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Evaluation of Safety and Healthmeasures on Building Construction Sites in Nasarawa Local Government, Nigeria

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ABSTRACT
Accidents on construction sites mostly occur as a result of lack of adherence to safety and health measures. The aim of this project work therefore, is to investigate and evaluate the responses of construction managers/firms tosafety and health requirements on building-construction sites in Nasarawa town, Nasarawa State, Nigeria. The various methods adopted to collect the data of this work include survey approaches through questionnaire, site visitations and interviews. The data obtained were analysed using the statistical percentage model represented on pie chart and bar-chart. The results indicated that most of the construction firms and contractors in Nasarawa town do not abide by the statutory regulations governing safety at work, and also,most of them do not have any in-service training to educate workers on safety practices. The key measures to be adopted to prevent occurrence of accidents and ensure proper workers' health and safety on building construction sites in this study area have therefore been proffered. These methods include abiding to the health and safety regulations on building construction sites.

Keywords: safety, health, statutory regulations, accidents

I. INTRODUCTION

1.1 Background to the Study

Health and safety are a vital issue in building construction works. A building construction site basically deals with construction of buildings, such as residential, commercial and public buildings. The issue of health and safety should be major priority because hazards on building construction sites need to be defined and eliminated through effective health and safety measures. LINDGREN (2018) stresses the need for contractors, safety professionals, and workers to remember that the hierarchy of controls begins with elimination or substitution of hazards. These methods provide the greatest mitigation of hazard in order to protect the workers and therefore should be pursued before moving further down the hierarchy to PERSONAL PROTECTIVE EQUIPMENT (PPE).

Exposure of building construction workers to hazards are mostly caused through enormous power tools, defective scaffolding and electrical defaults, falling of construction materials. The building construction sites in Nasarawatown are seemingly consisting of a numberof supervisors and contractors who do not put the health, safety and welfare of their workers into consideration. However, a few of these contractors are not actualy registered with the government and the contractors registering body (e.g. Corporate Affairs Commission, CAC). In order to affect the health and safety of workers on building construction sites, the associated hazards must be recognized and monitored with the view to adopting adequate and satisfactory protection measures, Eze (1990).

1.2Aim and Objectives of the Study

Aim

The aim of this project work is to investigate and evaluate the response of construction firms/managers to health, safety and welfare requirements on building construction sites in Nasarawa Local government, Nasarawastate, Nigeria.

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Objectives

To assess the awareness of construction personnel on safety provisions on the building construction sites in the study area.

To analyze the extent of enforcement of safety guidelines based on the rate of accidents recorded and the physical examination from the researchers on the building construction sites.

1.3 Research Questions

- How can one identify the causes of hazards and then initiate measures to prevent a reoccurrence?
- How can accident be investigated on construction sites, is it often necessary to conduct two or more interviews with witnesses?
- What are the needs to control accidents on the building construction industry?
- What are the remedies to accidents and injuries on building construction site?
- What are the statutory aspects of safety? (Employer – employee- liability).
- What are the health and safety requirements on a construction industry?
- What are the causes of accidental hazards on construction sites?
- How can accident be prevented?

II. RESEARCH DESIGN AND METHODOLOGY

This chapter describes the research design, population, sampling techniques, method of data collection as well as the method of data analysis used in this research.

This involves the selection of construction firms randomly in order to answer the research question and realize the objectives of the research.

2.1 Research Design

This research is designed to assess the issue of health and safety measures on building construction sites in Nasarawatown, as well as to ascertain the extent of implementation of the safety provisions contained in the contract forms and to analyze the extent of influence of same safety parameters based on the types of accidents and injuries, their causes and means of reducing them.

2.2 Research Area and Units

This research covered Nasarawalocal government. This is to enable the researchers carryout effective work due to lack of resources and time to cover the entire country. The units (sites) that the study was carried out frominclude: The Construction of NasarawaTown New Central Mosque by anonymous contractors, located Opposite Emir's Palace Nasarawa Town.Dinamiks Investment Nigeria Limited,whose head office is located opposite unity bank headquarters, central business district Abuja but at that time, were constructing the ICT and Resource Center for school of business in the Federal Polytechnic Nasarawa. Construction of micro finance bank byLimech Development Link beside Twin Theater Federal Polytechnic Nasarawa..Eknald Technical Company Nigeria Limited Beside Mardan Hotel GunkiNasarawa State were at that time constructing a duplex at Kemu..

2.3 Population of the Study

The population of the study was drawn from the professionals in the building industry. These include the Engineers, Quantity Surveyors, Contractors, Architects and Builders etc. This was to enable the researchers to collect enough and valuable data.

2.4 Sample Size and Sampling Technique

The sampling method used is the judgment and convenient method because it is a method that is based on the researchers' suitability of the choice as being representative of the population.

2.5 Instrument for Data Collection

Research instrument are tool used in getting the data, the research instrument used in this study were survey research documents such as questionnaire and personal interview method.

The respondents chose by ticking an option as well as putting down their personal opinion on the provided space.

2.6 Validation of Data

Validity is the process of finding out the degree to which a test measures what it supposes to measure. The validity and reliability of the data collected were ensured by subjecting row data to review by our supervisor.

2.7 Reliability of Data

Reliability is the process of finding out how reliable the data is and the source of the data collected. The questionnaires used in carrying out this research work were duly administered within the study area. 67% of these questionnaires were retrieved while 33% were missing.

