measure chitin content in ten pathogenic fungal isolates with high performance liquid chromatography (HPLC) was developed. Measurements of fluorescence of 9-fluorenylmethylchloroformate (FMOC-CI) derivatives of glucosamine were made on acid hydrolysates of pure chitin. The method was applied on 10 isolates of pathogenic fungi. Interference from amino acids was removed by pre-treatment of samples with 0.2 N NaOH. The chitin contents of ten pathogenic fungal isolates were determined. They varied from 35.03 (±0.09) to 398.54 (±0.50) (µg/ml). Cryptococcus gattii and Fusarium solani exhibited the highest and lowest levels of chitin, respectively, under test conditions. Based upon relative amounts of chitin produced per mycelial dry weight, three groups namely high (Cryptococcus gattii, Penicillium, Aspergillus fumigatus and Mucor) (398.54, 376.70, 298.13 and 283.55 µg/ml) respectively, medium (Candida tropicalis and Cryptococcus neoformans) (142.94 and 121.25 µg/ml) respectively, and low (Candida albicans, Aspergillus niger, Rhizopus and Fusarium solani) (47.12, 46.05, 36.61 and 35.03 µg/ml) respectively, were identified. Concentrations of chitin of ten pathogenic fungal isolates reported in this study fall within the range of other fungi caused Invasive fungal infections (IFI's) reported in the literature. The present chitin method offers a sensitive and specific tool for the quantification of chitin in fungi and in pathogenic fungal isolates.

Key words: Chitin, Pathogenic, Fungal, HPLC, Determination.

INTRODUCTION

Chitin is a skeletal cell polysaccharide that is a component of the inner cell wall of fungi, and has been the target of anti-fungal drugs (Debono and Gordee, 1994; Georgopapadakou and Tkacz, 1995). Chitin is the second most abundant biologically synthesized polymer found in nature. It is produced as a structural component in fungi, mollusks, cephalopods, and arthropods: including insect and crustacean exoskeletons (Tharanathan and Kittur 2003). It also occurs in the exoskeleton of insects but is not present in bacteria or in foods. Hence the chitin content of a food or raw material can provide an estimate of fungal contamination. Chitin is most effectively assayed by the method of Ride and Drysdale (1972). Alkaline hydrolysis is more readily accomplished at 121C in an autoclave (Jarvis, 1977). Improved assay sensitivity was achieved by derivatisation of glucosamine and other products with o-phthalaldehyde, separation by high performance liquid chromatography and detection of fluorescent compounds with a spectrofluorimeter (Lin and Cousin, 1985). Ekblad andNasholm (1996) also described an HPLC method which measured fluorescence of a 9-fluorenylmethylchloroformate derivative of glucosamine. The chitin assay remains rather complex and slow, usually requiring about 5 h.
A number of studies have indicated that the chitin assay is a valuable technique for estimating the

extent of fungal invasion in foods such as maize and soybeans (Donald and Mirocha, 1977), wheat (Nandi, 1978) and barley (Whipps and Lewis, 1980) to estimate mycorrhizal fungi and fungal pathogens in plant material and soil (Ekblad and Nasholm, 1996; Ekblad et al., 1998; Penman et al., 2000; Singh, 2005) and measure wood rotting fungi (Nilsson and Bjurman, 1998). Particular attention has been paid to the possibility of developing the chitin assay as a replacement for the Howard mould count for tomato products (Jarvis, 1977; Bishop et al., 1982; Cousin et al., 1984).
The number of opportunistic fungal infections has increased significantly during the past decades, at least in part as the result of a rising number of immunocompromised patients. Individuals at risk for the development of a serious fungal infection include patients undergoing solid-organ, blood and bone marrow transplantation, cancer patients, patients of the acquired immunodeficiency syndrome (AIDS) and other patients receiving immunosuppressive treatment (Pfaller and Diekema, 2004; Brakhage, 2005). Today, invasive fungal infections are among the most challenging problems in haematology, oncology and intensive care medicine (Vandewoude et al. 2006). Among the approximately 140 000 known fungal species only a few cause human infections (Richardson, 2003). The most predominant pathogens are the yeast Candida albicans and the filamentous fungus Aspergillus fumigatus, but also other fungal pathogens frequently cause systemic infections, such as the yeast species C. glabrata, C. krusei, C. tropicalis, Cryptococcus and Trichosporon, filamentous fungi such as Aspergillus, Fusarium, Rhizopus and Mucor, and Dematiaceous hyphomycetes (Richardson 2005).

MAIN RESULTS

Analysis of chitin: Chromatograms of chitin standards showed tow peaks with retention times between 1.200 and 2 minutes. Calibration curves of chitin were found to be linear with the values of 2894555, 2703874, 2469531 and 2185492 over the chitin of 100, 50, 20 and 10 mg, respectively (Figure 1) (Table 1).

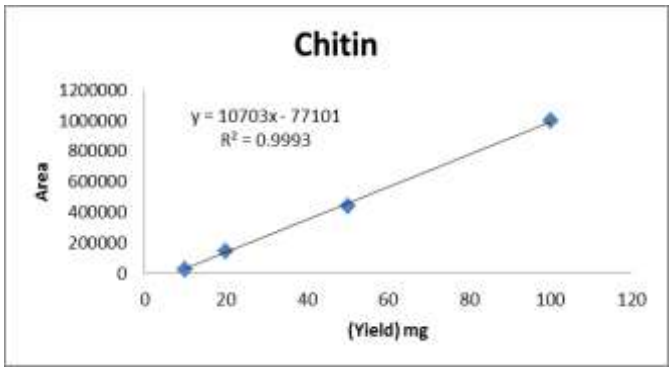


Figure 1: Calibration curve of standard Chitin

Table 1: Chromatograms of Chitin standards

Weight (mg)	HPLC RT (minutes)	HPLC peak area	HPLC peak height
100	1.122	998621	2894555
50	1.123	443099	2703874
20	1.125	148212	2469531
10	1.121	28245	2185492

Results of study are shown in (Table 2), The chitin contents of ten pathogenic fungal isolates were determined. They varied from 35.03 (±0.09) to 398.54 (±0.50) (µg/ml). Cryptococcus gattii and Fusarium solani exhibited the highest and lowest levels of chitin, respectively, under test conditions. Based upon relative amounts of chitin produced per mycelial dry weight, three groups namely high (Cryptococcus gattii, Penicillium, Aspergillus fumigatus and Mucor) (398.54, 376.70, 298.13 and 283.55 µg/ml) respectively, medium (Candida tropicalis and Cryptococcus neoformans) (142.94 and 121.25 µg/ml) respectively, and low (Candida albicans, Aspergillus niger, Rhizopus and Fusarium solani) (47.12, 46.05, 36.61 and 35.03 µg/ml) respectively, were

identified. Bacterial isolates did not show any positive result for the test because they did not contain chitin. Concentrations of chitin of ten pathogenic fungal isolates reported in this study fall within the range of other fungi caused Invasive fungal infections (IFI's) reported in the literature. The present chitin method offers a sensitive and specific tool for the quantification of chitin in fungi and in pathogenic fungal isolates.

Table 2: Chromatograms of chitin in pathogenic fungal isolates studied

Sample no.	Sample	HPLC result	Yield Conc. mg	HPLC RT (minutes)
1-Af	*Aspergillus fumigatus*	positive	298.13	1.123
2-An	*Aspergillus niger*	positive	46.05	1.124
3-Ca	*Candida albicans*	positive	47.12	1.126
4-Ct	*Candida tropicalis*	positive	142.94	1.121
5-Crg	*Cryptococcus gattii*	positive	398.54	1.124
6-Crn	*Cryptococcus neoformans*	positive	121.25	1.120
7-Fs	*Fusarium solani*	positive	35.03	1.123
8-Mu	*Mucor*	positive	283.55	1.125
9-Pe	*Penicillium*	positive	376.70	1.129
10-Rh	*Rhizopus*	positive	36.61	1.125
11-Bs	*Bacillus subtilis*	Negative	0	-
12-Ec	*Escherichia coli*	Negative	0	-
13-Pse	*Pseudomonas aeruginosa*	Negative	0	-
14-Ste	*Staphylococcus aureus*	Negative	0	-

CONCLUSION

The sensitivity and specificity of the present chitin assay makes it a suitable tool for future studies on Invasive fungal infections

REFERENCES

Debono, M. and Gordee, R. S. Antibiotics that inhibit fungal cell wall development. *Annu Rev Microbiol* 48 (1994), 471-497.

Georgopapadakou, N. H., Tkacz, J. S. The fungal cell wall as a drug target. *Trends Microbiol* 3 (1995), 98-104.

Tharanathan, R. N. and Kittur F. S. Chitin - the undisputed biomolecule of great potential. *Crit Rev Food Sci* Nutr 43 (2003), 61-87.

Ride, J. P. & Drysdale, R. B. A rapid method for the chemical estimation of filamentous fungi in plant tissue. *Physiological Plant Pathology* 2 (1972), 7–15.

Jarvis, B. A chemical method for the estimation of mould in tomato products. J. Food Technol. 12 (1977), 581–591.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Biocatalytic Desulfurization of Sour Crude Oil

Bushra Esmail Alkhalili[1]*, Adibah Yahya[2], Norahim Abrahim[3] and Birintha Ganapathy[4]

[1, 2, 3, 4] Department of Biotechnology and Medical Engineering
Faculty of Biosciences and Medical Engineering, University Teknologi Malaysia, Johor, Malaysia.
(E-mail: bushra_alkhaleli@yahoo.com, adibah@fbb.utm.my
norahim@fbb.utm.my, brintha860528@gmail.com)

ABSTRACT

Crude oil is one of the most important types of fossil fuel in the world, it is an economically important commodity and massively used in many industrial activities. Sulfur is reducing the quality of the oil, which translates to lower profit margins and negatively impacts the set air quality standards. polyaromatic sulfur heterocyclies (PASHs) exist in crude oil requires an efficient method to achieve deep desulfurization levels. Recently, biodesulfurization (BDS) is gaining greater attention because it is an environmentally benign bioprocess; the possible benefits of BDS include lower capital and processing costs. Studies have reported that BDS demands less capital in the region operating cost and organic sulfur removal relative to the traditional approach hydrodesulfurization HDS. The establishment of commercial scale biorefining technology will rely on major advancement with respect to less expensive and sufficient production of highly active and stable biocatalysts that can be adapted to the intense conditions encountered in petroleum refining.

Key words: Biodesulfurization, Hydrodesulfurization, Crude oil, Biocatalysts, Biorefining

INTRODUCTION

The existence of sulfur compounds in the final crude oil products has serious impacts on the balanced ecosystem. For example, the pre or post combustion of fuels with sulfur produces sulfur oxides and the emission of SO_2 produces low pH fogs and acid rain (Monticello,2000; Kilbane,1989; Prayuenyong,2001). The occurrence of acid rain leads to the corrosion of historical buildings, affects marine life through the lowering of the pH of water bodies such as rivers and lakes, which in turn is harmful to plants (EPA, 2006; Soleimani et al., 2007). In addition, the high corrosiveness of H_2S implies a high maintenance cost for the oil refineries due to the regular wear and tear of steel pipes, storage tanks, stove containers, compressors, pipelines for transportation and other metallic equipment (FSU, 2010). There are different techniques of desulfurizing sour crude oil in the literature (Khalfalla et al., 2008). However, each technique has its associated advantages and disadvantages (Javadli, 2011). Researchers focused on desulfurization of sour heavy oil have reviewed and evaluated the feasibility of the different desulfurization techniques. For example, the studies by (Liu et al., 2007; Gonsavesh et al., 2013) highlighted the hydrodesulfurization (HDS) as well as the biodesulfurization (BDS) techniques on the desulfurization of sour heavy oil (Liu et al., 2007; Gonsavesh et al., 2013). Other researchers combined HDS, BDS and desulfurization ionic liquids (ILs) techniques as the optimal solution for future refining process (Soleimani et al., 2007); due to the fact that the properties of the sour heavy oil, such as high sulfur content, high viscosity and high boiling point, require unconventional approaches for high performance (Javadli and Klerk, 2012). An in depth discussion of the desulfurization techniques is provided as follows.

MAIN REVIEW

Hydrodesulfurization (HDS) processes

HDS is the most commonly used method in refineries for transforming sulfur into H_2S. The conventional HDS process requires intensive energy usage, costly and ineffective as the ratio of organosulfur compounds (Mohebali and Ball, 2008; Gupta et al., 2005). This technology is widely used in the oil industry and requires extreme industrial conditions such as 200-340ºC temperature and 5 MPa pressure (Egorova, 2003). Consequently, this process under extreme conditions with longer residence time could lead to lower fuel

value of the oil product (Jian, 2003; Egorova, 2003; Folsom, 1999). Nevertheless, while the HDS procedure can be used to remove sulfur compounds such as thiols, sulfides and disulfides, it is not effective in removing (PASHs) (Rashidi et al., 2007; Monticello, 1998; Ma et al., 1994) as shown in Figure 1.

