SSR Journal of Arts, Humanities and Social Sciences (SSRJAHSS)

Homepage: https://ssrpublisher.com/ssrjahss

Volume 2, Issue 12, 2025 ISSN: 3049-0391 (Online)

Assessment of Occupational Hazards and Risk on Construction Sites in Obio/Akpor Local Government Area of Rivers State, Nigeria

Bealo Brownson[1], Eludoyin Sunday[2] & Tee Ngbaa Nwebabari[3]

[1]Centre for Disaster Risk Management and Development Studies, University of Port Harcourt, Nigeria
[2]Centre for Disaster Risk Management and Development Studies, University of Port Harcourt, Choba, PMB 5323, Port Harcourt, Nigeria
[3]Institute of Natural Resources, Environment and Sustainable Development (INRES), University of Port Harcourt, Choba, PMB 5323, Port Harcourt, Nigeria

Received: 01.10.2025 | **Accepted:** 09.10.2025 | **Published:** 15.12.2025

***Corresponding Author:** Bealo Deebari Brownson

DOI: *10.5281/zenodo.17934105*

Abstract **Original Research Article**

The study assessed the occupational hazards and risk on construction sites in Obio/Akpor Local Government Area in Rivers State with a view to identifying occupational hazards and risk prevalence, determining the effect of exposure to occupational hazards and risk on construction site and determining the workers awareness of occupational hazards and risk on construction sites among others. A survey design was adopted which personal interviews and questionnaires were administered to obtain information used for the study. Descriptive statistics were used and employed for the data analysis. The findings showed that there was high(68.8%) level of awareness on prevalence of a but low level of compliance(29.6%), to safety rules/control as well as provision and use of personal protective equipment. The need given enough insight of the risk at work and observe, monitor and periodically check employers and employees compliance with Health and Safety regulation especially the provision and use of PPE on construction sites is necessary considering its hazardous nature. From the study, workers on the construction sites have poor educational and socioeconomic background which is manifest in the hazard knowledge may be diminished and they may be complacent to the hazardous nature of the occupation. It is therefore recommended that Enforcement teams should also be instituted to ensure regular monitoring and periodic checks on employers and employees on their level of compliance to safety regulations considering its hazardous nature of the construction industry.

Keywords: Occupational Hazard, Risk, Construction sites, Awareness, Exposure.

Introduction

The construction industry is one of the most hazardous industries in the world in terms of accident as such health and safety in construction is a major cause of concern in the occupational world. According to statistics, the construction industry has higher records of fatal injuries and major accidents as compared to other sectors the world over. It is rated as the fourth most dangerous profession with second most fatal injuries. The fact that the human resources of an organization are one of its biggest

resources is indispensable. Therefore, the employer's obligation to ensure safe workplace with the proper use and protection of human resources will turn into the overall effectiveness and efficiency of the organization. Though many organizations consent to this concept but they still fail to recognize that as a management practices.

Concerns for health and safety resulting from accident dates back to the industrial revolution of the 18th century in Great Britain, when machines were invented and factories were built and installed with these machines. Several accidents occurred in the factories causing injuries, maiming, damage, losses and death. Workers also suffer from illness resulting from exposures to toxic fumes and gases. The accidents and illness arose because workers were exposed directly to dangerous moving parts of machines that had no guard on them including poorly lighted and inadequately ventilated factories. . Meanwhile the employers were contented with the returns that resulted from increased production at lower cost with little concern for the workers welfare Makinde (2014). According to Gill (1984) construction workers are highly exposed to occupational hazard than any other workers.

Nnedinma et al(2014), Anderson (2007); Idubor and Osiamoje (2013) opined that regulations without proper enforcement are tantamount to no laws. In that Idubor & Osiamoje (2013) postulated that lack of strict enforcement of occupational health and safety regulations enables non- compliance to occupational health and safety regulations. Whereas non-compliance to occupational health and safety regulations is a major contributor to the poor state of occupational health and safety in Nigeria. Also Diugwu et al. (2012) maintain that the failed occupational health and safety management system in Nigeria is due to the non-functional occupational health and safety regulations and provisions.