2.8 Method of Data Collection

This study includes a composition of both survey research and descriptive research. The survey research involves an investigation into the level of awareness of the health and safety laws on building construction sites, while the descriptive aspect was meant to throw light on the benefits that

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can accrue from knowing the health and safety regulations for effective delivery of construction projects.

The tools used for the purpose of data collection were questionnaire (open and closed ended) and oral interviews as well as physical examination of the sites visited The questionnaire contained some questions pertaining to certain demographic variables of the respondents such as educational qualification and level of experience.
The survey method involves visiting construction sites and collecting information from a large number of site personnel.

2.9 Method of Data Analysis

The method of analyzing those data that will be collected by the use of percentage allocation. The percentage allocation will be explained in tables and also graded in percentage as well.

2.9.1 Primary Data

Through this source, data was collected through the administration of structured questionnaire to accommodate research questions and personal interviews.
Thirty **(25)** copies of the questionnaire were distributed and twenty **(20)** returned. The personal interview was conducted to supplement the use of questionnaire. The questionnaires were understood and accurately answered.

2.9.2 Data Analysis

The main purpose of statistical analysis as stated by Kappel (1973) is to reduce a mass data into a more compact variable.
In addition, the technique used in analyzing data in this research work is **percentage model** adopted from Kappel (1973).

III. DATA ANALYSIS AND DISCUSSION

This chapter deals with the presentation and analysis of data collected for the purpose of this research.

3.1 Presentation of Data

Table 1
Total number of questionnaires distributed and total numbers returned.

FREQUENCY DISTRIBUTION	NO OF RESPONDENTS	PERCENTAGE
Issued	25	100
Returned	20	80
Not returned	5	20

Table 1: shows that out of 25 questionnaires that were distributed, 20 representing 80% were the total respondents that returned the questionnaire, while 5 representing 20% did not return their questionnaire.

Table 2 Response to question 1
What is the nature of your firm?

Options	No of Responds	Percentage
Building Construction	15	75
Design and Build	3	15
Civil Engineering	2	10
Others	0	0
Total	20	100

The table 2 above indicates that 15 representing 75% of the total respondents are building construction, 3 or 15% are design and build and 2 or 10% are civil engineering.

Table 3 Reponses to question 2
How long have you been in this firm?

Options	No of Respondents	Percentage
Less than 5 years	7	35
5 to 10 years	8	40
More than 10 years	5	25
Total	20	100

The source above indicates that 7 representing 35% respondents have less than 5 years,
8 representing 40% have between 5 to 10 years experience and 5 representing 25% have more than 10 years experience.

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Table 4 responses to question 3

What is your position in the firm presently?

Options	No of Respondents	Percentage
Contractor	6	30
Engineer	9	45
Architect	2	10
Quantity surveyor	3	15
Total	20	100

The source above indicates that 6 representing 30% of the respondents are builders, 9 representing 45% are engineers, 2 representing 10% are architects and 3 representing 15% of the total respondents are quantity surveyors.

Table 5 Responses to question 4

As a professional in building industry, does health and safety on building sites make any meaning to you?

Options	No of Respondents	Percentage
Yes	20	100
No	-	-
Total	20	100

The source above shows that 20 representing 100% of the total respondents agreed that health and safety on building sites makes meaning to them.

Table 6 responses to question 5

Does your firm have health and safety regulations?

Options	No of Respondents	Percentage
Yes	5	25
No	15	75
Total	20	100

The source above shows that 5 or 25% of the total respondents agreed that their firms have health and safety regulations while 15 or 75% of the total respondents agreed that their firms do not have the health and safety regulations.

Table 7 Responses to question 6

Are these regulations effectively communicated to your employees within the sites

Options	No of Respondents	Percentage
Yes	6	30
No	14	70
Total	20	100

Source indicates that 6 or 30% agreed that their firms communicate health and safety regulations effectively within the sit while 14 or 70% of the total respondents did not agree.

Table 8 Responses to question 7

Are there existing insurance policies covering accidents on sites in your firm?

Options	No of Respondents	Percentage
Yes	3	15
No	17	85
Total	20	100

Source above indicates that 3 or 15% of the respondents accepted that there are insurance policies covering accidents on site in their firms while 17 or 85% said no to that.

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Table 9 Responses to question 8
Which of the following medium is mostly used in communicating health and safety measures to your employees?

Options	No of Respondents	Percentage
Meetings	18	90
Seminars/workshop	2	10
Conferences	0	0
Total	20	100

Source shows that 18 representing 90% of the respondents communicate health and safety measures through meeting, 2 representing 10% through seminars/workshop while 0 representing 0% through conferences.

Table 10 responses to question 9
Are first aid facilities readily available on site and within the reach of the users?

Options	No of Respondents	Percentage
Yes	9	45
No	11	55
Total	20	100

Source shows that 9 representing 45% respondents have first aid facilities while 11 representing 55% do not have.

Table 11 Responses to question 10
Are the accident investigations properly taken care of on site on the event of such happening?

Options	No of Respondents	Percentage
Yes	7	35
No	13	65
Total	20	100

Source shows that 7 representing 35% of the respondents have proper accident investigation scheme while 13 representing 65% do not have.

Table 12 responses to question 11
Are the various risks involving site operations thoroughly guided and supervised by health and safety personnel of the firm?

Options	No of Respondents	Percentage
Yes	5	25
No	15	75
Total	20	100

Source shows that 5 representing 25% of the respondents have the various risks involving site operations through guided and supervised by health and safety personnel of their firms while 15 representing 75% are otherwise.

