

**EFFECTS OF SYNDICATE AND GUIDED-PRACTICE TRAINING METHODS ON
OCCUPATIONAL HEALTH AND SAFETY COMPETENCIES OF WORKERS IN THE
CONSTRUCTION INDUSTRY IN OYO STATE, NIGERIA**

BY

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ABSTRACT

Construction work and industry, although highly important to Nigeria's developmental processes, is characterised by high level of risks occurrence and hazards. The trend is exacerbated by the insecure manner in which the construction workers are recruited, placed and managed as well as non-enforcement of existing safety laws in the sector. This raises concern about the type of safety training provided in the industry and the instructional method used in imparting such safety trainings. Previous studies have focused largely on the causes, prevention, control, safety legislations and provision of safety trainings with little emphasis on safety training instructional methods. This study, therefore, determined the effects of syndicate (STM) and guided-practice (GpTM) training methods on occupational health and safety competencies (OHSC) of workers in the construction industry in Oyo State, Nigeria. The moderating effects of employees' literacy level and employment status were also examined.

This study was anchored on multiple cause and social learning theories while the pretest-posttest, control group quasi experimental design with a 3x3x2 factorial matrix was adopted. Purposive sampling technique was employed in selecting three reputable construction organisations in Oyo State. The workers in the three organisations who met the study's inclusion criteria were randomised into STM, (12), GpTM (11) and Lecture method (12) (Control) groups while treatment lasted six weeks. Construction Industry Occupational Health and Safety Competencies Questionnaire ($r=0.85$), training guides for STM, GpTM and lecture method were used for data collection. Data were analysed using descriptive statistics, Analysis of covariance and Scheffe post-hoc test at 0.05 level of significance.

Participants were male (80.0%) and female (20.0%) with a mean age of 34 years; 54.3% and 45.7% were on permanent and temporary employments respectively. Their levels of literacy status were: low (37.1%), medium (34.3%) and high (28.6%). There was a significant main effect of treatment on workers' OHSC ($F_{(2, 17)} = 22.28$, partial $\eta^2 = .72$). Participants exposed to STM obtained the highest posttest OHSC mean ($\bar{x} = 175.42$) followed by those in GpTM ($\bar{x} = 111.00$) and control ($\bar{x} = 82.58$) groups. There were no significant main effects of literacy level and employment status on OHSC. There was a significant two-way interaction effect of treatments and literacy on OHSC ($F_{(4, 17)} = 3.18$, partial $\eta^2 = .43$) but the two-way interaction effects of treatment and employment status, and employment status and literacy level were not significant. Also, three-way interaction effect of treatment, literacy level and employment status on OHSC was not significant.

Syndicate and guided-practice training methods were effective in enhancing the occupational health and safety competencies of construction workers regardless of their literacy level and employment status. Both training methods should, therefore, be employed regularly in safety trainings to achieve improved occupational health and safety competencies in the Nigerian construction industry.

Keywords: Occupational health and safety competencies, Syndicate and guided-practice training methods, Nigerian construction industry

Word count: 452

DEDICATION

This work is dedicated to my sister, Olukemi Grace Ojo (B.Sc.,M.Ed.,MBA, ACA), the Acting Bursar of Crawford University, Igbesa, who believed in and shared my dream of obtaining a university education at all cost and against all odds. She gave me total support at the beginning of my university education after a complete metamorphosis in Teacher Grade II and polytechnic education thereby leading to the realisation of this ambition.

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I pray that the great God of Heaven will bless every one of you.

CERTIFICATION

I certify that this study was carried out by Funmilola Elizabeth OJO (Matric. No.: 132714) under my supervision in the Department of Adult Education, University of Ibadan, Ibadan.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The construction industry is one of the most important sectors of any nation's economy because of its centrality to urbanisation and developmental process generally. Thus, Nigeria, like any other nations needs the construction industry to thrive and develop rapidly. Owing to its significance in the economy, it is necessary to give priority to the human resources within the industry (James, Braam and Kingma, 2012). This is because the success of any industry largely depends on the pool of workers operating in it as well as their general welfare. According to the Luxembourg Declaration, organisations depend on healthy, motivated employees for their success (European Network for Workplace Health Promotion, 2005). Generally, the integration of health and safety measures into the total quality management system within the construction sector could significantly contribute to cost-efficiency, quality assurance, environmental sustainability, better employee-employer relation and satisfaction (Okolie and Okoye, 2012).

Regardless of the centrality of the construction industry to the development of the economy, the industry is still prone to high incidences of fatalities. The fact that employees' physical and psychological health is affected by the work environment in the construction industry have been significantly documented in the literature (Van der and Maes, 1999; Ariens, 2001; Bongers, 2002, Stansfeld and Candy, 2006, Way and Mac Neil, 2006). The construction workers are constantly exposed to risks that differ from other industries. The construction industry is one of the most hazardous industries worldwide and typically ranks highest in terms of the total number of work-related fatalities each year (Bindra and Rinehart, 2008). Construction work is difficult, often involving manual handling of heavy materials and equipment, and also dangerous, as it includes having to climb high scaffolds or taking risky physical activities (Kester, 2013). Data are not readily available on the actual magnitude of hazards on construction sites in Nigeria because most of the construction workers are employed on contract basis. But it is estimated that one fatal accident occurs in the building and construction sector every ten minutes globally (Quaino, 2013). At least, 108,000 workers are killed in construction sites every year and workers die more while working on construction sites than in any other industry (Kester, 2013).

There is therefore a need to prevent such harms, hazards and danger with a view to ensuring safety at all times and in all places for the construction workers. The occupational health and safety in the construction industry is an issue of major concern to all stakeholders. Occupational health and safety centre on the prevention of incidence and occurrence of occupational diseases, injuries, hazards as well as fostering a safe and healthy workplace. It dwells mainly on protecting the safety, health and welfare of people engaged in work or employment. Occupational health and safety is very essential in any organisation because it relates to the safety of every individual within and without the organisation. For the workers to be highly productive, effective and efficient in the course of performing their jobs, certain minimum safety conditions need to be put in place to motivate and encourage them to work optimally. Some of these include good and safe working condition and environment as well as good remuneration.

The workers themselves also need to be involved in the process of ensuring safety at work and the prevention of occupational accidents, injuries and hazards. They, therefore, need to be well informed and adequately equipped with all the necessary protective equipment so as to reduce workplace accidents within the industry to the barest minimum. In this process, the construction workers will imbibe a good occupational health and safety competencies; having a good sense of compliance and adherence with safety rules and regulations, taking appropriate measures for the continuous prevention of hazards and risks at the workplace. The occupational health and safety competencies of workers refer to a high level of awareness of the need for safety at all times, identification and prevention of existing potential hazards, inculcation of safety skills in terms of personal protective equipment's usage and having the right attitude towards the establishment, execution and maintenance of safety culture at the workplace. The workers need provision of constant safety training all year round.

The importance of safety training, awareness and enlightenment cannot be ignored in a bid to ensure a safe workplace and encourage occupational safety and health competencies among both workers and employers in the construction industry. The establishment and effective implementation of occupational health and safety system in any organisation in the construction industry will centre on driving the various safety tips, rules and preventive measures through skill capacity building as well as continuous training programmes for the

workers and every stakeholder at the workplace. However, the success of this largely depends on the instructional methods which are employed in delivering safety information and this, to a large extent, will determine the effectiveness of the outcome of such safety training programmes.

Despite the high level of information and awareness on the importance of safety at work, there is still high prevalence of hazards, accidents and injuries in the Nigerian construction industry. Records have shown that at least one fatal accident occurs in every ten minutes globally (Quaino, 2013). This raises concern as to if the non-compliance with safety rules is as a result of the wrong use of instructional methodologies used in disseminating such safety rules. Ahmed and Newson-Smith (2010), identifies the following as some of the main reasons for not implementing workplace safety policy in most developing countries: lack of effective enforcement system, lack of information and accurate records of occupational diseases and accidents, and lack of basic professional training in occupational health and safety, which may lead to the use of inappropriate instructional methods in imparting safety instructions. There are numerous training methods which can be used in imparting knowledge, skills and attitudes particularly in a non-formal setting. Each of these training methods is more suitable in one learning environment than the other. While some methods are very useful in disseminating knowledge, some are more appropriate for inculcation of skills, while others are more beneficial for change of attitude.

One of the broad factors guiding the selection of methods is the focus of the intended learning programme. If the focus of learning is increasing knowledge, then the methods to be used may be lectures, field visits, demonstrations and self-study. If the focus of learning is to increase skills, the methods to be used are more of practice sessions, demonstrations, apprenticeship and learning by doing; but if the focus of learning is to generate awareness, the methods used would be role-plays, small group discussion, case studies, simulation, learning games and structured exercises. Other considerations for the choice of training or instructional methods include: the nature and background of learners, the experience and knowledge base of learners, the learning environment, time, space, competence of facilitators and group size.

Given the nature of the construction industry and the peculiar characteristics of most of the construction workers, any planned safety programme will require an interactive instructional method that is group-based, pragmatic, experiential and of immediate usage. This raises the issue of whether the introduction of such training methods, like syndicate and guided-practice will help to increase the occupational health and safety competencies of the workers.

Surgenor (2010) describes syndicate training as learning activities undertaken by a group of learners working to a brief under their own direction and for them to achieve productively; they will need an explicit brief, appropriate resources and clear outcomes. Syndicates can work in groups spread out in a large room; where facilities permit, they go away and use other rooms. The purist's view of small group teaching is that it must be learner-centred, with all students joining in free discussion of a particular topic (McCrorie, 2006). Small groups can also operate within a much larger setting, such as a lecture, workshop or conference. Small-group teaching is necessarily more demanding of staff and room resources and time than lectures. However, well-designed small-group teaching has clear benefits for learners in terms of retention of information, critical thinking and consolidation of learning from different parts of a programme (McCrorie, 2006).

Guided practice means learners use the strategy as the teacher provides targeted and differentiated supports. Guided practice refers to the phase of instruction that immediately follows the presentation of a new skill, concept, or strategy (Golden, Gersten and Woodward, 1990). The facilitator assesses learner's comprehension of a new concept or acquisition of a new skill during guided practice. This is done by assigning a few tasks that require learners to apply the new concept or skill thereby determining if the learners can perform these on their own. If learners demonstrate adequate performance, the facilitator assigns independent work involving the new concept. If, however, learners perform poorly during guided practice, the facilitator provides additional explanations or examples of the concept or provides additional models of how to solve a particular problem (Golden, Gersten and Woodward, 1990).

Both the syndicate and guided-practice methods have been used by facilitators in teaching school children and during training sessions of adult learners, mostly outside the construction industry. Hall (2002), in Birmingham-Southern College, worked on the effects of Internet

guided practice with aural modelling on the sight-singing accuracy of elementary education majors and concluded that the use of Internet-guided practice with aural modelling provided a way to aid in the development of skills. Also the dental undergraduates of Glasgow University, United Kingdom were very positive about the effects of the syndicate group approach in terms of making them work harder through a sense of group responsibility. The two methods have been proven to be effective in behavioural change, inculcation of new skills and increase in knowledge of learners. The two methods are based on the principles of adult learning, which include practice, experiential learning and group work. They also emphasize the importance of learner-centredness where the facilitator only acts as a guide to draw from the experiences of the learners in helping them to achieve the desired goals.

The literacy and employment status of the construction workers may also be of importance. The literature reveals that most of the construction workers are employees with low level of literacy who possess little knowledge about the risks and hazards at the workplace as well as the various safety techniques needed to keep them away from accidents. The majority seems to lack the knowledge of their rights as employees under the law to make their employers provide adequate and necessary safety equipment and a generally safe workplace for them. They are particular about making a source of livelihood and will not mind working under unsafe conditions as long as they can earn a living from it. This case may even be worsened by the fact that most of these construction workers are hired by the main contractors as casual, contract or temporary workers who may be laid off at any given time because of the absence of formal contractual agreement. Sustainance of injury by these set of workers would not attract payment of any liability on the part of the employers because they seem not to have any viable grounds to stand on with regard to legislation and it is very easy for such employers to replace them.

Although the issue of occupational health and safety is not new, previous studies have focused attention more on how to reduce the risks and hazards with less attention paid to the use of such methods as syndicate training method and guided-practice training method. Such studies include: Perceived influence of health education on occupational health of factory workers in Lagos State (Bankole and Lawal, 2012) Risk assessment of common construction hazards among different countries (Zolfagharian, Irizarry and Nourbakhsh, 2011); Comparing

occupational health and safety (OHS) management efforts and performance of Nigerian construction contractors (Idoro, 2011) the Relationship between psychosocial work factors, employee health and organisational production (Karlsson, Bjorklund and Jensen, 2012), Occupational health and safety: Issues, challenges and compensation in Nigeria (Kalejaiye, 2013), Exploration study of the cost of health and safety performance of building contractors in the South-East, (Okoye and Okolie, 2014). This study, therefore, examined the effects of syndicate and guided practice training methods on occupational safety and health competencies of workers in the construction industry in Oyo State, Nigeria.

1.2 Statement of the problem

Consultants to construction companies and their workers' unions organize training programmes for the workers in construction industry in order to reduce hazards that they face in the workplace. Most of the seminars and workshops are mere suggestions which workers at training programmes observed did not meet their training needs. Unfortunately, most of the workers are unable to effectively implement safety rules. One then wonders if the methods used for the safety training is faulty and requires a change in the safety education methodological process to enable the construction workers to display improved competencies with regard to their occupational health and safety issues.

The process of ensuring safety at the construction sites filled with risks and hazards raises serious concern about the type of safety training provided in the industry as well as the instructional methods used in imparting such safety training. There is therefore a need to replace the old methods of training with more practice-oriented methods so that workers in the construction industry will competently display their knowledge of safety at work and behave safely at all times in order to stay healthy and safe at the workplace.

Several studies have been done to examine the occupational health and safety of Nigerian workers. Most of these studies have focussed largely on the causes of the hazards, their prevention and control; management's commitments, enforcement of occupational health and safety legislations; and provision of safety training. Little has been done to examine the effects of the methods which are used in imparting safety knowledge and skills in order to improve the workers' occupational health and safety competencies. This situation raises the following

pertinent questions: Can the high prevalence and increasing occurrence of these hazards and accidents in the construction industry be curtailed with the current practice of using annual seminars and workshops to impart safety? Can syndicate and guided-practice instructional methods ensure occupational health and safety of construction workers? In view of the foregoing, this study examined the effects of syndicate and guided-practice training methods on occupational health and safety competencies of workers in construction industry in Oyo State, Nigeria. The moderating effects of employees' literacy level and employment status were also determined.

1.3 Objectives of the study

The general objective was to examine the effects of syndicate and guided-practice training methods on the occupational health and safety competencies of workers in construction industry with a view to reducing the occurrence of hazards and accidents and promoting as well as improving occupational safety and health competencies. The specific objectives were to:

- i. investigate the effects of syndicate and guided-practice training methods on occupational health and safety competencies of workers; and
- ii. examine the effects of literacy level and employment status of workers on occupational health and safety competencies.

1.4 Research hypotheses

The following hypotheses were raised to serve as anchor in this study:

HO₁: There is no significant main effect of treatment on occupational health and safety competencies of workers.

HO₂: There is no significant main effect of literacy level on occupational health and safety competencies of workers.

HO₃: There is no significant main effect of employment status on occupational health and safety competencies of workers.

HO₄: There is no significant two-way interaction effect of literacy level and employment status on occupational health and safety competencies of workers.

HO₅: There is no significant two-way interaction effect of treatment and literacy level on occupational health and safety competencies of workers

HO₆: There is no significant two-way interactive effect of treatment and employment status on occupational health and safety competencies of workers.

HO₇: There is no significant three-way interaction effect of treatment and employment status and literacy level on occupational health and safety competencies of workers.

1.5 Significance of the study

This research would provide a framework for the policy makers, governments, International Labour Organisation (ILO), training agencies, unions and development partners involved in safety training on the choice of appropriate methods to be used. It would create awareness of the value and importance of the methods employed in ensuring health and safety at the workplace to construction industries as well as other industries. It would better equip the workers in these industries to adequately guard against the occurrence of accidents and also to reduce to the barest minimum these inherent risks attached to the profession by the usage of appropriate methods in disseminating information on safety rules. The findings of this study would encourage the management of Nigerian organisations to set up and implement effective occupational health and safety management policies by providing them with effective framework. The outcome of this study would also benefit the government by helping to see the need to enforce the existing rules and regulations which compel the institutions to make adequate provision for the health and safety of the workers in construction industries. In addition, it would assist the government and management to pay necessary attention to the usage of appropriate methods for training the workers on safety issues.

Effective implementation of the suggestions of the research would benefit the Nigerian economy because the construction workers would perform better in a safe and healthy working environment. This would boost their positive impact on the technological developmental process in the nation. It could also help the construction workers to be aware of the occupational health hazards embedded in the chosen profession as well as the adequate ways of ensuring safety at work, thereby improving their occupational safety and health competencies.

The entire public would also benefit from the products of improved construction industries by enjoying better facilities like roads, buildings and other infrastructural facilities when the construction workers are able to work effectively under a conducive and safe environment. Finally, the study would also serve as a database for further studies in the fields of social

welfare, adult education and industrial relations. It would also serve as a reference point for future researchers.

1.6 Scope of the study

This study examined the effects of syndicate and guided-practice training methods on occupational health and safety competencies of workers in the construction industry in Oyo State, Nigeria. The choice of construction industry was because of the importance and centrality of the industry to the economic development of the state and the need to reduce the growing prevalence of risks, hazards and injuries in the industry due to its nature.

The study was further restricted to occupational health and safety competencies of construction workers in three organisations in the construction industry in Oyo State. These three construction organisations were chosen because they were registered reputable construction organisations in Oyo State with high patronage and a large number of workers on their pay rolls. They were purposively selected because their workers were being exposed to the same type of hazards. This allowed the researcher to use the treatment package on homogenous participants in determining the effects of the treatment and compare these construction organisations on a common ground. They were all expatriate-owned construction organisations, which further made the sample to be homogenous. The three construction organisations selected were Adold Engineering Development Company Limited used for Syndicate Training Method, L.D'Alberto and Co Limited used for Guided-Practice Training Method and Ciroco Nigeria Limited used for Lecture Method.

The study made use of syndicate and guided-practice methods because they are very relevant to impartation of skills, knowledge and change in behaviour among a group of people, like construction workers. They are suitable for the training of adult learners and help in real practice of the learning subject which encourages pragmatism in adult learning. The study was further delimited to the consideration of the moderating effects of employment status and literacy level on the main effects of treatments on occupational safety and health competencies. This was as a result of the high level of job insecurity peculiar to the construction industry as well as employees' low level of education.

1.6 Operational definition of terms

Syndicate training method: This refers to the process of training small learning construction workers' groups formed when the larger group is subdivided to allow a greater specialisation in discussion or to allow syndicates to tackle special issues before reporting back to a plenary session. This also refers to small group training or collaborative learning involving the construction workers.

Guided practice training method: This is when construction workers, as training participants, are supported in actually demonstrating a safety procedure or process or task with guidance on where they go wrong or where they get it right.

Employment Status: This refers to the permanent or temporary nature of employment of the construction workers.

Literacy Level: This means the level of educational attainment of the construction workers which varies at three levels: high, medium or low. High literacy level stands for those who have above senior secondary school certificate (for example NCE, HND, BSc/BEEd and others); medium literacy level stands for those with senior secondary school certificate or equivalent, technical certificate; while those with low literacy level are those with primary school leaving certificate.

Hazard: This refers to any activity, arrangement, circumstance, event, occurrence, phenomenon, process, situation, or substance in the construction industry in Oyo State that is an actual or potential cause or source of harm to the construction workers.

Hazardous substance: This is a substance which, by virtue of its chemical, physical, biological or toxicological properties, constitutes a harm and danger to the construction workers.

Occupational safety and health competencies: They include measurable pattern of knowledge, skills, abilities and behaviours that construction workers need to be safe at the construction sites, like compliance with safety rules, consistent usage of personal protective equipment, identification and proper assessment of workplace hazards and risks, control and prevention of risks, as well as hazards and accidents at the construction site.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter centres on review of relevant literature using the key variables of this study, including the dependent and the independent variables. Conceptual review of the variables is done, after which empirical findings are reviewed. Theoretical review of two theories which culminate into conceptual framework was also included.

2.1 Conceptual review

This section is devoted to review of the key concepts in this study in order to critically show the relationship that exists among them as well as the need for this study. This section makes use of both linear and spiral review of the concepts which form the key variables, that is the dependent and the independent variables.

2.1.1. Concepts of occupational hazards

Every individual in this life is exposed to risks at different degrees or grades, at home, workplace or in the place of worship. The events of bomb blasts in churches, falls at construction sites and home accidents are all pointers to the prevalence of risks and hazards in our environment. The presence of risks, hazards and danger at all levels predisposes people to harm and accident. Each type of occupation has its own risk, from the less obvious service industry to the more glaring risks in the factories, as well as manufacturing and construction industries.

Although risk is present everywhere, the injuries and accidents in the occupational setting constitute a serious concern and great burden. Occupational hazards could be described as the risks and harm arising out of the workplace situation. Workplace hazards, injuries and accidents have been of utmost concern worldwide. Injuries in the occupational domain constitute a significant burden in its own right. Over 300,000 workers die each year because of accidents and more than 250 million workers sustain injuries as a result of occupational accidents (Nishtar, 2008). More than half of these injuries require change of jobs, work restrictions or time away from jobs. There are outrageous records of the negative impacts of workplace hazards on workers internationally and even in Nigeria. However, globally quoted statistics tend to underreport injuries, due to lack of reliable information systems in the

developing countries and these data do not capture the burden of occupational injuries borne by many disadvantaged workers in the informal employment sector.

The overall picture that emerges for all parts of the developing world is one of increased health and safety risks in all occupations. The burden of disease and injury attributable to workplace risks in the formal and informal sectors is grave and will continue to rise. Inadequate data and reporting systems make capturing the effect of workplace risks problematic. Work-related accidents induce enormous emotional and financial costs to families and to society (Balsari, Ceilo and Saluttini, 1999). Unfortunately, work related accidents and diseases continue to be serious in the world. The human and economic costs of occupational accidents and diseases remain high and call for concerted efforts to handle them (Jerie, 2012).

The International Labour Organisation (ILO, 2009) estimates that more than 2 million workers die each year from work related accidents and diseases and this is probably an underestimation. The ILO estimates that workers suffer 270million accidents and at least 335 000 fatal injuries annually. Avoidable occupational diseases affect 160 million people every year. International concern and awareness of the problem of occupational diseases and accidents remains modest. The World Health Organisation (WHO) found that occupational injuries result in about 312,000 deaths per year caused by occupational injuries for the world's 2.7 billion workers; this figure contrasts to the approximately 6,000 deaths per year caused by occupational injuries for the 150 million workers in the United States.

Okoye and Okolie (2014) affirmed that workplace health and safety is a global challenge to the sustainable development of the society and civilization; they also give a report of the international labour office, which showed that work-related accidents and illnesses contribute 3.9 percent of all deaths and 25 percent of the world's population suffers a minor or major occupational accident or work related disease in any one year. Okoye and Okolie (2014) also posit that apart from the moral concerns, the economic cost is huge. The work-related injuries cost the United States 125.1 billion US dollars in 1998 (1.5% of GDP) and Britain between 14.5 and 18 billion pounds annually (2.1 % to 2.6% of GDP) (Indecon, 2006)

2.1.2 Nigerian construction industry

The Nigerian Construction industry dates back to the 1940s, with few foreign companies coming into operation (Olowo-Okere, 1985, cited in Isa, Jimoh and Achuenu, 2013). Nigeria's independence in 1960, bolstered by the "oil boom" of the 1970s, brought an upward trend in the construction activities. Up to the end of the Second Republic in 1983, the construction industry in Nigeria witnessed an overwhelming upsurge in construction contracts dominated by expatriate companies with few indigenous companies (Idoro, 2009). Unfortunately, the period also exposed the country's indigenous companies' low level of human resources development required for planning, designing, constructing and maintaining the magnitude (in size and number) of projects conceived by the government.

However, with improved training institutions, engagement of expatriates, collaborations between indigenous and foreign entrepreneurs, political stability and improved government policies, the apparent gap in the resources needed for successful completion of complex projects between indigenous companies and their foreign counterparts are now closer compared to the pre-independence era (Mbamali and Okotie, 2012). Sanusi (2008) observed that, several changes had occurred in Nigeria since the past ten years, which helped all sectors of the economy, especially the building & construction sector. He added that with double digit growth rates in the last 3 years, the construction industry had outgrown all other sectors of the Nigerian economy. However, its contribution to the Nigerian GDP and employment of labor are still very low. Despite its impressive performance, the industry faces a significant number of challenges including the lack of local skilled labor, power shortage, the unavailability of materials, and the unethical practices that are very common in the industry.