Occupational health and safety in construction industry therefore involves protection from any hazard/risk or danger associated with construction sites. Considering its hazardous nature of the world over, the need for an effective health and safety system which aims at preventing the risks and hazards associated with construction sites becomes very necessary. To this end therefore, there is the need for the management to ensure that employees work in healthy and safe environment that will enhance their productivity. As such emphasis must be laid on the fact that accidents are costly as it affects the workers, organisation and the environment. This study therefore seeks to access the occupational hazards and risk in construction sites in Obio/Akpor Local Government Area Rivers State Nigeria.

2.0 Materials and Methods

2.1 Brief description study area

2.1.1 Geo characteristics of study area

The study was carried out in Obio/Akpor LGA, Rivers State, Nigeria. Obio/Akpor Local Government Area is one of the 23 Local Governments in Rivers State which is located in the metropolis of Port Harcourt. It is one of the major centres of economic activities in Rivers State and Nigeria. The Local Government Area covers 260 km^2 and according to 2006 Census, it held a population of 464,789.

The economy of Obio/Akpor Local Government Area is essentially agricultural; farming is the principal source of livelihood and is based on the cultivation of yam, cassava, and vegetables. Substantially, Obio/Akpor Local Government is of economic advantage as it play host to several companies and including multi-national oil and gas companies. The population of study consisted of construction site in Obior Akpor namely: road construction, private building construction, high rise buildings, and industrial/institutional buildings and the workers in these construction sites. Construction sites operated by Lubrick Construction Company, MCC construction company, Julius Berger Limited and some indigenous company construction sites are also in focus.

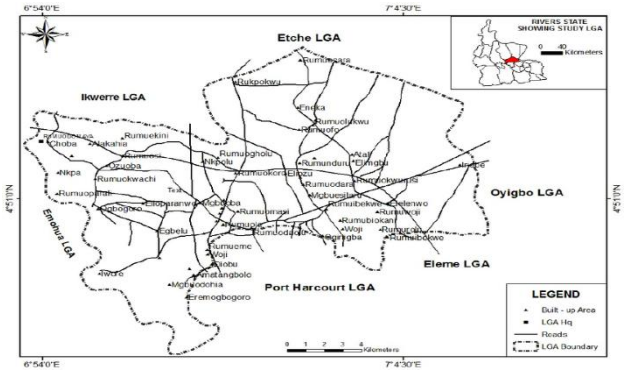

Figure 1: Obio/Akpor Local Government showing Communities

2.2 Methodology

The research was conducted in selected construction site in Obio/Akpor Local Government Area of Rivers States.

The study population from the identified construction sites were 1200. Using Yamene(1947) equation, a sample size of 300 was used and derived using Taro Yamene (1947) equation.

The population comprised a survey of construction sites in Obio/Akpor Local Government Area of Rivers State Nigeria.

Table 1: Survey of construction sites

SN	Delineated Zones In Obio/Akpor LGA	Number Of Construction Site	Sample size determined
1	Rumuekini-choba-uniport zone	300	70
2	Mgbuoba-Rumuigbo-Rumuokoro zone	200	60
3	Rumuola-Rumueme-New GRA-Presidential Estate zone	200	52
4	Rukpukwu-Eneka-Rumukwurushi zone	300	68
5	Woji-Elelenwo-Rumuomasi-Elekahia zone	200	50
	Total	**1200**	**300**

The study employed both primary and secondary data sources. The primary was collected from the use of questionnaires and personal interview methods. The researcher personally administered copies of research questionnaires to 300 employees or workers on construction sites while the secondary data comprise data from literatures. Personal data of the respondents retrieved from the questionnaires were used to plot the frequency tables, analysed in the Pearson Product Moment Correlation (PPMC) and multiple regression analysis environment. Using the descriptive statistics tool, the response to the questionnaire items were weighed from 1 to 5.

SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree; N = Undecided. Based on the weighted mean score, the criterion mean is established thus 5+4+3+2+1 = 15/5 =3.00

In attempt to collect data relevant to the study, a

total number of 300 questionnaires were administered on selected construction sites and a response rate of (Figure?) 96% were recorded.

