

ISSN 2073-7122

IJCRB

Vol. 4, No. 6
October 2012

Interdisciplinary Journal of Contemporary Research in Business

Double Blind Peer Reviewed Journal

Indexed/Abstracted in

DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

www.ijcrb.walis.com
ijrbjournal@alm.com

Indexed in ABI/INFORM

ABI/INFORM® ProQuest
USA, American Business Information

Monthly Edition
Copyright © 2012
IJCRB

Indexed in APA-PsycINFO

AMERICAN PSYCHOLOGICAL ASSOCIATION
PsycINFO

Listed in Journal Seek

Journal Seek

Included in

GOOGLE SCHOLAR

Indexed in

EBSCO Research Databases
HOST

Indexed in CABELL PUBLISHING

CABELL PUBLISHING

Listed in ULRICH'S

ULRICH'S PERIODICALS DIRECTORY

Institute of Interdisciplinary Business Research- IIBR
INTERNATIONAL RESEARCH CENTRE

Editorial Board

IJCRB is a peer reviewed Journal and IJCRB Editorial Board consists of Phd doctors from all over the world including USA, UK, South Africa, Canada, European and Asian countries.

Prof. Renee Pistone

Harvard University, Lifetime Fellow - Harvard URI.
706 McCormick Dr Toms River, New Jersey USA
Voice: 732.668.4533

Lord David K

Oxford University, St Catherine's College, Oxford, OX1 3UJ www.steatz.ox.ac.uk/,
www.ox.ac.uk/ Phone: +44 1865 271700, Fax: +44 1865 271768

Dr. Kenan Peker

Department of Agricultural Economics, University of Selcuk, <http://www.selcuk.edu.tr/>
University of Selcuk, 42079 Konya, Turkey, Tel: 90-332-231-2877

Dr. A. Sathiyasusuman

Senior Lecturer, Dept. of Statistics, University of the Western Cape, South Africa

Dr Mahdi Salehi

Assistant Professor, Accounting and Management Department, <http://www.znu.ac.ir/>
Zanjan University, D.N 1 Nagilo Alley, Hidaj City, Zanjan Province, Zanjan, Iran,
Tel: 98-9121-425-323

Dr Heryanto

Regional Development Bank of West Sumatra
Jalan Pemuda No. 21 PO Box 111 Padang 25117 West Sumatra Indonesia
Tel: +62-8126771699

Dr. Dave Hinkes

Assistant Professor of Managment & Marketing
Sam Walton Fellow, Lincoln Memorial University, Harrogate, TN, UK
Tel 423.869.6441

Dr. Francis A. Ikeokwu

Sr. Ph.D., MAC, MBA, CFC
Adjunct Professor, American Intercontinental University <http://www.aiuniv.edu/>

Dr Charles C. Dull

Sr. MBA, Ph.D.
American Intercontinental University <http://www.aiuniv.edu/>

Contents

Title	Page
THE INTERACTIVE EFFECTS OF LEADER-MEMBER EXCHANGE AND THE FEEDBACK ENVIRONMENT: A POTENT COMBINATION...FOR SOME DAMIAN J. LONSDALE (Click Here or on Title of paper for Full paper view)	16
THE FATORS INFLUENCED CONSUMERS' ATTITUDE TOWARD PORK TRACEABILITY ZHIJING ZHAO XIUMIN WU (Click Here or on Title of paper for Full paper view)	32
EVALUATION ON FARMER'S ENGAGEMENT IN PUBLICLY FUNDED TRAINING IN MINORITY NATIONALITY REGIONS OF SOUTH-WESTERN CHINA YURONG ZHU JINXIU YANG (Click Here or on Title of paper for Full paper view)	42
A STUDY ON THE DISPARITY OF FARMER TRAINING BETWEEN SUPPLY AND DEMAND IN THE MINORITY NATIONALITY REGIONS OF SOUTH-WESTERN CHINA YURONG ZHU JINXIU YANG (Click Here or on Title of paper for Full paper view)	49
SPIRITUALITY IN CORPORATE SOCIAL RESPONSIBILITY: A PROPOSED SOLUTION TO THE "FAILED SYSTEM" PROBLEM RAYMOND D. SMITH DANIEL P. SINGER. (Click Here or on Title of paper for Full paper view)	58
HUMAN RESOURCE DISCLOSURE: THE CURRENT PRACTICE AND ITS ASSOCIATION WITH CORPORATE CHARACTERISTICS IN MALAYSIA LEE MIIN HUUI MSB SIDDIQ (Click Here or on Title of paper for Full paper view)	68
EXAMINATION THE ABILITY OF EARNING AND CASH FLOW IN PREDICTING FUTURE CASH FLOWS MAHMOOD MOEINADDIN SAEID SAEIDA ARDAKANI FATEMEH AKHOONDZADEH (Click Here or on Title of paper for Full paper view)	94
CHALLENGES OF CUSTOMER DEALING IN COMMERCIAL BANKS OF PAKISTAN JAVED AHMED CHANDIO RAFIA MALLAH (Click Here or on Title of paper for Full paper view)	102