Over the last decade, several changes have occurred in Nigeria which have helped all sectors of the economy, especially the building and construction sector. However, the current recession in the Nigerian economy had its effects on the construction industry for the past few years. Most of the projects embarked upon by these industries were not promptly and adequately funded especially when governments were the clients. Describing construction industry in Nigeria, Aniekwu (2002) emphasized Nigeria's construction industry was not developing and was unable to implement the country's construction programme. This inability to contribute to the national output, given its relatively large contribution to the country's fixed capital formation

was ascribed to heavy dependence of the country on imported materials and technology for her construction.

Isa, Jimoh and Achuen (2013) viewed the construction industry in both developed and developing countries as that sector of the economy which, through planning, design, construction, maintenance and repair, transforms various resources into constructed facilities. The types of public and private facilities produced in construction range from residential and non-residential buildings to heavy construction; these physical facilities play a critical and highly visible role in the process of development (Kheni, Gibb, and Dainty, 2008). The major participants from the construction industry include the architects, engineers, management consultants, general contractors, special trade contractors or subcontractors, and construction workers.

The building and construction industry workplace health and safety guide by Workplace Health and Safety Queensland (2011) describes a particular work as construction work if it is:

- (a) work to erect, construct, extend, alter, convert, fit-out, commission, renovate, repair, refurbish, disassemble or decommission a structure, or part of a structure; or
- (b) work connected with site preparation, excavation and landscaping for work mentioned in paragraph (a); or
- (c) the assembly or installation of prefabricated components to form a structure, or part of a structure, for work mentioned in paragraph (a); or
- (d) the disassembly of prefabricated components for work mentioned in paragraph (a) that, immediately before the disassembly, formed a structure or part of a structure; or
- (e) an activity that is a prescribed activity.

Types of construction work

The building and construction industry workplace health and safety guide by Workplace Health and Safety Queensland (2011) also divides the construction work into various aspects as stated below:

Civil construction work : Construction of roads, highways, railways, harbours, water storage or supply systems, sewerage or drainage systems, electricity or gas generation, transmission or distribution structures, parks or recreational grounds, production, storage and distribution

facilities for heavy industry, refineries, pumping stations or mines and the construction or structural alteration of bridges and the erection of telecommunications structures.

Demolition work: Demolition or systematic dismantling of a building or other structure, or part of a building or other structure, not including the systematic dismantling of a part of a building or other structure for alteration, maintenance, remodelling or repair.

Housing construction work - work to erect, construct, extend or structurally alter:

(a) any of the following dwellings that is not located above or below another dwelling or another part of a building, other than a private garage:

(i) a detached house;

(ii) an attached dwelling, separated from the dwelling to which it is attached by a fire-resisting wall, for example, a terrace house or town house;

(iii) a boarding house, guest house, hostel or similar building with a floor area of not more than 300m²; or

(b) a building that is not designed for habitation but is ancillary to one of the above.

Importance of the construction industry in Nigeria

The products of the construction industry provide necessary public infrastructure and private physical structures for many productive services, commerce, utilities and other industries. Apart from contributing to the development of a nation, the construction industry is also a major source of employment to all categories of labour - skilled, semi-skilled and mostly the unskilled labour. Construction is often said to be the largest employer in any country (Bust, Gibb and Pink, 2008).

Recently in Nigeria, a number of development projects by government and private sector companies have created opportunities for construction companies and activities to thrive. For instance, in recent times in most states of Nigeria, infrastructural projects, like road reconstruction, housing projects, bridge building, construction of drainage, dams, rural electrification, city expansion and beautification projects, have been on the increase, especially in Lagos, Rivers, Akwa Ibom, Ogun and Oyo States where huge amounts of money, running into hundreds of billions of dollars have been voted for capital projects.

In Oyo State, there are different types of construction activities, like construction of bridges, roads, flyovers and building of edifice, going on. Construction work is being executed by different construction industries, like Ponti & Co Construction industry, L.D'Alberto & Co Limited, Ciroco Engineering Construction Limited, Adold Engineering and Construction Limited, Reynolds Construction Company, Julius Berger Plc., Ratcon Construction Limited, Costain West Africa Plc, G. Cappa Plc and Kopek Construction Limited, in the state. The various construction activities in Oyo State, no doubt have brought about development of the state as well as increase in job opportunities for all categories of workers.

In essence, the construction industry is closely linked to the economy of every state in the country and contributes to economic growth. Isa, Jimoh and Achuen (2013) state that the last four years saw an upward progression in the contribution of the construction industry to Nigeria's gross domestic product, (GDP). They also note that the all-inclusive effects of this sector, and especially its employment-generating potential, makes it a veritable platform for sustainable development especially if proper mechanisms are put in place for the growth of the sector.

Other researchers have opined that the construction industry is important to the economy of a nation and the general development and urbanization of the nation. Mosaku, Kehinde and Kuroshi (2006) cited in Isa, Jimoh and Achuen (2013), assert that the building and construction sector is one of the top five sectors used in measuring the National Gross Capital Formation (NGCF) and the GDP of any country and that its effect on every other sector, makes it a significant front for sustainable development. Ibiroko (2004) and Shittu and Shehu (2010) also claim that the construction industry plays a key role in satisfying a wide range of physical, economic and social needs, and contributes significantly to the fulfilment of various national goals. The construction industry is very germane to the development of any nation as it the hub of social and economic development in all countries of the world. The construction industry contributed only about 1.98% of the GDP of the Nigerian economy, its importance and roles can never be disputed. (National Bureau of Statistics, 2010; Okolie and Okoye, 2012). Isa, Jimoh and Achuen (2013) notes that the overview of construction sector to sustainable development in Nigeria is imperative by saying that the industry's size, the nature of its operation, the job-creation potentials and its presence in developmental activity have made it

an attractive area for experimentation in enhancing the effectiveness of governance and cooperative works towards sustainable economic development.

Historical background of L.D'Alberto & Co. Ltd

L.D'Alberto & Co Ltd is a building and civil engineering contractor established in 1956 with the head office located in 139 Obafemi Awolowo Road, Ibadan, Nigeria. It has wide range of clients representing all sectors of the economy. Examples of these include Proctor and Gamble Nigeria Ltd, Fan Milk Nigeria, Honeywell Enterprises, Nigeria Tobacco Company, Macmillan Publishers, First Bank Nigeria, Afribank, Zenith Bank, Oyo State Government, Ondo State Government, Osun State Government, University of Ibadan, Osun State University, Ilorin University and Odutola Investment Company.

Staff and workforce of the company currently comprise of 85 permanent staff including highly qualified Nigerians and expatriates who bring wealth of experience from working in the Middle East, Europe, Asia and Africa. The company, with this strong skill base developed over many years have been able to offer reliable, cost effective and sustainable construction solutions to its clients.

The company which is based in Ibadan, Oyo State operate the following facilities: head office and administration building, joinery and furniture manufacturing workshop, metal fabrication and blacksmith workshop, 200m² of secure warehousing and stores and 600m² of secure yard and external storage area. The company also adopted numerous safety policies which is usually implemented throughout projects execution. Some of these safety policies include method statement and process awareness, site inductions for all employees and visitors to sites, risk assessments for all critical activities at each stage of projects, first aid training and first aid stations, appropriate use of personal protective equipment, vehicle safety awareness, access equipment training, site layout and housekeeping and accident recording and analysis.

The company has also been involved in project management role in the construction of roads, culverts and drainage throughout South West, Nigeria for many years and are currently completing an extensive external works contract at the Ondo State Medical Village. It

specialises in major earthworks, asphaltic paving, culvert and drainage construction and hard and soft landscaping.

Some of the completed projects include undergraduate halls of residences, Mathematics and Statistics Department, Lady Bank Anthony Hall, senior staff flats, swimming pool complex and U.I. Ventures 28 bedroom guest house in University of Ibadan; First Bank Amunigun Ibadan, Wema Bank Mokola, NTC warehouse Ogbomosho and Nigeria Gas Cylinder Co. Factory Monotan, Ibadan among others.

Historical background of Adold Engineering Company Limited

Adold Engineering Company is an Engineering and Construction Development Company incorporated in 1976. It is registered under category 'D' (Major Contracts) with the Federal Ministry of Petroleum (DPR), PHCN and other various corporate organisations. Since its inception in 1976, it has expanded to offer full range of services in engineering and management related to the construction industry. These services range from development studies and planning, complete engineering and design, to procurement construction and supervision.

Complete project management or any component of engineering and management services desired could be provided. Adold Engineering has become an integral part of engineering and construction industry in Nigeria. During its thirty years in business, It has completed over 250 projects, among which are various works for Shell Petroleum Development Company Limited in Warri and Port-Harcourt, Chevron Texaco Unltd., Mobil producing Unltd., Centarl Bank of Nigeria, First Bank of Nigeria Plc, Leadway Assurance, Savannah Bank, National Bank, Rank Xerox, Wemabod Estate, Ajayi Crowther University, Globacom Limited and Arevea T & D Nigeria Ltd. The projects completed by Adold Engineering also included works for various government Agencies and parastatals like Estate Developemnt for CBN in satellite Town, Lagos, Ilori, Karu, Wuse, Garki, Apo, Mabushi in Abuja; Commercial and Residential developments for NPA in Abuja, Lagos Estate Developments for NPA in Abuja and Lagos State Ministry of Works.

2.1.3. Occupational hazards and accidents in the Nigerian construction industry

Construction work and industry, although, highly important to the developmental processes of any nation, is characterised with high level of risks occurrence and hazards, especially in Nigeria. The workers who are mostly temporary workers with relatively average educational background, are particularly prone and exposed to the various hazards and injuries. The trend is exacerbated by the insecure manner in which the construction workers are recruited, placed and managed. The seeming employers' ambition for high profit and effectiveness in productivity at all cost is fast increasing their nonchalant attitude to health and safety issues in the different construction sites in Nigeria. This has been fuelled by the poor economic situation prevalent in Nigeria as well as non-enforcement of existing safety laws in the various industries.

Construction workers are exposed to a variety of hazards every day and these may make them to be ill, injured, sick or disabled for life, especially in Nigeria. (Construction Safety Council, 2012). The construction industry has the highest number of hazards when compared to other industries (Samaneh, Javier and Mehdi, 2011). The workers in a construction site may be exposed to various hazardous substances and physical agents like asbestos, lead, silica dust, organic solvents, sewer gases, welding fumes, radiation, noise and vibration (Guidance Notes on Health Hazards in Construction Work, 2004.) Excessive exposures to these substances/agents may result in acute injury, chronic illness, permanent disability or even death. Loss of concentration at work and fatigue arising from poor health conditions may increase the risk of accidents.

The Nigerian construction work is characterised by high labour turnover, constantly changing environment and conditions on site, and different types of work being carried out simultaneously by several contractors. These features would further increase the health risks of workers. When compared with other labour-intensive industries, the construction industry has historically experienced a disproportionately high rate of disability, injuries and fatalities for its size (Hinze, 1997). The construction industry alone produces 30% of all fatal industrial accidents across the European Union (EU), (McKenzi; Gibb and Bouchlaghem, 1999). In the United States of America (USA), the construction industry accounts for 22% of all fatal accidents (Che Hassan; Basha and Hanfi, 2007). In other countries such as Japan, United

Kingdom (UK) and Ireland, the situation is even not better (Okolie and Okoye, 2012). Bomel (2001) notes that, in Japan, construction accidents account for 30%-40% of the overall industrial accidents, with the total being 50% in Ireland and 25% in the United Kingdom (UK). This situation is worse in the developing countries, like Nigeria, where there are no reliable sources of data for such accident records.

Workplace reports of accidents in Nigeria, according to Nigeria Report of the National Occupational Safety and Health Information Centre, CIS, (2006), is as given in the table below:

YEAR	NUMBER OF ACCIDENTS
2001	82
2002	63
2003	85
2004	90
2005	120
2006	57

Table 2.1: Workplace reports of accidents in Nigeria, CIS, (2006)

This gives a very scanty and low report of the number of accidents which actually happen in various workplaces in Nigeria from time to time.

Types of health hazards in construction industry

There are many types of health hazards in the construction industry. Falls are the leading cause of construction-related fatalities in most, if not all, countries as they account for more than 33 percent of all construction deaths. An example of such incidents in Nigeria was the crane accident in a proposed High Court Building Site at Abuja on 30, May 2006 that led to the loss of six lives. Falls are a common cause of occupational injuries and fatalities, especially in construction, extraction, transportation, health care and building cleaning and maintenance. Machines are common in many industries, including manufacturing, mining, construction and agriculture, and can be dangerous to workers. Non-fatal injuries, such as cuts and lacerations, eye punctures and back injuries are common among construction workers in all countries (Bindra and Rinehart, 2008). More workers die while working on construction than in any

other industry. Construction workers make up about 5 percent of the workers in the U.S., but they account for about 20 percent of the workers' deaths.

Construction workers are exposed to a variety of risks and health hazards (Smallwood and Ehrich, 2001, cited in Danso, 2012). These range from noise, resulting in noise-induced hearing loss (NIHL); skin diseases from close contact with irritant or sensitizing materials; to respiratory irritation from dusts, fumes and gases; as well as developing more serious lung diseases related to exposure to asbestos and other fibrogenic materials (Danso, 2012). Construction sites have many noisy operations and could be a significant source of noise exposure (Occupational Health and Safety Administration Pocket Guide, 2011). Loud noise can also reduce work productivity and contribute to workplace accidents by making it difficult to hear warning signals. Hearing loss limits construction workers' ability to hear high frequencies and understand speech. It also reduces their ability to communicate, which can lead to social isolation. Besides, they may be two to three times more likely to suffer from serious heart disease than workers who were not exposed (Gan, 2004).

Health hazards in the construction industry can be grouped under chemical hazards, physical hazards and ergonomic hazards:

- Chemicals can affect the body via inhalation, ingestion, or skin absorption.
- Physical hazards include noise, heat, vibration and radiation.
- Ergonomic hazards include mainly manual handling of loads.

Construction Safety Council, in its publication *Health Hazards in Construction Workbook*, classified the construction hazards into three, which are chemical, physical and biological hazards. Chemical hazards can also be in different forms, including gases, vapors, fumes, dusts and Fibers; Physical hazards are temperature, noise, repetitive motion and awkward postures ionizing and non-ionizing Radiation. Examples of biological hazards are fungi (mold), blood-borne pathogens, bacteria, poisonous plants, poisonous and infectious animals.

Silica dust

Silica is a major component of the earth's crust. Besides, a lot of building materials, like natural stone, bricks and concrete contain silica. Therefore, workers are widely exposed to it. Any process involving breaking, crushing or grinding silica-containing materials will generate silica dust. The workers at high risk include operators of pneumatic breakers, drillers and masons.

Another classification of the construction hazards is the big four hazards in construction: falls, electrocution, caught-in and struck-by. Struck-by hazards are further divided into four as stated below based on the nature of mobility of the causative agents:

1. Struck-by Falling Objects
2. Struck-by Flying Objects
3. Struck-by Swinging/Slipping Objects
4. Struck-by Objects on Ground Level

Each year, workers die from struck-by accidents. During the year 2007, total deaths from struck-by cases was 504, while the total number of deaths in construction was 311. Approximately 26% of deaths in construction are from struck-by accidents and approximately 10% of all occupational deaths are from struck-by accidents (OSHA, 2014).

Also in a Planning Guide for Construction and Development, the following are listed as examples of hazardous wastes generated at the construction site: used oil, hydraulic fluid, diesel fuel, or jet fuel; soil contaminated with toxic or hazardous pollyhydraulic fluid, diesel fuel, or jet fuel); resins, roofing cement, adhesives, machinery lubricants, and caulk; cleanup materials (such as rags) contaminated with the items listed above; drums and containers that once contained the items listed above; waste carpeting (due to formaldehyde contents); lead-based paint, lead flashing, or lead solder; computer monitors and televisions with cathode ray tubes; gypsum drywall (due to sulfate); rescent bulbs, broken mercury switches, batteries, or thermostats); and other items that may have inseparable hazardous constituents. tants (for example, soil contaminated with used oil, waste paints, varnish, solvents, sealers, thinners, waste carpeting (due to formaldehyde contents); lead-based paint, lead flashing, or lead solder; Mercury-containing demolition wastes; corrosive acids (with a pH less than 2 or bases with a pH greater than 12.5), such as rust removers, cleaning fluids, and battery acids; reactive (explosive or violently reactive), such as cyanide, plating waste, bleaches, and waste oxidizers; Toxic waste (meeting certain concentrations), such as materials containing metals (for example, mercury, cadmium, or lead) or solvents (like, carbon tetrachloride or methyl ethyl ketone). Materials may include adhesives, paints, coatings, polishes, varnishes, thinners, or treated woods. The listed wastes are divided into the four following waste codes:

- The “F” List contains nonspecific source wastes from specific industrial or manufacturing processes (for instance, spent solvents used to strip paint).
- The “K” List contains specific source waste (this list does not typically include waste from construction and demolition sites).
- The “P” and “U” Lists contain pure or commercial grade unused chemicals (like, left-over chemicals or container residues, such as toluene or acetone). Note that unused pesticides and their containers are covered by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Additionally, some commonly recycled materials are considered to be “universal wastes.” These are hazardous wastes that are subject to less stringent requirements. Universal wastes include the following hazardous wastes: batteries; pesticides (as defined by the universal waste definition); thermostats; and lamps. Physical hazards are a common source of injuries in many industries. They are, perhaps, unavoidable in many industries, such as construction and mining, but over time, people have developed safety methods and procedures to manage the risks of the physical danger in the workplace. The employment of children may pose special problems.

Falls are a common cause of occupational injuries and fatalities, especially in construction, extraction, transportation, health care, and building cleaning and maintenance. Machines are common in many industries and can be dangerous to workers. Many machines involve moving parts, sharp edges, hot surfaces and other hazards with the potential to crush, burn, cut, shear, stab or otherwise strike or wound workers if used unsafely. Various safety measures exist to minimize these hazards, including lockout-tagout procedures for machine maintenance and roll over protection systems for vehicles. According to the United States Bureau of Labor Statistics, machine-related injuries were responsible for 64,170 cases that required days away from work in 2008. More than a quarter of these cases required more than 31 days spent away from work. That same year, machines were the primary or secondary source of over 600 work-related fatalities. Machines are also often involved indirectly in worker deaths and injuries, such as in cases in which a worker slips and falls, possibly upon a sharp or pointed object.

2.1.4. Issues of occupational health and safety in the Nigerian construction industry

The construction industry has so many issues with regard to occupational health and safety of the workers. There are many reasons given for non-compliance with safety in construction industry. These include absence of required legislation, non-enforcement of the existing safety rules, lack of basic adequate training, management non-commitment to safety issues and poor safety culture among the employees. Haslam, Hide, Gibb, Gyi, Pavit, Atkinson, and Duff (2005) quoted in Okoye and Okolie (2014), state that the construction industry is indisputable for its overt position in the economy of any nation. However, the poor safety performance of the construction industry has continued to give international cause for concern. The health and safety performance of the industry remains a staring challenge in its effort to tackle the developmental initiative of many nations, including Nigeria. Despite Nigeria being among the countries that signed the occupational health and safety law in the Geneva Convention of 1981, the pathetic health and safety situation in the country's construction industry made Idoro (2011), to conclude that the contractors' management efforts on occupational health and safety do not reflect in their scope of operations and the accident and injury rates of the Nigerian construction industry are high.

In order to explain why occupational health and safety is yet to be fully established and maintained in most of the developing countries, Ahmed and Newson-Smith, (2010), identifies the following as some of the main reasons for not implementing the safety policy by most developing countries: lack of effective enforcement system, lack of information and accurate records of occupational diseases and accidents and lack of basic professional training in occupational health and safety. Bindra and Rinehart (2008) also raises some of occupational health and safety issues in construction as incomplete or no safety training for workers, no access to training and skill-building opportunities as well as extensive turnover of mostly migrant workers who are vulnerable to exploitation.

Also emphasizing the importance of adequate and effective training programme as a cogent factor for occupational health and safety of workers, Garcia, Boix and Canosa (2004) state that interventions over workers' behaviour intended to risk prevention are usually based on specific training programmes. This simply implies that safety training is one important factor which can affect workers' behaviour to safety at workplace. Cohen and Colligan (1998) argue that these

programmes are generally devoted to increasing workers' knowledge of job hazards and promoting safer work behaviours. However, Garcia, Boix and Canosa (2004) add that workers' behaviours regarding risk prevention are influenced by other factors besides proper training. These factors should be evaluated and their relative effects on the workers' behaviour measured in order to develop integral programmes for workplace hazards control. This shows that efforts geared towards achieving efficient and effective management of occupational health and safety must take into consideration all the factors involved. Some of these other factors, as identified by Lindel (1999), cited by Garcia, Boix and Canosa (2004) are organisational factors related to safety and health at work, including management's policies and practices regarding occupational risk prevention which may also affect implementation of workers' safety training.

On the other hand, the findings of Lauver (2007) are in contrast with many others' (Harshbarger and Rose, 1991; Reber, Wallin and Duhon, 1993; Letho and Salvendy, 1995) because he did not find a connection between training and organisational safety outcomes. He ascribes training measure, including both supervisory and employee training as reason for this lack of relationship. Although, Harshberger and Rose (1991) found that training was more important at both levels, Harvey, Bolam and Erdos, (2001) found training to be more important at the supervisory level. The findings of Lauver (2007) may also be due to how performance evaluation was operationalized in his study. Both formal performance evaluations and more general feedback questions were included, whereas most often studies examine the more general feedback and derive this measure from employees.

Commenting on the various reasons which can be given for the rising issues on occupational health and safety in Africa and especially in Nigeria, Puplampu and Quartey (2012) opine that the prevalence of occupational health and safety issues in most of the African countries is due to inadequate attention given to occupational health and safety (OHS) by industries and the government and also shows one perspective to the concern of many international and non-governmental organisations. The majority of the African countries are struggling to foster an effective occupational health and safety, as most of them have poor health and safety culture (Regional Committee for Africa Report, 2004). This could also lead to poor occupational health and safety competencies exhibited at workplace. Another reason is the greater emphasis

laid on increasing productivity and profitability, while compromising health and safety standards, procedures and policies.

Another OHS perspective for Africa is that Africa's slowness in promoting occupational health and safety is due to colonialism and its effects on socioeconomic development (Meredith, 1986). The colonial administration situated occupational health and safety in certain viable and relevant sectors in pursuit of their colonial ambitions. Many African countries have weak procedural and administrative justice systems to handle occupational health and safety issues, a perspective that is often neglected. These have retarded the development and promotion of occupational health and safety in African countries.

Nnedinmaik and Umeadi (2014) view safety culture as one of the important factors affecting the compliance of construction workers with occupational health and safety regulations; thus affirming that the safety competencies of Nigerian construction workers have an impact on the level of safety maintained at the workplace. They comment on the contributing effect of safety culture at workplace by comparing the views of Kalejaiye (2013) and Idubor and Osiamoje (2013). While Kalejaiye (2013) mention lack of safety culture in the family and the education sector as some of the challenges facing the OSH environment in Nigeria's workplace; Idubor and Osiamoje (2013) contend that the cultural dimension determines compliance with OSH regulations. An organisation with safety culture will have a lower accident rate than one without safety culture.

Nigeria has its own cultural norms; however, there is neither enforcement culture nor implementation culture. Idubor and Osiamoje (2013) describe this culture in Nigeria as 'lack of political will'. Lack of implementation of plans is a major setback to the compliance with occupational health and safety regulations. Okolie and Okoye (2012) posit that national cultural dimension is correlated with safety climate that constantly influence the safety perception and behaviour of construction workers in Nigeria. The safety perception and attitude of construction workers in Nigeria are influenced by culture. This implies that compliance with occupational health and safety regulations by construction workers is determined by national cultural dimension.

2.1.5 Occupational health and safety competencies in the Nigerian construction industry

Occupational health and safety competencies could be described as the ability of the workers to anticipate, recognize, evaluate and control occupational health hazards. Occupational health and safety (OHS) is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment (Alli, 2008). Occupational health and safety competencies could be related to safety culture and safety climate which, are usually used in a complementary way. Cooper (2000) refers to safety culture as a sub-facet of organizational culture, which is thought to affect member's attitudes and behaviour in relation to an organization's ongoing health and safety performance, while Cox and Cox (1991) argue that it reflects attitudes, beliefs, perceptions, and values that employees share in relation to safety. Also, Wilpert (2000), views the safety culture of an organization as the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management.