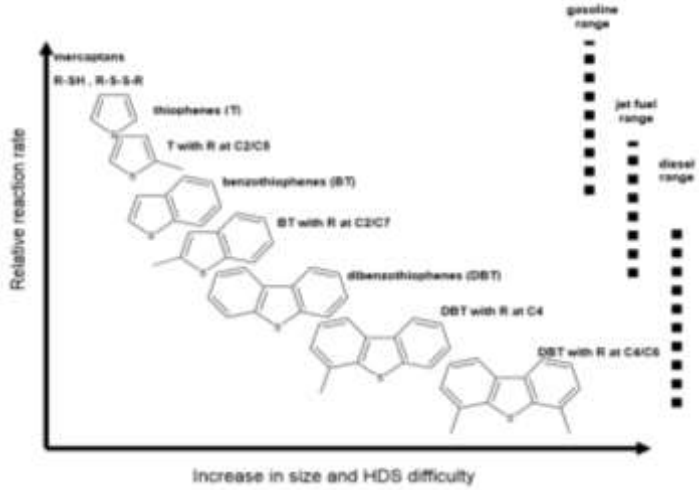


Figure 1: The Inverse relationship between hydrodesulphurisation and structure of organosulphur compounds (Zhao, 2009).

Biodesufurization (BDS) processes

BDS unit is considered as a complementary technology to deep desulfurize all forms of sulfur compounds present in fossil fuels and with numerous advantages (Monticello, 1996;1998; Pacheco, 1999). Biocatalytic desulfurization is a new approach of sulfur elimination in crude oil introduced to replace HDS in order to enhance energy savings. Thus, BDS is carried out at mild temperature, low pressure, and low emission and with safe reaction products (Mohebali and Ball, 2008). Furthermore, the desulfurization process results to a negligible level of undesirable products without lowering the calorific value of the fuel (Soleimani et al., 2007; Etemadifar et al., 2014; Xiaojuan et al., 2008). BDS is also a human-friendly method of sulfur elimination in that it utilizes natural bacteria to metabolize organic sulfur. BDS procedure can be carried out under both aerobic and anaerobic pathways (Rashidi et al., 2007).

Desulfurizing bacteria

Much effort has been made to the concept of bioremoval of organic sulfur from fossil fuels and crude oil without altering their caloric values. On the same basis, several aerobic and anaerobic microorganisms supposed to metabolize sulfur in petroleum, but the challenge shifted towards using microorganisms to remove sulfur selectively without lowering the energy value of the fuels.

Anaerobic biodesulfurization pathway

Sulfate reducing bacteria (SRB) are the first microorganisms employed to extract sulfur from petroleum because anaerobic bacteria are a unique group of microorganisms that use sulfate as a terminal electron receptor (Kurita et al., 1971). SRB were observed to utilize the sulfur in hydrocarbons such as benzothiophenes, dibenzothiophene and dibenzothiophene with substitution and producing H_2S as a final product (Lizama et al., 1995; Kim et al., 1995). Figure 2 shows the anaerobic metabolite of DBT.

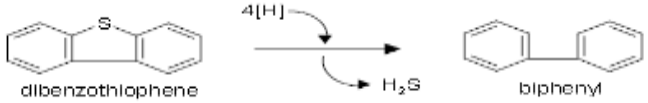


Figure 2: Principle of DBT anaerobic biodesulfurization (Marcelis, 2002)

Aerobic biodesulfurization 4S pathway

The future directions of BDS procedure include the use of aerobic bacteria to remove organosulfur from petroleum without degrading the carbon skeleton (Linguist and Pacheco, 1999; Oldfield et al., 1997). 4S pathways have recently attracted significant research attention for applications involving biodesulfurization ,. Three gene structures namely, is *dszA*, *dszB* and *dszC, which enc*ode the enzyme through four steps to

convert DBT to 2-hydroxyphenyl (2-HBP) and sulfite (Kayser 2002; Denome et al., 1993, 1994; Piddington et al., 1995). The first and second steps involved in the process are converting DBT to DBT-sulfone in two consecutive monooxygenation reactions of DszC through the monooxygenase catalyzing activation of thiophene ring. This is followed by converting DBT-sulfone to HBP sulfinate through a second monooxygenase (DszA gen) through oxidative cleavage of thiophenering (carbon-sulfur bonds). Finally, DszB is desulfinase through the desulfination of HPBS and release of sulfur atoms for producing 2-HBP and sulfite (Ohshiro et *al*., 1994; Konishi et *al*., 2000; Gray et al., 1996; Matsubara et al., 2001; Izumi et al., 2001). Figure 3 shows the steps of the 4S pathway.

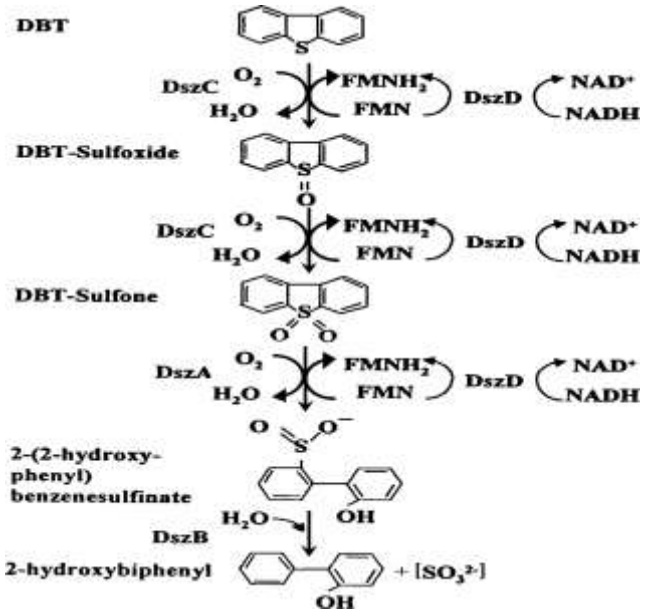


Figure 3: 4S Pathway of microbial Desulfurization Process of DBT to 2HBP and Sulfite (Ma,2010)

CONCLUSION

The advances in biodesulfurization is to find appropriate microorganisms to remove sulfur atoms from polyaromatic heterocyclic compounds, which do not serve as sole carbon and energy sources.

REFERENCES

Gray, K. A., Pogrebinsky O.S., Mrachko GT- Xi- L, Monticello, D.J and Squires C.H. Molecular mechanisms of biocatalytic desulphurisation of fossil fuels. Nat Biotechnol 14 (1996),1705-1709.

Gupta, N., Roychoudhury, P.K. and Deb, J.K. Biotechnology of desulfurization of diesel: prospects and challenges. Appl Microbiol Biotechnol 4(2005), 356-366.

Mohebali, G. and Ball, A.S. Biocatalytic desulfurization (BDS) of petro diesel fuels. Microbiology 154(2008), 2169-2183.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

PSB Quasi-Newton Update and its Global Convergence for Solving Systems of Nonlinear Equations

M. K. Dauda*[1], Mustafa Mamat[2] , Fatma Susilawati Mohamad[3] and M.Y. Waziri [4]

[1, 2,3] Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, Gong Badak, Terengganu, Malaysia.
(E-mail: mkdfika@gmail.com, musmat567@gmail.com,fatma@unisza.edu.my)
[4] Department of Mathematical Science, Bayero University, Kano, Nigeria.
(E-mail: mywaziri.mth@buk.edu.ng)

ABSTRACT

Nonlinear problems mostly emanate from the work of engineers, physicists and mathematicians and many other scientists. A variety of different iterative methods have been developed for solving large scale nonlinear systems of equations. The prominent method for solving such equations is the classical Newton's method, but it has many shortcomings. To overcome such drawbacks, a published article in conference proceedings have been reviewed and established its global convergence using suitable conditions. The method uses PSB (Powell-Symmetric-Broyden) update, and its efficiency has been improved in terms of number of iteration and CPU time, hence the main aim of this paper. The preliminary numerical results show that the proposed method is practically efficient when applied on some benchmark problems.

Keywords: Conjugate Gradient, Quasi-Newton, *PSB*, Nonlinear Equations, Mathematics Subject

INTRODUCTION

Consider the system of nonlinear

$F(x) = 0, x \in R^n$ (1)

Where F: $R^n \rightarrow R^n$ is a nonlinear mapping assumed to satisfy that: (i) There exists an $x^* \in R^n$ such that $F(x^*) = 0$ (ii) F is a continuously differentiable mapping in a neighborhood of x^* of the system and (iii) The Jacobian matrix of F at x given by $J(x) = F'(x)$ is symmetric (Dauda *et al*., 2015). There are many iterative methods for solving (1) which include Newton's method, QuasiNewton's method, Diagonal Broyden-like method etc. but the prominent method for finding the solution of (1) is the classical Newton's method. The Newton method has some shortcomings which includes computation of the Jacobian matrix which may be difficult or even impossible to compute. To overcome such deficiencies, a published article (Mamat *et al.*, 2016) in conference proceedings have been reviewed and improved by establishing its global convergence using suitable conditions. In the proposed method, the approximate Jacobian inverse H_k of PSB (Powell-Symmetric-Broyden) is updated and its efficiency has been improved in terms of number of iteration and CPU time, thereby making the method suitable for solving systems of nonlinear equations, hence the main aim of this paper. When the Jacobian matrix $F'(x^*)$, is nonsingular at a solution of (1) the convergence is guaranteed with a quadratic rate from any initial point x_0 in the neighborhood of x^* (Nocedal and Wright, 2006). Throughout this article, we always assume that the problem (1) is symmetric and can be converted to an equivalent global optimization problem.

$$\min_{x \in R^n} f(x) \quad (2)$$

with function f defined by $f(x) = \frac{1}{2}||F(x)||$ (3)

When $F(x_k)$ is small, then $g(x_k) \approx \nabla f(x_k)$ and in Dolan and More (2002),

$$g_k = \frac{F(x_k + \alpha_k F(x_k)) - F(x_k)}{\alpha_k} \quad (4)$$

Next section presents the derivation of the proposed method. Section 3, presents some numerical results. Section 4 presents the conclusion.

THE MAIN RESULT

By approximating H_k into Identity matrix I, the proposed method i.e. (PSB) update was obtained as follows. The PSB (Powell-Symmetric-Broyden) update comes from the solution of the following problem (Nocedal and Wright, 2006; Mamat *et al.*, 2016):

$min_B\|B - B_k\|F$, s.t. $Bs_k = y_k$,$(B - B_k) = (B - B_k)^T$ (5)

The solution of (5) gives the Hessian update of PSB

$$B_{k+1} = B_k + \frac{(y_k - B_k s_k)s_k^T + s_k(y_k - B_k s_k)^T}{s_k^T s_k} - \frac{s_k^T(y_k - B_k s_k)s_k s_k^T}{(s_k^T s_k)^2} \quad (6)$$

Using Sherman-Morrison-Woodbury, the formula of the inverse hessian approximation H_k for PSB is given by

$$H_{k+1} = H_k + \frac{(s_k - H_k y_k)y_k^T + y_k(s_k - H_k y_k)^T}{y_k^T y_k} - \frac{y_k^T(s_k - H_k y_k)y_k y_k^T}{(y_k^T y_k)^2} \quad (7)$$

H_k is updated at each iteration for $k = 0,1,2,\ldots,$. The updated matrix H_{k+1} is chosen in such a way that it satisfies the secant equation below

$s_k = H_{k+1}y_k$ with $s_k = x_{k+1} - x_k$ and $y_k = F(x_{k+1}) - F(x_k)$ (8)

Now the new direction is obtained via the following

$$d_{k+1} = \begin{cases} F(x_k) \ if \ k = 0 \\ -F(x_{k+1}) - \theta_k F(x_{k+1}) - \delta_k F(x_{k+1}) \ if \ k \geq 1 \end{cases} \quad (9)$$

where $\theta_k = \frac{(s_k - y_k)y_k^T + y_k(s_k - y_k)^T}{y_k^T y_k}$ and $\delta_k = \frac{y_k^T(s_k - y_k)y_k y_k^T}{(y_k^T y_k)^2}$. Finally, the following is the algorithm for the proposed method:

Algorithm 1

Step 1: Given x_o, $\alpha > 0$, $\sigma\epsilon(0,1)$ and $\epsilon > 0$ compute $d_o = -F(x_o)$, set $k = 0$;
Step 2: Compute $F(x_k)$ and test the stopping criterion, i.e. $\|F(x_k)\| \leq \epsilon$, If yes, then stop, otherwise continue with step 3;
Step 3: Compute α_k by using the line search $f(x_k + \alpha_k d_k) - f(x_k) \leq -\sigma_1\|\alpha_k F_k\|^2 - \sigma_2\|\alpha_k d_k\|^2 + \eta_k F(x_k)$;
Step 4: Compute $x_{k+1} = x_k + \alpha_k d_{k;}$;
Step 5: Compute search direction using (9);
Step 6: Set $k = k + 1$ and go to step 2.