Title	Page
THE FACTORS THAT AFFECT SHARES' RETURN IN AMMAN STOCK MARKET LAITH AKRAM MUFLIH AL – QUDAH (Click Here or on Title of paper for Full paper view)	1219
SMS: SHORT MESSAGE SERVICE OR SHARP MUTATING SERVICE (A REFLECTIVE STUDY ON ENGLISH LANGUAGE USERS) DR. MUBASHER NADEEM, DR.MUHAMMAD NAEEM MOHSIN, DR.M.SHABBIR ALI (Click Here or on Title of paper for Full paper view)	1232
EMPIRICAL INVESTIGATION OF THE EFFECT OF RELATIONSHIP MARKETING ON BANKS' CUSTOMER LOYALTY IN NIGERIA AMINU, S. A. (Click Here or on Title of paper for Full paper view)	1249
* FAILURE AND COLLAPSE OF BUILDINGS IN NIGERIA: THE ROLE OF PROFESSIONALS AND OTHER PARTICIPANTS IN THE BUILDING INDUSTRY. AYUBA PHILIP, OLAGUNJU, REMI EBENEZER AND AKANDE, OLUFEMI KEHINDE (Click Here or on Title of paper for Full paper view)	1267
PREDICTIVE MODELLING FOR SUSTAINABLE RESIDENTIAL BUILDING MAINTENANCE IN DEVELOPING COUNTRIES: A NIGERIA CASE OLAGUNJU, REMI EBENEZER (Click Here or on Title of paper for Full paper view)	1273
EVALUATING THE EFFECTS OF ORGANIZATIONAL STRUCTURE ON THE EFFECTIVE DELIVERY OF CIVIL ENGINEERING PROJECTS E.C. UBANI (Click Here or on Title of paper for Full paper view)	1284
APPLICATION OF ASSEMBLY LINE BALANCING HEURISTICS TO DESIGNING PRODUCT LAYOUT IN MOTOR MANUFACTURING OPERATIONS E.C. UBANI (Click Here or on Title of paper for Full paper view)	1297
EFFECT OF ECONOMIC MELTDOWN ON BANKS FUNDING OF DEVELOPMENT PROJECTS IN NIGERIA OKOROCHA, K.A. ECHEME, I.I, ONUOHA, I.J (Click Here or on Title of paper for Full paper view)	1308
THE IMPACT OF GOVERNMENT EXPENDITURES ON ECONOMIC GROWTH IN JORDAN IBRAHEM MOHAMED AL BATAINEH (Click Here or on Title of paper for Full paper view)	1320
THE IMPACT OF ECONOMIC FACTORS ON INTRAREGIONAL TRADE BETWEEN JORDAN AND SYRIA "1995-2009" IBRAHEM MOHAMAD AL BATAINAH (Click Here or on Title of paper for Full paper view)	1339

Note: To view Full paper (Click on title of paper), if click button don't work/appear then please press (Ctrl) Button on key board and then click.

FAILURE AND COLLAPSE OF BUILDINGS IN NIGERIA: THE ROLE OF PROFESSIONALS AND OTHER PARTICIPANTS IN THE BUILDING INDUSTRY.