The roles of employees in maintaining high level of occupational health and safety has been described in Good Health Is Good Fortune, a training guide by the Occupational Safety and Health Branch (2005), to be fully cooperating with their employers, complying with proper work practices and taking care of their own and others' safety and health. For example, they should comply with work regulations and instructions; carefully read and understand relevant information, such as instructions and warning labels; carefully and properly use any material, tool, device and personal protective equipment provided; avoid eating, drinking or smoking in any places where there are hazardous materials to prevent poisoning caused by toxic substances entering the body through contaminated food or cigarettes; as well as pay attention to personal hygiene and wash hands before eating or drinking.

Some of the processes involved in maintaining occupational health and safety competencies in the construction industry include:

Accident prevention

- i. Personal protective equipment
- ii. Material storage

- iii. Proper materials handling
- iv. Work zone safety

Occupational health and safety competencies have been referred to as industrial hygiene, which has been described as the art and science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness. Industrial hygienists use personal and environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering, work practice controls, and other methods to control potential health hazards (Construction Safety Council, 2012).

Occupational health and safety competencies may involve the practices stated in Guidance Notes on Health Hazards in Construction Work (2004) as hazard identification, risk assessment, prevention, control, personal protective equipment and medical surveillance. To prevent health hazards at work, all possible health hazards that may be encountered should be identified before commencement of construction work. The health hazards at a construction site may come from the hazardous substances used or those already present on site. The environmental conditions may also create additional health hazards. These factors should also be identified, for example, heat and noise. The information for hazard identification can be obtained from the equipment and material supplier, site owner and principal contractor. If such information is not available, then a contractor should take actions to identify unknown substances or seek assistance from a specialist if necessary.

Risk assessment is the process to look at the conditions under which workers are exposed to the hazards and determine whether the hazards are likely to cause any harm to the workers. Assessment of risks may be made by considering the following factors:

- the air concentration of fumes, vapours and dust generated from the work processes;
- the effectiveness of ventilation on site to control the air contaminants;
- the likelihood of skin or eye contact with corrosive/irritating substances;
- the exposure of the workers to hazardous physical agents, for instance, noise, heat and radiation;
- the ergonomic factors, e.g. repetitive tasks and manual handling.

Both the immediate risks, for example, being overcome by fumes in a confined space, and the long-term health risks, like skin cancer from prolonged contact with pitch, should be assessed.

The assessment should be reviewed when new hazardous substances and physical agents are used and when there is a significant change in the working environment.

When health hazards are identified, the first step is to try to eliminate them completely. It means either:

- doing the job in a different way, for example, instead of using acids or caustic soda to unblock a drain, use drain rods; or
- using a substitute, for example, instead of using spirit-based paints, use water-based ones which are generally less hazardous. However, always check that one hazard is not simply replaced by another.

If prevention is not practicable, the next step is to try to control the risk. The control methods may include:

- ensuring adequate ventilation in the working area;
- using as little hazardous substances as possible;
- applying local exhaust ventilation to particularly hazardous processes, for example, rock cutting and grinding and welding;
- using water suppression to control dust emission;
- segregating hazardous process so that workers not directly involved are not affected;
- administrative measures, like providing sufficient safety and health training, instructions and information to the workers, appropriate supervision, good personal hygiene and good housekeeping.

If exposure cannot be adequately controlled by any combination of the measures already mentioned, personal protective equipment should be provided. These may take the form of:

- respiratory equipment for protection against dusts, vapours or gases;
- protective clothing, such as overalls, boots and gloves for protection against irritating and corrosive substances, abrasion and vibration;
- eye protectors for protection against chemical splashes, such as goggles or face visors.

The personal protective equipment should be selected with care. A personal protective equipment programme, including selection, maintenance, user training and supervision, should be set up to ensure the effectiveness of the personal protective equipment.

Medical surveillance is basically a system of monitoring the health status of workers engaged in hazardous occupations. The objective is to detect early signs of illness so that intervention

may be taken to prevent permanent health damage. This is particularly useful for occupational illness with long latent period, like silicosis and occupational deafness.

The examination should be done by a medical practitioner with sound knowledge in occupational medicine. It is recommended that in the construction industry pre-employment and periodic medical examination should be undertaken because workers may have prolonged exposure to a high concentration/level of hazardous substances and/or physical agents.

2.1.6 Syndicate training method

The syndicate training method is a method in which learners are subdivided into small groups so as to perform a given task as a team (Langevin Learning Series, 2009). It is one of the methods used for small group teaching. McKimm and Jollie (2007) submits that small group teaching is very relevant to adult learners because learning in a small group facilitates learning through discussion, active participation, feedback and reflection. Syndicate training method can then be said to be relevant to training the construction workers who are basically adults. Adults differ greatly from children in the way they learn and these specific differences are identified by Brookfield (1998) when he states the main characteristics of adult learning:

- the learning is purposeful;
- participation is voluntary;
- participation should be active not passive;
- clear goals and objectives should be set;
- feedback is required; and
- opportunities for reflection should be provided.

The purist view of small group teaching is that it must be learner-centred, with all students joining in free discussion of a particular topic. (McCrorie, 2006). The syndicate training method could also be described as one of the collaborative learning techniques. Collaborative learning has been described by various experts in different ways but they all point to the fact that it entails joint efforts and pulling together of resources of all the members of the group. Dooly (2008) also stresses that collaborative learning involves working together towards a common goal. The most important feature of collaborative learning is that it means learners are

responsible for one another's learning as well as their own and that reaching the goal implies that learners have helped each other to understand and learn.

According to Gerlach (1994) "collaborative learning is based on the idea that learning is a naturally social act in which participants talk among themselves". Smith and McGregor (1992) note that collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. Usually students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product.

Collaborative learning activities vary widely, but most of them centre on students' exploration or application of the course material, not simply the teachers' presentation or explication of it. Dillenbourg (1999) defines collaborative learning as a situation in which two or more people learn or attempt to learn something together. "Two or more" may be interpreted as a pair, a small group (3-5 subjects) or a class (20-30 subjects). "Learn something" may be interpreted as "follow a course", perform learning activities, such as problem solving. "Together" may be interpreted as different forms of interaction which may be face-to-face or computer-mediated. Collaborative learning allows for student talk in which students are supposed to talk with each other, and it is in this talking that much of learning occurs. Collaborative teaching and learning is a teaching approach that involves groups of students working to solve a problem, complete a task or create a product (McGregor, 1990).

According to Surgenor (2010), members in a syndicate group could be asked to undertake Internet or literature searches, debate an issue, explore a piece of text, prepare an argument, design an artefact or many other tasks. To achieve productively, they will need an explicit brief, appropriate resources and clear outcomes. Specialist accommodation is not always necessary; syndicates can work in groups spread out in a large room, or, where facilities permit, go away and use other classrooms and so on. If the task is substantial, the tutor may wish to move from group to group, or may be available on a "help desk" at a central location. Outcomes may be in the form of assessed work from the group or produced at a plenary as described.

Surgenor (2010) further describes the steps which may be involved in syndicate group discussion saying that, in this technique, groups of 20 to 25 students are broken down into sub-groups or syndicates of 4-5 students. Each syndicate may be assigned different tasks or the same task.

Step 1: A preliminary meeting is held to describe the procedures, to allocate assignments and to set up the syndicates. Depending on the task, this meeting could be used to view a video-clip, observe an experiment or demonstration which will serve as the stimulus for the task each sub-group is going to undertake.

Step 2: Each syndicate works independently, in which they discuss, form views and deduce principles for themselves from reading and doing research. It is envisaged that the small number of individuals in the group means everyone can take full and active part in the work assigned. Each syndicate brings its task to completion by the writing of a joint report or preparation of notes for an oral report.

Step 3: There are a number of options available:

The papers from each syndicate are submitted to the instructor who may summarise their conclusions and present it in a lecture. The instructor will correct misconceptions and extend the subject beyond what participants have presented. The purpose is to consolidate what the students have learned. Alternatively, each syndicate makes an oral presentation to the full group. Students from other syndicates comment on the presentation and may ask questions. The instructor draws the different reports and gives comments and his or her views. The instructor will find commonalities and make generalisations based on the various reports. Sometimes, he or she may invite experts to come and comment on the participants' work.

2.1.7 Guided-practice training method

Richard recorded the five principles of effective Guided-Practice as the five principles will help teachers design a successful lesson phase between showing students how to do something and expecting them to do it on their own. In a typical high school lesson, teachers have between 45 and 70 minutes to complete a series of activities that, among other things, require that students learn something brand new, digest it, reflect on it, and perform a task using it.

Accomplishing all of that takes skill, discipline, consistency, and an effective plan. Among the many lesson models supported by research is a five-step plan that includes (1) Anticipatory

Set, (2) Presentation of New Material, (3) Guided Practice, (4) Independent Practice, and (5) Closure.

Part of this and nearly all lesson models is time allotted for “guided practice,” the phase of the lesson in which the teacher guides students through new materials before they can practise it on their own. Teachers make guided practice effective by doing five things.

Remind participants of the lesson objectives

All lesson components need to be tightly aligned to the objectives of the lesson. An explicit reminder when the guided practice phase begins will make the activity relevant to the students and fit it in to a clearer picture of what teachers expect of them. Being clear about what students are responsible for learning gives them what instructional experts have called, “executive control,” or the ability to make a selection of “strategies appropriate to the learning task.”

Immediately and frequently check for understanding

Participants are doing something new for the first time, and during the process they need to know from the teacher if they are performing the task correctly. Teachers also need to know if all students are meeting the cognitive demands of the lesson.

Slow and deliberate, a good pace should offer teachers time to let students know where they are right, and where they might be veering. A rule of thumb for teachers to follow is that 80% of students demonstrate understanding before continuing. This check on understanding can be very informal and random, but reliable in the context of the lesson.

Give non-evaluative feedback

Checks for understanding necessarily result in feedback, which is crucial at this point. Feedback should be non-evaluative – that is, accurate and objective, but without consequence. The assessment will come later, so scores can wait, too. With non-evaluative feedback during guided practice students can correct work or make improvements without the anxiety of their efforts going into a grade.

Make tasks interactive

Teachers must make it clear to students of the expectation to participate in guided practice. Gary, a leading educational researcher, has said “active engagement in the learning process at an appropriate level of difficulty must be a goal of every lesson, because without it little or no learning occurs.” One way to attain the appropriate level is to have a student lead the practice, while the teacher guides him through it.

An important aspect of interactivity is the security students need to ask questions. Guided practice needs to be a safe zone for all types of questions. If done properly, students have just been presented a brand new material – their nascent understanding develops in unique ways, and they need to be able to form and mold that understanding by testing it against their existing schema.

Teachers, then, should set up systems that encourage questions, like requiring that students pose questions publicly by voice or privately on paper. Points can be awarded for good questions. Asking students to think of questions that someone younger might have can also get them to develop inquisitive habits.

Scaffold class activities

Scaffolding simply means that the appropriate supports are in place to enable student learning in the most efficient way. Graphic organizers, vocabulary lists, Venn diagrams, and sentence stems are all examples of scaffolding that could be used during guided practice sessions.

During guided practice, one could use a table with six key points on the rows, and the main belligerent nations in columns, explaining how each point was viewed by each country.

Guided practice can be the crucial link from showing students what they are supposed to do and seeing them actually do it. Following the above five guidelines will result in good guided practice. Good guided practice will facilitate real learning.

2.1.8 Syndicate training method and occupational health and safety competencies

The syndicate training method is one of the methods that mainly draw from the experience of the participants and could be referred to as one of the techniques of experience-based learning.

It will be essentially useful for improving the occupational health and safety competencies of workers because it draws from their experience to help in the process of inculcating safety values and attitude. Andreson, Boud and Cohen (1996) state that “attitude and value change is liable to be promoted if authentic experience is used to define and raise awareness of attitudes and values not previously recognised by the holder.” They also identify the syndicate method as an experience-based technique, which includes internships, work placements, on-the-job training, excursions, adventure and wilderness trips, studios, laboratories, workshops, clinicals, practicums, case study approaches, action research, role plays, hypotheticals, simulations learning in lectures, computer simulations, use of realistic models, video-based activities, group discussion, autobiographical writing, problem-based learning, group work, use of reflective journals and self-directed projects, action research and action learning.

2.1.9 Guided-practice training method and occupational health and safety competencies

The guided-practice training method essentially follows the principle of “learning by doing” or “learning by observation” which can promote the application of various safety rules by the workers in the construction industry, thereby improving their occupational health and safety competencies. It may be important to enhance occupational health and safety competencies through the use of practical training, like guided-practice, because inadequate training method could result in poor occupational health and safety competencies. Stating the determinants of compliance of Nigeria’s construction industry to occupational health and safety (OHS), Umeokafor, Umeadi and Jones (2014) mention inadequate training of staff and workplace issues. They cite Othman (2012), who notes that technical failure and inadequate training coupled with harsh work environment and unsafe methods of working are among the causes of non-compliance with OHS regulations in developing countries’ construction. Windapo and Oladapo (2012), also claim that lack of adequate training and unsafe work environment can determine how construction firms handle the issues of compliance with OSH regulations.

Umeokafor, Umeadi and Jones (2014) also cite Adenuga, Soyngbe, and Ajayi (2007) and Idubor and Osiamoje (2013), who contend that inadequate training is a hindrance to OHS regulations. In the same vein, Idubor and Osiamoje (2013) maintain that the performance and productivity of staff is a function of the level of their expertise and skill, which is a function of the standard of training and education received. These imply that if adequate OHS training and

education are not given to staff, their OHS performance, for example, compliance with OHS regulations will be affected. It can, therefore be misunderstood, in simple terms to just result to lack of knowledge and information which in turn, depends on the level of acquired training and education. The facts are that management-related issues, individual willingness to participate in self-development, self-determination within a value oriented-work environment will encourage compliance to OHS regulations.

2.1.10 Literacy level and occupational health and safety competencies

The awareness level of all the stakeholders at the workplace about the importance and processes of ensuring and maintaining occupational health and safety could be described as generally low. Most of the employers in Nigeria may not have reasonable knowledge of the details of the rules and the legal implications expected of them as employers with regard to keeping a safe workplace. This could also be true of a large percentage of Nigerian employees whose literacy level on their health and safety at work is rather poor. The general low literacy level of the majority of casual workers used at construction sites may have a great impact on their health literacy making them to be ignorant or unable to understand the proper usage of the personal protective equipment as well as the safety instructions needed to use the equipment.

Nnedinmaik and Umeadi (2014), while explaining the determinants of compliance with occupational health and safety, identify low level of health literacy as well as proper awareness of the Nigerian construction workers particularly those workers in the informal sector, which constitutes a larger percentage of construction activities in Nigeria. Tanko and Anigbogu (2012), cited in Nnedinmaik and Umeadi (2014) submit that the informal construction sector in Nigeria engages in informal construction activities constitute about 70% of construction outputs. Kalejaiye (2013) posits that the informal construction sector has little or no access to occupational health. Its main methods of project execution involve employing a workforce that do not have ideas of adequate safety practices required. Therefore, it cannot advise the client to comply with OHS regulations. The argument, is that, if 70% of the construction activities are executed through the informal practice, the construction industry is shooting itself in the foot, as it will never conform to OHS regulations; rather, it contributes to most of the unsafe construction activities, thus hindering OHS improvement.

Emphasising the effect of low health literacy level of the construction workers on their occupational health, Nnedinmaik and Umeadi (2014) also stress that lack of awareness and improper medium of information dissemination could also be another reason for non-compliance with OHS laws. This was explained using the argument of Windapo and Oladapo (2012) that lack of knowledge and understanding of OHS regulations determine the level of compliance within construction regulations and that there is lack of awareness in most developing countries (for example, Nigeria) for OHS regulations and practice (Idubor and Osiamoje, 2013).

Therefore, Diugwu, Baba and Egila (2012), contend that lack of knowledge for details and implications hinder OHS management in the construction industry. They found that construction workers in Minna, Nigeria did not know the enforcer of OHS regulations in Nigeria. If workers do not know or understand the regulations, they will not know when their rights have been violated. Puplambu and Quartey (2012) also note a similar issue that lack of adequate information and statistics hinder the compliance with OHS in Africa; Diugwu et al. (2012) and Idubor and Osiamoje (2013) identify same for Nigeria. Diugwu et al. (2012), argue that OHS information dissemination in Nigeria is ineffective and has minimal impact to target groups, hence blame the government for it. This demonstrates that enacting laws without adequate effort to make it available to the public is as good as not formulating one at all.

When discussing the effect of literacy level on occupational health and safety of workers, Campbell (2008:5) submits that:

A low level of literacy can jeopardize workers' safety if they cannot understand the health and safety regulations provided to them. Furthermore, low literacy skills can prevent workers from obtaining information about their rights to a safe workplace. Without an understanding of their rights or the ability to assert them, workers with low literacy skills will continue to operate in unsafe work environments

This submission confirms that literacy level has a lot of impact on workers' occupational health and safety as the workers with low literacy level tend to have problems with the interpretation of some safety rules and exercise of their rights. The literature has also documented many benefits of increasing the literacy skills of workers and particularly with respect to occupational health and safety. Literacy skills, according to Bloom and Lafleur (1999), form the foundation on which advanced training, including safety training, is built and

are key to increasing employees' capacity to acquire the technical and job-specific skills they need to be high performers. In a research conducted in the United States for the U.S. Department of Education, the Conference Board, as reported by Bloom and Lafleur (1999), found that training also "gives employees a better grasp of workplace dangers and safety issues," leading them to appreciate the health and safety-related consequences of their actions. The result of workplace education programmes, the study concluded, is fewer accidents, less lost work time due to injuries, reduced workers' compensation payments, and better compliance with OHS regulations.

2.1.11 Status of employment and occupational health and safety competencies

There is a need for safe work environment at any place and especially in the construction industry. The Nigerian construction workers are characterized by low-level status and lack of job security. Most of these workers belong to the informal sector where they are not usually protected against loss of job or incidence of accidents. The sets of workers are usually laid off and given meagre allowances as soon as they are no longer useful as a result of occupational accidents.

Alli (2008) describes the disadvantaged position of part-time, migrant and informal workers, noting that they are another group that may suffer from not being covered by safety and health provisions. This is why the Part-Time Work Convention, 1994 (No. 175) stipulates that "measures shall be taken to ensure that part-time workers receive the same protection as that accorded to comparable full-time workers in respect of: (b) occupational safety and health" (Article 4). In 2000, economically active migrants were estimated to number some 81 million. For many of them, working conditions are abusive and exploitative: forced labour, low wages, poor working environment, a virtual absence of social protection, the denial of freedom of association and union rights, discrimination, xenophobia and social exclusion all rob workers of the potential benefits of working in another country (ILO, 2004).

Alli (2008) further stresses that the safety and health risks associated with such conditions are compounded by the kinds of work that most migrants do, namely hazardous and risky jobs, particularly in agriculture and construction. In Europe, occupational accident rates are about twice as high for migrant workers as for native workers, and there is no reason to believe that

the situation is any different in other parts of the world. Language barriers, exposure to new technology, family disruption, poor access to health care, stress and violence are some of the specific problems faced by migrant workers that make them particularly vulnerable to safety and health risks at the workplace.

Bindra and Rinehart (2008) also describe the extensive turnover of mostly migrant labourers who are vulnerable to exploitation, language barriers, no social security as part of the issues of great concern in the occupational health and safety of construction workers. Karlsson, Bjorklund and Jensen (2012), aver that downsizing, outsourcing, short-term contracts, job insecurity and less stable work environment are a result of major changes in the labour market which could also be a possible explanation for increased stress among employees and increased level of sickness absence in Sweden (Cooper, 1999; Harenstram, 2005).

Considering the various factors which are germane to compliance with occupational health and safety regulations, Nnedinmaik and Umeadi (2014) also argue that high rate of unemployment could be responsible for poor observation of safety regulations and thereby lead to high rate of accidents inasmuch as the vulnerable workers are willing to continue work even under risky and dangerous conditions because they may be unable to get another source of living if they leave their present dangerous jobs due to the prevalent high level of unemployment in Nigeria. Citing Idubor and Osiamoje (2013), they note that unemployment is one of the factors that embolden non-compliance with OHS regulations. The level of unemployment in Nigeria is so high and increasing. According to Trading Economics (2013), unemployment in Nigeria rose from 21.10 % in 2010 to 23.90 % in 2011. This amounts to high volume of men and women given to the employer to pay low wages or impunity to take advantage of workers to work under dehumanising conditions provided they have jobs. If construction works being carried out violate OHS regulations under dangerous conditions, the workers are unable to complain, for they risk losing their jobs. Quinlan and Bohle (2004) claim that the use of temporary workers affect employer attitudes to induction, training, participation in workplace committees and other implications for safety. This confirms the precarious or disadvantaged position of temporary workers especially regarding their safety at work.

2.2 Review of empirical findings

Okoye and Okolie (2014) assessed cost of health and safety performance of building contractors in South East, Nigeria and the relationship between the cost of performance and success of building projects. The study provided a framework through which contractors' health and safety actions can reduce the rate of accidents on construction sites. It employed the survey research method, where a questionnaire was structured and randomly distributed to a total of 150 respondents comprising three construction stakeholders (clients, contractors and professionals) across the zone. The data obtained were statistically analysed using Chi-Square statistics (X^2) to ascertain if statistical relationships exist. Cramer's V test is conducted to establish the strength the relationship. The result revealed that health and safety performance of contractors affected the success of building projects in terms of delivery time, quality, cost and productive, while non-performance induced litigations/legal costs, which inadvertently increased the overall building project cost. The result also portrayed the belief of the stakeholders that implementation of health and safety programmes and policies increased the overall project cost and as a result health and safety programmes were rarely implemented on site. The study recommended that the stakeholders, especially the contractors should look beyond the immediate effect of implementing health and safety programmes and policies and focus on their long-term comparative advantages which include quality reliability, profitability and timely delivery.

The study focused on the contractors and how their safety actions can reduce the rate of accidents at the construction sites. The result also confirmed that occupational health and safety competency of all stakeholders at workplace will affect the success of building projects. However, the study was limited to the contractors which included clients and professionals without considering all the workers at the construction site. Okoye and Okolie did not consider how suitable methods could be used to improve the safety behaviours or competencies of the workers. The researcher in this study looked at these areas to cover the gaps.

In his own study, Idoro (2011) compared the management efforts and performance of construction contractors in Nigeria with regard to OHS. The purpose of his study was to help all categories of construction contractors in Nigeria to improve their management efforts related to OHS. Toward this end, he conducted a field survey with a sample of forty

contractors selected using purposive sampling. The scope of operations of the contractors was designated as multinational, national, regional or local. Six OHS management parameters and seven OHS performance parameters were used. Data were collected using a structured questionnaire and analysed using mean and analysis of variance. The results revealed that contractors' OHS-related management efforts are not correlated with the scope of their operations. The OHS performance of the contractors remained the same in terms of six performance indicators but differed in terms of the rate of accidents per worker. The results also showed that the accident and injury rates in the Nigerian construction industry were high. Thus, the results revealed the challenges facing Nigerian contractors and other stakeholders working to improve the OHS performance of the industry. The findings indicated the need for effective risk management and regulation and control of OHS in the Nigerian construction industry.

Idoro's study focussed on the management's efforts without assessing workers' efforts in improving OHS practices with an aim of reducing accident occurrence in construction industry. The researcher through this study found out how workers competencies could help in improving OHS and reduce accident occurrences.

A survey was conducted by Yu, Cheng and Wong (2002) to review the provision of occupational health services (OHS) in the construction industry, the most hazardous industry in Hong Kong. A questionnaire was used to collect information on various aspects of OHS from a sample of construction companies. OHS provision was estimated by an overall score with the various components weighted with the various components weighted for their importance regarding prevention. Factors affecting the provision of services were explored by multiple linear regressions. Only 58 of the 183 establishments (32%) performed environmental assessment; 37 (20%) offered medical examinations to their workers and 70 (38%) provided health and safety talks. Scores for the provision of OHS were generally low especially for the component of surveillance concerning workers' health. In general, larger establishments size and having safety and / or health policies were important factors leading to high scores.

The study of Yu, Cheng and Wong (2002) was on the various ways by which OHS services were provided in the construction industry by the management and the factors affecting the

provision of these services but did not consider how workers could contribute to the improvement of OHS by having the right attitude, skills and knowledge on OHS. The researcher through this study established that workers are important to the provision and maintenance of OHS services in the construction industry. The importance of training method used in the enhancement of safety competencies among the construction workers was also emphasized as a major factor which may affect workers' safety.