Note for proper analysis of the above table 2 (see appendix) and all other table involving reference to mean, we adopted criterion mean or mean cut off point print and ground mean decision rules as computed below.

$$\text{Criterion mean} = \frac{\text{Sum of item scale quantifica tion figure}}{noofquantification}$$

Since the items were on a 5-point scale quantification

$$\text{Criterion mean} = \frac{5+4+3+1}{5} = 3.0$$

Grand mean is obtained as (X) = $\frac{X}{N}$

From the foregoing all items with means above 3.0 are accepted while those means whose means are below 3.0 are rejected. Again, items with grand means that exceed the criterion mean implies that the dimension (variable) is significant decision, for table 2 all the items of service quality.

Results and Discussions

Socio-economic Characteristics of Respondents

In the various construction sites, the survey carried out shows that, there were more male than female as shown in figure 2 amounting to 90.3 percent male and 9.7 percent female.

In the survey conducted, there were 90.3% male and 9.7% female while the respondents age, 32% were between the age of 18-28 years, 38% were between 29-39 years, 20.7% were between 40-50 years and 9.3% of the respondents were over 50 years.

For income level of respondents, 3.5% earn income of less than 30,000 monthly, 66.7% earn between 30,000 and 80,000, 22.2% also earn an income between 80,000 and 150,000 while 7.6% earn above 150,000.

For educational level of respondents, those with basic secondary education constitute 51.4%; while illiterates or those that have no formal education constitute 7.6%, those that attended primary school were 26.4% and tertiary education were 14.6% of the respondents. Most of the respondents were temporary workers were 87.9% and only 12.1% were permanent.

Table 2: Socio-demographic Characteristics of Respondents

ITEM	FREQUENCY	PERCENTAGE
Gender of the respondents		
Male	260	90.3%
Female	28	9.7%
	288	100%
What is your age?		
18-28	91	31.6%
29-39	109	37.9%
40-50	62	21.5%

Over 50	26	9.0%
	288	100%
Marital Status		
Married	160	55.6%
Single	74	25.7%
Divorced	28	9.7%
Others	26	9.0%
	288	100%
What is your employment pattern:		
Temporary	253	87.9%
Permanent	35	12.2%
	288	100%
How much do you earn in a month?		
<30,000	10	3.5%
30,000-80,000	192	66.7%
80,000 - 150,000	64	22.2%
<150,000	22	7.6%
	288	100%
Level of education		
None	22	7.6%
Primary	76	26.4%
Secondary	148	51.3%
Tertiary	42	15.0%
	288	100.3%

The grand mean score of the items is 3.7 which are also greater than the criterion mean of 3.0. This implies that service quality is a significant dimension of relationship of hazards prevalent on construction sites.

The analysis in the table 3 reveals that the mean score of the items of effect of exposure of occupational hazards and risk.

Table 3: Effect of Exposure of Occupational Hazards and Risk

	Frequency and mean score	**SA**	**A**	**N**	**SD**	**D**	**TOTAL**	**Mean**	**Criterion mean**	**Grand mean**
		5	**4**	**3**	**2**	**1**				
1	There are	110	88	40	25	25	288	**3.81**	**3.0**	**3.70**

	hazards prevalent on construction site	38.2%	30.6%	13.9%	8.7 %	8.7 %	100%			
		550	352	120	50	25	1097			
2	There is extreme heat on site while working on site	98	88	49	30	23	288	**3.72**		
		34.0%	30.6%	17.0%	10.4 %	8.0 %	100%			
		490	352	147	60	23	1072			
3	Site work is always characterized with material and manual handling	98	90	40	35	25	288	**3.70**		
		34.0%	31.3%	13.9%	12.2 %	8.7 %	100%			
		490	360	120	70	25	1065			
4	Slips, trips and falls are common issues on site due to uneven surfaces	99	87	37	37	28	288	**3.67**		
		34.4%	30.2%	12.8%	12.8 %	9.7 %	100%			
		495	348	111	74	28	1056			
5	Abestoes and cement dust are a commonly generated and inhaled at works	88	75	61	24	40	288	**3.51**		
		30.6%	26.0%	21.2%	8.3 %	13.9 %	100%			
		440	300	183	48	40	1011			
6	I sometimes work in height	90	88	42	39	29	288	**3.59**		
		31.3%	30.6%	14.6%	13.5 %	10.1 %	100%			
		450	352	126	78	29	1035			
7	I sometimes take awkward posture while working	100	86	38	34	30	288	**3.67**		
		34.7%	29.9%	13.2%	11.8 %	10.4 %	100%			
		500	344	114	68	30	1056			
8	There is possible Collapse on construction site	101	86	50	31	20	288	**3.75**		
		35.1%	29.9%	17.4%	10.8 %	6.9 %	100%			
		505	344	150	62	20	1081			
9	Moving objects are usually experience on site	95	92	48	32	21	288	**3.72**		
		33.0%	31.9%	16.7%	11.1 %	7.3 %	100%			
		475	368	144	64	21	1072			