Ayuba Philip¹, Olagunju, Remi Ebenezer¹ and Akande, Olufemi Kehinde²

1. Department of Architecture, Federal University Technology, Minna, Nigeria
2. Architecture Programme, Abubakar Tafawa Balewa University, Bauchi, Nigeria

* Postal address of the corresponding author: P.O. Box 2563, Minna, Niger State, Nigeria.

Abstract

The activities of unskilled craftsmen in the building industry have really smeared the image of the building profession in the recent past. The incessant cases of collapse of buildings in some parts of the country have resulted in the loss of lives, property and left many people injured. Quite a number of factors are responsible for collapse of high-rise, reinforced concrete buildings in Nigeria. Government, professional bodies and people are asking countless questions as to who should be responsible and how solutions could be proffered. This paper therefore, intends to highlight causes of collapse of high-rise buildings in Nigeria, the roles of professionals and other participants play in the industry in terms of the use of building materials, placement and curing of concrete, modification in the use of a building, collapse of building induced by fire and other causes. The paper concludes by suggesting possible measures to be taken by government and other regulatory bodies in the building industry to avert this.

Keywords: Building, Collapse, Failure, Fire, Professionals

1. Introduction

The need to provide shelter to man and his daily activities has always been an utmost priority. Buildings are constructed to serve as shelter for man, his properties and other activities therefore; they must be properly planned, designed and erected to obtain desired satisfaction from environment. However, recent events in Nigeria in places like Abuja, Lagos, Port Harcourt, Enugu, Aba, and other places in the country have seen these buildings as a growing cause of death, loss of property and left many people injured.

A nation's development is usually measured by the strength of the building and construction sector of its economy; as such this building industry must be properly monitored. The factors to be observed in building industry should include adequate stability to prevent its failure or discomfort to the users, durability, resistance to weather, fire outbreak and other forms of accidents. As new materials are being constantly discovered, so also is the style of building construction changing in the building industry. According to Arayela, & Adam, (2001) the selecting of materials, components and structures that will meet the expected building standards and aesthetic value is paramount. But if there is a non-occurrence, non-performance, breaking down, ill sickness and unsuccessful things or attempt in the building exhibiting any of the above characteristics, failure can be said to have occurred which can lead to building collapse. Quite a number of factors are responsible for this incessant collapse of buildings in Nigeria. It is the position of this paper to discuss the possible causes of collapse of buildings and attempt suggestions and recommendations to avert this trend.

2. Building failure

Building failure according to Chapman, (2000) is defined as an act of omission or occurrence or performance. Failure could also be defined as non-occurrence, non-performance, running short, breaking down, ill success, in solvency, and unsuccessful attempt Arayela, & Adam, (2001). Failure in construction can be seen as negative

consequences arising from risk action(s) resulting in obstruction of any or all of the appropriate benefits derivable from the construction project. Building failure is an unacceptable difference between expected and observed performance. A failure can be considered as occurring in a component when those components can no longer be relied upon to fulfil its principal functions (Roddis, 1993). Failure in building could be of two types namely: cosmetic failure that occurs when something has been added to or subtracted from the building, thus affecting the structures outlooks while structural failures affect both the outlook and structural stability of the building.

3. Causes of building failure and collapse in Nigeria

In Nigeria, building failures have been attributed to so many factors ranging from the use of substandard materials, poor workmanship, low quality of blocks, concrete and other factors. Oyewande, 1992, stressed that building failures are attributed to the following causes; design faults (50%) faults on construction site (40%) and product failure (10%) While Akinpelu, (2002) categorized the following as major causes of structural failures: environmental changes, natural and man-made hazards; improper presentation and interpretation in the design. Failure could occur in the form of partial or total collapse of the structure.

3.1 Effect of low quality sand crete blocks on structural wall

Sand Crete blocks are composite units made up of mixture of sand, cement and water in specified proportion. The quality of sand Crete block used in the construction of walls play a very significant role in the total strength of the wall. The quality of any sand Crete block is largely determined by its properties which include strength, durability, thermal conductivity, fire resistance, density, efflorescence and dimensional changes. However, these properties greatly depend on the type and proportioning of the constituent materials, mix ratio, mode of compaction and duration of curing. These constituent materials are first mixed and then compacted in moulds to form pre-cast units. On setting and hardening, the blocks attain sufficient strength and can be used as walling units (Oyewande, 1992).