Mckerlie, Cameron, Sherriff and Bovill (2012) carried out a study on students' perceptions of syndicate group learning. *The General Dental Council curriculum guidelines* states that the dental undergraduate at graduation should be competent at designing partial dentures. This requires them to gain a sound theoretical knowledge and understanding of key principles of partial denture designed within a treatment plan and apply these in the clinical environment. Dental undergraduates in their second year of study had a series of tutor-led small group tutorials covering the basic principles of partial denture design. The study investigated the effectiveness of introducing a new syndicate learning approach. Syndicate learning involves small semi-independent (tutor-less) groups working on joint assignments and evidence has shown that students develop a greater capacity for applying learned concepts in new situations. The students (n=90) were divided into groups containing five students (n=18). The project brief required the groups to work through cast analysis and design processes for three separate scenarios. Each group undertook practical activities surveying and mounting casts on an articulator and applied previously learned principles. All students who volunteered to participate completed a feedback questionnaire and a random sample were asked to attend a focus group (two focus groups each containing 12 students) to explore issues that emerged from the questionnaire data. The resulting qualitative data was analysed using a general inductive approach.

The results demonstrated that syndicate learning helped students to achieve course objectives. However, in addition to this, tutor-less groups were rated more positively by students in comparison to more traditional group work with a tutor/facilitator as well as to other teaching methods such as lectures. Outcomes such as enhanced student motivation, engagement, interaction and enjoyment are encouraging. Students were very positive about the effects of the syndicate group approach in terms of making them work harder through a sense of group

responsibility. They also reported learning more deeply by having to teach their peers and learn from their peers. These outcomes suggest that syndicate learning groups can offer a valuable contribution to the undergraduate dental curriculum. A total of 70% of them (n=55) stated that learning methods were appropriate to enable them to meet course objectives. While, 46% of them (n=36) felt group members made an equal contribution to the task; 37% (n=29) disagreed. Comparing this specific style of group work to tutor directed groups, 89% (n=70) found the group work more enjoyable, 84% (n=66) found it more engaging, 73% (n=58) found it more motivating, and 80% (n=63) found it more interesting.

In the focus groups, students' commented on the effectiveness of syndicate group learning. The main themes that emerged from students' comments were: the added value of the group approach in terms of learning and enhanced social cohesion; the sense of responsibility to peers and higher level of autonomy that led them to work harder and have to be able to justify their decisions; and the greater peer interaction achieved through syndicate learning compared to their experiences of other learning methods. A total of 88% of the students (n=79 of 90) completed the feedback questionnaire. Similarly, 87% (n=69) of them felt that sufficient direction or instruction was provided to allow the group to proceed with the task. In addition, 82% (n=65) of them enjoyed the self-regulated group session and thought the group was supportive and encouraging. The study focused on the effectiveness of syndicate method on dental students while the researcher in this study looked at the effectiveness of the same method on construction workers' occupational health and safety competencies. The researcher aimed to find out that whether syndicate method was as effective with construction workers as it was with dental students.

Hall (2002) also found out the effects of Internet guided practice with aural modelling on the sight-singing accuracy of elementary education majors using 37 students who enrolled in a music method course. A t-test for independent samples indicated no significant difference in the posttest scores of the two groups in rhythm ($p > .05$), pitch on solfege ($p > .05$), or pitch on text ($p > .05$) at the conclusion of the 15 weeks of study. However, it was concluded that both groups did improve significantly from pretest to posttest, indicating that the skill of sight singing can be taught to elementary education majors using multimedia technology and guided practice. Internet guided-practice was used and found effective on elementary education majors

while the researcher in this study intended to test the effect of the method on construction workers and their occupational health and safety competencies.

In addition, Navidian, Rostami and Rozbehani (2015) carried out a study on effect of motivational group interviewing-based safety education on workers' safety behaviours in glass manufacturing and explained that workers' safety education using models that identify and reinforce factors affecting behaviour is essential. The study determined the effect of safety education based on motivational interviewing on awareness of, attitudes toward, and engagement in worker safety in the glass production industry in Hamedan, Iran, in 2014 using a quasi-experimental interventional study, including a total of 70 production line workers at glass production facilities in Hamedan. The workers were randomly assigned to either an intervention or a control group, with 35 workers in each group. The participants in the control group received four one-hour safety education sessions, in the form of traditional lectures. Those in the intervention group received four educational sessions based on motivational group interviewing, which were conducted in four groups of eight to ten participants each. The instruments used included a researcher-developed questionnaire with checklists addressing safety awareness, and attitude and performance, which were completed before and 12 weeks after the intervention.

The data were analyzed using descriptive statistics, independent and paired t-tests, and chi-square tests. Results from the study revealed the differences in scores before and after the intervention and the mean changes in the scores of awareness, attitude, and use of personal protective equipment among workers who underwent motivational group interviewing (3.74 ± 2.16 , 1.71 ± 3.16 , and 3.2 ± 1.92 , respectively, $p < 0.05$), showing that the scores were significantly greater than those of control workers who underwent traditional educational sessions (1.28 ± 1.93 , 1.1 ± 3.07 , and 0.2 ± 1.26 , respectively). It was then concluded that incorporation of motivational interviewing principles into safety education programmes had the positive effect of enhancing workers' knowledge, attitude, and, particularly, implementation of safe behaviours. The application of this advisory approach was then recommended to increase workplace safety and minimize occupational hazards in the work environment.

Fazarro and Trybula (2012) assessed the effectiveness of an eight-hour training course on environmental health and safety (EHS) implications of nanomaterials. A pretest was given to the participants to assess if they knew anything about EHS, and a posttest was administered after the training course. A hypothesis test was used to determine the effectiveness of the content of the course. A paired sample t-test was used to ascertain whether there was improvement in scores from the pretest to posttest. The findings indicated a statistically significant difference between the group mean scores from the pretest to posttest. The study concluded that the training programme had positive results on the participants' knowledge of nanosafety. This shows that safety training was effective in improving the competencies of the workers regarding nanosafety.

2.3 Theoretical Review

Discussions on the causes of accident and how to reduce such as well as the ways through which information and skills can be effectively passed to the adults have been explained by diverse theories. Two theories will be reviewed to help in the course of this study and these theories are: Multiple Cause Theory by Dan Peterson (1988) and Social Learning Theory by Albert Bandura (1986).

Multiple cause theory

The theory of accident causation is corroborated by the multiple cause theory, which states that "Behind every accident there are many contributing factors, causes, and sub-causes. These factors combine in a random fashion causing accidents." We must find the fundamental root causes and remove them to prevent recurrence. The theory is relevant to this study because it shows that accidents and injuries at workplace could be prevented if the unsafe act of a person and /or mechanical or physical hazard are removed by acting safely and imbibing safety culture. The theory recognises the incompetency of the construction workers with regards to occupational health and safety as one major cause of accidents at the construction sites. If the workers and all the stakeholders at workplace are all safety-conscious and act to identify, prevent, reduce and control these unsafe acts and conditions, there will be a reduction in the rate of occupational hazards and accidents. A true display of competencies by the workers in the area of occupational health and safety may therefore, be necessary to reduce the incidence

of occupational hazards and accidents and this could be enhanced with the use of appropriate training methods like syndicate and guided-practice methods.

This theory is also relevant to this study because it emphasises the need to remove the root causes of accidents and hazards at the workplace in order to prevent the recurrence of such. The root causes, as identified by Heinrich, refer to the unsafe act and conditions which often lead to other causes and then accident. These unsafe acts and conditions are products of nonchalant attitude and acts of incompetencies relating to health and safety at work.

However, this theory does not provide or suggest the use of appropriate methods which can be employed in the process of removing these unsafe acts and conditions. It does not explain the appropriate methods which can be used in improving the occupational and safety competencies of the construction workers. It only points to what could be the cause of accidents and hazards in the construction industry; hence the need for another theory which will explain the methods which can be used in enhancing the competencies of the workers as regards their health and safety at work and thus make them shun the unsafe acts and conditions which can cause accidents at the workplace.

Social Learning Theory

The leading proponent and the major motivator behind the social learning theory is Albert Bandura (1986). The theory could also be referred to as observational learning because it focuses on how learning occurs in a social context. It describes the way people can learn from one another through observation, imitation and modelling. Bandura argued that a change in behaviour can occur if a learner observes how a model performs an action. He also highlighted some factors which can affect the acquisition and performance of the observed behaviour by the learners, which are attention, motivation, retention and reproduction.

Modelling has many positive effects on the learners because it can help to:

- ✓ teach new behaviours
- ✓ influence the frequency of previously learned behaviour
- ✓ discourage previously forbidden behaviour
- ✓ increases the frequency of similar behaviour

Social learning theory is of great relevance to this study because the use of the two methods (syndicate and guided-practice) which are based on the principle of social learning through observation, imitation, learning from the experience of others will help in behavioural change of the construction workers and help to improve their occupational health and safety competencies and thus lead to reduction in hazard. This serves as a complement to Multiple Cause theory, which only describes the causes of accident but fails to prescribe appropriate methods which can help in the removal of the causes. These two theories were used by the researcher to build a framework for the study.

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FRAMEWORK FOR SYNDICATE AND GUIDED-PRACTICE INTERVENTION IN ENHANCING OCCUPATIONAL HEALTH AND SAFETY COMPETENCIES IN CONSTRUCTION

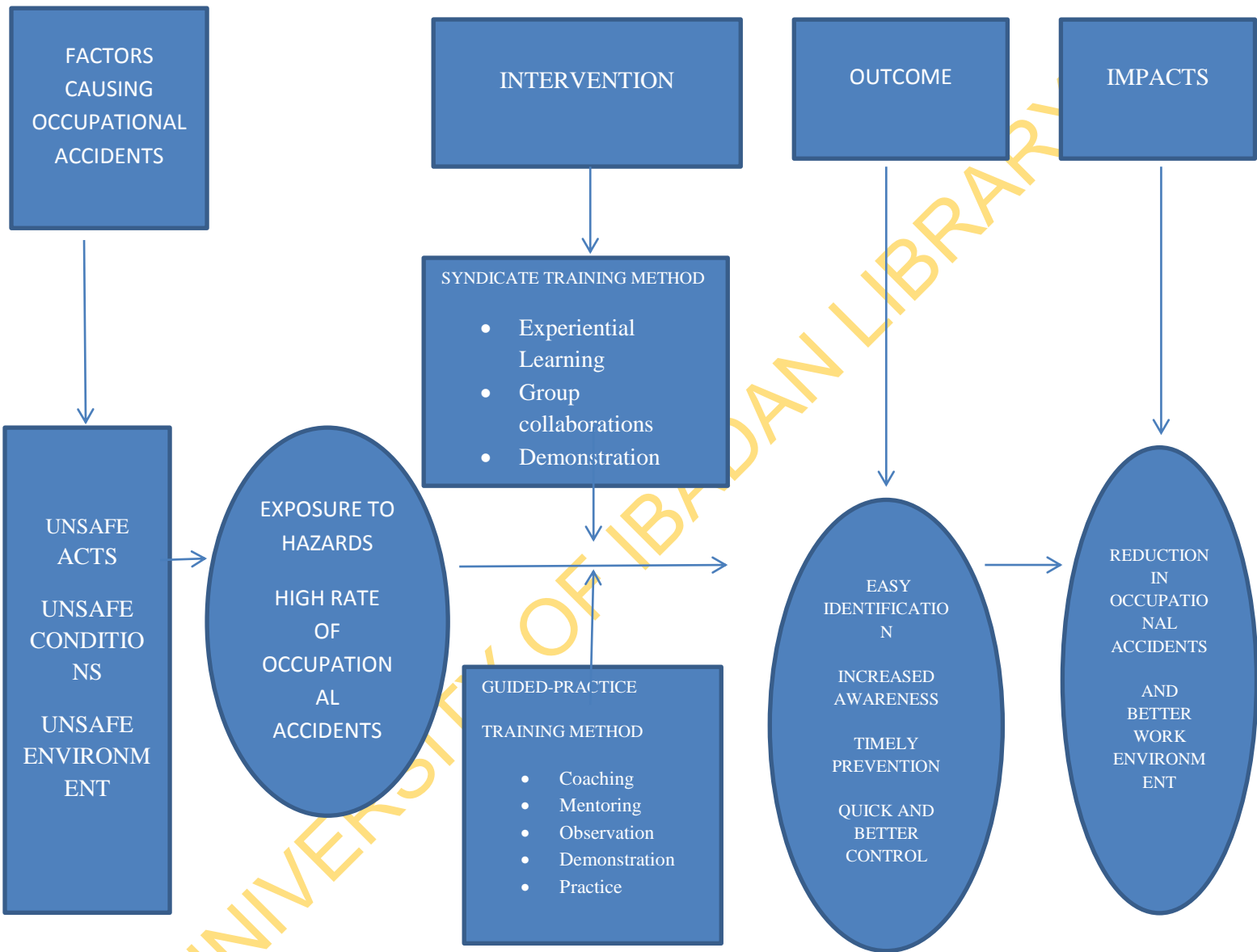


Figure 2.1

Source: Researcher (2016)

The factors leading to or causing occupational accidents, ill-health, injuries and even death are the unsafe conditions and the combination of these two, as explained by Heinrich's theory of accident causation and multiple cause theory by Dan Peterson (1988). These root causes, which can also be described as health and safety incompetencies by the workers and management will then lead to other factors which will eventually result into exposure to hazards by workers as well as high rate and occurrence of occupational accidents and injuries. This calls for an intervention in the form of safety training, which will appropriately address the problem of safety incompetencies and lead to improved competencies.

This entails such methods as syndicate training methods with such features as experiential learning, group collaborations and demonstration. The second intervention is guided-practice training method with such features as coaching, mentoring, observation, demonstration and practice. These two methods are appropriate for construction workers who are adults and can learn through immediate practice as well as based their learning on the experience of others. These methods are in tune with the view of Albert Bandura (1986), in the social learning theory that learning occurs in a social context through observation, imitation and modelling. These two interventions will then produce such outcomes as easy identification of hazards, increased awareness about existing hazards at workplace, timely prevention of such hazards as well as quick and better control of the hazards, thereby achieving improved safety competencies of the workers trained through the interventions. The overall impacts will then be reduction in occupational accidents and better work environment for all the stakeholders.

CHAPTER THREE METHODOLOGY

3.1 Research design

The study adopted the pretest - posttest, control group quasi experimental design. The design employed 3x3x2 factorial matrix to enable the researcher consider the effects of the moderating variables: employment status and literacy level alongside the effects of the two instructional methods on the construction workers' occupational and health safety competencies. This is presented below:

Table 3.1 3x3x2 factorial matrix

Treatments	EMPLOYMENT STATUS						Total
	Permanent B1			Temporary B2			
	LITERACY LEVEL						
	High B1	Medium B2	Low B3	High C1	Medium C2	Low C3	
STM (A1)	3	2	2	1	2	2	12
GPTM (A2)	1	2	2	3	1	2	11
Control (A3)	2	1	2	3	1	3	12
Total	6	5	6	7	4	7	35

A1= Syndicate Instructional Method

A2= Guided-practice Instructional Method

A3= Control (traditional lecture method)

B1= Permanent and High Status

B2= Permanent and Middle Status

B3= Permanent and Low Status

C1= Temporary and High Status

C2= Temporary and Middle Status

C3= Temporary and Low Status

The control group was subjected to training using the traditional training method, while the control and the experimental groups were exposed to pretest and posttest.

3.2 Population

The population of the study comprised all the construction workers in Oyo State; these included both temporary and permanent employees.

3.3 Sample and sampling techniques

The purposive sampling technique was employed in selecting three reputable construction organisations in Oyo State because of their size, high level of patronage and exposure of their workers to homogenous hazards. These construction organisations were assigned to Syndicate Training Method (Adold Engineering Development Company Limited, Apata, Ibadan), Guided-Practice Training Method (GPTM) (L.D'Alberto and Co Limited, Ibadan) and Traditional Method (Ciroco Nigeria Limited, Ibadan). The construction workers in each of the three organisations who met the inclusion criteria of the study were used as participants for the study.

Inclusion criteria:

The inclusion criteria for the study were:

- i. Participants who were construction workers actively engaged by the construction organisation at the time of carrying out the research.
- ii. Participants who showed willingness and readiness to take part in all the activities and processes of training throughout the period of the research without any force.

Table 3.2: Sample size for the study

Groups	Construction industry	No of Employees (Pre-Test)	No of Employees (Post-Test)
Syndicate Training method Group I	Adold Engineering Development Company Limited	13	12
Guided-Practice Training Method Group II	L.D'Alberto and Co. Limited	13	11
Traditional Method Control Group	Ciroco Nigeria Limited	21	12

TOTAL		47	35

3.4 Instruments

The major instrument used were Construction Industry Occupational Health and Safety Questionnaire, Occupational Health and Safety Competencies Scale, and Syndicate Training Method (STM), Guided-Practice Training Method (GPTM) and Traditional Method (TM) guides.

- i. **Construction Industry Occupational Health and Safety Questionnaire:** This tested the knowledge of the construction employees about the understanding of occupational health and safety situation in the construction industry. The questionnaire contained questions that tested the awareness and knowledge of the construction workers regarding the occupational health and safety of their workplace.
- ii. **Occupational Health and Safety Competencies Scale (OHSCS):** This contained questions which are aimed at obtaining data from the participants on the effects of the syndicate and guided-practice instructional methods on their occupational health and safety competencies. The questions were designed to elicit information from the participating construction workers about the influence of the two instructional methods which will be used on improving their attitude to safety at work, compliance to safety rules, usage of equipment and reduction of the incidence of occupational hazards and accidents. The instrument was used for both pre-test and post-test.
- iii. **Syndicate, Guided-Practice and Traditional Training Methods' Guides:** These consisted of the activities that were adopted for training the participants on how to improve their occupational health and safety competencies using the syndicate, guided-practice and traditional training methods. This was useful for the training process and the research assistants. This was adapted from Health Hazards in Construction, a training manual from Occupational Health and Safety Administration Department.

3.5 Validity of the instrument

The instruments were given to experts in measurement and evaluation from the field of Industrial Relations to ascertain the content/face validity. Thereafter, it was submitted to the researcher's supervisor for corrections, which were effected appropriately before the administration of the instruments to the participants.

3.6 Reliability of the instruments

The reliability was measured by a test re-test method through a pilot study using a sample of forty respondents having similar characteristics but outside the scope of the study. The pilot study was done using the construction workers in Ijebu-Ode, Ogun State, Nigeria to validate the instruments and Cronbach alpha value of 0.85 and 0.78 was obtained after administering the Construction industry occupational health and safety questionnaire and occupational health and safety competencies scale respectively. This helped in eliciting further information on the occupational health and safety competencies of the construction workers so as to show the extent to which the training can be adopted for future use in their organisations.

3.7 Procedure of research

The three construction organisations were visited by the researcher in order to get familiar with the management teams of the organisations and also to take due permission for the conduct of the training in their workplaces. The researcher also, at that time, elucidated the importance of the study as well as the benefits that may accrue to the participants, the industries and society at large after the completion of the research.

The researcher, with the help of research assistants who had been trained prior to the period of the training gave a general briefing on OHS competencies in all the three groups (both experimental and control) and then conducted the pre-test. The administration of the treatment was done using syndicate instructional method in the 1st group, guided-practice-instructional method in the 2nd group and traditional method for the control group. At the end of the training sessions, the participants were evaluated through a post-test treatment to see if there was any improvement in their OHS competencies. The results of the experimental groups were used to compare that of the control group to determine the effects of the treatment used on the two

experimental groups. The sets of questionnaire were personally administered by the researcher, with the help of three research assistants.

There was attrition of the participants in the course of the training; the actual sample size reduced to thirty-five at post-test from forty-seven at pre-test. Some of the workers who were absent during post-test were sent on official assignment, while some were busy working on the sites at that period, which made it impossible for them to participate in the last part of the training. This further confirmed the nature of construction work as time-bound.

3.8 Brief Description of the Sessions

There were two experimental groups and one control group. The researcher developed some training packages on occupational safety and health competencies which was used on the two experimental groups based on syndicate instructional method for group one and guided-practice instructional method for group two, while the control group was exposed to the modified traditional method of teaching the skills on occupational health and safety competencies. The researcher with the help of three research assistants, who had been trained by the researcher conducted the training.

Table 3.3: Experimental Group I-Syndicate Group Instructional Method

TIME DURATION	TEACHING CONTENT/ACTIVITIES
1 st Week 1hour	OPENING SESSION Opening formalities- <ul style="list-style-type: none"> ○ Prompt: Prayers, solidarity songs, anthem ○ Self-introduction by participants ○ Setting of ground rules / Selection of rapoteur Opening Remarks Objectives, expected outcomes Pre-test administration
2 nd Week 1 hour	GENERAL GROUP BRIEFING Overview of Occupational Health and Safety <ul style="list-style-type: none"> ○ The concept, principles and safety precautions ○ Occupational health and safety competencies
3 rd Week 1hour Syndicate groups	SESSION ONE Accidents at workplace <ul style="list-style-type: none"> ○ What is an accident

	<ul style="list-style-type: none"> ○ Why accidents occur ○ Causes of accidents\
4 th Week 1 hour Syndicate groups	SESSION TWO Identification and awareness of hazards <ul style="list-style-type: none"> ○ Health hazards in construction ○ Anticipation of health hazards ○ Recognition of health hazards
5 th Week 1 hour Syndicate groups	SESSION THREE Control of hazards <ul style="list-style-type: none"> ○ Hierarchy of control ○ Job hazard analysis
6 th Week 1 hour Syndicate groups	SESSION FOUR Occupational health and safety administration : Employees' Rights <ul style="list-style-type: none"> ○ Occupational Health and Sfaety Administration ○ Employees' rights
7 th Week 1 hour	PLENARY SESSION <ul style="list-style-type: none"> ○ Reports from syndicate groups ○ Hazards prevention discussions
8 th Week 1 hour	CONCLUSION <ul style="list-style-type: none"> ○ Lessons learnt / Key messages ○ Way forward / Suggestions ○ Post-test administration

Table 3.4: Experimental Group II- Guided-Practice Instructional Method

TIME DURATION	TEACHING CONTENT/ACTIVITIES
1 st Week 1 hour	OPENING SESSION Opening formalities- <ul style="list-style-type: none"> ○ Prompt: Prayers, solidarity songs, anthem ○ Self-introduction by participants ○ Setting of ground rules / Selection of rapoteur Opening Remarks Objectives, expected outcomes Pre-Test Administration
2 nd Week 1 hour	GENERAL GROUP BRIEFING Overview of occupational health and safety <ul style="list-style-type: none"> ○ The concept, principles and safety precautions

	<ul style="list-style-type: none"> ○ Occupational health and safety competencies
3 rd Week 1 hour Individual teaching and practice	SESSION ONE Accidents at workplace <ul style="list-style-type: none"> ○ What is an accident ○ Why accidents occur ○ Causes of accidents
4 th Week 1 hour Individual teaching and practice	SESSION TWO Identification and Awareness of Hazards <ul style="list-style-type: none"> ○ Health hazards in construction ○ Anticipation of health hazards ○ Recognition of health hazards
5 th Week 1 hour Individual teaching and practice	SESSION THREE Control of hazards <ul style="list-style-type: none"> ○ Hierarchy of control ○ Job hazard analysis
6 th Week 1 hour Individual teaching and practice	SESSION FOUR Occupational health and safety administration : Employees' Rights <ul style="list-style-type: none"> ○ Occupational health and safety administration ○ Employees' rights
7 th Week 1 hour	FIELD TRIP <ul style="list-style-type: none"> ○ Practical demonstrations ○ Hazards prevention practice
8 th Week 1 hour	CONCLUSION <ul style="list-style-type: none"> ○ Lessons learnt / Key messages ○ Way forward / suggestions ○ Post-test administration

Table 3.5: Experimental Group III- Control Group

TIME DURATION	TEACHING CONTENT/ACTIVITIES
1 st Week 1 hour	OPENING SESSION Opening formalities- <ul style="list-style-type: none"> ○ Prompt: Prayers, solidarity songs, anthem ○ Self-introduction by participants ○ Setting of ground rules / Selection of rapoteur Opening Remarks Objectives, expected Outcomes Pre-test administration

2 nd Week 1 hour	GENERAL GROUP BRIEFING Overview of occupational health and safety <ul style="list-style-type: none"> ○ The concept, principles and safety precautions ○ Occupational health and safety competencies
3 rd Week 1 hour Lecture method of teaching	SESSION ONE Accidents at workplace <ul style="list-style-type: none"> ○ What is an accident ○ Why accidents occur ○ Causes of accidents
4 th Week 1 hour Lecture method of teaching	SESSION TWO Identification and awareness of hazards <ul style="list-style-type: none"> ○ Health hazards in construction ○ Anticipation of health hazards ○ Recognition of Health hazards
5 th Week 1 hour Lecture method of teaching	SESSION THREE Control of hazards <ul style="list-style-type: none"> ○ Hierarchy of control ○ Job hazard analysis
6 th Week 1 hour Lecture method of teaching	SESSION FOUR Occupational health and safety administration : employees' rights <ul style="list-style-type: none"> ○ Occupational health and Safety Administration ○ Employees' rights
7 th Week 1 hour	Participants are left without any interaction.
8 th Week 1 hour	CONCLUSION <ul style="list-style-type: none"> ○ Post-test Administration

3.9 Method of data analysis

The data collected through the sets of questionnaire were coded and analysed for the purpose of the study. The demographic data collected were analysed using the descriptive statistics such as frequency counts and simple percentages while the pretest and posttest results were analysed using ANCOVA and Scheffe post hoc.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the results from the analysis of data collected on the field through the research instruments and discusses the findings based on the hypotheses tested. The results are presented in tables and pie-charts. These are followed by interpretation and discussions. This chapter is divided into two parts. Part A describes the demographic characteristics of the respondents, while part B explains inferences from the hypotheses tested on the respondents.