NUMERICAL RESULTS

In this section, the numerical results of the implementation of the proposed algorithm (denoted as M1) is presented. The performance of the *M*1 method is compared with that of *M*2 (Waziri and Jamilu, 2015) respectively by solving several benchmark problems with their respective initial points using five (5) different dimensions ranging from 10 to 5000. In addition to numerical solution in Mamat *et al.* (2016), additional numerical solution is presented to ascertain the effectiveness of the proposed method.

P1:

$$F(x) = \begin{pmatrix} 2 & -1 & & & \\ -1 & 2 & -1 & & \\ & \ddots & \ddots & \ddots & \\ & & \ddots & \ddots & -1 \\ & & & -1 & 2 \end{pmatrix} x + (e_1^2 - 1, \ldots, e_n^2 - 1)^T, i = 1,2,3,\ldots,n.$$

P2:

$$F(x) = e_i^2 - 1, \quad i = 1,2,3,\ldots,n.$$

P3:

$$F(x) = \begin{pmatrix} 2 & -1 & & & \\ 0 & 2 & -1 & & \\ & \ddots & \ddots & \ddots & \\ & & \ddots & \ddots & -1 \\ & & & -1 & 2 \end{pmatrix} x + (\sin x_1 - 1, \ldots, \sin x_n - 1)^T, i = 1,2,3,\ldots,n.$$

The comparison of the performance between the methods using the benchmarks problems above was based on the performance profile presented by Dolan and More (2002). The performance profile $P : R \rightarrow [0,1]$ is defined as follows: Let P and S be the set of problems and set of solvers respectively. For n_s solvers and n_p problems, and for each problem $p \in P$ and for each solver $s \in S$, we define $t_{p,s}$:=(number of iterations required to solve problem p by solver s. The performance ratio is given by $r_{p,s} := t_{p,s}/\min\{t_{p,s}\}$. Then the performance profile is defined by

$P(\tau) = \frac{1}{n_p} size\{p \in P: r_{p,s} \leq \tau\}$, for all $\tau \in R$ where $P(\tau)$ is the probability for solver $s \in S$ that a performance ratio $r_{p,s}$ is within a factor $\tau \in R$ of the best possible ratio. The computational experiment is based on number of iterations and CPU time. The code for the proposed method was done using MATLAB 7.1, R2009b programming environment and run on a personal computer 2.4GHz, Intel (R) Core (TM) i7-5500U CPU processor, 4GB RAM memory and on windows XP operator. Both the methods was implemented with the same parameters as $\alpha_1 = 0.01, r = 0.2, \sigma_1 = \sigma_2 = 10^{-4}$, and $\eta_k = \frac{1}{(k+1)^2}$ .The search is stopped if:(i) $\|F(x_k)\| < \epsilon$ with $\epsilon < 10^{-4}$. (ii) The total number of iteration exceeds 1000. The numerical results of the comparison between the proposed method *M*1 and the result in Waziri and Jamilu (2015) are presented in table 1. The meaning of each column in the tables are stated as follows, "*P*" : Benchmark problem, "*ISP*" : Initial starting points, "*n*" : Dimension of the test problems, "*Iter*" : the total number of iterations and "*CPU*" : the CPU time in seconds. Figure 1-2 presents the graphical results of problems 1-3 relative to number of iterations and CPU time respectively. The top curve is the method that performs better in a time that was within a factor τ of the best time.

Table 1: The Numerical Results for M1, and M2 on problems 1 and 3a.

P	ISP	n	M1		M2	
			Iter	CPU	Iter	CPU
1	0.2	10	10	0.020054	16	0.035210
		100	11	0.027556	26	0.059943
		500	14	0.247199	31	0.332710
		1000	15	0.861693	29	0.886335
		5000	13	17.055897	31	17.714645
	0.5	10	19	0.001132	43	0.005636
		100	24	0.006024	33	0.006100
		500	22	0.173295	47	0.019830
		1000	26	0.842423	45	0.022793
		5000	21	15.165427	42	0.076617
2	0.5	10	15	0.000886	34	0.047627
		100	15	0.027561	48	0.092627
		500	15	0.198412	51	0.355818
		1000	15	0.738472	53	1.359412
		5000	15	16.373810	52	24.259263
	0.8	10	19	0.005685	44	0.001750
		100	23	0.003318	28	0.006325
		500	23	0.011314	47	0.222946
		1000	24	0.022132	51	0.904741
		5000	21	0.076411	48	18.286801
3	0.8	10	9	0.003696	7	0.000628
		100	11	0.000487	2	0.002495
		500	12	0.000849	2	0.084208
		1000	13	0.001516	2	0.469173
		5000	13	0.003172	1	9.347748

From Figure 1, the proposed *M*1 methods relative to the number of iteration, performs relatively better. Figure 2 gives the performance of *M*1 methods relative to CPU time which outperforms *M*2, this indicates that *M*1 method achieved the objectives of this article, thus yields the best result.

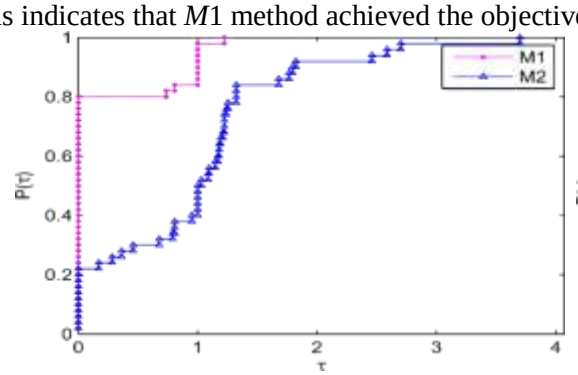


Figure 1: Proposed *M*1 methods

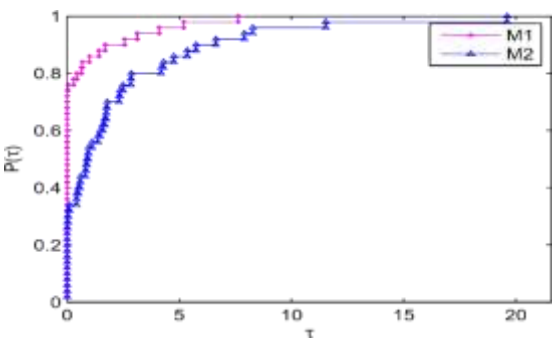


Figure 2: Performance of *M*1 methods

CONCLUSION

In this article, a method for solving nonlinear systems of equations (1) via modification of Powell-Symmetric-Broyden (PSB) update is presented. It is worth noting that $M1$ solves problems effectively, thus the proposed method is particularly suitable for symmetric equations. We have compared the $M1$ method with $M2$ by Waziri and Jamilu (2015) and found that the proposed method is effective in practical computation and superior in many situations and the preliminary numerical results show that the proposed method is substantial and efficient for solving symmetric systems of non-linear Equations (1).

Acknowledgements: The authors would like to thank the administration of Universiti Sultan Zainal Abidin (UniSZA) for funding this research partially under the fundamental research grant Scheme UniSZA/1/2015/SRGS/5.

REFERENCES

Dauda, M.K., Mamat, M., Waziri, M.Y. Ahmad, F. and Mohamad, F.S. Inexact CG-Method via SR1 Update for Solving Systems of Nonlinear Equations, Far East Journal of Mathematical Sciences(FJMS) Volume 100, Issue 11,(2016) Pages 1787-1804.

Dolan, E. and More, J. Benchmarking optimization software with performance profiles, Math. Program. Ser. A, 91 (2002), 201-213.

Li, D. and Fukushima, M. A globally and superlinearly convergent Gauss Newton-based BFGS method for symmetric nonlinear equations. SIAM J. Numer. Anal. 37: (2000)152-172.

Li, S. and Liu, J. Spectral DY Type Projection Method for Nonlinear Monotone Systems of Equations, Journal of Computation of Mathematics, 4(2015) 341-354.

Mamat, M., Dauda, M.K., Waziri, M.Y., Ahmad, F. and Mohamad, F.S. Improved Quasi-Newton method via PSB update for solving systems of nonlinear equations, AIP Conference Proceedings 1782, 030009 (2016); doi:10.1063/1.4966066

Nocedal, J. and Wright, S.J. Numerical Optimization, 2nd ed., Springer, New York, 2006.

Waziri, M.Y. and Jamilu, S. A Derivative-Free Conjugate Gradient Method and Its Global Convergence for Solving Symmetric Nonlinear Equations, International Journal of Mathematics and Mathematical Sciences, (2015) 39: Article ID 961487,10 pages.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

An Overview Of Information Security Governance Frameworks In Cloud Computing

Muhaned AL-hashimi [1*], Marini Othman [2] Hidayah Sulaiman [3], Mohanaad Shakir [4] Waheeb Abdel Rahman Abu-Ulbeh[5]

[1, 2] Department of Basic Science Branch, College of Dentistry, Tikrit University, Iraq
Information Systems Department, College of Information Technology, Universiti Tenaga Nasional, Malaysia
(E-mail: muhaned@tu.edu.iq, marini@uniten.edu.my)
[3] Information Systems Department, College Of Information Technology, Universiti Tenaga Nasional, Malaysia
(E-mail: hidayah@uniten.edu.my)
[4] Department of Information Technology, Al Buraimi University College, Oman
(E-mail: mohanaad@buc.edu.om)
[6] Department of information system, faculty of computing, UTM, Malaysia
(E-mail: wakf.utm@gmail.com)

ABSTRACT

Information security governance framework can help inform agency leaders, information security professionals, and information security governance participants on how to move into cloud environment without excessive information security risk or potential legal and regulatory compliance failures. However, very few sound ISG frameworks exist that can effectively guide most organizations in their ISG endeavors.
Hence, this paper aims to provide an overview on current information security governance frameworks which could guide organizations in evaluating cloud computing frameworks suitable for their use. To achieve the aim, a systematic review was conducted to gain deeper insight on ISG: what is ISG, what constitutes an ISG, and what is the research status for ISG particularly in cloud computing? How is the ISG framework useful to an organizations? How is the suitability (usefulness) evaluated? The review has found that there is need for a framework selection method which can assist organizations in selecting suitable frameworks that meet their business requirement. Following that, it is recommended that further research be undertaken to propose criteria and sub-criteria in an ISG for organizations wanting to adopt cloud computing.
Key words**:** Cloud computing, Information security governance, Governance framework

INTRODUCTION

Although cloud computing creates new opportunities, it also creates new risks. In particular, ensuring the security of information in the cloud to be in compliance with legal, regulatory, and contractual security requirements for cloud consumers, has become a primary task for cloud providers. Hence, to ensure successful adoption and transition of information systems to cloud, the implementation of a strategic proactive information security management and governance framework need to be in place [6].This requires cloud providers and clients to work collaboratively to provide an assurance framework.
Many respected IT organizations and standards setting bodies have established frameworks to identify the "risks and mitigation strategies with the evolving cloud computing paradigm. While no one framework or model encompasses all of the possible IT controls, collectively they cover the "what, how, and scope" of IT Governance with some duplication and overlap. To avoid potential pitfalls of extending governance to the cloud paradigm, organizations should put in place and sustain a practical governance framework to ensure cloud infrastructure and operations are as secure as traditional IT governance approaches [2].
As any other technologies, cloud has also gone through changes in addressing the ever-changing need of its clients. This leads to a need for a suitable assurance framework which deals with the different levels of security and against which the cloud model can be secured [7,12].

This paper provides an overview of information security governance, and on current information security governance frameworks in cloud computing, and the current efforts of evaluating these frameworks. The following subsection explain the method used than, a summary of review is presented followed by some critical analysis of review.

INFORMATION SECURITY GOVERNANCE CLOUD FRAMEWORK

It is important to firstly establish understanding on the two important keywords: Cloud Computing and Information Security Governance.

The research team at the UC Berkeley RAD Lab clarifies the term Cloud Computing as referring to "both the application delivered as services over the Internet and the hardware and systems software in the datacenters that provide those services." And," it is enabled by the construction and operation of extremely large scale commodity-computer datacenters" [8]. In keeping the information secure, mechanisms of monitoring and controlling must be in place. Information security governance (ISG) is an important integral of this mechanism.