Table responses to question 12
What safety measures do you adopt while working on building sites?

Options	No of Respondents	Percentage
Helmets	5	25
Goggles	2	10
Safety boot	10	50
Safety wear	3	15
Total	20	100

Source indicates that 5 representing 25% of the total respondents use safety helmets, 2 or 10% use goggles, 10 or 50% use safety boots, while the remaining 3 representing 15% uses safety

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wears which are adopted on the building construction sites.

Table 14 Responses to question 13
Do you think that lack of proper layout and organization causes accidents on building sites?

Options	No of Respondents	Percentage
Yes	20	100
No	-	-
Total	20	100

Source shows that 20 or 100 of the total respondent agreed that lack of proper site layout and organization cause accidents on building sites.

Table 15 responses to question 14
Does careless dropping and handling of tools cause accidents on sites?

Options	No of Respondents	Percentage
Yes	20	100
No	-	-
Total	20	100

Source shows that 20 or 100% of the total respondents complied that careless dropping and handling of tools cause accidents on sites.

Table 16 responses to question 15
Do you think that lack of adequate knowledge and training can cause accidents on building sites?

Options	No of Respondents	Percentage
Yes	20	100
No	-	-
Total	20	100

Source indicates that 20 or 100% of the total respondents agreed that lack of adequate knowledge and training can cause accidents on building sites.

Table 17 – Responses to question 16
Is it true that climatic factors such as storms earth movements etc can cause accidents on sites?

Options	No of Respondents	Percentage
Yes	20	100
No	-	-
Total	20	100

Source indicates that 20 or 100% of the total respondents agreed that climate factors such as storms, earth movement etc can cause accidents on building construction sites.

Table 18 Responses to question 17
Do your worker use personnel protection equipment such as hand gloves, helmet, safety boots etc.

Options	No of Respondents	Percentage
Yes	9	45
No	11	55
Total	20	100

Source indicates that 9 or 45% of the respondents agreed that their worker use personnel protection equipment such as hand gloves, helmet, and safety boots etc.
While 11 or 55% does not.

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Table 18 Responses to question 18

Who carries out the health and safety enforcement?

Options	No of Respondents	Percentage
Safety officer	2	10%
Foreman	18	90%
Total	20	100

Source indicates that 2 or 10% of the total respondents agreed that health and safety enforcement is carries out by safety officer while the remaining 18 or 90% agreed that health and safety enforcement is carried out by foremen.

Table 19 Responses to question 19

Is there any penalty to the defaulters?

Options	No of Respondents	Percentage
Yes	5	25
No	15	75
Total	20	100

Source indicates that 5 or 25% of the total respondents agreed that there is penalty to the defaulters while 15 or 75% disagreed with that.

Table 20 responses to question 20

How can accidents be eliminated on building construction sites?

Options	No of Respondents	Percentage
To provide a safe work environment that in risk free	5	25
Ensuring adequate knowledge, training and supervision	10	50
Agree to safety procedures	5	25
Total	20	100

Source indicates that 5 or 25% of the total respondents agreed to provide a safe work environment that is risk free, will eliminate accident, 10 or 50% of the total respondents, agreed that ensuring adequate knowledge, training and supervision will eliminate accidents, while the remaining 5 or 25% agreed that safety procedures eliminates accidents on building construction sites.

3.2 Analysis of Data

4.2.1 Analysis of Answers to Question 1

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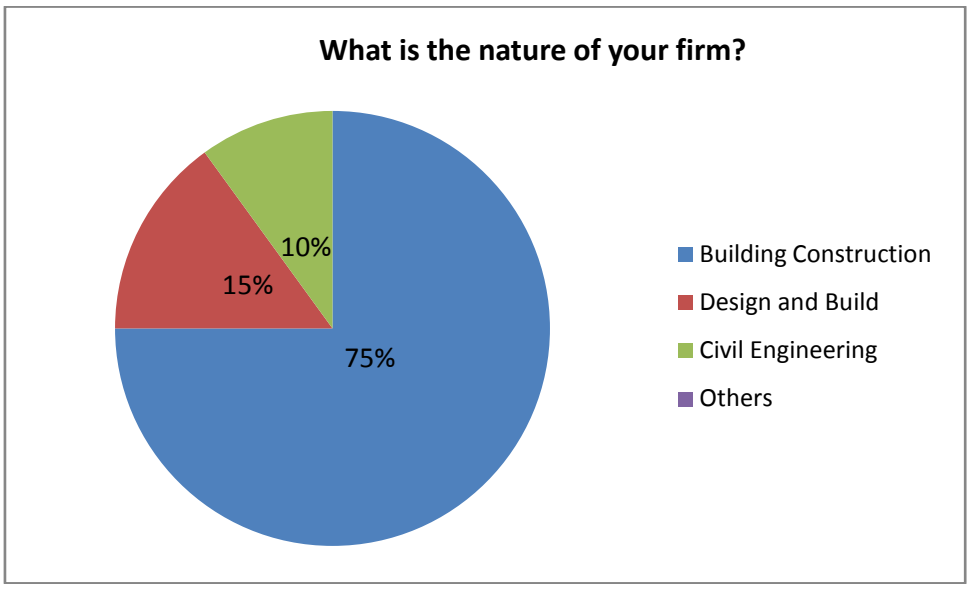