PART A

4.1 Analysis of demographic characteristics of the respondents

This part explains the demographic characteristics of the training participants and how this may affect their occupational health and safety competencies.

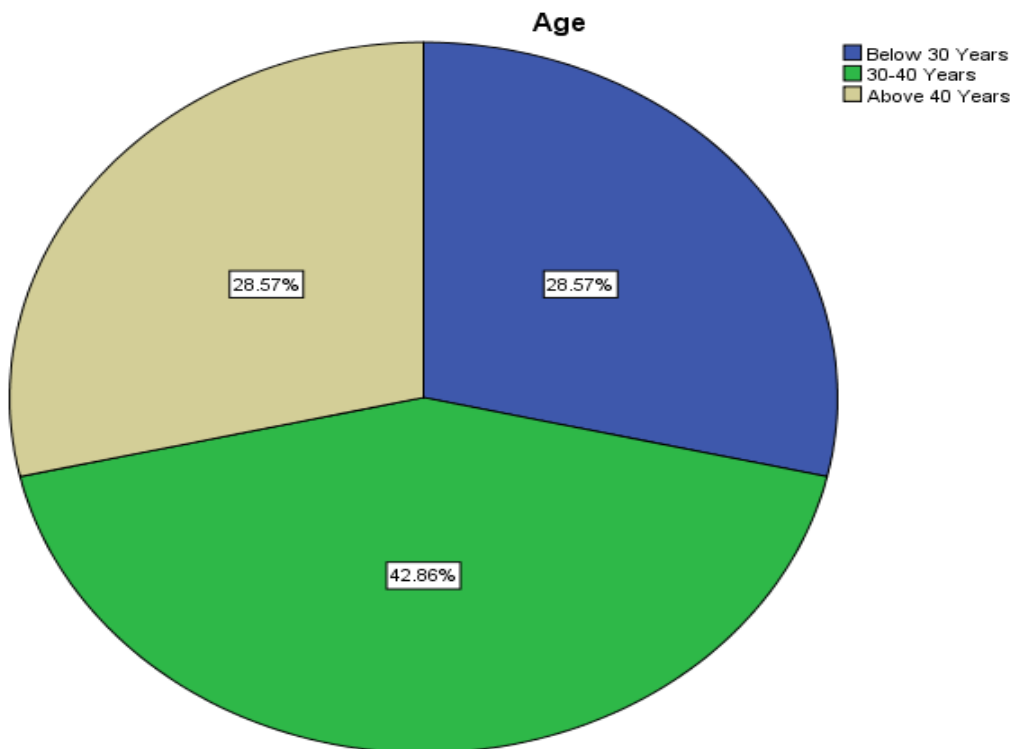


Figure 4.1: Distribution of the respondents based on age

Figure 4.1 shows that 28.6% of the respondents were below 30 years, 42.9% were 30-40 years and 28.6% were above 40 years. This showed that a greater percentage (71.5%) of the construction workers were in their youthful age (below 40 years). This further confirmed that construction work requires a lot of energy and employs many energetic vibrant youths who are exposed to various hazards and need to be protected if the country will not continue to lose the most productive part of the population. It is also the age of youthful exuberance, experimentation and carelessness. Hence, there is need for continuous improvement of the occupational health and safety competencies of these workers.

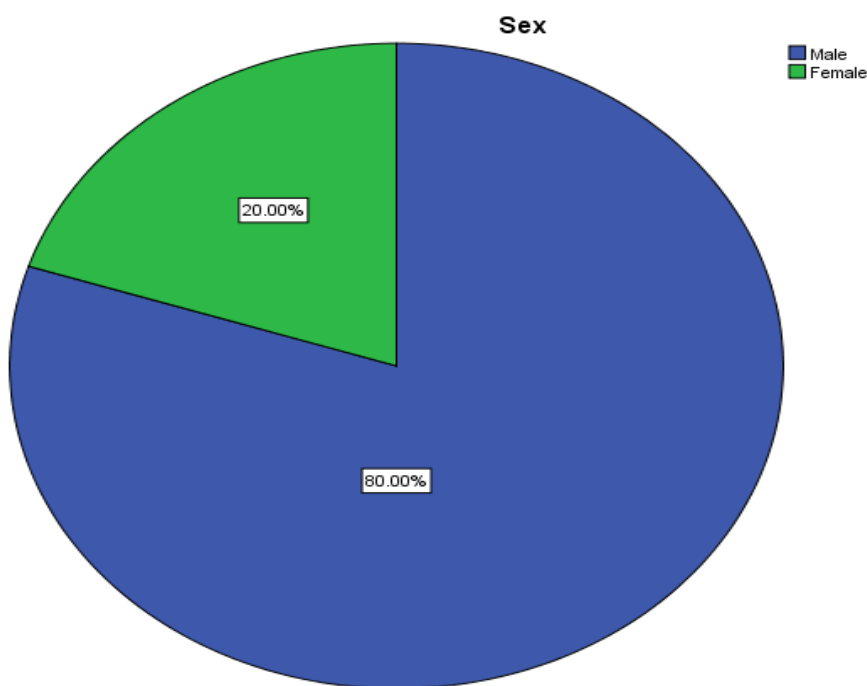


Figure 4.2: Distribution of the respondents based on sex

Figure 4.2 indicates that 80.0% of the respondents were male, while only 20.0% were female. This confirmed that most of the construction workers were males, due to the hazardous nature of construction work which does not attract females who are generally considered as weak. The females who worked at construction sites were involved only in the less tedious work, such as flag bearing, quantity survey, brick carriage and administrative work.

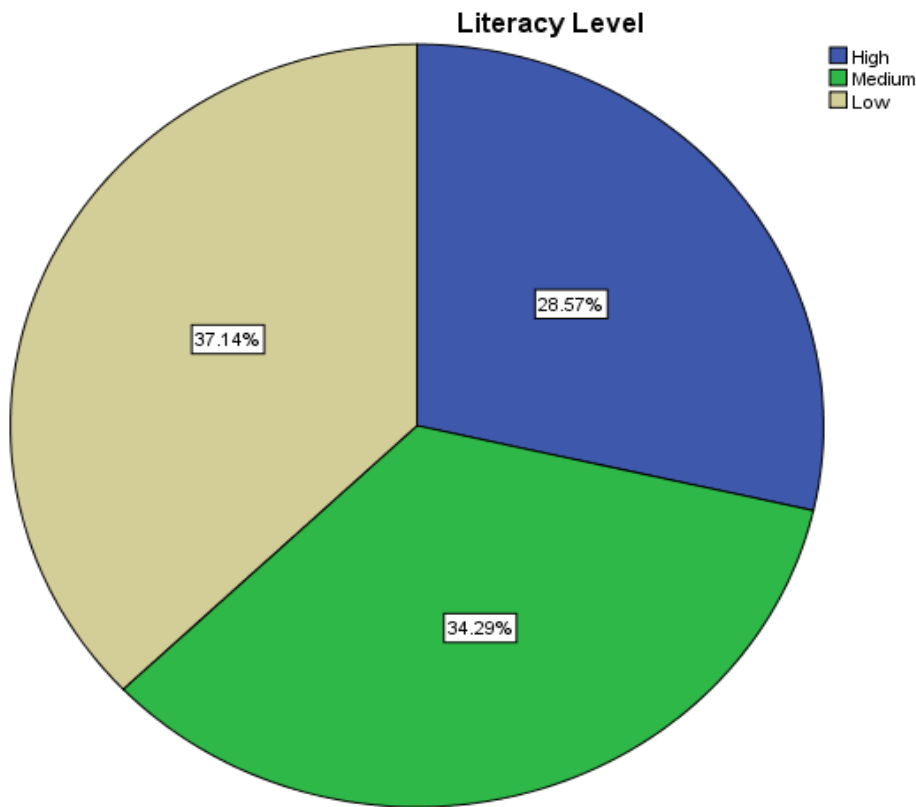


Figure 4.3: Distribution of the respondents based on literacy level

Figure 4.3 reveals that 28.6% of the respondents had high literacy level, 34.3% medium and 37.1% low literacy level. This showed that a large percentage (62.9%) of the workers had senior secondary school certificate, while 37.1% had primary school certificate. Some of the workers were in the construction industry because of the economic situation of the country. The high level of unemployment made them to take up the jobs offered in these construction industries for their survival.

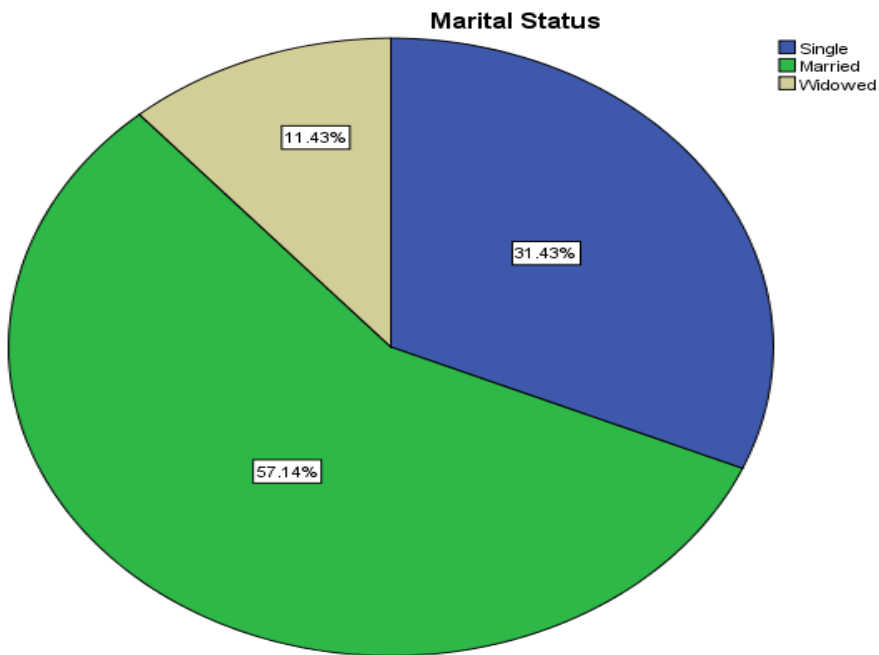


Figure 4.4: Distribution of the respondents based on marital status

Figure 4.4 shows that 31.4% of respondents were single, 57.1% married and 11.4% widowed. Most of the construction workers were married and responsible adults who had dependants to cater for. Any fatality to them may have bandwagon effects. The singles among them need the job for sustenance and daily living.

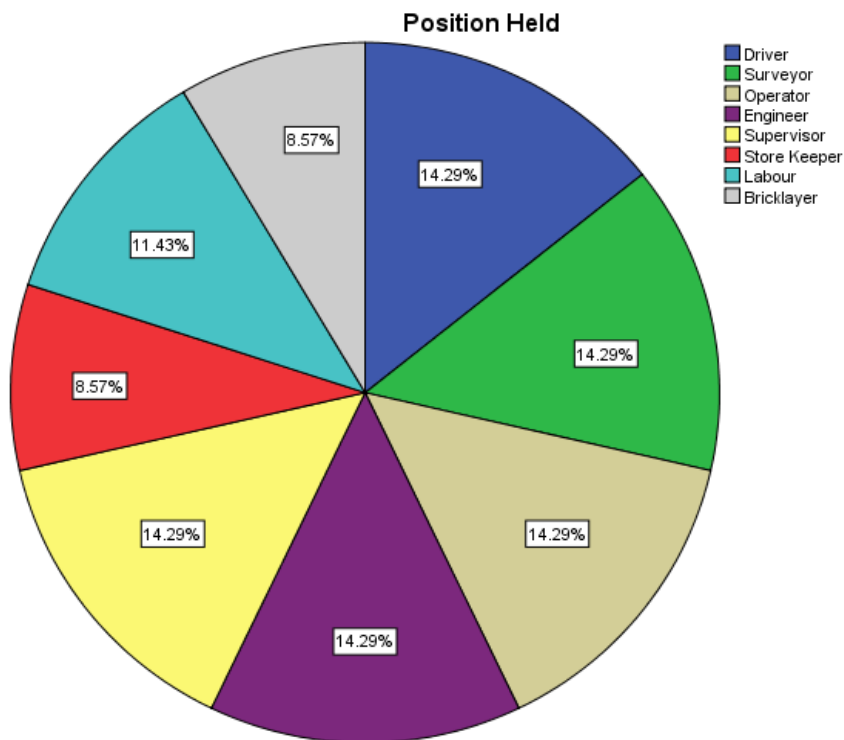


Figure 4.5: Distribution of the respondents based on the position held

Figure 4.5 shows that 14.3% of the respondents were drivers, 14.3% were surveyors, 14.3% were operators, 14.3% were engineers, 14.3% were supervisors, 8.6% were store keepers, 11.4% were labour and 8.6% were bricklayers. This implies that the training participants cut across all levels and departments of the three construction companies. Drivers, surveyors, operators, engineers and supervisors had the highest percentage of 14.3%, while storekeepers and bricklayers had the least percentages.

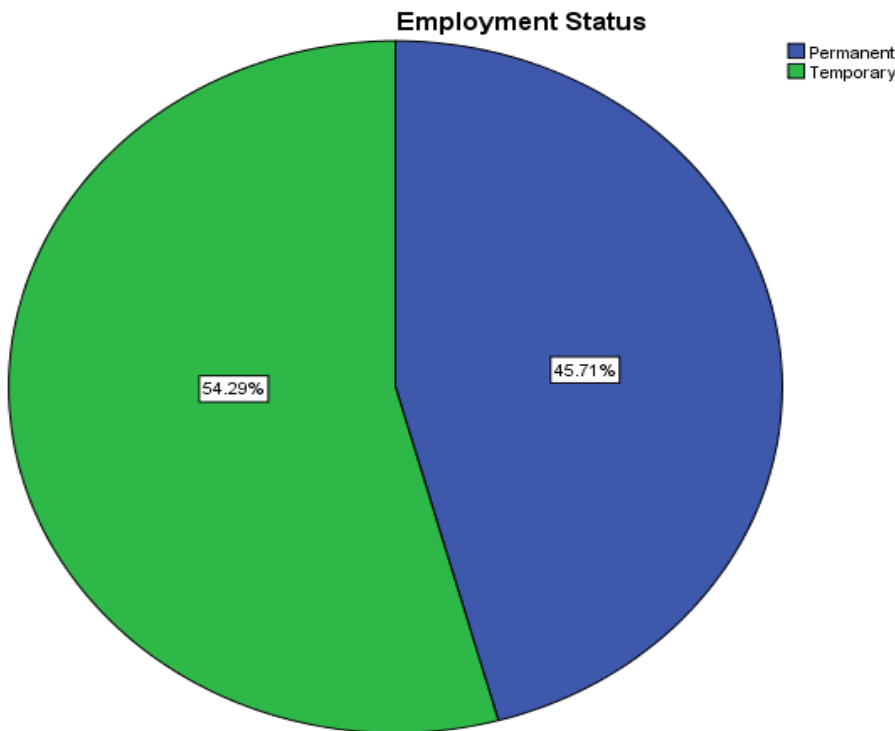


Figure 4.6: Distribution of the respondents based on employment status

Figure 4.6 shows that 45.7% of the respondents were permanent, while 54.3% were on temporary employment. This means that a larger percentage of the workers in the construction companies were temporary workers who were employed by the sub-contractors. Ahmed and Newson-Smith (2010), identifies extensive turnover of mostly migrant workers who are vulnerable to exploitation as one of the main reasons for not implementing the safety policy by most developing countries. This confirms that a larger percentage of construction workers are usually temporary or contract employees who are prone to occupational hazards.

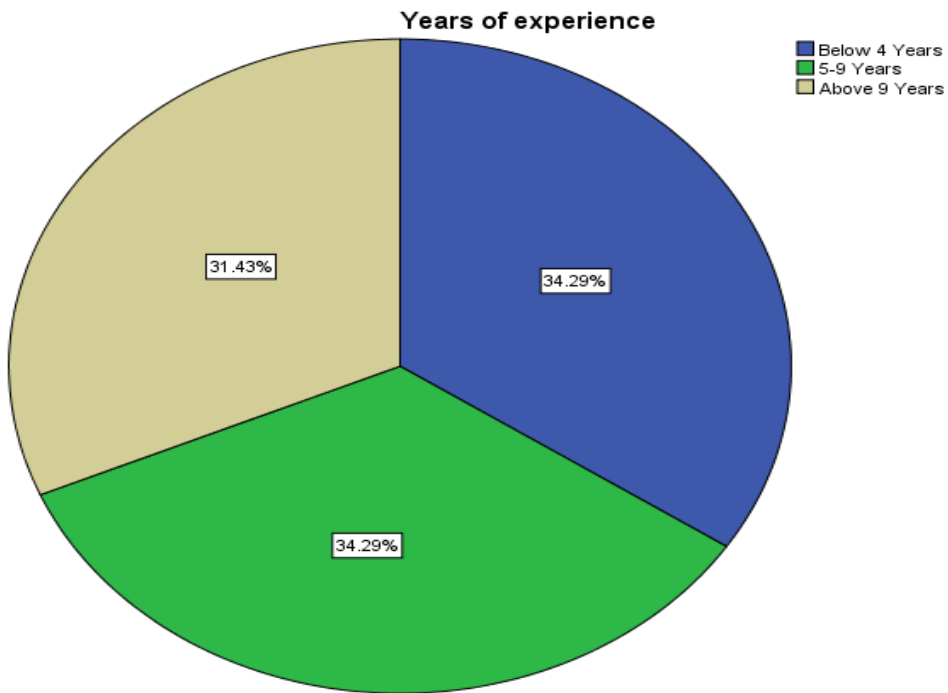


Figure 4.7: Distribution of the respondents based on experience

Figure 4.7 indicates that 34.3% of the respondents had worked in the construction company for less than 4 years, 34.3% had worked for between 5-9 years and 31.4% had worked for more than 9 years. This showed that training participants had varied levels of working experience, ranging from low to high level, and each of these categories were relatively equally represented in the training programme.

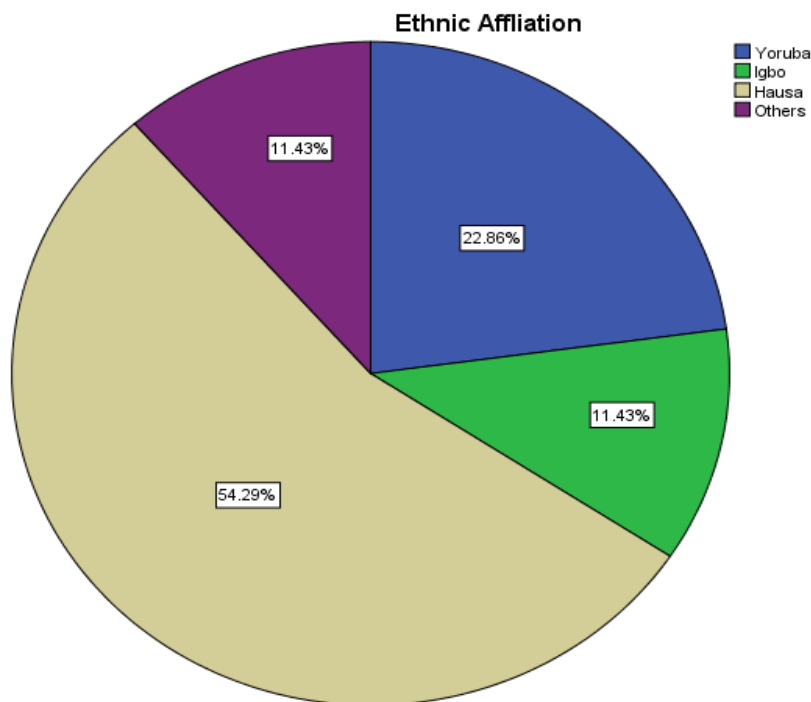


Figure 4.8: Distribution of the respondents based on ethnic affiliation

Figure 4.8 shows that 22.9% of the respondents were Yoruba, 11.4% were Igbo, 54.3% were Hausa and 11.4% belonged to other ethnic groups not indicated on the questionnaire. This confirmed the fact that most of the construction workers were migrants who were employed on temporary terms. This category of workers are usually regarded as vulnerable because employers most times do not give them priority in terms of safety training, which may have negative effects on their competencies. Belin, Zamparutti, Tull, Hernandez, Brussel and Gravelin (2011) who found that the occupational health and safety situation of domestic workers, a great majority of whom were migrants and almost all of whom were women, was particularly difficult, as many of them were exposed to physical and psychosocial problems. High percentage of Hausa ethnic group could also be due to the fact that Ibadan as a cosmopolitan city usually have a lot of strangers who migrate to seek employment opportunities.

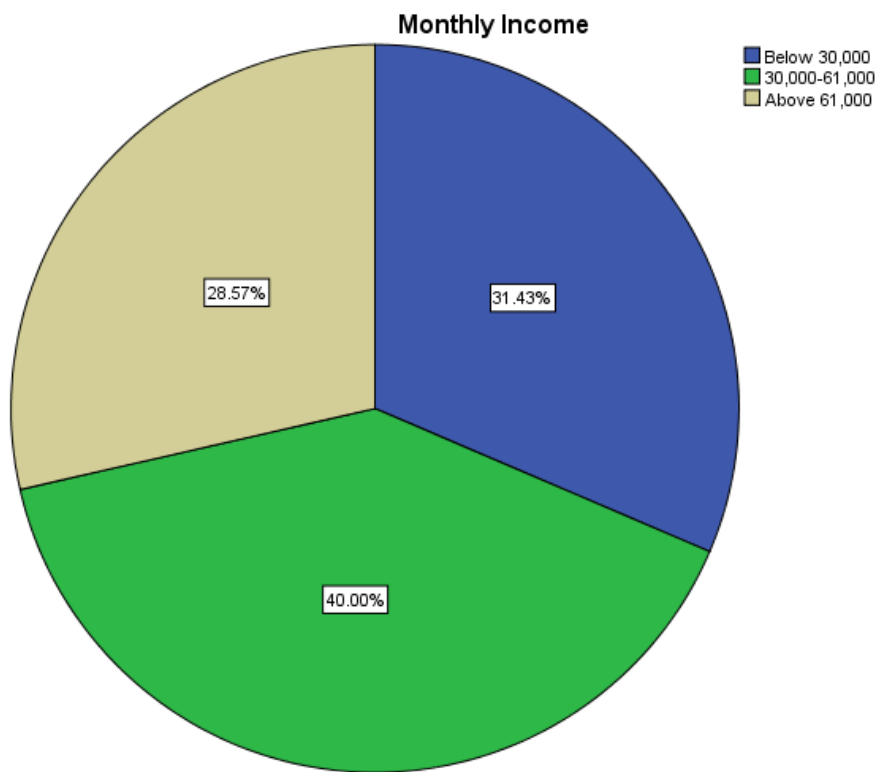


Figure 4.9: Distribution of the respondents based on monthly income

As captured by Figure 4.9 31.4% of the respondents were below 30,000, 40.0% 30,000-61,000 and 28.6% above 61,000 as monthly income.