The term information security governance (ISG) describes the process of how information security is addressed at an executive level and a part of an organization's overall corporate governance responsibilities. Information security governance is considered to be a facet of an organization's broader corporate governance strategy, which itself commences at board level [13] . Information Security Governance is now accepted as an integral part of good IT and Corporate Governance [14]. Corporate governance is a set of responsibilities and practices exercised by organization board and executive management provide strategic direction, ensure that objectives are achieved, ascertain that risks are managed appropriately and verify that the enterprise's resources are used responsibly [2]. Security governance, as part of the company's corporate governance, is the most suitable path by which to gain control of security processes and guarantee an alignment with business strategies [10].

Information security governance is a subset of organizations' overall (corporate) governance program [11] . Information security governance (ISG) consists of the leadership, organizational structures and processes that safeguard information inside an organization. ISG is the process of developing a framework and supporting management structure and processes to provide assignment of responsibility, all in an effort to manage risk. It also aims to provide assurance that information security strategies are aligned with and support business objectives and consistent with applicable laws and regulations through adherence to policies and internal controls [9].

Information security governance is the mechanism through which organizations can ensure effective management of information security. It is a critical component of a successful transition to the cloud [6]. Moving into the cloud needs to develop a clear governance strategy and management plan by organization [9]. Governance in the cloud requires defining policies and implementing an organizational structure with well-defined roles for the responsibility of information technology management, business processes, and applications as these elements are moved out of the traditional IT environment and into the cloud [2]. Typical governance activities such as goal setting, policy and standard development, defining roles and responsibilities, and managing risks must include special considerations when dealing with cloud technology and its providers [5,10]. Without a sound governance strategy that applies to both the organization and the cloud service provider, organizations risk ineffectiveness, loss of control and potential harm to their reputation from negative legal or regulatory action [17].

ISG cloud framework is process oriented and is based on a set of activities, which provide a structured means of developing a security governance structure supporting a cloud computing service. ISG cloud offers a precise description of activities that should be overtaken to guarantee security governance of the cloud service. ISG cloud's tasks also include numerous references to existing guidance and support of security standards that may be used in order to facilitate its implementation and performance [11] . Typical ISG activities such as goal setting, policy and standard development, the definition of roles and responsibilities and risk management must include special considerations when dealing with cloud technology and its providers [10].

Information security governance framework can help inform agency leaders, information security professionals, and information security governance participants on how to take advantage of the benefits of the cloud computing environment (CCE) without exposing their mission to excessive

information security risk or potential legal and regulatory compliance failures [6] . However, very few sound ISG frameworks exist that can effectively guide most organizations in their ISG endeavors [14].Research by [8] has performed comparative analysis on several ISG frameworks in the light of information technology governance, corporate governance and information security domains. The analysis results showed that although each framework attempts to deal with ISG in a comprehensive manner, some aspects are tackled in more depth than others. Matters such as risk management, strategic alignment or process management are considered in sufficient detail by almost all of the proposals, but other issues such as value delivery through IT or control and accountability are considered less frequently. When transposing these security frameworks for their deployment in cloud computing, the same precautions must be taken. More importantly, the loss of control which is inherent in cloud computing must be compensated for with additional security controls to reduce vulnerability.

IMPORTANT ASPECTS IN ISG CLOUD COMPUTING

The review has noted consistent aspects highlighted by researchers pertaining to governance of security in cloud computing: close attentions to aspects involved during deployment of the cloud; development phases and process; and actual security measures or steps at a given phase or process.

The Pillars

Oscar Rebollo [10] Indicated that frameworks in a cloud computing deployment are supported by three pillars namely:

Policies and Processes Adaptation (PPA)

- Redefining the processes and evaluating security policies according to the cloud paradigm.
- Implementation of new security processes and procedures in order to achieve organization goals.

Control and Audit (CA)

Control these new processes, which run out of the organization's boundaries into the cloud provider. The control and audit criterion embraces the additional security controls that should be established owing to the new cloud relationship. It includes:

- Definition of new security controls
- Security metrics for evaluation information security,
- Performance management by monitoring security strategies and processes
- Provide tools to access Cloud Provider Logs
- Audit and evaluate the services provided by the cloud by monitoring its levels

Service Level Agreements (SLA)

This agreement reflects the commercial relationship between the cloud client and the provider. The SLA is a tool that allows customers to define the security requirements during the provision of the cloud service. Moreover, this agreement should offer a commitment to provide the security services required by the cloud provider. The SLAs should include all the security aspects that the organization wishes to control.

Management Process

Jamie Miller [6] Developed an information security management and governance framework which is based on evolving international standards and planned evolution of the national institute of standards and technology (NIST) risk management framework. The framework includes seven management processes: strategy and planning, policy portfolio management, risk management, awareness and training, communication and outreach, compliance and performance management, and management oversight. The management processes interact in a Plan, Do, Check, Act cycle of continuous improvement to effectively manage and govern enterprise information security.

Life Cycle

Oscar Rebollo [11] Proposed an ISG cloud framework to a real-life case study of a Spanish public organization. The framework includes six stages with different activities as shown in table 1 below:

Table 1. ISG cloud framework stages and activities

Stage	**Security Steps**
Planning/ Strategy Definition	Establish Information Security Governance structure
	Define Information Security Program
Cloud Security Analysis	Define Information Security requirements
	Cost/benefit analysis of available cloud options
	Cloud risk analysis
Cloud Security Design	Define SLAs and legal contracts
	Establish Information Security roles and responsibilities
	Specify cloud service monitoring and auditing
	Define applicable security controls
Cloud Implementation/Migration	Secure cloud implementation
	Educate and train staff
Secure Cloud Operation	Cloud security operation
	Communicate information security inside the organization
Cloud Service Termination	Cloud service termination

An empirical evaluation of the framework proves its validity and demonstrates the usefulness of the framework to the organization. The evaluation focused on cloud service security (if it is covered by the cloud provider's solution), development of a security governance structure (Governance metrics need to be defined in order to evaluate the state of security governance inside the organization after the service deployment), and the practical applicability of ISG cloud framework (is it easy and useful).

ENISA [4] Proposed a governmental cloud security framework based on the Plan-Do-Check-Act (PDCA) cycle. The analysis of literature indicated that main security challenges, requirements and barriers in the governmental cloud are related to: data protection and compliance, interoperability and data portability, identity and access management, auditing, adaptability and availability, as well as risk management and detailed security SLA formalization. Based on the analysis of collected data and some preliminary interviews, a logic model for a security framework for governmental clouds was developed including the specific activities and steps as shown in table 2. The framework is flexible enough to include new requirements. The frame work was applied on governmental cloud use cases in several European countries. The use cases help to define a generic security framework through the analysis of the strategies adopted by selected countries from the security perspective.

Table 2. Overview of the proposed security framework

Lifecycle Phase	**Security Activity**	**Security Steps**
PLAN This phase focuses on setting policies, a strategy for implementing controls to achieve security objectives	Risk Profiling	Identify services to "cloudify"
		Select relevant Security Dimensions
		Evaluate individual impact to dimensions
		Determine global Risk Profile
	Architectural Model	Decide on the deployment-Service Mode
	Security & Privacy requirements	Establish Security Requirements
DO This phase involves implementing and operating the controls, i.e., controls are executed in the DO Phase	Security Controls	Selection of security controls
	Implementation, Deployment & Accreditation	selected security controls Formalization and implementation
		ex ante verification of suitability of Cloud service to provide due level of assurance
		Start service execution

CHECK This phase is focused on review and evaluation of the performance (efficiency and effectiveness) of the system. Tests are performed to ensure that controls are operating as intended and meet objective	Log/Monitoring	Periodically check that security controls are in place and being followed
	Audit	Verification that the defined / contracted levels of security are fulfilled
ACT This phase involves remediation of deficiencies or gaps identified in the CHECK Phase. Changes are made where necessary to bring the system back to the planned performance	Changes Management	Implementation of remedies and improvement to the security framework / approach
	Exit Management	Contract termination, return of data to customer and data deletion

CURRENT INFORMATION SECURITY GOVERNANCE FRAMEWORKS

Several cloud computing information security governance (CCISG) frameworks have been proposed by researchers, agencies and associations. A summary of existing such frameworks are introduced in Table 3.

Table 3. Existing CCISG Frameworks

CCISG Frameworks			
Authors/Year	**Outcome**	**Brief description**	**Evaluation criteria**
The European Network and Information Security Agency (ENISA) (2009)	information assurance framework	(ENISA) has published a guide which assesses the security risks and benefits of using Cloud Computing, and provides security guidance for potential and existing users. This guide reviews technical and legal risks, along with policy and organizational issues. These risks are used as a starting point for introducing an information assurance framework, which is based on the controls from the ISO 27000 family.	The study evaluates set of assurance criteria which are based on the controls from the ISO 27000 family.
Jericho Forum (2009)	Cloud Cube Model	The model's objective is to assist in determining which cloud formation is best suited to the business' needs, along with enabling secure operation through the chosen option. The Jericho Forum's model proposes the development of a Collaboration Oriented Architecture (COA) to assure secure business in de-parameterized environments. The COA framework includes a set of guidelines with which to guarantee secure interaction between users and end systems located in different security domains.	The Jericho Forum has identified 4 criteria to differentiate cloud formations from each other and the manner of their provision.
Tim Mather, Subra Kumaraswamy and Shahed Latif (2009)	Cloud Security and Privacy	The authors address issues that affect any organization preparing to use cloud computing as an option. They propose an introductory view to a variety of security issues related to Cloud Computing, so that users can be confident of dealing with the most important concerns.	The authors highlight a set of criteria dedicated to ISG issues such as Managing identity, Defining service requirements, Monitoring service levels, and providing assurance in internal controls, managing incident response, or Developing a business continuity program, audit and compliance functions.
The Cloud Security Alliance (CSA) (2009)	Security Guidance for Critical Areas of Focus in Cloud Computing	CSA has published guidelines on different security issues related to Cloud Computing. The guide has a section which deals with Governing in the Cloud, whose second domain is dedicated to Governance and Enterprise Risk Management. The proposed guidelines are not compulsory and may not all be applicable to every cloud deployment, but help to identify threats in the cloud context and to choose the best options by which to mitigate vulnerabilities.	The authors identify a set of criteria in two domain governance and operations. The governance domains are broad and address strategic and policy issues within a cloud environment, while the operational domains focus on more tactical security concerns and implementation within the architecture.
Klaus Julisch and Michael Hall (2010)	Security and Control in the Cloud	Authors propose expanding the concept of an Information Security Management System (ISMS) from ISO/IEC 27001 to virtual ISMS. An ISM includes the set of processes and policies used by an organization to implement, operate and monitor information security. The Plan-Do-Check-Act (PDCA) cycle is adapted to the virtual ISMS. They analyze public cloud's SLAs and conclude that they tend to protect cloud providers with small penalties in comparison to the risk that is transferred.	The authors adopt the iterative PDCA cycle to define, implement and review the organization's internal processes. Continuous iterations are used to refine the processes in order to achieve their control objectives.
The Information	IT Control	The (ISACA has recently published [ISACA	The publication Identify the related

Systems Audit and Control Association (ISACA) (2011)	Objectives for Cloud Computing	(2011)] with the purpose of providing an understanding of Cloud Computing and identifying its related risks. This framework deals with governance, security and assurance aspects separately.	risks, controls and frameworks that can be used as a criteria to address challenges and maximize value in the cloud.
Nia Ramadianti Putri ,Medard Charles Mganga (2011)	framework that is suitable to identify information security metrics	The overall aim of this study is to identify Service Level Agreement (SLA) based information security metrics cloud computing using the COBIT framework. The author identified 41 SLA based information security metrics to aid both cloud providers and customers obtain common security performance expectations and goals	The author identify threats and security attributes applicable in cloud computing. He also selects a framework suitable for identifying information security metrics. Moreover,He identifies SLA based information security metrics in the cloud in line with the COBIT framework.
Oscar Rebollo, Daniel Mellado and Eduardo Fernández-Medina (2012)	comparative framework	This paper presents a systematic literature review whose objective is to seek existing Information Security Governance frameworks that may assist companies in defining a clear governance strategy with regard to the security of its information assets.	The author analyzed the frameworks and provided a set of comparative criteria that consider the particularities of Cloud Computing when dealing with security governance issues.
ENISA, 2015	Security Framework for Governmental Clouds	A governmental cloud security framework based on the Plan-Do-Check-Act (PDCA) cycle. The framework is flexible enough to include new requirements.	The security framework has been empirically validated through four Gov Cloud case studies: Estonia, Greece, Spain and UK.

Table 3 revealed encouraging results in the area of evaluating an Information Security governance framework and criteria that have been specifically designed for the Cloud Computing environment. However, considerable work is still needed to specify a proper selection method of a suitable and optimal CCISG framework. The task of selecting CCISG framework has become more complex and difficult among the available frameworks. This difficulty is exacerbated due to lack of technical knowledge and experience of decision makers; and continuous improvements in information technology in various environments.