10	The site is always characterize with loud noise	86	103	48	31	20	288	**3.71**		
		29.9%	35.8%	16.7%	10.8 %	6.9 %	100%			
		430	412	144	62	20	1068			
11	Workers are subjected to hand arm vibrations while using power equipment	104	95	36	32	21	288	**3.80**		

The analysis reveals that the mean score of all the items exceed the criterion mean score of 3.0. Therefore, all the items are accepted as effect of exposure of occupational hazards and risk. Again, considering the grand mean which is 3.60, it is obvious that the grand mean also above the criterion mean score of 3.0. This result suggests that effect of exposure of occupational hazards and risk is of significant dimension of occupational hazards and risk assessment in construction sites.

The analysis in the table 4 show that for all the items on level of awareness of occupational health and safety indicates items one (Q) has mean score 3.49.

Table 4: level of awareness of occupational Health and Safety

	Frequency and mean score	**SA**	**A**	**N**	**SD**	**D**	**TOTAL**	**Mean**	**Criteria mean**
		5	**4**	**3**	**2**	**1**			
1	Am aware of the harmful effect of hazards	99	54	48	62	25	288	**3.49**	**3.0**
		34.4%	18.8%	16.7%	21.5%	8.7%	100%		
		495	216	144	124	25	1004		
2	Am aware of the various health and safety laws	54	67	51	85	31	288	**3.10**	
		18.8%	23.3%	17.7%	29.5%	10.8 %	100%		
		270	268	153	170	31	892		
3	I have the right to know about any potential hazards to which I may be exposed to.	71	112	40	31	34	288	**3.54**	
		24.7%	38.9%	13.9%	10.8%	11.8 %	100%		
		355	448	120	62	34	1019		
4	It is important to know and follow safe work procedures	98	88	46	29	27	288	**3.70**	
		34.0%	30.6%	16.0%	10.1%	9.4%	100%		
		490	352	138	58	27	1065		
5	It is important to report injuries and illnesses	100	93	33	34	28	288	**3.70**	
		34.7%	32.3%	11.5%	11.8%	9.7%	100%		

	immediately	500	372	99	68	28	1067		
6	I always have training or safety briefing on site before carrying out any work	99	89	49	33	30	300	**3.65**	
		34.4%	30.9%	17.0%	11.5%	10.4 %	104%		
		495	356	147	66	30	1094		

The grand mean is 3.5 which is greater than the criterion mean score of 3.0

The analysis in the table 5 reveals that the mean scores of two items are greater than the criterion mean score of 3.0 and the grand mean score of 3.6 is also above the criterion mean score.

Table 5: Effect on workplace Environment

	Frequency and mean score	**SA**	**A**	**N**	**SD**	**D**	**TOTAL**	**Mean**	**Criterion mean**	**Grand mean**
		5	**4**	**3**	**2**	**1**				
1	The construction operation affect the health and safety of the public	77	104	51	29	**27**	288	**3.61**	**3.0**	**3.6**
		26.7%	36.1%	17.7%	10.1%	9.4%	100 %			
		385	416	153	58	27	1039			
2	There are observed illnesses after each day construction activity	88	93	45	34	**28**	288	**3.62**		
		30.6%	32.3%	15.6%	11.8%	9.7%	100 %			
		440	372	135	68	28	1043			
3	There are life threatening risk s associated with construction	71	89	48	50	**30**	288	**3.42**		
		24.7%	30.9%	16.7%	17.4%	10.4 %	100 %			
		355	356	144	100	30	985			
4	The effects of these risks, are slight, minor, major, single fatality and/or multiple fatality?	84	91	45	35	**33**	288	**3.55**		
		29.2%	31.6%	15.6%	12.2%	11.5 %	100 %			
		420	364	135	70	33	1022			
5	Noise from equipment on construction site constitute serious health risk	101	76	47	34	**30**	288	**3.64**		
		35.1%	26.4%	16.3%	11.8%	10.4 %	100 %			
		505	304	141	68	30	1048			