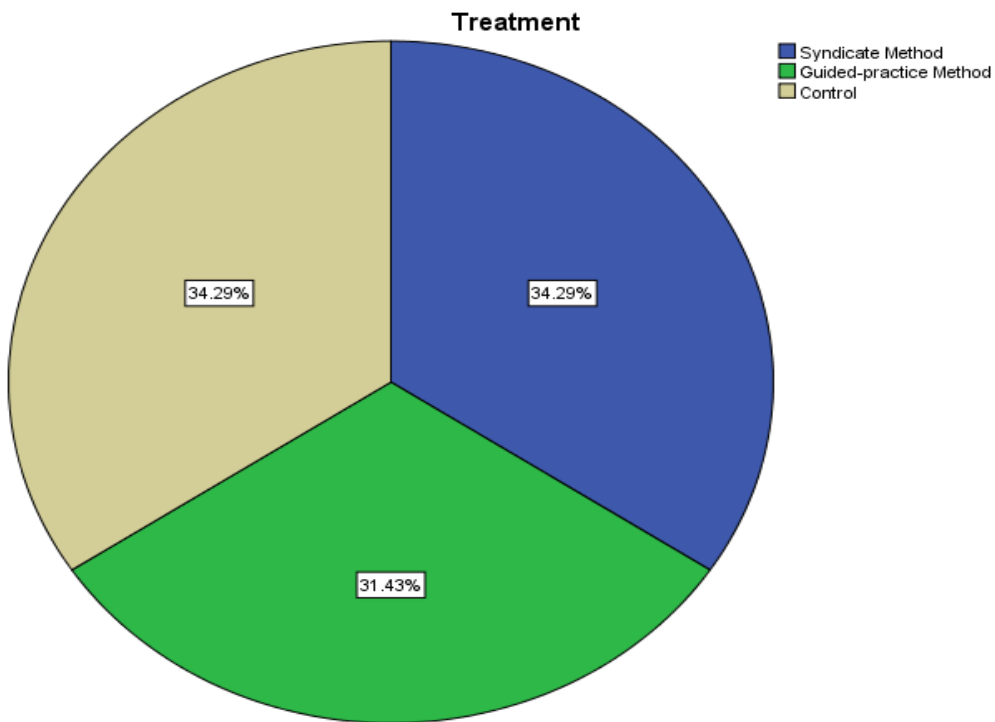


Figure 4.10: Distribution of the respondents based on experiment and control groups

Figure 4.10 indicates that 34.3% of the respondents were in the experimental group of syndicate method, 31.4% were in the guided-practice method and 34.3% were in the control group.

PART B

4.2 Testing of hypotheses and discussion of findings

This part presents the results obtained from the seven hypotheses tested and also discusses these results with the existing literature.

HO₁: There is no significant main effect of treatment on occupational health and safety competencies.

The first hypothesis tested if the treatments, that is syndicate training method and guided-practice training method, had a significant effect on the occupational health and safety competencies of the construction workers who participated in the training.

Table 4.1: Summary of 3x3x2 Analysis of Covariance (ANCOVA) showing the significant main and interactive effect of treatment groups, employment status and literacy level among workers

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Treatment	34733.467	2	17366.734	22.280	.000	.724	S
Error	13251.010	17	779.471				
Total	618575.000	35					
Corrected Total	86103.886	34					

R Squared = .846 (Adjusted R Squared = .692) *Significant at 0.05

Interpretation and discussion

Table 4.1 shows that there was significant main effect of treatment on workers' occupational health and safety competencies ($F_{(2, 17)} = 22.280, p < .05, \eta^2 = .724$). This implies that there is a significant impact of the treatments in the groups test scores on occupational health and safety competencies of workers. Therefore, the null hypothesis which states that there is no significant main effect of treatment on workers' occupational health and safety competencies, was rejected. Table 4.1 also shows the contributing effect size of 69.2%. For further clarification on the margin of differences between the treatment groups and the control group, a scheffe post-hoc pairwise analysis which shows the comparison of the adjusted mean, was computed and the result is as shown in table 4.2.

Table 4.2: Scheffe Post-hoc Pairwise Analysis showing the significant differences among various treatment groups and the control group in occupational health and safety competencies

Treatments	N	Subset for alpha = 0.05	
		1	2
Control	12	82.5833	
Guided-practice Method	11	111.0000	
Syndicate Method	12		175.4167
Sig.		.111	1.000

Table 4.2 reveals that the experimental group II (Syndicate Method) ($\bar{x} = 175.42$) had a higher mean than the experimental group I (Guided-Practice Method) ($\bar{x} = 111.00$) and control group ($\bar{x} = 82.58$). By implication, the syndicate method is more potent in enhancing occupational health and safety competencies of the workers than the guided-practice method. The coefficient of determination (Adjusted $R^2 = .692$) overall indicated that the differences that existed in the group accounted for 69.2% in the variation of workers' occupational health and safety competencies. In order to obtain further information on the performance of each group, an Estimated Marginal Means (EMM) was computed and the result is presented in Table 4.3.

Table 4.3: Estimated Marginal Means (EMM) showing the differences in occupational health and safety competencies of workers across the three groups

Treatments	N	Mean	Std. deviation	Std. error	95% Confidence Interval for Mean	
					Lower bound	Upper Bound
Syndicate Method	12	175.4167	32.87292	9.48959	154.5302	196.3031
Guided-practice Method	11	111.0000	30.34139	9.14827	90.6164	131.3836
Control	12	82.5833	31.41933	9.06998	62.6204	102.5462
Total	35	123.3429	50.32362	8.50625	106.0561	140.6296

Table 4.3, shows that workers exposed to the syndicate method obtained the highest mean score (Grand Mean = 175.42), followed by those exposed to the guided-practice method (Grand Mean = 111.00) and the control group (Grand Mean = 82.58).

The syndicate training method, as shown by this study, is very effective in training construction workers who are adults and also in the achievement of improved occupational health and safety competencies of the workers. This is because syndicate training entails small group decision, which allows participants to share their experiences and also have immediate practice of the acquired knowledge and skills. McKimm and Jollie (2007) submit that small group teaching is very relevant to adult learners because learning in a small group facilitates learning through discussion, active participation, feedback and reflection. The syndicate training method can then be said to be relevant to training the construction workers who are basically adults, as shown by the findings.

This finding established the fact that appropriate methods of training are very important if there will be continuous improvement in the occupational health and safety competencies of construction workers. Safety training need to incorporate the use of relevant methods, like syndicate and guided-practice methods, which will promote active participation and immediate use of the knowledge and skills acquired by the construction workers. Lack of such practice-oriented methods and the use of lecture method without adequate participation and practice will affect the occupational health and competencies of the workers negatively. This is corroborated by Ahmed and Newson-Smith (2010), who sees lack of basic professional

training in occupational health and safety as one of the main reasons for not implementing the safety policy by most developing countries. Bindra et al. (2008) also assert that incomplete or no safety training for workers and no access to training and skill-building opportunities constituted part of the occupational health and safety issues in construction.

A safety training conducted without appropriate methods which can enhance improvement in occupational health and safety competencies and effective achievement of the training goals could be termed as non-professional training which will serve as a deterrent to the process of maintaining a safe workplace for workers, Idubor et al. (2013) aver that an organisation with safety culture will have a lower accident rate than one without safety culture. Therefore, in a workplace where the workers' occupational health and safety competencies are not maintained and improved with the use of appropriate safety training methods, there is bound to be a high rate of accident owing to poor safety culture or lack of competencies in health and safety issues.

The syndicate training method is one of the methods that mainly draw from the experience of the participants and could be referred to as one of the techniques of experience-based learning. It will be useful for improving the occupational health and safety competencies of workers because it draws from their experience to help in the process of inculcating safety values and attitude. Attitude change in construction workers will be achieved with the use of safety training which is based on the experiences of the participants. Andreson, Boud and Cohen (1996) state that "attitude and value change is liable to be promoted if authentic experience is used to define and raise awareness of attitudes and values not previously recognised by the holder."

This is also supported the by the findings of Mckerlie, Cameron, Sherriff and Bovill (2012) in a study carried out on students' perceptions of syndicate group learning. The results demonstrated that syndicate learning helped students to achieve course objectives. However, the study showed that tutor-less groups were rated more positively by students in comparison to more traditional group work with a tutor/facilitator as well as to other teaching methods, such as lectures. Outcomes such as enhanced student motivation, engagement, interaction and enjoyment were encouraging. The students in that study were very positive about the effects of

the syndicate group approach in terms of making them work harder through a sense of group responsibility. They also reported learning more deeply by having to teach their peers and learn from their peers. Vidya (2015), in his study argues that the method offers various intellectual benefits for students, like problem definition and identification, data gathering and interpretation, problem-solving and critical analysis, proposition of management plan, group leadership and communication skills, incorporation of social and ethical aspects of medicine and promotes metacognition. These outcomes also supported the fact that syndicate learning groups can offer a valuable contribution to enhancement of occupational health and safety competencies as established by the finding of this study.

The importance of group based training which hinges on group collaborations, as shown in the syndicate training method for change of behaviour, especially that of inculcation of safety skills and imbibing safety attitude was also established in the study carried out by Navidian, Rostami and Rozbehani (2015). The work was on the effect of motivational group interviewing-based safety education on workers' safety behaviours in glass manufacturing. They found that the mean changes in the scores of awareness, attitude, and use of personal protective equipment among workers who underwent motivational group interviewing were significantly greater than those of control workers who underwent traditional educational sessions. It was, then, concluded that incorporation of motivational group-interviewing principles into safety education programmes had the positive effect of enhancing workers' knowledge, attitude, and, particularly, implementation of safe behaviours.

However, with the syndicate method, it is possible to experience dominance of a particular individual who could be the vocal one. This means that the effectiveness of the method could be because of this dominant figure. The expertise of the facilitator comes into play here. Facilitation should discourage dominance by a person.

Although the guided-practice training method is not as effective as the syndicate training method, the findings showed that it was better than the lecture method used for the control group. This was because guided-practice training essentially follows the principle of 'learning by doing' or 'learning by observation', which can promote the application of various safety rules by the workers in the construction industry, thereby improving their occupational health

and safety competencies. Hall (2002) examined the effects of Internet guided practice with aural modelling on the sight-singing accuracy of elementary education majors. He found that both groups that were used improved significantly from pre-test to post-test, indicating that the skill of sight singing can be taught to elementary education majors using multimedia technology and guided practice method.

HO₂: There is no significant main effect of literacy level on occupational health and safety competencies.

The second hypothesis raised for this study tested if the literacy level of the construction workers had a significant effect on their occupational health and safety competencies. The table below shows the results from the analysis.

Table 4.4 Analysis of Covariance (ANCOVA) showing the significant main and interactive effect of literacy level on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Literacy	101.316	2	50.658	.065	.937	.008	NS

Table 4.5: Estimated Marginal Means (EMM) showing the differences in occupational health and safety competencies of workers across the literacy level

Literacy Level	N	Mean	Std. deviation	Std. error	95% Confidence Interval for Mean	
					Lower bound	Upper Bound
High	11	131.4167	64.04893	18.48933	90.7219	172.1114
Medium	12	126.6364	42.38224	12.77873	98.1636	155.1091
Low	12	112.2500	43.31518	12.50401	84.7288	139.7712
Total	35	123.3429	50.32362	8.50625	106.0561	140.6296

Interpretation and discussion

Table 4.4 indicates that there was no significant main effect of literacy level on workers' occupational health and safety competencies ($F_{(2, 17)} = .065, p > .05, \eta^2 = .008$). Hence, the null hypothesis was accepted. This denotes that there is no significant difference in the occupational health and safety competencies of high-, medium- and low literacy-workers. Table 4.5 equally reveals the mean score of high-literacy workers (estimated mean = 131.42), medium-literacy workers (estimated mean = 126.64) and low-literacy workers (estimated mean = 112.25). The high-literacy workers had slightly higher occupational health and safety competencies compared to their counterparts with medium-literacy and low-literacy workers but the difference was not significant.

Although there was no statistically significant effect of literacy level, this study showed that workers with a high literacy level performed better in their occupational health and safety competencies after the training than the workers with low level of literacy. This is supported by the work of Nnedinmaik and Umeadi (2014), who identified low level of health literacy as well as lack of awareness of the Nigerian construction workers, particularly involving those workers in the informal sector which constituted a larger percentage of construction activities in Nigeria, as part of the causes of non-compliance with occupational health and safety. This then means that construction workers with high literacy level tend to imbibe safety culture and comply with occupational health and safety rules than workers with low literacy level.

Kalejaiye (2013) posits that the informal construction sector has little or no access to occupational health. Their main methods of project execution involve employing workforce that do not have ideas of adequate safety practices required and therefore cannot advise the client to comply with OHS regulations. The argument is that if 70% of the construction activities are executed through the informal practice, the construction industry is shooting itself in the foot, as it will never conform to OHS regulations. It contributes to most of the unsafe construction activities, thus hindering OHS improvement.

This shows that the level of literacy had little impact on the occupational health and safety competencies of these workers though it is not statistically significant. The insignificance of the literacy level of the participants could also be attributed to the fact that most of the construction workers, including those with low level of literacy, had general knowledge on the hazards associated and peculiar to their job because of their experience. Their level of ignorance was mainly on the operation of Occupational Health and Safety Acts, which covers their rights as employees to health and safety at work. It was observed that both the temporary and permanent workers were ignorant of the duty of the Federal Ministry of Labour and Productivity to enforce their rights to safety. The above assertion is supported by Nnedinmaik and Umeadi (2014), who stress that lack of awareness and improper medium of information dissemination could also be another reason for non-compliance with occupational health and safety laws. Windapo and Oladapo (2012), note that knowledge and understanding of OHS regulations determine the level of compliance within construction regulations and that there is lack of awareness in most developing countries (for example, Nigeria) for OHS regulations and practice, an issue that is also echoed by Idubor and Osiamoje (2013).

Diugwu, Baba and Egila (2012) argue that lack of knowledge for details and implications hinder OHS management in the construction industry. They found that construction workers in Minna, Niger State, Nigeria (if not the whole country) did not know the enforcer of OHS regulations in Nigeria. If workers do not know or understand the regulations, they will not know when their rights have been violated. Pupilampu and Quartey (2012) also argue that lack of adequate information and statistics hinder the compliance with OHS in Africa. Diugwu, Baba and Egila (2012) and Idubor and Osiamoje (2013) identify same for Nigeria. Diugwu, Baba and Egila (2012) aver that OHS information dissemination in Nigeria is ineffective, and

has minimal impact to target groups. They blame the government for it. This demonstrates that enacting laws without adequate effort to make it available to the public is as a good as not formulating one at all.

HO₃: There is no significant main effect of employment status on occupational health and safety competencies.

This hypothesis tested the effect of employment status of the construction workers on their occupational health and safety competencies Table 4.6 presents the findings.

Table 4.6 Analysis of Covariance (ANCOVA) showing the significant main and interactive effect of employment status on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Employment	1814.728	1	1814.728	2.328	.145	.120	NS

Table 4.7: Estimated Marginal Means (EMM) showing the differences in occupational health and safety competencies of workers across the employment status

Employment Status	N	Mean	Std. deviation	Std. error	95% Confidence Interval for Mean	
					Lower bound	Upper Bound
Permanent	16	123.375	54.670	13.667	94.243	152.506
Temporary	19	123.316	47.884	10.236	100.236	146.395
Total	35	123.343	50.324	106.056	106.056	140.630

Interpretation and Discussion

Table 4.6 demonstrates that there was no main effect of employment status on workers' occupational health and safety competencies ($F_{(1, 17)} = 2.328, p > .05, \eta^2 = .120$). Therefore, the null hypothesis was accepted. The EMM on Table 4.7 indicates the mean score of workers with permanent employment status (estimated mean = 123.38) and the temporary employment status (estimated mean = 123.32). This implies that workers with permanent employment status have slightly higher occupational health and safety competencies than their counterparts with temporary employment status.

The findings established that there was no significant difference between the occupational health and safety competencies of permanent and temporary workers although most of these workers were usually temporary workers and were most exposed to a lot of hazards and unfair practices. Alli (2008), describes the disadvantaged position of part-time, migrant and informal workers, commenting that they are another group that may suffer from not being covered by safety and health provisions. Bindra et al, (2008) also discuss the extensive turnover of mostly migrant labourers who are vulnerable to exploitation, language barriers and no social security as part of the issues of great concern in the occupational health and safety of construction workers. Karlsson, Bjorklund and Jensen (2012), state that downsizing, outsourcing, short-term contracts, job insecurity and less stable work environment are a result of major changes in the labour market, which could also be a possible explanation for increased stress among employees and increased level of sickness absence in Sweden. (Cooper, 1999; Harenstram, 2005).

The vulnerable nature of the larger percentage of these workers might be a factor which helped them to respond positively like the permanent workers who were less vulnerable to the safety training given the use of appropriate method because they realized that they would benefit more if they imbibed good occupational health and safety competencies. This accounted for the insignificance in the effect of employment status. The slight difference in the post-test results of the permanent workers might be as a result of their advantageous position of having more access to safety training than the temporary workers. This is supported by the report of Belin, Zamparutti, Tull, Hernandez, Brussel and Gravelin (2011), that temporary workers have less access to training or to advantages such as bonuses or promotions and are less likely to be

unionized, which can lead to a lower level of social and occupational safety and health protection than permanent workers experience.

HO₄: There is no significant two-way interactive effect of literacy level and employment status on occupational health and safety competencies.

Hypothesis four of this study focused on the interactive effects of literacy level of the construction workers and their employment status on the occupational health and safety competencies of these workers. The results in the table explains the findings with regard to this hypothesis.

Table 4.8 Analysis of Covariance (ANCOVA) showing two-way interactive effect of literacy level and employment status on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Literacy * Employment	191.904	2	95.952	.123	.885	.014	NS

Table 4.9: Estimated Marginal Means (EMM) showing the two-way interactive effect of literacy level and employment status on occupational health and safety competencies

Employment Status	Literacy level	Mean	Std. error	95% Confidence Interval	
				Lower bound	Upper Bound
Permanent	High	171.035 ^a	8.615	153.004	189.066
	Medium	174.415 ^a	10.939	151.520	197.310
	Low	149.906 ^{a,b}	16.966	114.395	185.417
Temporary	High	161.732 ^{a,b}	24.791	109.844	213.620
	Medium	174.917 ^a	10.111	153.754	196.080
	Low	176.672 ^a	9.352	157.098	196.247

Interpretation and discussion

The result in Table 4.8 reveals that there was no significant interaction effect of employment status and literacy level on workers' occupational health and safety competencies ($F_{(2, 17)} = .123, p > .05, \eta^2 = .026$). Therefore, the null hypothesis was accepted. This means that employment status and literacy level did not significantly influence the occupational health and safety competencies of the workers. These results showed that the post-test scores of participants with high, medium and low literacy levels in the treatments and control groups were not significantly different. This implied that both employment status and literacy level did not interact significantly to enhance the occupational health and safety competencies of the trained workers. This further showed that employment status and literacy level did not influence the positive effects of the treatments - syndicate training and guided-practice training methods - on the occupational health and safety competencies of the participants. Workers could, therefore, be trained using syndicate and guided-practice methods regardless of their level of literacy or whether they are permanent or temporary workers to achieve improvement in the occupational health and safety competencies of the workers.

HO₅: There is no significant two-way interactive effect of treatment and literacy level on occupational health and safety competencies.

This hypothesis tested the combined effect of the treatments - syndicate and guided-practice training methods - with literacy level of the construction workers in the different groups. The results obtained from the analysis are presented in Table 4.10 and 4.11

Table 4.10 Analysis of Covariance (ANCOVA) showing two-way interactive effect of treatment and literacy level on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Treatment * Literacy	9899.764	4	2474.941	3.175	.040	.428	S

Table 4.11: Estimated Marginal Means (EMM) showing the two-way interactive effect of treatment and literacy level on occupational health and safety competencies

Literacy Level	Treatment	Mean	Std. error	95% Confidence Interval	
				Lower bound	Upper Bound
High	Syndicate Method	168.375 ^a	15.619	135.684	201.066
	Guided-practiceMethod	158.958 ^{a,b}	11.793	134.275	183.641
	Control	179.129 ^{a,b}	13.541	150.787	207.470
Medium	Syndicate Method	179.165 ^a	11.116	155.898	202.432
	Guided-practiceMethod	187.637 ^a	16.958	152.143	223.131
	Control	157.196 ^a	10.467	135.288	179.104
Low	Syndicate Method	208.541 ^{a,b}	11.522	184.426	232.657
	Guided-practiceMethod	143.595 ^a	13.150	116.071	171.119
	Control	167.049 ^a	15.033	135.584	198.514

Interpretation and Discussion

The results in Table 4.10 indicated that there was significant interaction effect of treatment and literacy level on workers' occupational health and safety competencies ($F_{(4, 17)} = 3.175$, $p < .05$, $\eta^2 = .428$). Therefore, the null hypothesis was rejected. This showed that the literacy level of workers influenced the effectiveness of treatment in enhancing occupational health and safety competencies. This finding revealed that literacy significantly interacted with treatment

in improving the occupational health and safety competencies of the participants. This further showed that the participants with high literacy level responded more positively to the treatments than those with low literacy level. The participants with high literacy level were able to cope better in the syndicate and guided-practice training groups. These participants understood the contents better due to their level of literacy and most of them also led in the syndicate group discussions, making them to have more enhanced occupational health and safety competencies.

This finding is in agreement with previous studies which highlighted the benefits of literacy at workplace. The literature has also documented many benefits of increasing the literacy skills of workers and particularly with respect to occupational health and safety. Literacy skills, according to Bloom and Lafleur (1999), form the foundation on which advanced training, including safety training, is built and are key to increasing employees' capacity to acquire the technical and job-specific skills they need to be high performers. In the research conducted in the United States for the U.S. Department of Education, the Conference Board, as reported by Bloom and Lafleur (1999), found that training also "gives employees a better grasp of workplace dangers and safety issues," leading them to appreciate the health and safety-related consequences of their actions. The result of workplace education programmes, the study concluded, is fewer accidents, less lost work time due to injuries, reduced workers' compensation payments, and better compliance with occupational health and safety regulations.

HO₆: There is no significant two-way interactive effect of treatment and employment status on occupational health and safety competencies.

Table 4.12 Analysis of Covariance (ANCOVA) showing two-way interactive effect of treatment and employment status on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Treatment * Employment	3309.394	2	1654.697	2.123	.150	.200	NS

Table 4.13: Estimated Marginal Means (EMM) showing the two-way interactive effect of treatment and employment status on occupational health and safety competencies

Employment Status	Treatment	Mean	Std. error	95% Confidence Interval	
				Lower bound	Upper Bound
Permanent	Syndicate Method	165.292 ^{a,b}	12.434	139.267	191.316
	Guided-practice Method	164.982 ^a	12.392	139.045	190.919
	Control	170.211 ^a	8.263	152.915	187.506
Temporary	Syndicate Method	191.012 ^a	10.210	169.643	212.382
	Guided-practice Method	163.238 ^{a,b}	12.815	136.416	190.060
	Control	158.494 ^{a,b}	13.951	129.294	187.694

Interpretation and Discussion

Table 4.12 shows that there was no significant interaction effect of treatment and employment status on workers' occupational health and safety competencies ($F_{(2, 17)} = 2.123, p > .05, \eta^2 = .200$). Hence, the null hypothesis was accepted. This demonstrates that employment status did

not significantly moderate the efficiency of the treatment in enhancing workers' occupational health and safety competencies. This indicated that, whether the workers were temporary or permanent workers did not have any significance effect on how the treatments enhanced their occupational health and safety competencies. The treatments improved the occupational health and safety competencies of the participants regardless of whether they were temporary or permanent workers. This is in support of the findings in hypotheses three and four, which showed that there was no significant main effect of employment status on occupational health and safety competencies of the participants. This suggests that the use of syndicate and guided-practice methods can be recommended for both temporary and permanent workers for improved occupational health and safety competencies.

It is important to expose both the temporary and permanent workers to periodic safety training using appropriate methods, like syndicate and guided-practice methods, since both categories of workers benefited from these methods regardless of their employment status. Employers of labour must then deviate from their nonchalant attitude shown towards training of temporary workers, as shown in the literature. One of the Managing Director of the construction industry stated categorically that he did not really care about the training of the sub-contractors and temporary workers because he believed that they might not have a positive attitude towards safety at workplace. However, this study confirmed that the use of learner-centred and pragmatic methods, like syndicate and guided-practice methods, will change the attitude of both temporary and permanent workers. The reaction of this manager was also emphasized by Quinlan and Bohle (2004) who observe that the use of temporary workers affect employers' attitudes to induction, training, participation in workplace committees and other implications for safety.