EVALUATION OF INFORMATION SECURITY GOVERNANCE CLOUD FRAMEWORK

Most cloud users of a private or a public cloud have certain expectations for their data security. Moreover, the owner and operator of a cloud share responsibility for ensuring that security measures are in place, and the standards and procedures are followed. A good starting point to measure the presence and effectiveness of the cloud security includes having a list of required or recommended security controls. Measuring the presence and/or effectiveness of security controls (against security requirements) is largely what security evaluations are intended to do. Security evaluations have broad value as guidance for planning or developing security and for verifying that required controls are properly implemented. But evaluations also have utility for procurement of cloud services; for instance, a CSP may choose to publish the high-level results of a third party security evaluation. Several efforts have been conducted to offer guidance for cloud security as shown in table 4 [16].

Table 4. Efforts for evaluating cloud computing

Committee	Efforts
Cloud Security Alliance (CSA)	- Cloud Controls Matrix (CCM) - Consensus Assessments Initiative Questionnaire - Security Guidance for Critical Areas of Focus in Cloud Computing V2.1 - Guidance for Identity & Access Management V2.1 - Cloud Audit
European Network and Information Security Agency Leading	Cloud Computing: Information Assurance Framework
	Cloud Computing: Benefits, Risks and Recommendations for Information Security
The Federal CIO Council's	Security Assessment and Authorization for U.S. Government Cloud Computing.
The Trusted Computing Group (TCG)	Trusted Multi-Tenant Infrastructure Work Group, which aim to develop a security

	framework for cloud computing
The Information Systems Audit and Control Association (ISACA)	Provide a framework to understand Cloud Computing and identifying its related risks. the framework deals with governance, security and assurance aspects

The proposed guidelines are not compulsory and may not all be applicable to every cloud deployment, but help to identify threats in the cloud context and to choose the best options by which to mitigate vulnerabilities [1].

All of these efforts are relatively are intended to serve as a starting point for more formal work toward a common framework for cloud security as much of the previous cloud computing world has not adopted security evaluation frameworks. The intent of developing a cloud security evaluation checklist is to have a uniform means to verify the security of a cloud and also to obtain assurance from a CSP about their security. One application for the checklist is that a cloud owner can use it to guide a security evaluation of their cloud. If cloud providers use such a checklist as a framework to report on the security of their clouds, then prospective tenants and users could compare the relative security of multiple clouds [3,16].

[9] conductive a comparative review to analyzes existing information security frameworks that have been specifically designed for the cloud computing environment. This comparison is performed using the eleven security control clauses from the ISO/IEC 27002 standard as evaluation criteria. Some other criteria are also introduced to evaluate cloud particular conditions such as the alignment between client IT security policies and cloud provider implementation, and liability, which reflects the relationship of responsibility between the cloud customer, the provider and applicable laws. Analysis results show that cloud specific criteria and those that gather traditional security issues, which are usually related to a technical point of view, are widely taken into account in the proposals studied. Of these criteria, the following can be highlighted: access control, communications and operations management, physical and environmental security, and compliance. However, aspects related to organizational management are less frequently considered. These are security policy, asset management and human resources security.

DISCUSSION

Organizations need to redefine their processes and re-evaluate security policies when moving to cloud computing. Therefore, organizations should have the ability to control these new processes, which run into the cloud out of the organization boundaries. It has been indicated that policies and processes, control and audit (CA), and service level agreement represent the most relevant criteria for differentiating ISG frameworks in a cloud computing deployment. However, the frameworks differ in their criteria, which impede the proper framework selection process. For example some of them provide guidelines and others provide recommendations or checklists, while some provide sub criteria procedure, tool, metrics or policy. Moreover some frameworks focus on policy and others on audit and control or SLA. Generally, each framework attempts to deal with ISG in a comprehensive manner even they focus on specific issues more than others. However, almost frameworks consider adequately issues such as risk management, strategic alignment or process management with less consideration on control and accountability. Furthermore, all the frameworks lack to a framework selection method, which can help organizations to select the suitable framework that meets their requirements.

CONCLUSION

Encouraging results have been achieved in the area of evaluating information security governance frameworks and defining criteria that have been specifically designed for the cloud computing environment. However, selecting suitable and optimal CCISG framework

has become more complex and difficult among the available frameworks. This difficulty is exacerbated due to lack of technical knowledge and experience of decision makers; and continuous improvements in information technology in various environments. In general, there is a needed to specify a proper selection method of a proper and efficient CCISG framework.

REFERENCES

Alliance, C. S. (2009). *Security Guidance for Critical Areas of Focus in Cloud Computing V2.1*. Cloud Security Alliance.

Bailey, J. D. (2014). IT Controls and Governance in Cloud Computing . *AMCIS Proceedings forthcoming* (hlm. 20). Savanah: Twentieth Americas Conference on Information Systems.

Daniele Catteddu, G. H. (2009). Cloud computing risk assessment. *European Network and Information Security Agency (ENISA)*, 583-592.

ENISA. (2015). *Security Framework for Governmental Clouds.* . European Union Agency for Network and Information Security.

ISACA. (2011). *IT Control Objectives for Cloud Computing: Controls and Assurance in the Cloud.* United States of America: ISACA.

Jamie Miller, L. C. (2009). *Information Security Governance-Government Considerations for the Cloud Computing Environment.* Booz Allen Hamilton.

Kevin, S. (2009). Security in a virtualized world. *Network Security* , 15-18.

Michael Armbrust, A. F. (2009). *Above the Clouds : A Berkeley View of Cloud Computing.* Berkeley Technical Report No. UCB/EECS-2009-28.

Oscar Rebollo, D. M.-M. (2011). Comparative Analysis of Information Security Governance Frameworks: A Public Sector Approach. *ECEG -Proceedings of the 11th European Conference on EGovernment: ECEG2011* (hlm. 482 - 490). Slovenia: Academic Publishing Limited Reading UK.

Oscar Rebollo, D. M.-M. (2012). A Systematic Review of Information Security Governance Frameworks in the Cloud Computing Environment . *Journal of Universal Computer Science,*, vol. 18, no. 6, 798-815.

Oscar Rebollo, D. M.-M. (2015). Empirical evaluation of a cloud computing information security governance framework. *Information and Software Technology*, 58,44–57.

Rossouw von Solms, S. (. (2006). Information Security Governance: A model based on the Direct–Control Cycle. *computers & security* , 25, 408–412.

S. Subashini, V. K. (2011). A survey on security issues in service delivery models of cloud computing. *Network and Computer Applications*, 1-11.

Shaun Posthumus, R. v. (2004). A framework for the governance of information security. *Computers & Security / Elsevier*, 23, 638 , 646.

Solms, S. (. (2005). Information Security Governance - Compliance management vs operational management. *Computers & Security* , 24, 443,447.

Winkler, V. (. (2011). *Securing the Cloud: Cloud computer Security techniques and tactics.* Elsevier Inc. .

Young, E. A. (2012). *Ready for takeoff: Preparing for your journey into the cloud.* EYGM Limited.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Radiological Effects Due to Natural Radioactivity in Soil of Kelantan, Malaysia

Nuraddeen Nasiru Garba*[1], Ahmad Termizi Ramli[2] and Muneer Aziz Saleh[3]

[1]Department of Physics, Ahmadu Bello University, Zaria, Nigeria.
(nngarba@abu.edu.ng,nurangetso@yahoo.com)
[2]Department of Physics, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor, Malaysia.
(termizi@dfiz2.fs.utm.my)
[3]Nuclear Engineering Programme, Faculty of Chemical Engineering and Energy, Universiti Teknologi Malaysia, 81310 Johor, Malaysia. (mouneersaleh@yahoo.com)

ABSTRACT

Radiological effects due to external and internal exposure to natural radiation associated with the natural radionuclides ^{226}Ra, ^{232}Th, and ^{40}K in soil of Kelantan, Malaysia was assessed. The mean TGRD was found to be 209 nGy h^{-1} and from soil samples analyzed, the mean activity concentrations of ^{226}Ra, ^{232}Th, and ^{40}K was found to be mean of 82 Bq kg^{-1}, 123 Bq kg^{-1} and 643 Bq kg^{-1} respectively, which were both about 3 times higher than the Malaysian average as reported by UNSCEAR 2000. The mean radium equivalent (Ra_{eq}), absorbed dose rates (D), annual effective dose (H), annual gonadal dose equivalent (AGDE) as well as external and internal radiation hazard index (Hex) which were the indicators of radiological health hazards were found to be 307 Bq kg^{-1}, 139 nGy h^{-1}, 0.22 mSv y^{-1}, 969.422 µSv y^{-1}, 0.653 and 1.05 respectively.
Key words: Radioactivity, Gamma spectrometry, AGDE, Effective dose, Kelantan

INTRODUCTION

Assessment of radiation exposure to the population depends primarily on the Natural radioactivity levels in the environment. There are two prominent sources of external radiation exposure to the population namely; cosmic rays and terrestrial gamma rays. Terrestrial gamma rays are essentially due to radionuclides belonging to ^{238}U and ^{232}Th series and ^{40}K present in the earth's crust (Garba et al., 2016; Murty and Karunakara, 2008).

Kelantan is known to be rich with a variety of minerals deposits, which contribute enormously to the economic progress of the state and Malaysia at large. However, increase in illegal mining activities can degrade the environment and thus enhanced the background radioactivity levels of the area therefore affecting the population in the surrounding environment. Therefore, this study been a pioneer has research reported the TGRD value and ^{226}Ra, ^{232}Th and ^{40}K concentrations in soil samples collected throughout Kelantan state, Malaysia based on geological formations and soil types as well as associated potential health implications.

MATERIALS AND METHODS

Sample collection

About 2kg soil samples were collected from thirty six different locations throughout the study area. Samples were taken from the upper depth layer soil of about 10 - 15 cm within a marked cleared area of about (50×50) cm in diameter that is away from roads, trees, buildings and any other source of obstruction and mixed thoroughly in order to obtain a true representative sample of that area, sampling locations were recorded with a global positioning system (GPS).

Sample Preparation

In the laboratory, the samples were cleared of stones and pebbles and then oven dried at a temperature of about 110 ^{0}C for 24 hours. The dried samples were crushed and ground to a fine powder and pass through a 400 µm and 250 µm mesh sieved to homogenized, the homogenized samples were then weighted and packed into a standard 500 mL Marinelli beakers and stored for about thirty days to attain secular equilibrium between radium and its progeny.

Sample Analysis

After attaining secular equilibrium, the sealed samples were counted using a coaxial high purity germanium (HPGe) detector (GC2018-7500 SL) manufactured by Canberra with a relative efficiency of 20 % relative to a 7.62 cm × 7.62 cm NaI (Tl) detector and a resolution of 1.8 keV for the 1332 keV gamma ray emission of ^{60}Co. Genie 2000 (VI.3) software from Canberra. The activity of ^{226}Ra was determined based on gamma ray emissions of ^{214}Pb (352 keV) and ^{214}Bi (609), ^{232}Th was determined based on the emissions of ^{208}Tl (583.1 keV) and ^{228}Ac (911.2 keV) and that of ^{40}K was determined directly from its emission energy of 1461.8 keV. The concentrations of ^{226}Ra and ^{232}Th were calculated from the weighted mean activity values determined for various emissions. IAEA Soil 6 was used for quality control and assurance energy calibration was carried out using a point source whereas the efficiency calibration was done using a 500 mL multi-nuclide standard solution of: ^{60}Co (1173 and1332 keV) , ^{241}Am (59.54keV), ^{137}Cs (661.62 keV).

An empty Marinelli beaker was counted to strip the background from the samples. The value of Minimum Detectable Activity (MDA) was 13.23 Bq kg^{-1} for ^{40}K, 1.00 Bq kg^{-1} for ^{226}Ra and 1.69 Bq kg^{-1} for ^{232}Th for a counting time of 21600 s (IAEA, 1989; IAEA, 2003b; Saleh et al., 2013b). The activity of ^{226}Ra was determined based on gamma ray emissions of ^{214}Pb (295.21 and 352 keV) and ^{214}Bi (609 and 1120.29 keV), ^{232}Th was determined based on the emissions of ^{212}Pb (238.6 keV), ^{208}Tl (583.1 keV) and ^{228}Ac (911.2 keV) and that of ^{40}K was determined from the emission at 1461.8 keV. The concentrations of ^{226}Ra and ^{232}Th were calculated from the weighted mean activity values determined for various emissions. Quality control and assurance was carried out using IAEA S-14, IAEA S-16 and Soil 6.