The quality of block used in Nigerian building industries is a factor in building failure. For instance, the nine inch (9") hollow blocks used for the construction of external walls of a building are to support the weight of the decking and other floors above it in conjunction with column. Since the strength of the blocks depends on the ratio of cement to sand used for moulding them, the right proportion must be used to ensure that they are strong and durable. Due to its high demands in the building industry, the block industries in Nigeria have equally increased the quantity thereby compromising the quality in the bid to get the most number of blocks per bag of cement; they use more sand than necessary which eventually results in moulding weak blocks (Ayininula, & Olalusi, 2004).

A lot of these blocks even break in the process of conveying them to the site. Most block industries in Nigeria do not meet the standard requirements specified by the Standard Organization of Nigeria (SON). The Nigeria Industrial Standard (NIS 87:2000) requires that a certain degree of quality for sand Crete blocks be produced. The basic requirements stipulate that sand Crete blocks should have the required crushing strengths, the required dimensional tolerances and the desired appearance; only blocks that are sound and true in shape, free from holes, cracks and any other flaws shall be considered good for use in the building industry.

3.1.2 Quality of concrete used

Concrete is a very versatile material that can be cast in place with or without reinforcement to achieve any required strength. It is used for construction of foundation footings, mass concrete slabs, beams, floor slabs, columns, lintels and decking. It composes of cement, sand and stones, when iron rods are introduced into it, it becomes reinforced concrete. (Oyewande, 1992) observed that the strength of reinforced concrete depends on the proportion of cement, sand, stones and iron rods. These constituents are always used in the design of high-rise structures. The structural analysis is done by a structural engineer who calculates the weight of the building, number and sizes of iron rods that will be put into the beams and columns to strengthen them for carrying the weight.

Most times in the building industry, this structural analysis is not properly carried out which may result into trial and error methods by the contractor without using the needed number and sizes of iron rods. Some contractors even fail to use the correct mix design for the concrete. When these errors accumulate over time, may lead to building failure and subsequent collapse of building.

3.1.3 Effects of improper concrete curing and bracing of form work

Curing is probably the most abused aspect of the concrete construction process. Concrete requires an adequate time to cure at a proper temperature and humidity; if not it may not develop the characteristics that are expected to provide necessary durability (Akinpelu, 2002). He opined that when formworks are not properly aligned, premature removal of formwork, improper mixing inadequate design and improper concrete placement can lead to discontinuity in the surfaces of concrete which could break resulting into building failure. Poor construction and negligence of concrete placement and curing process have caused collapse of buildings in Nigeria.

3.1.4 Poor compaction and consolidation of foundation soil

In the building industry, a building could collapse if it lacks adequate compaction of the soil inside the foundation before placing hardcore and placing the over site concrete slab. If the soil is not well compacted before the over site concrete slab is cast, settlements may occur causing cracks on the wall and over site concrete slab leading to structural failure (Philip, 2002).

3.1.5 Effects of weak soil

Weak soil has also contributed to building failure as a result of the geologic nature. In most cases some layers of soil are not strong enough to carry the weight of the building particularly the top most layer. According to Sunday (2006), most buildings are erected without carrying out soil test by the engineers. If this factor is not considered from the onset, could lead to differential settlement of the building caused by cracking of walls and decking. In some areas, due to weak nature of the soil, building might just sink.

3.1.6 Modification in the use of a building

Modification in the use of a building refers to the situation where by the use of a building is modified, other than that which it was originally intended for. Ayininula, & Olalusi, (2004) observed that even though majority of the clients seek for approval before commencement of projects in Nigeria, further alterations during construction are not made known to the authority where the approvals were sought from. For instance a storey building designed to carry only two floors approved and constructed, if given an additional weight without due consideration for foundation, column and slab will eventually fail as a result of structural inefficiency due to excessive loading of area after remodelling, improper binding of units and an equal distribution of load.