HO₇: There is no significant three-way interactive effect of treatment, employment status and literacy level on occupational health and safety competencies.

This hypothesis tested whether the treatments with the two moderating variables of literacy level and employment status interacted together to have a significant effect on the occupational health and safety competencies of the construction workers. The results are captured in Table 4.14.

Table 4.14 Analysis of Covariance (ANCOVA) showing three-way interactive effect of treatment, employment status and literacy level on occupational health and safety competencies of workers.

Source	Type III Sum of squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Remark
Corrected Model	72852.875 ^a	17	4285.463	5.498	.001	.846	
Intercept	2577.982	1	2577.982	3.307	.087	.163	
Pretest	2.656	1	2.656	.003	.954	.000	
Treatment * Literacy * Employment	4383.899	3	1461.300	1.875	.172	.249	NS

Table 4.15: Estimated Marginal Means (EMM) showing the three-way interactive effect of treatment, employment status and literacy level on occupational health and safety competencies

Employment	Literacy	Treatment	Mean	Std. error	95% Confidence Interval	
					Lower bound	Upper Bound
Permanent	High	Syndicate Method	175.018 ^a	16.748 ^a	139.963	210.073
		Guided-practice Method	158.958 ^a	11.793	134.275	183.641
		Control	179.129 ^a	13.541 ^a	150.787	207.470
	Medium	Syndicate Method	155.565 ^a	17.080 ^a	119.816	191.315
		Guided-practice Method	196.017 ^a	24.238	145.287	246.748
		Control	171.661 ^a	17.952 ^a	134.088	209.234
	Low	Syndicate Method	141.321 ^a	21.328 ^a	107.924	207.109
		Guided-practice Method	139.970 ^a	24.642 ^a	88.395	191.545
		Control	159.843 ^a	17.976 ^a	122.219	197.466
	High	Syndicate Method	161.732 ^a	24.791 ^a	109.844	213.620
		Guided-practice Method	153.381 ^a	17.952 ^a	107.952	211.822
		Control	137.281 ^a	15.812 ^a	97.381	198.224

Temporary		Syndicate Method	202.764 ^a	13.396	174.725	230.802
	Medium	Guided-practice Method	179.256 ^a	23.005	131.105	227.406
		Control	142.732 ^a	14.853	111.643	173.820
Low		Syndicate Method	208.541 ^a	11.522	184.426	232.657
	Low	Guided-practice Method	147.220 ^a	11.865	122.386	172.055
		Control	174.256 ^a	23.005	126.105	222.406

Interpretation and Discussion

Table 4.14 indicates that there was no significant interaction effect of treatment, employment status and literacy level on workers' occupational health and safety competencies ($F_{(3, 17)} = 1.875, p > .05, \eta^2 = .249$). By implication, the null hypothesis was accepted. This denotes that the impact of the treatment, employment status and literacy level in enhancing workers' occupational health and safety competencies was not significant. In other words, the post-test scores of the temporary and permanent workers with different levels of literacy placed in the two treatments and control groups were not significantly different. This also implies that combined effects of employment status and literacy level did not affect the effectiveness of the two treatments - syndicate and guided-practice methods - in enhancing occupational health and safety competencies of the workers.

It was observed that the construction workers in the treatment groups of syndicate and guided-practice training exhibited improved occupational health and safety competencies after the training. This was evident in their level of awareness regarding their rights to safety at work as employees in the construction industry. They also exhibited a change of attitude with respect to how they embraced the usage of personal protective equipment and employed different ways of controlling accidents at workplace. However, participants in all the three groups asked the facilitators the steps they needed to take to contact the regulatory body in charge of workers' rights to safety, that is Occupational Health and Safety Administration (OSHA) Office in their local environment, in case they want to protect their safety rights at work. Most of them showed high level of ignorance on the existence of the body that enforces the rights of workers to safety. This agrees with the opinion of Puplampu and Samuel (2012) that the prevalence of occupational health and safety issues in most of the African countries is due to inadequate attention given to occupational health and safety by industry and the government. The Federal Ministry of Labour and Productivity, which is responsible for organising awareness

programmes on the existence and importance of OSHA to enable workers to have free access to file a case against violation of their safety rights at workplace have not been doing enough which could account for the high level of ignorance about the existence of OSHA.

In addition, during the discussions at the syndicate and guided-practice training sessions, the participants lamented that most of the personal protective equipment items which were supposed to be provided by the employers were not available, while the available ones provided were usually low-quality and sub-standard. They also added that some of the basic safety rules, like barricading of work environment, non-entrance of strangers to work environment, the use of personal protective equipment by workers, were no longer enforced by the employers. They, therefore, suggested that the employers need to be more committed to safety of the workers by observing all these safety rules as well as enforcing strict adherence by the workers on site. These observations are in agreement with the submissions of Garcia, Boix and Canosa (2004), who state that workers' behaviours regarding risk prevention are influenced by other factors, besides proper training, and these factors should be evaluated and their relative effects on the workers' behaviour measured in order to develop integral programmes for workplace hazards control. This shows that efforts geared towards achieving efficient and effective management of occupational health and safety must take into consideration all the factors involved. Some of these other factors as identified by Lindel (1999) and cited by Garcia, Boix and Canosa (2004) are organisational factors related to safety and health at work, including management's policies and practices regarding occupational risk prevention, which may also affect implementation of workers' safety training.

This equally agrees with the multiple cause theory by Peterson (1988) which states that workplace accident come as a result of many factors or causes. It further explains that all these causes of accidents must be removed in order to achieve reduction or prevention of accident.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter consists of the summary, conclusion and recommendations of the study. It also discusses limitations to the study and suggestions for further studies.

5.1 Summary

The main objective of this study was to establish the effects of syndicate and guided-practice training methods on the occupational health and safety competencies of workers in the construction industry in Oyo State, Nigeria. Also, it was to determine the interaction effects of literacy level and employment status as moderating variables. The study was presented in five chapters, starting with the introduction, where the study variables, justification for the study and the gap that the study would fill in the literature were thoroughly discussed. In addition, the objectives, significance, hypotheses and scope of the study were also presented.

Relevant empirical studies were examined to establish the effectiveness or otherwise of syndicate and guided-practice training method in enhancing positive behavioural change. There was also theoretical review of Multiple Cause and Behavioural learning theories that were considered relevant to the study. All these were handled in chapter two.

The research design adopted for the study was pretest-posttest, control group quasi experimental design with a 3x3x2 matrix. A total sample size of thirty-five (35) construction workers from three purposively selected construction organisations in Ibadan was used as participants. The treatment lasted eight weeks and two validated research instruments were used. Also, the methods of data analysis were presented, which included descriptive statistics, Analysis of Covariance (ANCOVA) and Scheffe Post- hoc at 0.05 level of significance. The data collected were analysed. The results generated were discussed in Chapter four.

Treatments had significant main effect on workers' occupational health and safety competencies. This implies that there is a significant impact of the treatments in the groups test scores on occupational health and safety competencies of workers. The construction workers' occupational health and safety competencies improved after being exposed to the treatments.

Employment status and literacy level had no significant effect on the construction workers' occupational health and safety competencies, which made the workers to achieve improved occupational health and safety competencies regardless of their literacy level and employment status.

Only the two-way interaction effect of literacy level and treatment had significant effect on the construction workers' occupational competencies, while the other two-way interaction effect of treatment and employment status, literacy level and employment status, had none. In addition, the three-way interaction effect of treatment, literacy level and employment status was also not significant.

5.2 Conclusion

Safety training has been established in literature as a panacea for the reduction of fatalities. Most of the construction workers are migrants who are usually employed on contract or part-time basis with little knowledge of their rights of occupational health and safety. Although, they are exposed to safety training and measures, there are still evidences and records of fatalities. It is clear that the success of the safety training largely depends on the instructional methods employed in the inculcation of the contents of these safety training, particularly interactive methods like syndicate and guided-practice training methods.

The study showed that both syndicate training and guided-practice training methods are effective in enhancing the occupational health and safety competencies of workers in the construction industry in Oyo State regardless of their literacy level and employment status. There is therefore a need for more practice-oriented methods of training if there will be improvement in the occupational health and safety competencies of construction workers with the aim of reducing the prevalence of industrial accidents.

5.3 Recommendations

The following recommendations were made based on the findings of this study:

There is the need to regularly incorporate the use of syndicate training and guided-practice training methods in the process of enhancing occupational health and safety competencies of construction workers. This will, in the long run, help in reducing the high prevalence of

workplace accidents and ill-health in the construction industry. Therefore, training agencies, unions and development partners, like the International Labour Organisation (ILO), who are actively involved in safety training of workers should ensure the use of these two methods to achieve effective safety training outcomes.

Experience-based learning and group collaborations with a lot of demonstrations, as found in the syndicate training method should form the bedrock of safety training and should be factored into any process targeted at improving occupational health and safety competencies of workers. The use of the syndicate training method should also be adopted in the process of training workers in other high-risk sectors, such as mining, manufacturing, and even the service industries, like banking, insurance and academics where the risks are perceived to be minimal. Likewise, the guided-practice training method should be employed in safety training because it promotes coaching, mentoring, observational and pragmatic learning. Safety training process should ensure that these basic essential components are used for improving occupational health and safety competencies of the workers.

The Federal Ministry of Labour and Productivity needs to provide information and monitor through regular inspection. This will make the construction organisations carry out regular or periodic safety training and also make use of appropriate methods of facilitation to ensure effective training programme. There is also a need for the Federal Ministry of Labour and Productivity to sensitise, from time to time, the construction workers on their rights and responsibilities as employees and as provided for in the Occupational Health and Safety Acts to which the Nigerian government is a signatory.

The government should make it a policy, which must be duly enforced by the Federal Ministry of Labour and Productivity, that the expatriates and indigenous construction engineers who own the industries cater appropriately for their permanent and temporary workers, especially on the issue of occupational health and safety, without any prejudice to those workers who are employed by sub-contractors as temporary workers.

5.4 Contributions to knowledge

This study has contributed to knowledge in various ways. The findings from this study showed that the use of practice-oriented methods, like syndicate training characterised with experiential learning, demonstration and group collaborations, will achieve better results than the use of traditional lecture method in safety training. Also, results from this study established that guided-practice method with useful components of coaching, mentoring, observational and pragmatic learning will help in the enhancement of occupational health and safety competencies more than the lecture method, where these components are lacking.

The study has shown that the syndicate training method is effective in safety training process, especially for workers who are adults. It also showed that guided-practice training method is effective in safety training of construction workers. This study has provided a framework for policymakers in the form of a model for safety training in construction industry.

In addition, this study showed that the lecture method had limited impact and was not as effective as syndicate and guided-practice training methods and should not be used solely for safety training of workers.

5.5 Limitations to the study

This study encountered some limitations. The researcher was unable to start the training session on time due to serious challenges faced by the construction organisations as a result of the economic situation in the country. This made many of the construction organisations earlier visited by the researcher to lay off most of their workers, arising from non-payment of their funds by the Federal Government. Consequently, this made the researcher to change some of the construction organisations. The training session was also delayed when the construction workers and their unions went on strike at the beginning of the year 2016 which made it practically impossible to meet and train the workers.

The sample size was affected by the nature of construction job, which is usually time-bound for completion of their work. So, only few employees were allowed by their employers to participate in the training to ensure non-distruption of the flow of work, especially where the training was conducted in the morning immediately after their morning briefing.

5.6 Suggestions for further studies

This study examined the effects of syndicate and guided-practice training methods on occupational health and safety competencies of workers in the construction industry in Oyo State, Nigeria. There are other areas which can still be explored. Other researchers could examine the effects of these methods in safety training process of workers in other sectors, like mining, manufacturing, aviation, oil and gas as well as service industries where safety risks are perceived as serious concern.

Besides, other moderating variables, such as years of experience of the worker, could also be examined, while other practice-oriented methods can also be assessed to test their effectiveness in enhancing occupational health and safety competencies of workers. In addition, other studies could also be carried out in some other geo-political zones of the country. Some of the suggested topics are:

1. Effects of syndicate and guided-practice training methods on the occupational health and safety competencies of workers in the oil and gas industry, Port-Harcourt, Nigeria
2. Effects of team coaching and blended-learning on the occupational health and safety competencies of aviation workers in northern Nigeria

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APPENDIX I
OCCUPATIONAL HEALTH AND SAFETY COMPETENCIES QUESTIONNAIRE
(OHSCQ)
DEPARTMENT OF ADULT EDUCATION
UNIVERSITY OF IBADAN

Dear Respondent,

The purpose of this research is to assess the effect of some training methods on the Occupational Health & Safety Competencies of construction workers in Nigerian construction industry. Information gathered will be treated in strict confidence and used only for the purpose of this research. The utmost sincerity and cooperation of respondents will be of utmost importance to enable the researcher obtain factual information for the success of this research.

Thank you.

Demographic Information

1. Name of construction industry : -----
2. Age : 16-30yrs, 31-40yrs, 41 and above
3. Sex : Male () Female ()
4. Level of Literacy : NCE, () OND,() HND () University Degree and above ()
Secondary School Certificate and Technical Education () Primary Six Certificate and below ()
5. Marital Status : Single () Married, Widowed () Separated ()
6. Position held : -----
7. Nature of employment: Permanent () Temporary ()
8. Years of experience in the construction industry: 1-4 yrs , 5-9yrs, 10 yrs and above
9. Religion: Christianity () Islam () Traditional ()
10. Ethnic Affiliation: Yoruba () Igbo () Hausa() Other (specify)

11. Monthly Income(in naira): 0-30000 () 31000-60000 () 61000 and above ()

APPENDIX II
CONSTRUCTION INDUSTRY OCCUPATIONAL HEALTH AND SAFETY
QUESTIONNAIRE

Dear Respondent,

This part contains questions which are aimed at assessing your level of awareness and general knowledge about the existing and potential hazards which are peculiar to and inherent in the construction industry. Your response will be treated confidentially. Use the following format as a guide: ML = Most Like Me; RL = More Like Me; L = Like Me; LL = Least Like Me. Please tick (✓) appropriately.

S/N	Questionnaire – Items	Responses			
		ML	RL	L	LL
1	I am aware of the hazards in my job.				
2	I am able to identify the various hazards connected with my job.				
3	I know that falls from heights are major part of the hazards encountered in my job.				
4	I can identify loud noise as one of the hazards.				
5	I am aware that ergonomics hazards are common in my industry.				
6	I know that chemical hazards, such as presence of residues left by degreasing agents, usually chlorinated hydrocarbons (chloroform and carbon tetrachloride) are generally prevalent in my industry.				
7	I know that my job exposes me to biological hazards, like the presence of plant and/or animal wildlife (poisonous venom, feces, rabies...)				
8	I am aware of the physical hazards peculiar to my industry				
9	I usually identify waste substances which may be hazardous to my health at work.				
10	I am able to identify the various parts of the machines used which can be risky.				

11	Unsanitary condition can lead to health hazards.				
12	Poorly kept toilet as an unsanitary condition can lead to health hazards.				
13	Extreme temperatures (hot or cold environments) can pose as threat to health at workplace.				
14	Radiological exposures (nuclear power plants or antennas, hospitals or laboratories or sun) can pose as threat to health at workplace.				
15	Confined spaces can serve as hazards at workplace.				
16	Enclosed spaces can serve as hazards at workplace.				
17	Contaminated soil conditions can be hazardous to health at workplace.				
18	Unsafe actions could constitute a form of hazard				
19	Risk-taking could constitute a form of hazard.				
20	Malfunctioning alarms are other sources of hazard to the workers.				
20	Malfunctioning rescue devices are other sources of hazard to the workers.				

Thank you.

OCCUPATIONAL HEALTH AND SAFETY COMPETENCIES QUESTIONNAIRE

Dear Respondent,

The questions are designed to elicit information from you in order to test your level of occupational health and safety competencies, which include attitude to safety at work, compliance to safety rules, usage of protective equipment and reduction of the incidence of occupational hazards and accidents. Your response will be treated confidentially. Use the following format as a guide: ML = Most Like Me; RL = More Like Me; L = Like Me; LL = Least Like Me. Please tick (✓) appropriately.

PREVENTION OF HAZARDS:

S/N	Questionnaire – Items	Responses			
		ML	RL	L	LL
1	I always use personal protective equipment at work.				
2	I always use alternative less hazardous materials to prevent the hazards associated with my job process.				
3	I usually find a new method of working in order to prevent job hazards.				
4	I often prevent harmful dusts, vapours or gases by using respiratory equipment.				
5	I always guard against irritating or corrosive substances, abrasion and violation by wearing protective clothing, like overalls, boots or gloves.				
6	Prevention against chemical splashes is done by using eye protectors, such as goggles.				
7	Prevention against chemical splashes is done by using eye protectors, such as face visors.				
8	I have appropriate information on the selection of personal protective equipment.				
9	I am well informed on the maintenance of the personal protective equipment.				
10	I am able to identify safety symbols on sign posts.				
11	Usage of safety sign posts is always done to avoid				

	workplace risks.				
12	First aid equipment is usually in my workplace for emergency.				
13	Fire extinguishing equipment is usually in my workplace to prevent fire.				
14	I always provide and maintain appropriate lighting for the work being done.				

CONTROL OF HAZARDS :

S/N	Questionnaire – Items	Responses			
		ML	RL	L	LL
1	Performing a hazard analysis (e.g., air monitoring, dust sampling, noise metering or biological monitoring & medical surveillance) is one way of controlling job hazards.				
2	Following good hygiene practices can also help to control job hazards.				
3	Implementing engineering or administrative controls (e.g., wet methods, ventilation, or dust collection systems) is another way of controlling the hazards.				
4	Practising good housekeeping can control the occupational hazards, like safe access to or from the workplace.				
5	Appropriate access to or from workplace, as good housekeeping, can control hazards.				
6	Clear access to or from workplace, as good housekeeping, can control hazards.				
7	Safe systems for collecting excess materials can control hazards.				
8	Safe systems for storing excess materials can				

	control hazards.				
9	Safe system for disposing of waste material is one way of controlling hazards.				
10	Adequate space for storing materials is another good housekeeping way of controlling hazards.				
11	The usage of personal protective equipment, including respiratory or hearing protection or protection of face or hand or feet or eyes or whole body helps in the control of hazards.				

EMPLOYEES' RIGHTS KNOWLEDGE:

S/N	Questionnaire – Items	Responses			
		ML	RL	L	LL
1	I have the right to notify my employees about workplace hazards.				
2	I have the right to notify OSHA about workplace hazards.				
3	I have the right to request an OSHA inspection if I believe there are unsafe conditions in my workplace.				
4	I can file a complaint with OSHA within 30 days of retaliation by my employer for making safety or health complaints.				
5	I can file a complaint with OSHA within 30 days of discrimination by my employer for exercising my rights under the OSH Act.				
6	I have the right to copies of my medical records.				
7	I have the right to records of my exposure to toxic substances.				
8	I have the right to records of harmful				

	conditions.				
9	I must comply with all occupational safety and health standards issued under the OSH Act that apply to my actions.				
10	Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an imminent danger.				

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APPENDIX III

EXPERIMENTAL GROUP ONE

SYNDICATE TRAINING MANUAL ON OCCUPATIONAL HEALTH AND SAFETY COMPETENCISS

WEEK 1

ORIENTATION AND ADMINISTRATION OF PRE-TEST INSTRUMENT

Table of contents

Introduction

UNIT 1: General Orientation

UNIT 2: Administration of Pre-test

Introduction

In this session, the researcher and the research assistants will familiarize themselves with the participants and also administer the pre-test instrument. The purpose of the research will also be made known to the participants.

UNIT 1: GENERAL ORIENTATION

Objectives

At the end of this session, the participants should be able to:

- get acquainted with the purpose and procedures to be used for the training programme
- get themselves ready to participate fully in the programme in view of the benefits they will get from the programme
- have the ground rules for the training at the back of their minds; and
- identify with a group

Content: Introduction of the researcher and participants

Activities:

Step I: Opening prayer is said after which the participants are asked to sing the solidarity song and national anthem.

Step II: The facilitator welcomes the participants, introduces herself and other research assistants and also asks each of the participants to do self-introduction.

Step III: The facilitator explains what the programme is all about and the benefits which can accrue to them by participating in the training programme.

Some of the benefits to derive from this training may include:

- ❖ increased awareness of the hazards peculiar to or inherent in construction work
- ❖ inculcation of appropriate safety skills for working at the construction sites
- ❖ developing positive and right attitude to health and safety at the workplace
- ❖ being able to recognise, anticipate, control and reduce hazards
- ❖ reduction of the incidence of accidents and injuries while working at the construction sites

Step IV: The facilitator, with the help of the research assistants also describes the procedures to be used for the training. The training will last for six weeks covering:

- general orientation and pre-test administration
- group briefing
- breaking into syndicate groups
- plenary session and post-test administration

Step V: The facilitator encourages the participants to be punctual throughout the period of training in order to fully benefit from it.

Step VI: The facilitator, with the participants, sets ground rules to be followed during the training period:

- switching off mobile phones or putting them on silence mode
- regular and punctual attendance at the training
- full participation by all attendants
- No noise-making nor loitering around during the training period

Step VII: The participants are allowed to contribute by commenting briefly or asking questions on areas not clear to them on the commencement of the training.

Evaluation: Participants are asked the following questions:

- What are the benefits which can be derived from the training?
- Mention some of the activities which will make up the training.
- State some of the ground rules to be observed during the training.

Learning Points

Purposes of the training include increased awareness, inculcation of safety skills,

positive safety attitudes and reduction in hazard occurrences.

Procedures of the research are given

Ground rules are set

UNIT 2: Administration of Pre-test

Objectives

At the end of this section, the participants should have adequately filled the pre-test instrument with the assistance of the facilitators.

Content

Step I: Administration of pre-test questionnaire to the training participants by the facilitators

Step II: The facilitators supervise the filling of the instrument and make clarifications where necessary.

Evaluation: The exercise of questionnaire administration

WEEK 2

GENERAL GROUP BRIEFING

TABLE OF CONTENTS

Introduction

UNIT 1: Concepts and Principles of Occupational Health and Safety

UNIT 2: Occupational Health and Safety Competencies

Introduction

In this session, discussions will be made on basic concepts in occupational health and safety as well as how they are related to this training. Some of the concepts that will be explained include health, safety, occupational health, hazard, risk and accident. This session will also explain what is meant by occupational and health competencies and its importance.

Unit 1: Concepts and Principles of Occupational Health and Safety

Objectives

At the end of the session, participants should be able to:

- mention some of the concepts which are used in occupational health and safety
- define health, safety, work and other key concepts in occupational health and safety.

Contents

Everyone has a general idea of what is involved in the phrase health and safety at work, but it is important to be able to describe the specific ways in which the words are used.

What is health?

What is safety?

What is occupational health?

Occupational health covers the overall state of people's physical, mental and social well-being at work resulting from their kind of work. A wide range of workplace conditions and practices are usually with occupational health. They include:

- air quality
- manual handling
- the use of and exposure to chemicals and biological agents
- exposure to noise and vibration

What are hazards and risks?

In general conversation, we often use the words hazard and risk interchangeably, but it is important to understand the differences between them in the context of health and safety at work.

A **hazard** is a source of danger: it is any circumstance, condition or state with a potential to cause harm. That harm could be personal injury or illness, or damage to property, machines, structures and the environment. There are many examples of hazardous substances, objects, processes and procedures, some of which will be covered later during this training. Examples include:

- machinery and equipment,
- inflammable substances,
- work at heights, and
- lifting heavy objects.

Risk is a measure or scale of the likelihood that harm will occur from a particular hazard and the severity of the bad consequences, which could be:

- death,
- major injury,
- disease,
- minor injury, or
- damage to property

Activities

Step I: The facilitators welcome the participants to the second session of the training and remind them of the purpose, procedures and ground rules for the training.

Step II: The facilitators explain that the second session will cover basic concepts and principles in occupational health and safety.

Step III: The facilitators state and display the key concepts to be examined for the participants and encourage them to define or describe them.

Step IV: The facilitators then define and describe each of the concepts while he/she allows the participants to contribute by adding more examples from their wealth of experience, that is, working on construction sites.

Evaluation: The participants are asked the following questions:

- mention three of the concepts used in occupational health and safety
- describe two of the concepts.

Learning Points

Health can be defined as soundness of body, while safety means freedom from danger.

Occupational health covers the overall state of people's physical, mental and social well-being at work as a consequence of their work.

Hazard is a source of danger, while risk is a measure or scale of the likelihood that harm will occur.

Unit 2 : Occupational Health and Safety Competencies

Objectives

At the end of this unit, the participants should be able to:

- describe occupational health and safety competencies
- state the importance of occupational health and safety competencies

Contents

What is occupational health and safety competency?