RESULTS AND DISCUSSION

The results of radioactivity measurements in soil are presented in Table 1., presents the specific activity concentrations of ^{226}Ra, ^{232}Th and ^{40}K in soil samples of each of the ten district of Kelantan State with a mean of 82 ± 3 Bq kg^{-1}, 123 ± 4 Bq kg^{-1} and 643± 64 Bq kg^{-1} respectively. UNSCEAR (2000 reported the average concentrations of ^{226}Ra, ^{232}Th and ^{40}K in Malaysia as 66 Bq kg^{-1} (range from 49 Bq kg^{-1} to 86 Bq kg^{-1}); 82 Bq kg^{-1} (range from 63 Bq kg^{-1} to 110 Bq kg^{-1}); and 310 Bq kg^{-1} (range from 170 Bq kg^{-1} to 430 Bq kg^{-1}), respectively.
The ^{226}Ra concentration varied in the range 15 - 219 Bq kg^{-1} with a mean of 82.3 Bq kg^{-1}, ^{232}Th in the range 12 – 351 Bq kg^{-1} with a mean of 123 Bq kg^{-1} and ^{40}K in the range 33 – 1660 Bq kg^{-1} with a mean of 643 Bq kg^{-1} which were both about 3 times each the mean and range values reported for Malaysia (UNSCEAR, 2000).

Table 4 above presents the specific activity concentrations of ^{226}Ra, ^{232}Th and ^{40}K in soil samples of each of the ten district of Kelantan State with a mean of 82 ± 3 Bq kg^{-1}, 123 ± 4 Bq kg^{-1} and 643± 64 Bq kg^{-1} respectively. UNSCEAR (2000 reported the average concentrations of ^{226}Ra, ^{232}Th and ^{40}K in Malaysia as 66 Bq kg^{-1} (range from 49 Bq kg^{-1} to 86 Bq kg^{-1}); 82 Bq kg^{-1} (range from 63 Bq kg^{-1} to 110 Bq kg^{-1}); and 310 Bq kg^{-1} (range from 170 Bq kg^{-1} to 430 Bq kg^{-1}), respectively.
The ^{226}Ra concentration varied in the range 15 - 219 Bq kg^{-1} with a mean of 82.3 Bq kg^{-1}, ^{232}Th in the range 12 – 351 Bq kg^{-1} with a mean of 123 Bq kg^{-1} and ^{40}K in the range 33 – 1660 Bq kg^{-1} with a mean of 643 Bq kg^{-1} which were both about 3 times each the mean and range values reported for Malaysia (UNSCEAR, 2000).

Table 4. The activity concentrations of ^{226}Ra, ^{232}Th and ^{40}K in soil samples for each District in Kelantan State**.**

District	^{40}K (Bq kg^{-1})		^{226}Ra (Bq kg^{-1})		^{232}Th (Bq kg^{-1})	
	Mean	Range	Mean	Range	Mean	range
Bachok	710 ± 71	710 - 710	96 ± 3	96 - 96	124 ± 5	124 - 124
Gua musang	798 ± 80	356 - 1114	101 ± 3	28 - 214	152 ± 5	24 - 282
Jeli	761 ± 76	249 - 1112	86 ± 3	39 - 201	201 ± 7	46 - 328
Kota bharu	1175 ± 115	689 - 1660	65 ± 2	33 - 96	45 ± 2	40 - 50
Kuala krai	442 ± 45	213 - 611	90 ± 3	15 - 219	125 ± 5	19 - 351
Machang	701 ± 69	614 - 787	90 ± 2	43 - 136	74 ± 2	52 - 95
Pasir mas	346 ± 34	346 - 346	110 ± 3	110- 110	138 ± 4	138 - 138
Pasir puteh	358 ± 37	33 - 836	104 ± 4	41 - 146	113 ± 4	12 - 169
Tanah merah	572 ± 57	144 - 1146	57 ± 2	16 - 110	92 ± 3	14 - 216
Tumpat	637 ± 64	389 - 884	28 ± 1	22 - 34	38 ± 2	38 - 38
Kelantan State	**643 ± 64**	**33 - 1660**	**82 ± 3**	**15 - 219**	**123 ± 4**	**12 - 351**

CONCLUSION

This study assessed the radiological health effects associated with natural radioactivity in Kelantan state, Malaysia. The mean activity concentrations of ^{226}Ra, ^{232}Th, and ^{40}K was found to be mean of 82 Bq kg^{-1}, 123 Bq kg^{-1} and 643 Bq kg^{-1} respectively, which were both higher than the Malaysian and World averages as reported by UNSCEAR (UNSCEAR, 2000).

Acknowledgment:

This project is funded by the Atomic Licensing Board (AELB) of Malaysia, Ministry of Science, Technology and Innovation, Malaysia under project title: PEMETAAN ISODOS SINARAN GAMA DATARAN, SEMENANJUANG MALAYSIA space and Universiti Teknologi Malaysia (UTM) for support and funding under UTM Research University Grant; QJ130000.2526.03H67.

REFERENCES

Al-Hamarneh IF, Awadallah MI. Soil radioactivity levels and radiation hazard assessment in the highlands of northern Jordan. Radiation Measurements 2009; 44: 102-110.

Amrani D, Tahtat M. Natural radioactivity in Algerian building materials. Applied Radiation and Isotopes 2001; 54: 687-689.

Arafa W. Specific activity and hazards of granite samples collected from the Eastern Desert of Egypt. Journal of environmental radioactivity 2004; 75: 315-327.

Beretka J, Mathew P. Natural radioactivity of Australian building materials, industrial wastes and by-products. Health physics 1985; 48: 87-95.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 - 18 May 2017

Impact of Green Building on Values of Commercial Properties in Abuja

Alhassan Abdullahi Ahmed

Department of Estate Management, Federal Polytechnic PMB 01 Nasarawa, Nigeria
aaahmednas@gmail.com

ABSTRACT

The Nigerian government began consultations on a draft national policy on climate change in 2010 as with an average of 5½% of the country's population directly affected by the negative impact, a figure sure to exponentially rise given widespread devastation caused by climate change. Through a comparative review of literature gather from 2008 to 2018, the research infers that the quests for green buildings among developers and professionals in the building industry have risen. Although, most green rating are more focus on commercial building, similar buildings in Abuja Nigeria are not left out, as owners of new buildings as clamoring for their building to be rated green while existing one are gearing towards retrofit to attain green. A building is green when it helps reduce the footprint it leaves on the natural environment or impact and on the health of its inhabitants. On the one hand green buildings are 2% - 4% expensive than their conventional counterpart; but study of the total cost of buildings through their life cycle, shows that green building have a better ROI. This would definitely add values to commercial buildings in Abuja; as part of the initial benefits for green buildings design and built in Abuja include; tax and levy reduction and incentive to ease construction process. This is part of what green buildings around the world enjoy.

Keywords: Abuja, Commercial Properties, Green Building, Values,

INTRODUCTION

Buildings are the largest energy consumers and greenhouse gases emitters and against the backdrop of rapid urbanisation and unreliable power supply, more efforts are needed to legislate the minimum performance of buildings, and to advocate for them to be built in as sustainable a manner as possible. Buildings should be built to at least to contribute less carbon emission (Solid Green Consulting, 2018).-The practice of increasing the efficiency with which buildings and considering the complete building life cycle of a particular building can add value to a building or buildings design with green in mind. The economic benefits include reduced operating costs, optimizing life cycle economic performance, improved occupant productivity, and expanding markets for green products and services as well as long term return of investment (ROI). The value of commercial properties will certainly be impacted as apart from the long term ROI the buildings are environmental friendly to we as human and our immediate environment.

BACKGROUND

Definition of Sustainability and Sustainable Development

Sustainable development requires not just new techniques but new ways of thinking about social, economic and environmental goals and how to achieve them. Warburton 1998, Sustainability as postulated in Germany "requires the inextricable linkage of ecology, economy and social security. Sustainable development requires that improvements in economic and social living conditions accord with the long-term process of securing the natural foundations of life (G1). In other parts of the world, these are many ways individuals are improving the energy efficiency in home. In the context of green buildings, life cycle assessment evaluates building materials over the course of their entire lives and takes into account a full range of environmental impacts, including a material's embodied energy, the solid waste generated in its extraction, use, and disposal the air and water pollution associated with it and its global-warming potential, Cullen (2011)

Awareness and Evolution of Green Buildings

The environmental impacts of buildings are huge. Conventional buildings or non-green building use large amounts of energy, land, water, and raw materials for their construction, demolition and operation. They are responsible for large greenhouse gas (GHG) emissions as well as emissions of other harmful air pollutants. They also generate large amounts of construction and demolition (C&D) waste and have serious impacts on plants, habitats and wildlife. The two most common sources of energy for buildings are purchased electricity and direct consumption of natural gas and petroleum for electricity and cooking. Electricity consumes for approximately 78% of total building energy consumption and largely contributes to greenhouse gas emissions. Dalibi, et al (2017) identified ten hindrances to GB developments in the Nigeria's Built Environment, out of which: The Perception of GB as Expensive Concept is the major Hindrance to GB developments; which ranked 1 followed by In-availability of local GB materials another important point in their research findings is lack of locally or a single unified/standard GB assessment system. Although among the building professional there is increase of awareness as seen in Waniko, 2012 findings Figure 1.

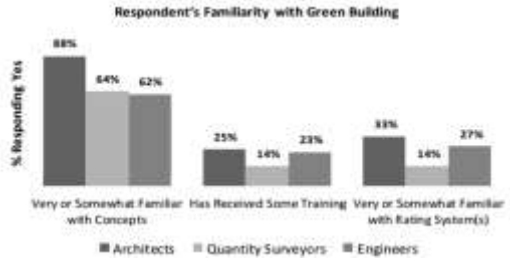


Figure 1: Perceptions of selection of Professional Body's Green Building Activity (Source: Waniko 2012)

Values and Cost of Green Buildings compare to Commercial Properties in Abuja

Various researches carried out for energy consumption in many sectors, the building sector contributes as much as one third of greenhouse gas emissions, primarily through the use of fossil fuels during their operational phase, both in developed and developing countries. A building is green when it helps reduce the footprint it leaves on the natural environment or impact and on the health of its inhabitants. On the one hand green buildings are 2% - 4% expensive than their conventional counterpart; but a careful study of the total cost of buildings through their life cycle, shows that green building have a better ROI. This would definitely add values to commercial buildings in Abuja.

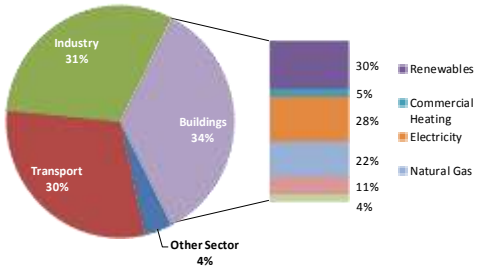


Figure 2: Final Energy Consumption by Sector and Buildings Energy Mix, 2010 (Source: IEA, 201

METHOD

This research uses a comparative analysis from literature gather from the inception of green buildings (2008 to 2018) with regards to awareness and practice of green building in Abuja Nigeria. Although, Nigeria is yet to be at the forefront of climate change policy forum at regional and international levels despite the alarming effect of changing climate on the lives and livelihoods across the country (Dodo, Adetunji & Abubakar, 2013). Architecture is responsible for about 45% of the carbon dioxide (greenhouse gas) emissions in the United Kingdom (International Energy Agency [IEA], 2013). Figure 2, further explain how energy is been consume by various sector. It shows building with 34% consumption rate.

RESULT & DISCUSSION

Principles of sustainability shows that there are various social and environmental factors that greatly influence the green buildings, above all is the economic aspect which this paper focus on. There is significant potential for the use of renewable energy all throughout Africa but before this happens, buildings should be built to at least to contribute less carbon emission (Solid Green Consulting, 2018).-The practice of increasing the efficiency with which buildings and considering the complete building life cycle of a particular building can add value to a building or Buildings design with green in mind. The Eeconomic benefits include reduced operating costs, optimizing life cycle economic performance, improved occupant productivity, and expanding markets for green products and services as well as long term return of investment (ROI). The value of commercial properties will certainly be impacted as apart from the long term ROI the buildings are environmental friendly to we as human and our immediate environment.

CONCLUSION

Sustainability is a concept which try to solve problem ranging from; Social, Environment and Economy in scenario which are peculiar to the scenario in question. On the one hand, green buildings are 2% - 4% more expensive than their conventional counterpart; but study of the total cost of buildings through their life cycle, show that green building have a better ROI. This would definitely add values to commercial buildings in Abuja; as part of the initial benefits for green buildings design and built in Abuja include; tax and levy reduction and incentive to ease construction process. This is part of what green buildings around the world enjoy. On the other hand to achieve the aim of sustainability, the three components of sustainability need to be implemented; Awareness, Policy pull and Technology, these components are the drivers of sustainability.

Acknowledgement

This research would not have been possible without the Federal Polytechnic Nasarawa Management, for given me the opportunity to carry out this study; assisting both morally and financially.