3.1.7 Use of non-professionals in building construction

Due to high cost of some building materials in Nigeria, use of substandard materials, incompetent adoption of untested local construction methods are employed, with non-existent or lack of enforcement of building regulation, by-laws and construction health and safety regulations such as placement of structural beams and columns. Lack of experience on the part of the contractor and the consultant could result in poor workmanship and low standard of construction. This could result in high running cost and in some cases failure of some part or the whole building. These non-professional other wise known as quacks have over taken up the services of architects, engineer and other allied professionals in the building industry (Oyewande, 1992).

3.1.8 Collapse of buildings induced by fire

Fire is said to be a process of burning that produces light and heat as well as smoke and flame. Over the ages, man has used fire to solve basic problems such as the provision of heat energy for residential use, commercial and for individual use. However, the misuse of it has always resulted in consequential adverse effect which leads to burning down of so many things like buildings, vehicles and other utilities. In the building industry, adequate attention has not been paid to fire as a causative factor that is responsible for building collapse in Nigeria.

Taiwo, (2002) opined that when fire occurs in buildings, the structural members such as walling materials, foundation and other structural members get weakened. After sometimes, the walls begin to crack which may lead to total collapse of building.

3.1.9 The role of professionals and other participants in the building industry

All the participants involved in the construction of buildings are contributors to building failures in one way or the other. Onyemachi, & Uji, (2005) observed that architects contribute to building collapse by not involving engineers at all stages of construction. Today, architects are seen undertaking buildings all alone without the

consultation of engineers. Structural engineers are also involved in carrying out structural analysis without site inspection, possessing inadequate soil knowledge and geological formation of the site.

Clients contribute to building failure by erection of structures on unapproved land, additions of extra floors on existing buildings without any consultations with the structural engineers, altering a structure's purposes, and lack of maintenance culture. Clients are also involved in cutting corners, monetary delays, involvement of non-competent professionals and building without building plans. Consultants should always provide specialized knowledge and skills to supplement those of the architect. They should be hired directly by and responsible to the architect. The architect must then coordinate and control all aspects of the design process. As part of their duty to safe guard public health, welfare and safety, building officials should administer building codes that establish minimum standards for construction. Their primary responsibility is to ensure that buildings meet health, and safety requirements, particularly those related to structural and fire safety, as well as local zoning or land use.

Recommendations

1. Standard Organization of Nigeria (SON) should ensure that a well packed bag of cement with sharp river sand can be used to produce about 45 pieces of block. Any thing above 45 pieces of block from a bag of 50kg will not produce the desired quality and quantity of blocks. Therefore, there should be a regular check of block industries to ensure that blocks are of good quality and highly vibrated.
2. The building code introduced should define emphatically how a building will be erected, the type of materials to be used to reflect the required standard, and to be in good maintenance. The code should spell out among other things how to assemble materials to use for what project and other details or actions to be taken in the building process.
3. Various regulatory bodies such as Nigerian Institute of Architects (NIA), Architects Registration Council of Nigeria (ARCON), Nigerian Society of Engineers (NSE), Council of Regulation of Engineers in Nigeria (COREN), should ensure that there are some kinds of multiple responsibilities between the architects and the engineers in the design and construction of high-rise buildings in Nigeria. Nigerian institute of architects, Architects Registration Council of Nigeria, should ensure that architects do not work alone in the design and construction of high-rise buildings without engineers.
4. The Nigerian Institute of Town Planners (NITP) in collaboration with organization responsible for approval of building plans should live up to their expectation by monitoring buildings that are not approved, unauthorized addition of extra floors, on existing buildings without due consultations with the structural engineers. Only buildings with ARCON, and COREN seals should be approved.
5. Government should come up with professional policy outlawing indiscriminate building construction by non-professionals and all the regulatory bodies in the building industry to comply strictly with their professional ethics. Stable policy on building approvals should be enforced.
6. In order to stop this ugly trend in the building industry , competent professionals like the Nigerian Institute of Architects (NIA), Architects Registration Council of Nigeria (ARCON), Nigerian Society of Engineers, (NSE) Council of Regulation of Engineers in Nigeria,(COREN) Nigerian Institute of Builders,(NIOB) Nigerian Institute of Quantity Surveying, (NIQS), Nigerian Institute of Estate Management and Values,(NIEMV), Nigerian Institute of Town Planners (NITP) and government should jointly work together to achieve common goals.
7. All professionals involved in the building industry supervising projects should ensure the following;
 - a. Building foundations are properly back-filled and well consolidated before the mass concrete slab is cast. If this is done it will prevent secondary settlement and cracking of walls.
 - b. Blocks used for the building come from block industry certified by standard organization of Nigeria. (SON)