Fig: 4.1the Nature of the Building Firms

4.2.2 Analysis of answers to question 2

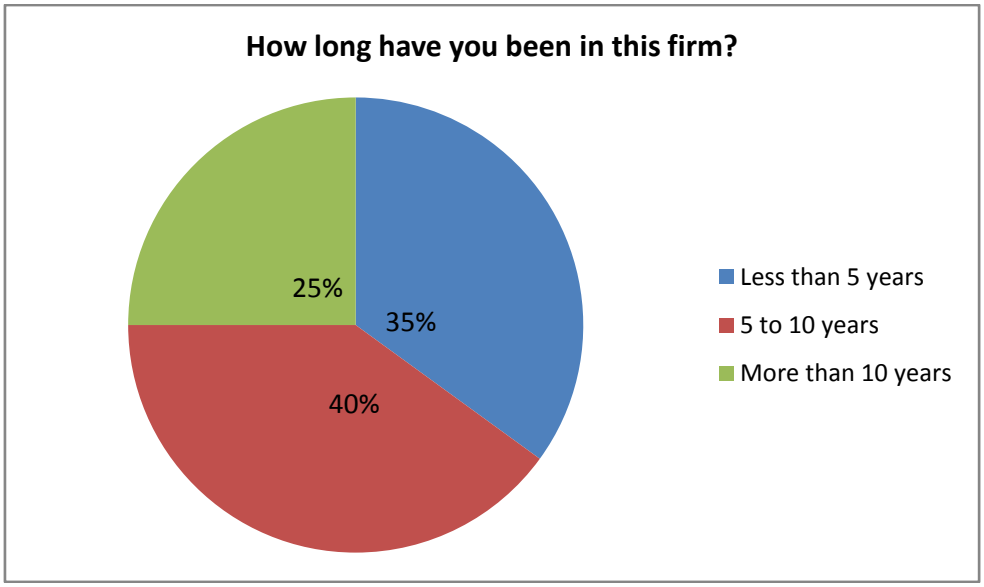

Fig: 4.2 Respondents' Experience in the Firms

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4.2.3 Analysis of answers to question 3