Therefore, the analysis in the table 5 indicates that the effect of hazards on workplace environment are of a significant dimension of occupational hazards and measure of risk assessment in construction sites. Frequencies on compliance of health and safety rules/practice/control measures by workers and their employers. Measurement items were used

to elicit responses on occupational hazards and risk assessment in construction sites. Table 6 shows the frequencies and analysis on each of the measurement items. Each item mean score was compared with the criterion mean. The analysis was also extended to a comparison of the grand mean score with criterion mean score.

Table 6: Occupational health and safety management compliance/control measures

	Frequency and mean score	**SA**	**A**	**N**	**SD**	**D**	**TOTAL**	**Mean**	**Criterion mean**	**Grand mean**
		5	**4**	**3**	**2**	**1**				
1	Assessments are usually done to identify risk and hazards	74	100	50	33	**31**	288	**3.53**	**3.0**	**3.1**
		25.7 %	34.7 %	17.4 %	11.5 %	10.8 %	100%			
		370	400	150	66	31	1017			
2	Personal protective equipment are always made available and use at work	50	85	88	35	**30**	288	**3.31**		
		17.4 %	29.5 %	30.6 %	12.2 %	10.4 %	100%			
		250	340	264	70	30	954			
3	Health and safety rules are enforced at work	94	33	83	50	**28**	288	**3.40**		
		32.6 %	11.5 %	28.8 %	17.4 %	9.7%	100%			
		470	132	249	100	28	979			
4	The employer correct unsafe acts and unsafe conditions	52	35	29	90	**82**	288	**2.60**		
		18.1 %	12.2 %	10.1 %	31.3 %	28.5 %	100%			
		260	140	87	180	82	749			
5	Personal Protective Equipment (PPE) provided by Management is adequate and appropriate	84	29	99	46	**30**	288	**3.32**		
		29.2 %	10.1 %	34.4 %	16.0 %	10.4 %	100%			
		420	116	297	92	30	955			
6	Guards are provided on all moving parts of equipment use on site	33	30	70	100	**55**	288	**2.60**		
		11.5 %	10.4 %	24.3 %	34.7 %	19.1 %	100%			
		165	120	210	200	55	750			
7	There is a First Aid Box on site	65	40	66	80	**37**	288	**3.06**		
		22.6 %	13.9 %	22.9 %	27.8 %	12.8 %	100%			
		325	160	198	160	37	880			

Pearson Product Moment Correlation Analysis (PPMC)

The relationship between Occupational hazards and risk in construction sites regression coefficient is 0.877; t is .22.743 and p-value of 0.000 which less than the level of significance of 0.05(2-tailed), the occupation hazards and risk on construction site is statistically significant implying that there is a significant relationship between Occupational hazards and risk in construction sites. Also, the result in table 7 reveals a regression coefficient of 0.890, t = 24.361 and p-value of 0.000 which is less 0.05(2-tailed), the null was rejected, therefore, there exist a relationship between occupational hazards/risk and workplace environment implying that there is no significant relationship between occupational hazards/risk and workplace environment. the effect of awareness of occupation hazards/risk on construction site regression coefficient is 0.957, t is 41.274 and p-value of 0.000 which less than the level of significance of 0.05(2-tailed), the effect of effect of awareness of occupation hazards/risk on construction site is statistically significant implying that there is no significant relationship between occupational hazards/risk and awareness on construction sites

.