REFERENCE

Dodo Y. A., Adetunji, A. B., and Abubakar, S. K. (2013). Potentials for Stabilizing Emission of Carbon Dioxide in the Building Sector. Journal of Science and Multidisciplinary Research, vol. 5, no. 2, pp. 192 – 198

Howe, C. J. (2011) Overview of Green Buildings retrieved on 20th, June 2017 available at https://sallan.org/pdf-docs/CHOWE_GreenBuildLaw.pdf

International Energy Agency (IEA) (2013). Transition to Sustainable Buildings: Strategies and Opportunities to 2050. Report from July 2013.

Dalibi S. G. *et al* 2017 Hindrances to Green Building Developments in Nigeria's Built Environment: "The Project Professionals' Perspectives" IOP Conf. Ser.: Earth Environ. Sci. 63 012033

Waniko D. P. (2012) Green Building in Nigeria Emerging Opportunities for the Quantity Surveying Profession retrieved on 20th July 2015 from https://www.academia.edu/12181314/Green_Building_in_Nigeria

Warburton, D., (1998), Community and Sustainable Development: Participation in the Future, United Kingdom, Earthscan Publications Limited

Universiti Teknologi Malaysia 17 -18 May 2017

Study on Screening, Optimization, Partial Purification and Characterization of Protease from Marine Algae

[1]Sani, I and [2]Salisu, B. S

[1]Department of Plant Biology, Faculty of Life Sciences, Bayero University, Kano.

[2]Department of Sci. and Tech. Education, Faculty of Education, Bayero University, Kano.

saibmuk@gmail.com,sibrahim.bot@buk.edu.ng

ABSTRACT

Study on screening, optimization, production, partially purification and characterization of protease from marine algae were carried out. The enzyme was extracted using 10% Tris-Hcl buffer (pH 7.4). Totally, 2 species of marine algae showing protease activity were screened (*Chodrococcus hornemanii* and *Enteromorpha compressa*). Among the two one species, the best one (green brownish algae) was selected based on the zone of gelatin hydrolysis. Preliminary plate assay was carried out using casein, gelatin and skimmed milk medium and based on the zone formation due to protease hydrolysis, gelatin was selected because it shows better zone of inhibition. Protein estimation using Bradford method was carried out and enzyme assay was estimated spectrophotometrically. Optimization of concentration at (5 mM, 10 mM, 20 mM and 50 mM), temperature at (-14^{O} C, 37^{O} C, 45^{O} C and 55^{O} C) and pH at (7.2, 7.4, 7.6 and 7.8) were carried out to identify their effects on the enzyme activity. SDS-PAGE was also carried out to characterize the protein, and the molecular size of the protein was found to be 45kDa, bands were observed and compared with the standard BSA run alongside.

Keywords: Protease, Algae, Dialysis, Hydrolysis, Protein

Introduction:

Enzymes are macromolecular biological catalyst. They are responsible for thousands of metabolic processes that sustain life (Smith, 1997, Grisham et al., 1999). In 1833, payen and Persoz achieved alcohol precipitation of thermolabile „diastase" from malt, in 1890s, Fisher suggested the „Lock and Key" model for enzyme action, in1898,Declaux suggested nomenclature for the enzymes with substrate plus suffix „ase", in 1906, Harden and Young studied coenzymes

AIM:

The study aimed at Production and Partial Purification of Protease Enzyme from Marine Algae.

OBJECTIVES:

- To produce Protease enzyme from marine actinobacteria.
- To partially purify the protease enzyme

MATERIALS AND METHODS:

It includes the following:

- Collection of sample
- Processing of sample:
- Extraction of Enzyme:
- Protein estimation (Bradford method)
- . Quantitative assay for protease:

MAIN RESULTS

Table 1: Zone of inhibition of qualitative screening of the enzyme

Concentration (µg/ml	Zone of inhibition (cm)
250	0.3
500	0.2
750	0.3
1000	0.5
Control (250)	0.0

Table2 : Effect of different concentrations on enzyme activity

Concentration (mM)	OD at 595	Enzyme activity (EU/ml)
5	0.067	0.071
10	0.151	0.160
20	0.076	0.081
50	0.060	0.064

Table 3: Effect of different pH values on enzyme activity

pH	OD at 595	Enzyme activity (EU/ml)
7.2	0.048	0.051
7.4	0.151	0.160
7.6	0.053	0.056
7.8	0.057	0.060

Primary screening for protease producing algae was done on three different media (Gelatin, Casein and Skimmed milk), based on the zone formation due to protease hydrolysis, gelatin was selected because it shows the zone of inhibition, whereas, casein and skimmed milk do not show the zone of inhibition. Totally, 2 species of marine algae showing protease activitywere screened (*Chodrococcus hornemanii* and *Enteromorpha compressa*). Among the two, a best (*Enteromorpha compressa*) wasselected based on the zone of gelatin hydrolysis (plate 1 and 2).

From table 1 above, the enzyme shows zones of inhibition at different concentrations with 1000 µg/ml having the highest zone of inhibition. This is due to increase in enzyme concentration

increases the rate of the reaction also, because there are more enzyme molecules (and so more active sites)(Preetha, 2010).

Ammonium precipitation was carried out at 70% saturation. The protein content was also estimated. There was increase in the protein content after the precipitation as a result of increase in the salt concentration. This result is in accordance with the findings of Swapnil and Jeyanthi (2014) in their work "Isolation and Characterization of Protease from Marine Algae" and Swapnil and Jeyanthi (2014) in their work "Comparative Study on Methods of Extraction of Protease from Marine Algae

REFERENCES

Prakash, S. L., 2005. Biotechnology. 2nd ed. MJP Publishers, Chennai, India. Pp 157-161

Bold, H. C and M. J. Wayne, 1985. Introduction to the algae: Structure and Reproduction,2nd ed., New Jersey, Prentice-Hall, Inc., USA, Pp. 720.

Guidry, M., 2009. Seaweed site, seaweed web site, National University of Ireland, Galway, URL: http://www.seaweed.ie/algae/seaweeds.html.

Lobban, S. C andJ. P. Harrison, 1994.Seaweed Ecology and Physiology, Cambridge University Press, London. Pp 386.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Solid-State Synthesis, Characterization and Antimicrobial Studies of Ni (II), Co (II) and Cu (II) Complexes 1-(4-Nitrophenyl)imino]methyl)naphthalen-2-ol.

Muhammad M. and[*1] Kurawa, M.A[2]

1. Department of Science and Technology Education, Bayero University Kano, 700241, Gwarzo Road, Kano-Nigeria

2. Department of Pure and Industrial Chemistry. Bayero University Kano, 700241, Kabuga, Kano-Nigeria.

(mmuhammad.ste@buk.edu.ng , makurawa.chm@buk.edu.ng)

ABSTRACT

Ni (II), Co (II) and Cu (II) Metal complexes of 1-(4-nitrophenyl)imino]methyl)naphthalen-2-ol have been synthesized. The complexes were synthesized by grinding in an agate mortar with pestle. The complexes have been characterized by FT-IR, decomposition temperature, solubility test, magnetic susceptibility and conductivity measurement. The IR spectra of the free ligand showed a band at 1629cm^{-1} which is assigned to the stretching vibration of the azomethine. The down shifts of this band to lower frequencies in the spectra of the metal (II) complexes indicate complexation. The job's method of continuous variation suggested a 1:2 metal-ligand ratio in both the Ni (II), Co (II) and Cu (II) complexes. The lower conductivity measurement values (43, 34 and 29 $Ohm^{-1}cm^2mol^{-1}$) revealed the non electrolytic nature of the complexes. The Schiff base and its complexes have been tested for antimicrobial activity against bacterial isolates (*Staphylococcus aureus and Escherichia coli*) and fungal isolates (*Mucor sp and Aspergillus flavus*). All the complexes exhibited appreciable activity on all the isolates.

Key words*:* Solid-state, Metal Complexes, 2-Hydroxy-1-napthaldehyde, Antimicrobial, Schiff base

INTRODUCTION

In recent years, solid-state synthesis has possibly gained more attraction because these reactions are sometimes more convenient than using solvent-based synthesis, cost effective and can reduce environmental contamination (Garay *et al*., 2007). The mechanochemical reaction promises to be an essential facet of "Green Chemistry" and is of high interest from both the economical and synthetic point of view. Solvent-free reactions possess some advantages over traditional reactions in organic solvents, for example they do not only reduce the burden of organic solvent disposal, but also enhance the rate of many inorganic reactions. For example, Solid state synthesis of $[CuCl_4][4,4'\text{-}H_2bipy]$ and $[CuCl_2 4,4'\text{-bipy}]$ was reported when $CuCl_2.5H_2O$ was ground with $[(4,4'\text{-}H_2bipy)Cl_2]$ and $CuCO_3$ with $[(4,4'\text{-}H_2bipy)\ Cl_2]$ respectively.

The aim of this paper is to synthesize, characterize and study antimicrobial activities of metal (II) complexes of Schiff base derived from 4-nitroaniline and 2-hydroxy-1-napthaldehyde by solid-state method which is now less time consuming, environmentally friendly, low cost and high yield.

MATERIALS AND METHOD

Materials

All reagents are of analar grade purchased from Sigma-Aldrich and used without further purification. All the glassware used in this work were washed with detergent and rinsed with distilled water and dried in an oven at 110^0C. All weighing were carried out using an electric weighing balance AB54 model. The antimicrobial screening was carried out in the microbiology laboratory, Bayero University, Kano. Nigeria.

Methods

Synthesis of the ligand

A measured quantity of 2-hydroxy-1-napthaldehyde and 4-nitroaniline were grounded in an agate mortar with pestle for some minutes, which formed a crystalline powdered on further grinding and was dried at 50 ºC as adopted from Kurawa, 2009.

Synthesis of the Metal complexes

The metal (II) complexes of Co (II), Ni (II) and Cu (II) chloride salts were synthesized by grinding measured quantity of each of the metal salts and the Schiff base in an agate mortar with pestle for 2-5 minutes which gives crystalline powdered on further grinding and was dried at 50 ºC as adopted from Kurawa, 2009.

The synthesized schiff base and metal (II) complexes were characterized by FT-IR, decomposition temperature, solubility test, magnetic susceptibility and conductivity measurement and were tested against some bacterial and fungal isolates.

RESULTS

Table 1 Physico-chemical characterization of the Schiff base and Metal (II) Complexes

Compound	Colour	Yield (%)	Melting Point ^{0}C	Decomposition Temperature ^{0}C
Ligand	Orange		121	_____
[NiL]	Dark Red	86.60	_____	194
[CoL]	Dark Red	90.01	_____	205
[CuL]	Dark brown	89.11	_____	184

L= 1-{[(4-nitrophenyl)imino]methyl}naphthalen-2-ol

CONCLUSION

- Metal (II) complexes of Co (II),Ni (II) and Cu (II) have been synthesized by solid-state synthesis which is now environmentally friendly and gives a higher yield.

- The ligand was bidentate coordinating through the nitrogen of the azomethine (-C=N-) and deprotonated oxygen.
- The complexes were found to have a high decomposition temperature.
- The complexes are insoluble in most common organic solvent but readily soluble in dimethylsulfoxide (DMSO) and chloroform Except Cu (II) complex which is slightly soluble in choroform.
- Both the ligand and its complexes were tested against some bacterial isolates (*Escherichia coli* and *staphylococcus aureus)* and fungal isolates (*Mucor sp and Aspergillus flavus*)

REFERENCE

Aliyu H.N. and Sani U. (2010); Synthesis and characterization of Cobalt (II) complexes with Schiff base derived from 2-Hydroxy-1-napthaldehyde and some aliphatic Diamines and their Antibacterial and Antufungal Activities, *International Journal of Pharmaceutical and Applied Sciences,1(3), 20-24.*

Kaupp, G.S. Schmeyers, J. and Boy, J. (2003); Solid-State molecular synthesis; Complete Reaction without Auxiliaries Based on the new Solid-state Mechanism. *Chemosphere 43-55*.

Kurawa, M.A. (2009), Solid-state synthesis of crystalline metal salts and coordination networks.Ph.D Thesis, University of Bristol. Pp 8-12, 34-77.