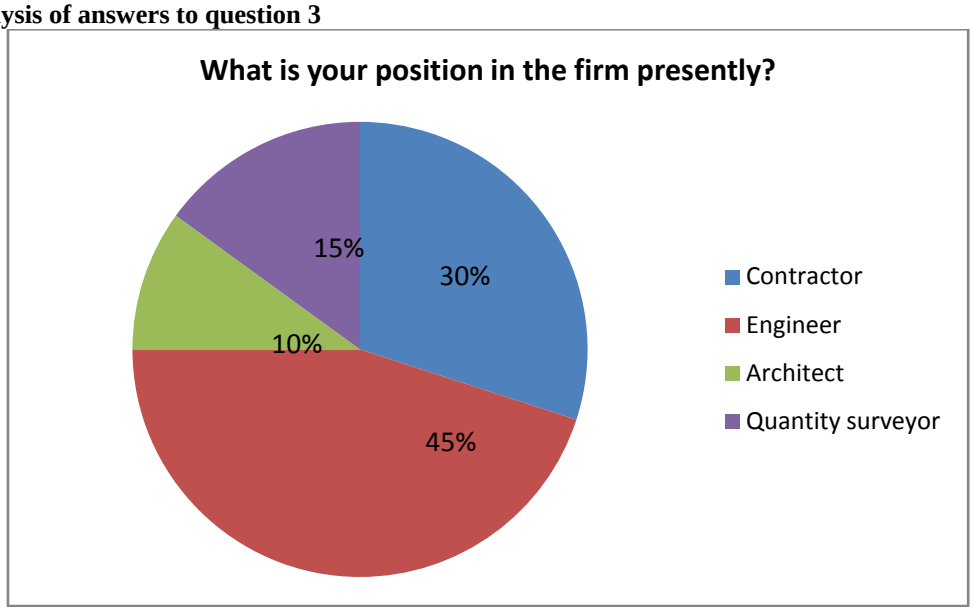

Fig: 4.3 Respondents' Positions in the Firms

4.2.4 Analysis of answers to question 4

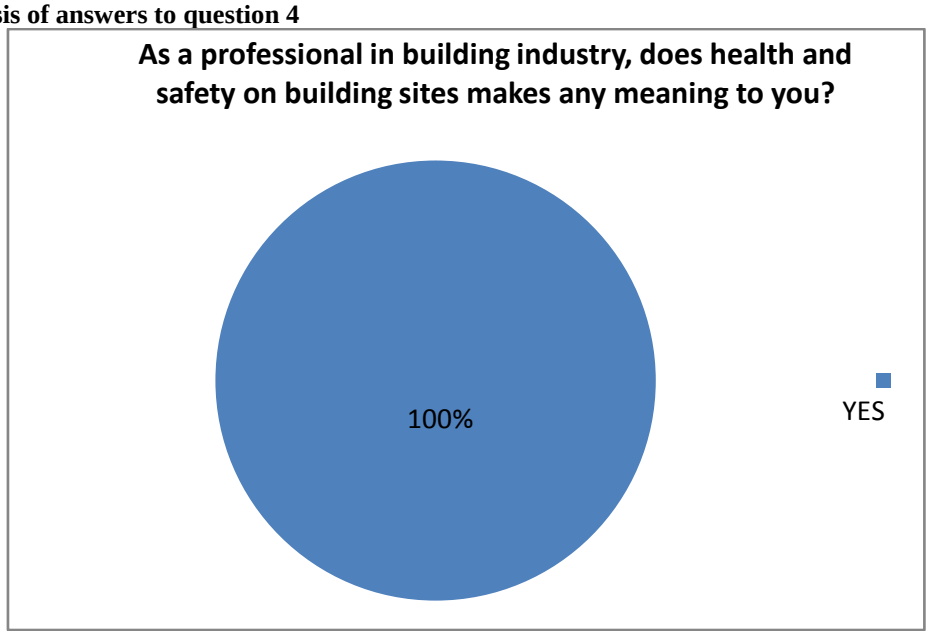

Fig:4.4 Respondents' views on the relevance of health and safety in the Firms

4.2.5 Analysis of answers to question 5
Does your firm have health and safety regulations?

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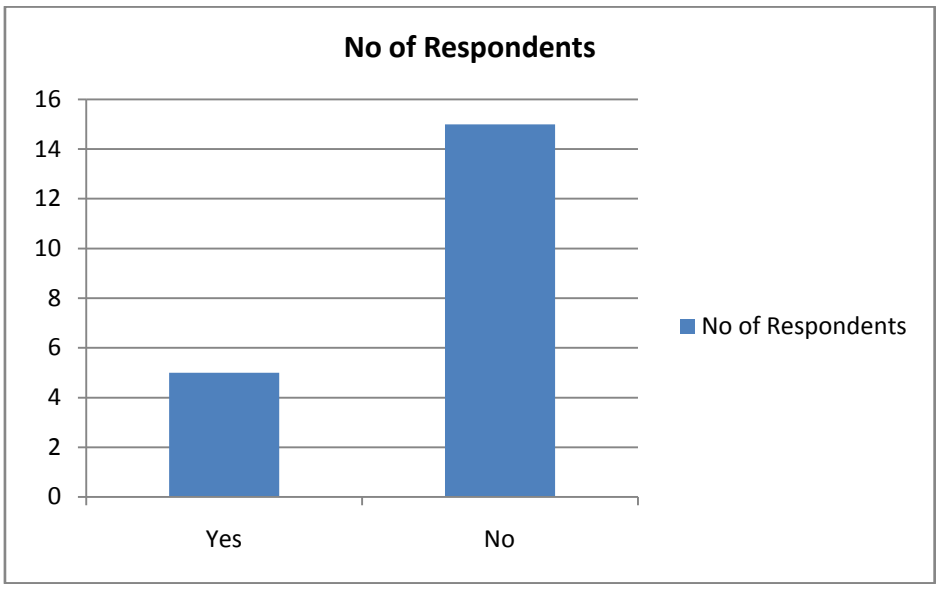

Fig: 4.5 Responses on the of Health and Safety Regulations

4.2.5 Analysis of answers to question 6
Are these regulations effectively communicated to your employees within the sites?