Regression Analysis

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Occupational_ Hazards[b]	.	Enter
a. Dependent Variable: Construction_Sites			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.877[a]	.768	.767	.47690	.768	517.259	1	282	.000

a. Predictors: (Constant), Occupational_Hazards

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	117.643	1	117.643	517.259	.000[b]
	Residual	35.480	282	.227		
	Total	153.123	283			

a. Dependent Variable: Construction_Sites

b. Predictors: (Constant), Occupational_Hazards

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.011	.140		.079	.937	-.265	.287
	Occupational_Hazard	1.076	.047	.877	22.743	.000	.982	1.169

a. Dependent Variable: Construction_Sites

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Occupational_Safety_Hazards[b]	.	Enter

a. Dependent Variable: Workplace_Environment

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.890[a]	.792	.791	.45328	.792	593.460	1	283	.000

a. Predictors: (Constant), Occupational_Safety_Hazards

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	121.932	1	121.932	593.460	.000[b]
	Residual	32.052	282	.205		
	Total	153.984	283			

a. Dependent Variable: Workplace_Environment

b. Predictors: (Constant), Occupational_Safety_Hazard

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound

1	(Constant)	.103	.133		.779	.437	-.159	.366
	Occupational_Safety_Hazards	1.095	.045	.890	24.361	.000	1.006	1.184
a. Dependent Variable: Workplace_Environment								

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Awareness_on_Construction_Sites[b]	.	Enter
a. Dependent Variable: Occupational_Hazards_Risk			
b. All requested variables entered.			

Conclusion

From the study, workers on the construction sites have poor educational and socioeconomic background which is manifest in the hazard knowledge may be diminished and they may be complacent to the hazardous nature of the occupation. Even if they have some knowledge of prevailing vulnerability to these hazards, they may not have updated knowledge and capacity to avoid through compliance with relevant rules and control measures unguided.

Recommendations

First aid facilities should be available in all construction workplaces to provide immediate support to injured persons on sites in case of accident before comprehensive medical attention.

Workers should be properly developed and given adequate information about the risk and dangers inherent in the work before it is carried out. This should do through continuous education on work related accidents and ways to minimize them if them if not eradicated completely. Works should be specifically designed to eliminate all potential hazards to make it safe for workers.

Enforcement teams should also be instituted to ensure regular monitoring and periodic checks on employers and employees on their level of compliance to safety regulations considering its hazardous nature of the construction industry.

REFERENCES

Abel Pinto, Isabel L. Nuns, Rita A. Ribera (2011), "Occupational Risk Assessment in Construction Industry – Overview and Reflection", Safety Science 49, 616–624.

Adane MM, Gelaye KA, Beyera GK, Sharma HR, Yalew WW(2013)"Occupational Injuries Among Building Construction Workers in Gondar City, Ethiopia", Occup Med Health Aff 1: 125. doi: 10.4172/2329-6879.1000125.

Aksorn, T & Hadikusumo, B.H.W. (2007). Gap Analysis Approach for Construction Safety Program Improvement. Journal of Construction in Developing Countries, 12(1): 77 – 97

Holt, A. and Andrews,H.(1993).Principles of Health and Safety at Work, London: IOSH Publishing

John, N. Ugbebor(2014). Modern safety principles and practice,: Ibadan Vertex media limited publishing, Ibadan

Anderson, J.M (1992). Managing Safety In Construction. Proceedings Of The Institute Of Civil Engineering, London. Construction Industry Training Board manual (1990). Managing Health And Safety In Construction. Principles and application to main contractor/sub-contractor projects. HMSO, London.

Ezeji S.C.A (1984). Building Construction. 1st edition Longman group ltd, London. Federal Tender Board (1985). Federal Tender Board. Unpublished, Lagos, Nigeria. Federation of Civil Engineering Contractor's (F.C.E.C) (1975). Supervisor safety booklet. Published by the Federation of Civil Engineering Contractor 3rd edition London.

Henirich H.W (1968). Industrial Accident Prevention. 2nd edition Longman group Ltd. UK.

Hinzer J. (1996). Construction Safety Record Since 1971. Proceedings of ASCE National Convention, 1996 New York.

Kunju A.R (2000). Symposium of the ISSA Construction System. Facility of Built Environment Technology, University of Malaysia, Malaysia. Wallah. D.J (1963). Accident Prevention Manual for shop teacher. The Technical Press Ltd London.

Adeogun, B. K., and Okafor, C. C. Occupational Health, Safety and Environment (HSE) Trend in Nigeria. International Journal of Environmental Science, Management and Engineering Research, 2013. Vol 2 (1), pp 24-29.