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Attaining Sustainable Development Goals Through Mass Housing

Alhassan Abdullahi Ahmed

Department of Estate Management, Federal Polytechnic PMB 01 Nasarawa, Nigeria
aaahmednas@gmail.com

ABSTRACT

Governments in the third world have been content with improving the built environment by purely technical methods primarily aimed at securing a high volume of construction without particular regard to cultural and social factors. Their housing programs have been determined, not by a thorough analysis of real housing needs, but by the meager financial resources at their disposal and by the productive capacity of their construction industries. Sustainable Development can thus be defined as the evolving or transformation of the environment in a way that promotes a healthy and better way of life, both socially and economically, while the environment is still protected and nurtured, and in this process, not compromising the quality of life for future generations. This paper thus employs a critical literature review on the current trend on sustainability and mass housing in order to seek the possibility on how mass housing could help in addressing the 17 Sustainable Development Goals by the United Nations. There are various social and environmental factors that greatly influence both crime and sustainability. These are Poverty; Equity and ownership; Quality of the environment, and Access to Infrastructure, facilities and services**.** Sustainability is a concept which brings together a housing environment which solves most of the problems faced by mass housing developments. In conclusion, this paper was able to identify how mass housing can enhance the attainment of some of 17 global goals set by the United Nations; through a proposed framework. The proposed framework would be subject to validation for adoption in a further study.

Keywords: Attainment; Sustainable Development Goals; Mass Housing

INTRODUCTION

In other developed countries, such as the United States of America, France, Germany and Italy, such policy changes have also occurred over a period of time, all in the process of finding solutions which can best resolve the problem of housing and mass housing in these countries (Wynn, 1984; Alao, 2009 and Hassan, 2012). Today we see examples of Sustainable Housing Developments such as the BedZED zero energy development, located in Wallington, England, The Cube House in Rotterdam – a mixed-use development providing 24hrs use, the Cittaslow towns in England, Norway, Wales, Poland, Germany, Italy, etc. On the other hand, developing countries are at present going through the same process Which the developed countries passed through, with little or no precautions to ensure that same mistakes are made. Governments in the third world have been content with improving the built environment by purely technical methods primarily aimed at securing a high volume of construction without particular regard to cultural and social factors. Their housing programs have been determined, not by a thorough analysis of real housing needs, but by the meager financial resources at their disposal and by the productive capacity of their construction industries (Alao, 2009).

BACKGROUND

Definition of Sustainability and Sustainable Development

Sustainable development requires not just new techniques but new ways of thinking about social, economic and environmental goals and how to achieve them. Warburton 1998, Sustainability as postulated in Germany "requires the inextricable linkage of ecology, economy and social security. Sustainable development requires that improvements in economic and social living conditions accord with the long-term process of securing the natural foundations of life (G1). Plessis & Holm, (1999) stated that the central tenet behind sustainable development is to achieve harmony and balance between humankind and nature in such a way that it also allows equitable social and economic systems. According to the International Conference on Conservation and Development (1986), Sustainable Development is defined as:

- Integration of conservation and development;
- Satisfaction of basic human needs;
- Achievement of equity and social justice;
- Provision of social self-determination and cultural diversity;
- Maintenance of ecological integrity.

Oktay & Hoskara, (2003) in their findings infer that; Sustainable Development can thus be defined as the evolving or transformation of the environment in a way that promotes a healthy and better way of life, both socially and economically, while the environment is still protected and nurtured, and in this process, not compromising the quality of life for future generations

Sustainable development goals

The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by the United Nations. The broad goals are interrelated though each has its own targets to achieve. ... The SDGs are also known as "Transforming our World: the 2030 Agenda for Sustainable Development" or 2030 Agenda in short**.** The goals were developed to replace the Millennium Development Goals (MDGs) which ended in 2015. Unlike the MDGs, the SDG framework does not distinguish between "developed" and "developing" nations. Instead, the goals apply to all countries. Paragraph 54 of United Nations General Assembly Resolution A/RES/70/1 of 25 September 2015 contains the goals and targets United Nations (2015) The UN-led process involved its 193 Member States and global civil society. The resolution is a broad intergovernmental agreement that acts as the Post-2015 Development Agenda. The SDGs build on the principles agreed upon in Resolution A/RES/66/288, entitled "The Future We Want". This was a non-binding document released as a result of Rio+20 Conference held in 2012 United Nations (2012).

Figure 1: A diagram listing the 17 Sustainable Development Goals Source: United Nations (2015)

METHOD

Review of literature

Besides, the importance of the connectivity between environmental, economic and social issues has not yet been realized and decision makers still treat these issues separately, Doratli, Hoskara & Pulhan (2003). There is again the problem of lack of implemented housing policies in developing countries. This paper thus employs a critical literature review on the current trend on sustainability and mass housing in order to seek the possibility on how mass housing could help in addressing the 17 Sustainable Development Goals by the United Nations. The broad goals are interrelated though each has its own targets as mass housing from another perspective can conveniently transforming our world as set by the UN 'the 2030 Agenda for Sustainable Development'.

RESULT

From the principles of sustainability there are various social and environmental factors that greatly influence both crime and sustainability these are: *poverty; equity and ownership; quality of the environment, and access to infrastructure, facilities and services***.**

Poverty: Poverty is faced with physical and social marginalization and therefore little opportunity for self-improvement, many poor people turn to crime as both a survival mechanism and an entrepreneurial opportunity. Poverty, whatever its causes, is one of the great stumbling blocks to sustainable development. It impacts on the environment, the economy and the society. While poverty is mainly an issue that requires socio-economic solutions, the built environment can contribute to sustaining poverty levels.

Equity and Ownership: Ownership addresses the principles of equity and self-determination that underlie sustainable development, and, through fostering territoriality, influence crime patterns and the willingness of people to intervene in a potential crime situation. Newman (1972) saw the issue of territoriality as one of the key principles for crime prevention through environmental design. To him, there are four elements which make space defensible through design:

Quality of the Environment: The quality of one's environment can be negatively influenced by a variety of factors such as pollution of the air and water, badly maintained sanitary services, litter, overcrowding and hostile or bad quality buildings.

Access to infrastructure, Facilities and Services: The poor are excluded from economic activities and educational facilities due to their geographical position on the city periphery. Community facilities like libraries, clinics, daycare, schools and recreational facilities, if they do exist, are often inadequate and offer inferior service. Separating the poor from the rich in artificially striated communities heightens social disparities and incites negative, rather than positive interactions.

CONCLUSION

Sustainability is a concept which brings together a housing environment which solves most of the problems faced by mass housing developments. The city had the economic and social opportunity, but overcrowded housing and an appalling physical environment. The countryside offered open fields and fresh air, but there all-too-few jobs and very little social life; and, paradoxically, if anything housing conditions for the average worker were just as bad. Mass housing could be used to enhance achieving some out of the seventeen (17) Sustainable Development Goals by the United Nations.

Acknowledgement

This research would not have been possible without the Federal Polytechnic Nasarawa Management, for given me the opportunity to carry out this study; assisting both morally and financially.

REFERENCE

Alao, D. A. (2009), A Review of Mass Housing in Abuja, Nigeria: Problems and Possible Solutions towards Sustainable Housing, Unpublished Master's Thesis submitted to Eastern Mediterranean University Gazimağusa, North Cyprus

Doratli, N., Hoskara, S. & Pulhan, H., (2003), "Questioning the Quality of Life in the City of Gazimagusa (North Cyprus)", International Conference on - Quality of Urban Life: Policy versus Practice,

Istanbul 2003, Organized by Istanbul Technical University Urban and Environmental Planning and Research Center

Gonduan, C. K., (Sept. 2002), "Housing Indigenous People in Appropriate Social and Cultural Responsive Housing in Urban Societies", World Congress on Housing: Housing Construction – An Interdisciplinary Task, Vol. 1, 2002, Portugal, University of Coimbra, Department of Civil Engineering, Pages 533 – 541

Gottdiener, M., Hutchison, R. (1994), The New Urban Sociology – 2

Hardoy, J. E., Cairncross, S. & Satterthwaite, D. (1990), The Poor Die Young: Housing and Health in Third World Cities, London, Earthscan Publications Limited.

Hassan, G. F. (2012), The Enabling Approach for Housing Supply Drawbacks & Prerequisites – Egyptian Experiences, Alexandria Engineering Journal 50, 421–429

Khan, A., (1988), "Housing Development and Culture", the Architecture of Housing: Exploring Architecture in Islamic Countries, 1988, Switzerland, Aga Khan Award for Architecture, Pages 8 – 13

Massoudi, A. & Simonian, W., (1978), "The Problem of Housing in Developing Countries", Housing Problems in Developing Countries: Proceedings of IAHS International Conference, 1978, Malta, Interprint Ltd, Pages 50 – 56.

Newman, O. (1972), Defensible Space: Crime Prevention through Urban Design, London, Macmillan. http://www.sed.manchester.ac.uk/architecture/research/radicalisation/documents/newman-1972.pdf

ICSESS2017
3rd International Conference of Science, Engineering and Social Sciences
Universiti Teknologi Malaysia 17 -18 May 2017

Production and Partial Purification of Amylase Enzyme from Marine Actinobacteria.

Salisu Bello Sadau[1]
[1]Department of Science and Technology Education
Bayero University, Kano-Nigeria.
(EMAIL:sbsadau.ste@buk.edu.ng,sadausalisu@gmail.com)

ABSTRACT

The marine environment represents largely untapped source for isolation of new microorganisms. Gram positive actinobacteria are of special interest, since they are known to produce enzymes with wide range of biological activities. This research work aimed at the production of amylase enzyme from marine actionbacteria and partial purification of the enzyme. Among the isolates maximum amylase activities were exhibited by 5th strain which was determined by DNS (3, 5-dinitrosalicylic acid) Assay method. It is confirm that the protein content and enzymatic activity increases with increase in enzyme purification.
Key words: Actinobacteria,Amylase Enzyme , Production and Purification

INTRODUCTION

The marine biosphere is one of the richest habitats of microorganisms. The oceans cover around 70% of the earth's surface and present themselves as an unexplored area of opportunity **.**Marine microorganisms are increasingly becoming an important source in the production of medical and industrially important enzymes. Considering the fact that marine environment is saline in nature. It could provide rare and unique microbial products, particularly enzymes that could be safely used for human therapeutic purpose (Dhevagi and Porani, 2006).

AIM:

The study aimed at Production and Partial Purification of Amylase Enzyme from Marine actinobacteria.

OBJECTIVES:

- To produce amylase enzyme from marine actinobacteria.
- To partially purify the amylase enzyme

MATERIALS AND METHODS:

It includes the following:

- Screening for amylase production
- Partial purification:Ammonium precipitation and Dialysis

MAIN RESULTS

Screening for amylase production:

The actinobacteria strains were tested on 1% starch and a clear zone around the colony was measured in centimeter after application of iodine solution and incubated for 5 minutes . 5th strain have the highest zone when compared with other strains.

TABLE 1: Inhibition Zone

Strain no	Inhibition Zone (cm)
SBS 1	1.8
SBS 2	0.6
SBS 3	-
SBS 4	1.8
SBS 5	3
SBS 6	-
SBS 7	-
SBS 8	2.5

TABLE 2: Enzyme activity

STRAIN	**CONCENTRATION(µl)**	**ACTIVITY (EU/ml)**
SBS5	100	1.77
CONTROL	0	0.11

PARTIAL PURIFICATION

Precipitation:

Ammonium precipitation was carried using ammonium sulphate salt. The protein content of the partially purified samples after ammonium sulphate precipitation was also estimated as shown in Table 3 .

Dialysis

The sample was dialyzed in order to remove excess salt and other small impurities which could pass through the dialysis membrane leaving the protein behind. The activity of the enzyme as well as the protein content were also estimated as shown in Table 3 below.

TABLE 3: Effect of purification on enzyme activity

Sample	**Protein estimation (mg/ml)**	**Enzyme assay (U/ml)**
Crude sample	1.26	1.88
Precipitated sample	2.31	4.75
Dialyzed sample	3.36	5.23

CONCLUSION

The amylase was produced and purified .it was revealed that the protein content and enzyme activity increseses with the purification.

Acknowledgment:

The authors would like to express his appreciation to Bayero University Kano for the support of the sponsorship, Dr. Ali Idris and Dr. Suwaiba Said Ahmad for their moral support and encouragement.

REFERENCES

Ajita, S. and P. Thirupathihalli (2014). "α-Amylase Production and Applications: A Review." *Journal of Applied & Environmental Microbiology*, 2(4):166-175.

Ashraf, H., Iqbal, J., and Qadeer, M. A. (2003). "Production of alpha amylase by Bacillus licheniformis using an economical medium". *Bioresource Technology*, *87* (1):57- 61

Das.SP.,and Khan.S.,(2008).Characterization and identification of marine actinomycetes existing systems, complexities and future directions Natl acad Sci lett. 31(5): 149-160

Dhevagi, P.and Poorani, E. (2006). Isolation and characterization of *L asparaginase* from marine actinomycetes. *Indian Journal of Biotechnology* 5: 514-520.

I AM UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Organisers

UTM

UTM INTERNATIONAL

UTM International Student Centre

Collaborators

ISI
INSTITUT SULTAN ISKANDAR

UTM School of Postgraduate Studies

UTM Faculty of Computing

Sponsor

BLUESCOPE LYSAGHT

ISBN 998-978-58482-3-5

9 989785848235