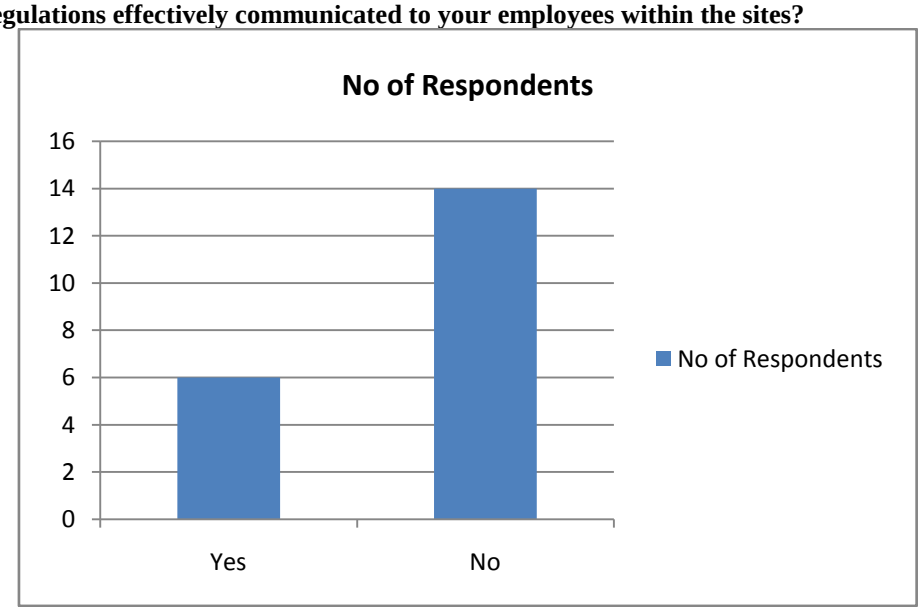

Fig:4.6 Responses on Communicating Health and Safety Regulations to Employees

4.2.6 Analysis of answers to question 7
Are there existing insurance policies covering accidents on sites in your firm?

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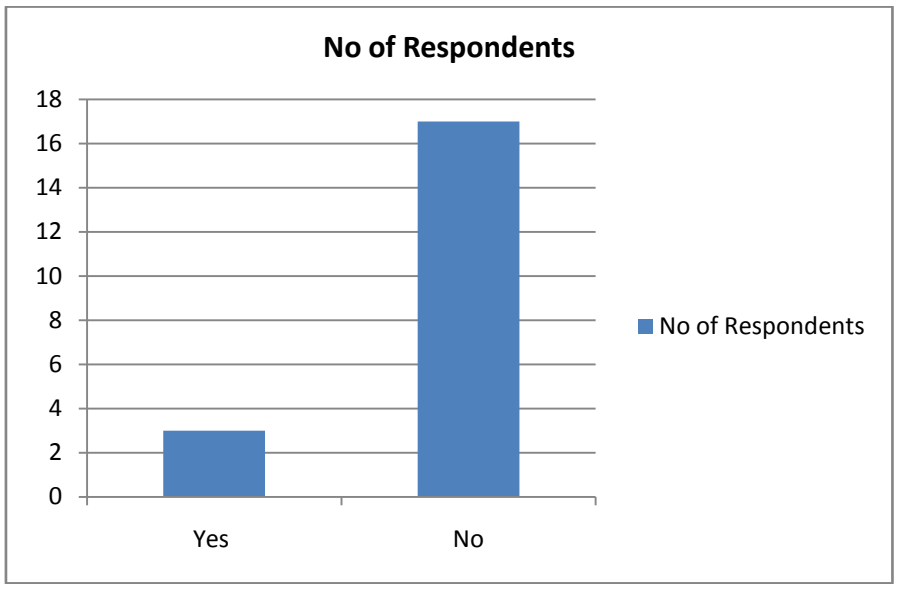

Fig:4.7 Responses on the Presence of Insurance Policies Coverage

4.2.7 Analysis of answers to question 8

Which of the following medium is mostly used in communicating health and safety measures to your employees?

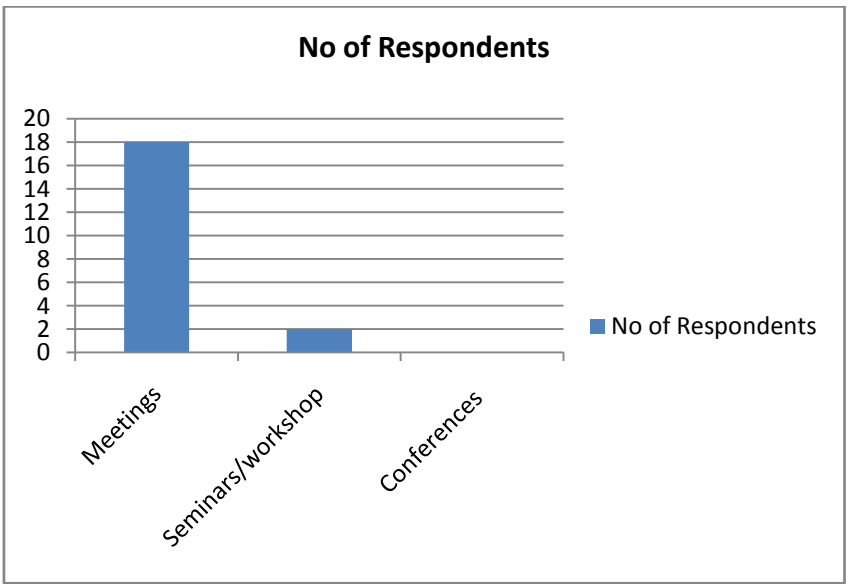

Fig: 4.87 Responses on the Medium of Communicating Health and Safety Measures to Employees

4.2.8 Analysis of answers to question 9

Are first aid facilities readily available on site and within the reach of the users?

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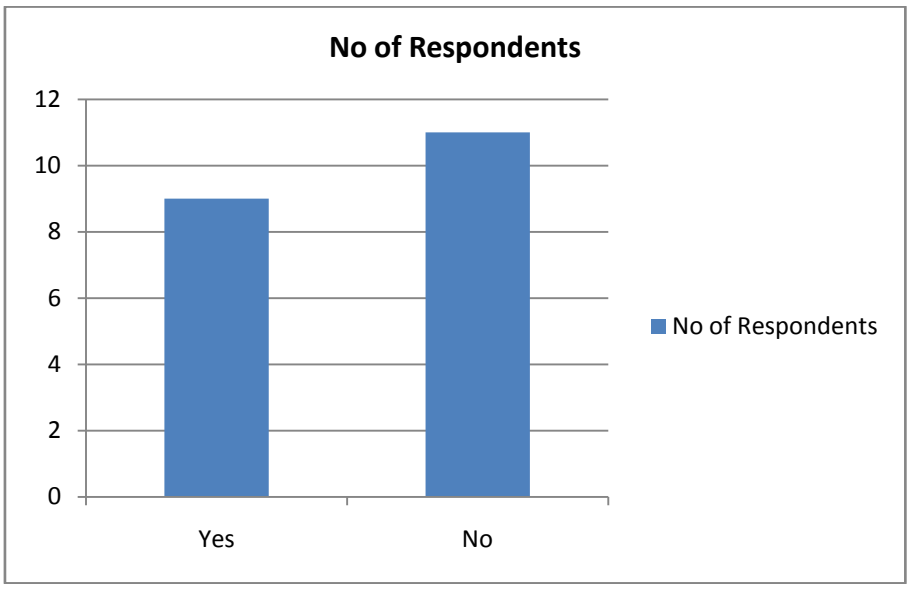

Fig4:9 Responses on Availability of First Aid Facilities on Sites.

4.2.9 Analysis of answers to question 10
Are the accident investigations properly taken care of on site on the event of such happening?