- c. Correct number and sizes of iron specified for columns, slabs and beams are used to carry the much needed weight.
- d. Contractors using correct mixing ratio of concrete at site, and site execution management be handled by professional builders with architects and engineers certifying buildings. There should therefore be a periodic inspection of existing buildings to ensure their fitness and planning authority to remove such buildings.
- e. Foundation design plans be it bungalow or high-rise as yardstick for granting certificates of fitness by relevant government agencies in charge of planning development.
- f. Buildings that are partially or wholly engulfed by fire should always be inspected by building officials to ensure the safety of the occupants. If the buildings are found to be unfit, they should be pulled down immediately, to avoid total collapse.

Conclusion

The leadership of building construction industry is in the hand of architect, who co-ordinates the operations of all stakeholders and allied professions in the building industry to ensure that the end product is what is desired by the employer or the client. Therefore, there is the need for the use of qualitative use of materials, labour and skilled professionals. Hence, an architect as the master planner should always recommend competent professionals to the client and contractors. However, with the introduction of building code now in place, the building experts otherwise called professionals will be put on their toes in rendering qualitative work as well as impeding clients from the use of quacks in property development.

Various regulatory bodies such as Nigerian Institute of Architects, Architects Registration Council of Nigeria, Nigerian Society of Engineers, Council of Registered Engineers in Nigeria, Nigerian Institute of Builders, Nigeria Institute of Quantity Surveying and others in the building sector to beam their search light in making sure that defaulting builders are not only apprehended but also prosecuted. Government on its own part should put sufficient legislations to ensure that buildings do not collapse again in the country. It is only when the rules and regulations of development control are implemented that the issue of collapsed buildings in Nigeria, remains unabated in the country.

References

Akugelu, J.A. (2002). The need for code of conduct, building regulations and by-laws for the industry in Nigeria. *The professional Builder*, Nigeria institute of Building, 2(1):11-14.

Arayela, O. & Adam, J.J. (2001). Building Disasters and Failure in Nigeria: Causes and Remedies. *Association of Architectural Educators (AARCHES) Journal*, 2(6).

Ayintinola, G.M. & Olalusi, O.O. (2004). 'Assessment of Building failures in Nigeria: Lagos and Ibadan case study' *African Journal of Science and Technology (AJST) Science and Engineering series* 5(1).

Chapman, J.C. (2000). Learning from failures: A paper by Chapman Associates/Imperial College of science, Technology and Medicine, 78(9): 23-24.

Federicks, M. & Ambrose, J. (1989). *Building Engineering and Systems Design*, Van Nostrand Reinhold, New York 2(3).

Nigerian Industrial Standard (NIS87:2000). Standard for Sand Crete block production. Unpublished research, Federal Ministry of Industry.

Obande, M.O. (1984). *Block making and block laying*. Second Edition; Longman Press Nig. Ltd.

Onyemachi, T.U. & Uji, Z.A. (2005). 'Building Failure and its Implication on Real Estate Investment in Nigeria'. *Association of Architectural Educators (AARCHES) Journal*, 4(1).

Oyewande, B. (1992). 'A Research for Quantity in the Construction Industry' *Builders Magazine*, June/ July Ed., Lagos.

Philip O.S. (2002). 'The Building Act, Building failures and Education'. The Cladding Institute, New Zealand, (11).

Sunday, E.B. (2006). *Building Code and Challenges for Builders*.

Taiwo, E.A. (2002). Building Failures visa vis the Practice in Millennium. *Association of Architectural Educators (AARCHES) Journal* 2(2)