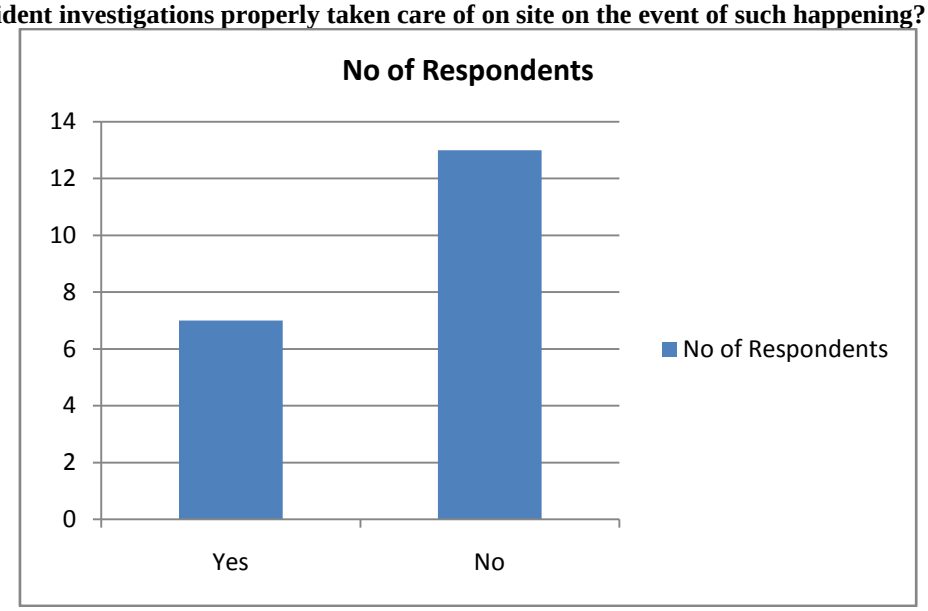

Fig: 4.10Responses on the Presence of Accident Record.

4.2.10 Analysis of answers to question 11
Are the various risks involving site operations thoroughly guided and supervised by health and safety personnel of the firm?

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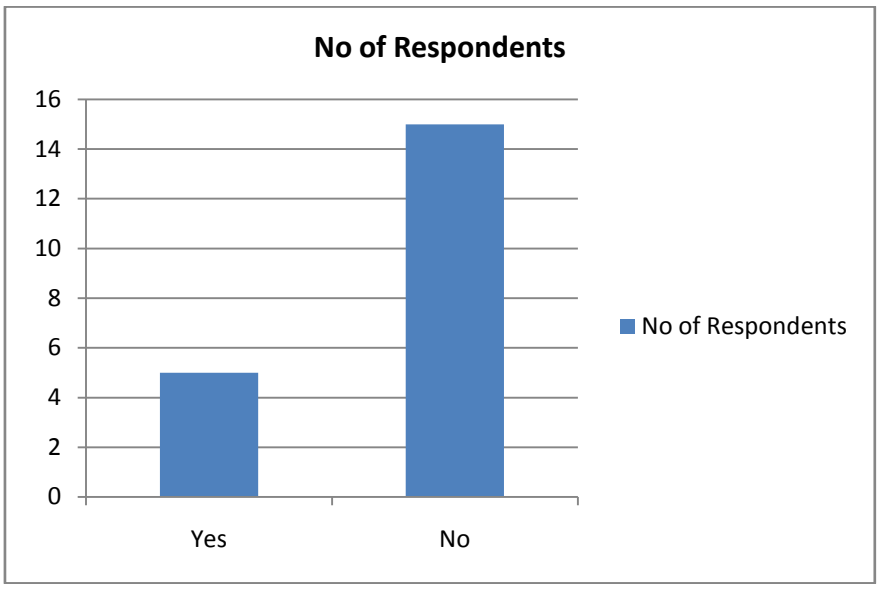

Fig: 4.11

4.2.11 Analysis of answers to question 12
What safety measures do you adopt while working on building sites?

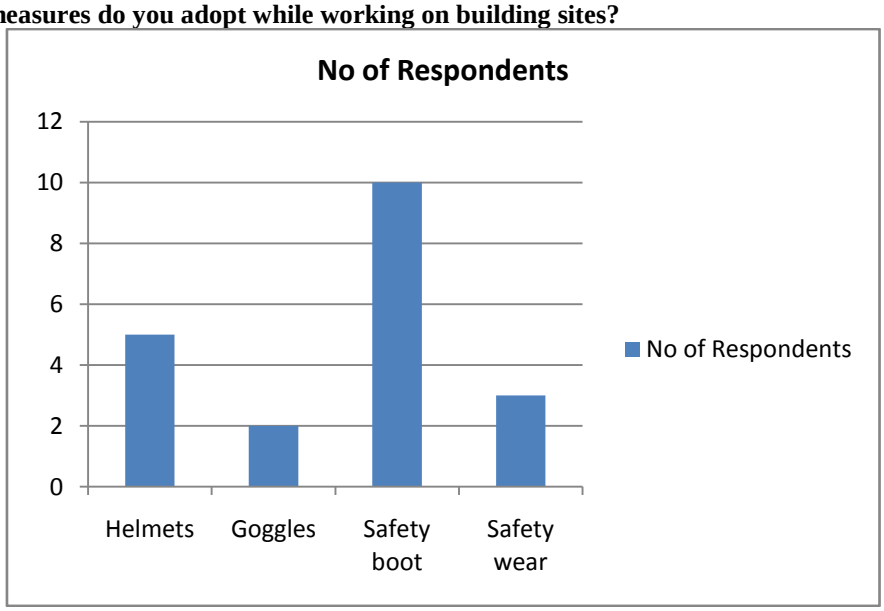

Fig:4.127 Responses on Safety Measures Adopted on Sites.

4.2.12 Analysis of answers to question 13
Do you think that lack of proper layout and organization causes accidents on building sites?

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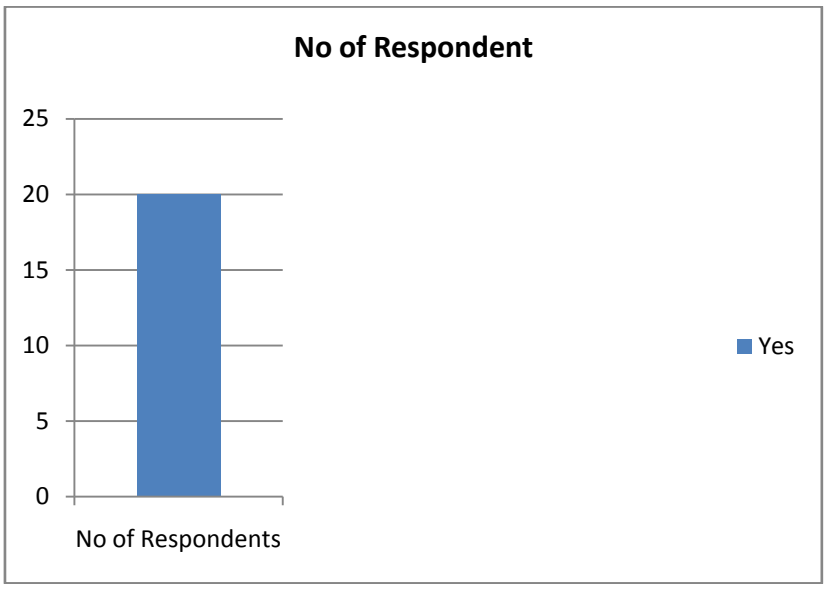

Fig:4.137 Responses on the relationship between organizational layout and accidents occurrences

IV. CONCLUSION AND RECOMMENDATION

This chapter deals with drawing conclusions and suggesting solutions to the major problems on adherence to health and safety measures, as reported in this research work.

4.1 Conclusion

The project has highlighted the various regulations on health, safety and welfare of the workers on the building construction sites, especially to the contractors within the study areas. This is so because most of the contractors did not know much about such regulations before this research's well drafted questionnaire was administered to them.

Workers and personnel on sites within the study area (Nasarawa town) work without being conscious about their own safety and the safety of their co-workers due to improper execution of safety rules and regulations on building construction sites.

Lack of records on accident occurrences, leaving defaulters unpunished and inadequate training of staff were found to be the major causesofnon-compliance to the health and safety measures in construction sites in the study area.

Also, almost absence of accidents' records made it impossible for the researchers to find out much about the effects of contractors' noncompliance to health and safety rules on building construction sites.

4.2 Recommendations

The health and safety of workers on building construction site in Nasarawa local government have to be monitored from time to time during construction to eradicate injuries to persons during construction processes.

Lack of adequate life and health insurance scheme for workers tends to make them perform less effectively. Based on this, therefore proper health insurance scheme should be provided for workers to increase productivity.

This research work has also identified that health and safety education and training should be made necessary for workers, on health and safety rules and regulations in the building construction site.

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APPENDIX I
QUESTIONNAIRE
SECTION A
Personal Data of the Respondent

Name of the firm - - - - - - - -
How long have you been with the firm - - - - -
When was the company established? - - - - -

SECTION B

1. What is the nature of your firm - - - - - -
2. How long have you been in this firm? - - - - - - - - - - - - - -
3. What is your position in the firm presently - - - -
4. As a professional in building industry does health and safety on building sites make any meaning to you? - - -
5. Does your firm have health and safety regulation?
   a) Yes ☐ b) No ☐
6. Are these regulations effectively communicated your employees within the site
   a) Yes ☐ b) No ☐
7. Are there existing insurance policies covering accidents in your sites or firm?
   a) Yes ☐ b) No ☐
8. Which of the following medium is mostly used in communicating health and safety measures to your employees'?
   a) Meeting ☐ b) Seminars ☐
9. Are there first aid facilities readily available on site?
   a) Yes ☐ b) No ☐
10. Are accident investigations properly done on sites?
    a) Yes ☐ b) No ☐
11. Are the various risks involving site operations thoroughly guided and supervised by health and safety personnel of the firm?
    a) Yes ☐ b) No ☐
12. What safety measures do you adopt while working on building sites?
    a) Helmets ☐ b) Goggles ☐ c) None ☐
13. Does careless dropping and handling of tools cause accidents on site?
    a) Yes ☐ b) No ☐
14. Do you think that lack of adequate knowledge and training can cause accident?
    a) Yes ☐ b) No ☐

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15. Is it true that lack of climate factors such as storms, earth movements etc can cause accidents on site?
    a) Yes ☐ b) No ☐
16. Does your firm operate a deliberate safety policy?
    a) Yes ☐ b) No ☐
17. Do your worker use personnel protection equipment such as hand gloves, helmet, safety boots etc?
    a) Yes ☐ b) No ☐
18. Who carries out the health and safety enforcement?
    a) Safety officer ☐ Foremen ☐
19. Is there any penalty to the defaulters?
    a) Yes ☐ b) No ☐
20. Is there any in-service training to educate workers on safety practice?
    a) Yes ☐ b) No ☐