Occupational health and safety competencies refer to measurable patterns of:

- knowledge
- skills

- abilities and attitude

that workers need to keep safe as they perform their duties at their workplace. This implies that the workers who are safety competent will be able to identify, prevent, control and reduce the various hazards which are inherent in their job.

Why the need for health and safety competencies?

It is very important for workers to be conscious of the need to keep safe at their workplace and have a high level of occupational health and safety competencies because

- it enhances the safety of the workers at the workplace;
- it reduces occurrences and high prevalence of injuries and fatal accidents;
- it consequently helps the workers to work better;
- it increases their productivity as well as that of the industry;
- it transforms into better products from the industry, which will be enjoyed by the citizens; and
- a healthy workforce is a key to successful production

Activities

Step I: The facilitator reviews the previous unit with the participants and introduces the concept of occupational health and safety competencies

Step II: The facilitator asks the participants to mention some activities which can show competent safety behaviour by workers while the facilitator highlights and explains the basic features of competent workers

Step III: The participants are also asked to state some of the importance which can be derived from being safety-competent.

Step IV: The facilitator then modifies and adds to some of the points raised by the participants on the importance of occupational health and safety competencies.

Evaluation: The participants are asked to:

- describe occupational health and safety competencies
- mention some of the importance of occupational health and safety competencies to different stakeholders

Learning Points

Occupational health and safety competencies centres on knowledge, skills and attitude to health and safety at work

Occupational health and safety is relevant to the workers, organization and the society at large.

WEEK 3
ACCIDENTS AT WORKPLACE

Table of Content

Introduction

Unit 1: What is an accident?

Unit 2: Why do accidents occur?

Unit3: What are the causes of accidents?

Introduction

In this study, we will focus on what constitutes accident at the construction sites and the various factors which can cause accidents. Construction site are filled with various hazards which can lead to accidents. Construction workers, therefore, need to be able to identify the various factors which can cause accidents at work in order to guard against such occurrences.

Unit 1: What is an accident?

Objectives

At the end of the training session, participants should be able to:

- discuss and state the meaning of accident
- list the different outcomes of accident at the construction sites

Content

Accidents could be described as an unlooked for mishap or untoward event which is not expected or designed. It could also be described as any unintended and unexpected loss or hurt.

What is clear is that an accident is:

- an unplanned and uncontrolled event
- an event that causes injury, damage or loss
- an event that could lead to a near-miss accident or could result in no loss or damage at all

An important part of your duty as employees is to ensure that everything is done to prevent a loss of control that allows a chain of uncontrolled events to occur. This takes planning, implementation and monitoring.

Outcome of an accident

The outcome of an accident could be one or several of the following:

- death

- personal injury
- long-term health problems
- damage to, or loss of, property and premises
- damage to the environment
- no injury or damage at all

Such accidents that do not result in injury or damage can be referred to as incidents, near-misses or near-miss accidents.

Activities

Step I: The facilitator welcomes the participants to another session and reminds them of what was discussed in the previous session

Step II: The facilitator divides the participants into three smaller syndicate groups with a facilitator assigned to each group.

Step III: The researcher instructs each syndicate group to appoint a chairman and a secretary to record the proceedings of their discussion which will be reported at the plenary session.

Step IV: The facilitator at each syndicate group introduces the topic of discussion, “what is an accident?” and makes members of the group to contribute, while the secretary documents the various contributions.

Step V: The facilitator then briefs the group on the meaning of accidents, bringing together all the points raised by the participants in the group.

Step VI: The facilitator also makes members of the group to highlight the various outcome of accident at the construction sites with practical examples of their own experience, while s/he summarises the points raised and gives additional points not raised.

Evaluation: The participants are asked to briefly comment on what has been discussed

- describe accident at the construction site
- list the different outcomes of accidents at the construction site

Learning Points

Accidents are uncontrolled or unplanned event that could cause injury, damage or loss

Unit 2: Why accidents occur?

Objectives:

At the end of this session, participants should be able to :

- state the factors that could cause accident

- discuss practical examples of the factors that could cause accident

Most accidents happen because of failure to control an activity. The control of activities is usually affected by:

- occupational factors
- environmental factors
- human factors
- organisational factors

Occupational factors

These are the issues most closely related to the specific work that an individual carries out. The risks from specific tasks undertaken are likely to depend upon:

- the degree to which a particular job is designed to fit the person doing it- ergonomic principles
- the specific safety standards applied to work equipment used

Environmental Factors

The conditions in which people work can affect the level of risk to which they are exposed. For example:

- poor lighting can make it difficult to carry out many types of work and to spot hazards,
- air quality, temperature and humidity may affect the level and duration of someone's concentration.
- the space available for carrying out particular tasks can also help staff to work easily and safely. Examples include slips and trips
- the time available to do a job and the way in which it is done can also affect the degree of risk to a worker. For example, if there is severe pressure to meet deadlines and the design of the work procedure is unrealistic for meeting those deadlines, there will be a high risk that accident will occur.

Human factors

Certain personal characteristics may have an influence on the level of risk a person is exposed to when at work. They include:

- general health and fitness, including physical capabilities such as strength, suppleness and co-ordination
- mental capabilities, such as general intelligence and the ability to recognise hazards
- skill level

- general attitude towards safety and general awareness of safety
- inexperience of work or the workplace or both
- the influence of drugs or alcohol
- fatigue

Organisational factors

Organisational factors which may influence the risk that an accident will occur include

- safety standards, precautions and procedures that are enforced and encouraged by an employer;
- effectiveness of communication between the employer and employees;
- effectiveness of communication between individual employees and groups of employees; and
- level of training, advice and supervision.

Activities

Step I: The facilitator of each syndicate group introduces the topic of discussion as “why accidents occur?” S/he further emphasises that accidents do not just occur as discussed earlier.

Step II: Members of each syndicate group are allowed to itemize some of the factors which they think can necessitate the occurrence of accident.

Step III: The facilitator then mentions the factors which could result into accident and allows members of the group to give practical examples relating to their work environment on each of the factors highlighted.

Step IV: The facilitator asks the secretary to brief the group on the cogent points from the discussion.

Evaluation

The facilitator asks members of the syndicate group at random to:

- state the factors that could cause accident
- discuss practical examples of the factors that could cause accident

Learning Points

Accidents do not just happen, they are necessitated by some factors.

Factors that could cause accidents include occupational, environmental, human and organisational factors.

Unit 3: The causes of accidents

Objectives

At the end of this unit, participants should be able to:

- state the three types of typical causes of accident at the construction sites
- give examples of each of these causes as it relates to their work environment

Contents

The four types of factors mentioned in the previous unit help to explain what lies behind the failure to control an activity. The factors can be analysed so that changes can be made to reduce the likelihood of an accident. In practice, you need to identify the actual events and the chain of events that led to an accident, so that you can prevent such circumstances recurring.

Accidents happen in many ways, but their typical causes can be divided into three groups:

- unsafe acts
- unsafe conditions
- a combination of unsafe acts and unsafe conditions

Unsafe acts

Examples of unsafe acts include:

- using work equipment incorrectly
- operating equipment or using hazardous chemicals without being trained and authorized to do so
- operating a dangerous machine without the guard in place
- using damaged or defective work equipment
- lifting loads in an unsafe manner
- failing to use personal protective equipment where it is provided and necessary
- using dangerous chemicals without taking proper precautions
- messing around or deliberately misusing safety equipment, such as fire extinguishers
- taking drugs or drinking alcohol

Unsafe conditions

Examples of unsafe conditions include:

- inadequate maintenance of work equipment
- poor environmental conditions,
 - such as high or low workplace temperatures

- high humidity
 - dust or other reason for poor air quality
 - noise
 - low levels of lighting or glare from lighting
 - poorly designed buildings
- an untidy workplace
 - broken or unsuitable machine guards
 - poor construction and design of machinery
 - systems of work that fail to take safety sufficiently into account
 - loose or unsuitable clothing
 - poor fire warning systems
 - exposure to radiation

Combination of unsafe acts and unsafe conditions

Activities

Step I: Facilitator in each syndicate group introduces the new topic as causes of accidents at the construction sites.

Step II: The facilitator explains that these causes refer to specific conditions that can lead to accident at their workplace and then encourages members of the group to brainstorm on these causes as applicable to their workplace.

Step III: The facilitator then mentions the three categories of these causes and allows members of the group to classify the examples they cited under each of these categories while s/he gives additional points on each category.

Step IV: The facilitator asks the group secretary to read out the salient points which have been discussed by the group for that session.

Evaluation: Participants are asked to:

- briefly state the factors that could influence the risk of an accident
- explain the causes of accidents in their workplace

Learning Points

Learning Points

Most accidents and injuries at workplace happen because of a failure to control an activity

The control of activities is usually affected by:

Occupational factors, environmental factors, human factors and organisational factors
The main categories of causes of accidents at workplace are unsafe acts, unsafe conditions and combination of unsafe acts and unsafe conditions

WEEK FOUR

IDENTIFICATION AND AWARENESS OF HAZARDS

Table of Content

Introduction

Unit 1: Health Hazards in Construction

Unit 2: Anticipation of Health Hazards

Unit3: Recognition of Health Hazards

Introduction

In this session, discussions will be made on what the health hazards in construction are and the ways in which the health hazards in construction can be anticipated. It will also discuss the ways in which the sense organs can be used in recognizing different health hazards in construction.

Unit 1: Health Hazards in Construction

Objectives

At the end of the session, participants should be able to:

- identify the main forms or categories of health hazards associated with construction activities
- give practical examples of each form of health hazards peculiar to their workplace

Contents

There are various hazards in the construction industry which every employee should be able to identify and have high level of awareness in order to help in reducing the negative influence of these hazards on the workers. These hazards can be poisonous or toxic depending on the dose (the amount) and the concentration at the affected site. The construction workers should study and learn the hazardous effects of the substances that they are working with as well as the dangers associated with the health hazards. Some of these hazards include:

Chemical hazards: Examples are gases, vapors, fumes dusts, fibers, mists

Physical hazards including temperature, noise, repetitive motion & awkward postures, ionizing & non-ionizing radiation,

Biological hazards which are fungi (mold) blood borne, pathogens, bacteria, poisonous plants, poisonous & infectious animals

Activities

Step I: The facilitator in each of the syndicate groups welcomes the members to another session of discussion.

Step II: Each facilitator introduces the topic for discussion by reminding their members of the meaning of hazards as explained during the introduction session.

Step III: The participants are asked to mention and identify some examples of these hazards which are peculiar to their workplace and where they can be found around them.

Step IV: The participants are told that these hazards in construction can be categorized under three forms, while the facilitator encourages the participants to categorize each of the identified hazards under the three forms.

Evaluation: The participants are asked to answer the following questions:

- identify the main forms or categories of health hazards associated with construction activities
- give practical examples of each form of health hazards peculiar to their workplace

Learning Points

Health hazards in construction can be grouped into three, namely chemical, physical and biological hazards.

Some examples of the health hazards in construction include fumes, dusts, temperature, noise, fungi and poisonous plants.

Unit 2: Anticipation of health hazards

Objectives

At the end of this session, participants should be able to:

- mention different ways of anticipating health hazards at their workplace
- state the various occupational hazards and health threats which can be anticipated at the workplace

Contents

Health hazards can be anticipated by :

- knowing the history of the work involved;
- workers' experience; and
- education.

Learn all the hazards associated with your job and be better prepared to make good decisions regarding your health and safety.

Generally, hazards associated with a particular job are either

- inherent (present before the worker shows up);
- or hazards can be created by the work (e.g., welding & cutting, use of fuel-powered equipment).

There is a need to survey job-site conditions and be aware of the actions and behaviours of workers in order to anticipate job hazards.

Hazardous conditions that can be anticipated on construction job-sites include:

- Confined or enclosed spaces (hazardous atmospheres),
- Contaminated soil conditions (hazardous atmospheres),
- Unsanitary conditions (poor housekeeping, poorly kept toilet facilities, etc.),
- Presence of hazardous materials (dangerous coatings on structures & metal containing alloys, concrete & silica),
- The use of hazardous chemicals (gases, solvents & glues),
- The presence of residues left by degreasing agents, usually chlorinated hydrocarbons (chloroform and carbon tetrachloride),
- Older buildings and structures; unoccupied dwellings (fungi/mold, asbestos & lead),
- Extreme temperatures (hot & cold environments; working outside or in attics, boiler rooms, etc.),
- Radiological exposures (nuclear power plants, antennas, hospitals, laboratories and the sun),
- Loud noise (use of tools and equipment),
- Hot work (welding and cutting),
- The presence of plant and/or animal wildlife (poisonous venom, feces, rabies...).

Activities

Step I: The facilitator of each group introduces the topic by asking members of the group to mention ways in which health hazards can be anticipated in their workplace, while s/he

summarises different ways as highlighted by the group members and also adds other points not mentioned.

Step II: The participants are asked to state some examples of health hazards which can be anticipated on the work site.

Step III: The facilitator then show members other examples not yet mentioned by the members.

Evaluation: The participants are asked to answer the following questions:

- mention different ways of anticipating health hazards at their workplace.
- state the various occupational hazards and health threats which can be anticipated at the workplace.

Learning Points

Health hazards could be anticipated by knowing the history of the work, through experience and education.

Some of the hazards that can be anticipated on the job include confined or enclosed spaces, contaminated soil and unsanitary conditions.

Unit 3: Recognition of Health Hazards

Objectives

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs.

Contents

Recognition of Health Hazards

- What do you see?

Visible material in the air – If you see visible clouds of vapour or particles, there may be a serious exposure problem. Remember, however, that most gases and vapours are invisible, and that often the most dangerous particles are too small to see.

- Do you smell or taste anything?

Odour – If you smell a chemical, you are inhaling it. However, some chemicals can be smelled at levels well below those that are harmful. The odour threshold is the lowest level of smell or taste could cause you to recognize a health hazard

➤ Do you hear anything?

Loud noise can severely damage your hearing!

Sources of loud noise in construction: Hand tools (e.g., metal hammers), power tools (e.g., jackhammers, grinders, saws, powder actuated tools), Equipment (e.g., generators, excavators, cranes, trucks), Blasting

➤ Do you feel immediate symptoms?

Particles in your respiratory system: one result of these symptoms may be poor coordination, which can contribute to falls and other accidents.

➤ Unsafe conditions and unsafe behaviours

Not following safety procedures could often constitute hazards at workplace.

Learn to recognize unsafe conditions and unsafe behaviours which can be hazardous to workers, some of these include:

- Not implementing engineering and/or administrative controls (e.g., wet methods, ventilation, and dust collection systems).
- Not wearing appropriate personal protective equipment (e.g., gloves, respirators, chemical suits, hearing protectors, etc.).
- Not practising good housekeeping.
- Not following good hygiene practices.
- Not performing a hazard analysis (e.g., air monitoring, dust sampling, noise metering, and biological monitoring & medical surveillance).

Know the safety procedures on your job and learn to recognize safety violations – report them and get them corrected!

Activities

Step I: Participants in each syndicate group are asked to name their sense organs and discuss how they can be useful for their safety generally and specifically at work.

Step II: Participants are then led into discussion about how each of the sense organs can help them to recognise health hazards at the construction industry, making members to discuss further on each point raised relating to their own environment and also collating the ideas raised by the group members.

Step III: Participants are also exposed to recognition of unsafe behaviour and unsafe acts which may constitute health hazards at work by leading them in a discussion of various examples of such acts.

Step IV: Syndicate facilitator then summarises all the ways in which health hazards can be recognised as discussed by the group and documented by the group secretary.

Evaluation

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs

Learning Points

Human sense organs are useful in recognizing health hazards

It is important for construction workers to recognise unsafe behaviours and unsafe acts which may constitute health hazards

WEEK FIVE

CONTROL OF HAZARDS

Table of Contents

Unit 1: Hierarchy of Control

Unit 2: Job hazard analysis

Introduction

In this session, discussions will be made on ways of controlling hazards at the construction sites by looking at hazard abatement, hierarchy of control and job hazard analysis.

Unit 1: Hierarchy of Control

Objectives

At the end of the session, participants should be able to:

- state the meaning of hazard abatement
- describe the hierarchy of control
- explain and demonstrate the process of controlling construction hazards

Hazard Abatement

To abate a hazard means to eliminate its effects; this would cause a worker who might otherwise be exposed to a hazard not to be exposed by means of one or more control strategies.

Hierarchy of Controls

Controlling exposures to occupational hazards is the fundamental method of protecting workers. OSHA requires that employers use the hierarchy of controls in order of preference for protecting the worker.

Hierarchy of controls in order of preference:

1. Elimination of hazard; substitution with safe alternative.
2. Engineering; ventilation & wet methods.
3. Administrative; work practices, scheduling workers to minimize exposure, extended breaks,
4. Personal Protective Equipment (PPE); respiratory and hearing protection, protection of face, hand, feet, eyes & whole body.

The idea behind this hierarchy is that the control methods at the top of the list are potentially more effective and protective than those at the bottom. Following the hierarchy normally leads to the implementation of inherently safer job-sites, ones where the risk of illness or injury has been substantially reduced.

Hierarchy of Controls – Elimination & Substitution

Elimination & Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process or job-site. If the project is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard.

Elimination & Substitution include:

- Automate the process by using equipment; remove or isolate the worker.
- Select and use a less toxic chemical; in an effort to reduce occupational illness, chemical manufacturers have created less harmful substitutes.
- Sub-contract out jobs to more qualified people; know the limitations of your workers and be prepared to solicit the services of specially trained and equipped contractors.

Some work may require a special license, i.e. lead & asbestos.

Elimination & Substitution Example: Skid steer loader with pneumatic hammer; demolition of structure using mechanical shears, combined with the safe work practice of spraying water, will significantly reduce worker exposure to harmful dust.

Activity: Participants are asked to state other examples of elimination and substitution control which can be applied in their daily working activities.

Hierarchy of Controls – Engineering Controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. This barrier can be placed at the source of the hazard, between the source and the worker, or at the worker. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. Engineering controls include:

- Using dust suppression (wet methods) and/or dust collection systems.

OR

- Installing and using mechanical ventilation; general (dilution) and local (exhaust) ventilation systems,

Engineering Control Example: Water suppression system on concrete saw, dust suppression system on concrete saw using supplied water.

Administrative Controls

Administrative controls are changes in work procedures, such as written safety policies, rules, supervision, schedules, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations.

Administrative controls include:

- gathering all specialty equipment, including, ventilators, warning signs, personal protective equipment, etc. before starting work;
- performing operations that involve toxic substances at times when other workers are not present;
- isolating the work to a few employees;
- rotating workers through various job assignments;
- prohibiting workers from working around hazardous substances once they have reached a predetermined level of exposure;

- requiring workers in hot environments to take breaks in cool rest areas and providing fluids for rehydration;
- prohibiting worker access to areas involving hazards such as lasers, toxic materials, or excessive noise

Administrative Control Example: Posting signs is often required under certain regulations, Frequent hand-washing will help to prevent sickness and disease.

Safe work practices while sweeping:

- Use a sweeping compound to reduce airborne dust.
- Wear personal protective equipment (respirator).
- Schedule clean-up operations appropriately.
- Warn others and clear the area of those who are affected by the dust and are not protected.

Personal Protective Equipment (PPE)

Controlling a hazard at its source is the best way to protect workers. However, when engineering, work practices and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment (PPE) to the employee and ensure its proper use.

Consideration and use of PPE is only allowed when:

engineering controls and/or work practices are not feasible;

engineering controls or work practices are being implemented;

engineering controls or work practices do not effectively reduce exposure to acceptable limits, or;

In cases of emergency (e.g., confined space rescue, area evacuation, etc.)

Personal Protective Equipment Example: Chemical resistant suit, gloves, safety, glasses and face shield.

Questions regarding personal protective equipment (PPE):

Is the device approved?

Is the device appropriate for the type of hazard?

Is the worker wearing the device properly trained to understand the use, limitations and care instructions of the device?

Does the material have sufficient strength to withstand the physical stress of the tasks at hand?

Will the material withstand repeated use after contamination and decontamination?

Is the material flexible or pliable enough to allow end-users to perform needed tasks?
Will the material maintain its protective integrity and flexibility under hot and cold extremes?

Activities

Step I: The facilitator in each syndicate group introduces the topic of discussion by asking the participants to discuss what they could say about hazard abatement while s/he explains further that it means to eliminate its effects using control strategy.

Step II: Hierarchy of control is also introduced by explaining that the methods of controlling hazards come in stages, basically four stages

Step III: Each of the stages is introduced while participants are asked to contribute and discuss with special reference to their work environment.

Step IV: A summary of the discussions as documented by the secretary is read to the group.

Evaluation: Participants are asked the following questions:

- State the meaning of hazard abatement.
- Describe the hierarchy of control.
- Explain and demonstrate the process of controlling construction hazards.

Learning Points

Hazard abatement means elimination of its effect.

Hierarchy of control, in order of preference are elimination of hazard, engineering, administrative and personal protective equipment.

Unit 2: Job Hazard Analysis

Objectives

At the end of the session, participants should be able to:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Contents

Job Hazard Analysis

A job hazard analysis (JHA) is a technique that focuses on the relationship between the worker, the task, the tools, and the work environment; it's an essential first step that helps an industrial hygienist determine the sources of potential problems.

Questions that are asked during a job hazard analysis are:

What is it?

Materials & Equipment – What building materials, chemicals, tools and equipment are being used? What is the likelihood that these things will cause a potential health hazard (gases, vapours, fumes, dusts/fibers, noise, vibration, radiation, etc.)?

Process – How and where is the work being performed; potential health hazards can turn into toxic exposures if the process is not controlled?

Who are exposed?

People – Who are exposed to the hazards? Are these workers properly trained, qualified and wearing appropriate personal protective equipment (PPE)?

The Value of a Job Hazard Analysis

Supervisors can use the findings of a job hazard analysis to eliminate and prevent hazards in their workplaces. This is likely to result in:

- fewer worker injuries and illnesses;
- safer, more effective work methods;
- reduced workers' compensation costs; and
- increased worker productivity.

The analysis also can be a valuable tool for training new employees in the steps required to perform their jobs safely.

Factors for determining health hazards

Determining whether a health hazard exists at your worksite is based on a combination of factors including:

- observation,
 - interviews,
 - measurements of the level of air contaminants arising from the work processes
- evaluation of the effectiveness of control measures in the workplace.

Activities

Step I: Participants are asked to discuss job hazard analysis after the facilitator has introduced the topic by explaining the word analysis.

Step II: Participants are allowed to state various questions which they may need to ask to analyse job hazards with particular reference to their own job while the facilitator gives a recap of the questions based on materials and equipment, process and people.

Step III: Participants are also asked to discuss the importance or values of job hazard analysis with a summary of the values documented.

Step IV: Various factors which can determine existence of hazard in at worksite are also highlighted and discussed in each of the syndicate groups.

Evaluation: Participants are asked the following questions:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Learning Points

Job hazard analysis focuses on the relationship between the worker, the task, the tools, and the work environment.

Observation, interviews, measurement of air level and effectiveness of control measure are factors for determining job hazard analysis.

WEEK SIX

OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION: EMPLOYEES' RIGHTS

Table of Contents

Unit 1: Occupational Health and Safety Administration

Unit 2: Employee's Rights and Responsibilities

Introduction

In this session, the reasons for the establishment of Occupational Health and Safety Administration will be discussed alongside her responsibilities. Employees' rights and responsibilities regarding their safety at work as stipulated by OSHA will also be examined.

Unit 1: Occupational Health and Safety Administration

Objectives

At the end of the session, participants should be able to:

- identify the Occupational Safety and Health Administration (OSHA) as being the authority for protecting worker's health and safety on the job.

- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Acts

Contents

The Occupational Safety and Health Act of 1970 (OSH Act) was passed by the United States Congress to prevent workers from being killed or seriously harmed at work. The law requires that employers provide their employees with working conditions that are free of known dangers. The Act created the Occupational Safety and Health Administration (OSHA), which sets and enforces protective workplace safety and health standards.

Occupational Safety & Health Act of 1970

OSHA Duties

- assuring safe and healthful working conditions for working men and women;
- authorizing enforcement of the standards developed under the OSH Act;
- assisting and encouraging the States in their efforts to assure safe and healthful working conditions;
- providing research, information, education, and conducting training in the field of occupational safety and health.

What is OSHA's General Duty Clause?

Section 5(a)(1) of the Occupational Safety and Health Act of 1970 has become known as the "General Duty Clause". It is a catch all for citations if OSHA identifies unsafe conditions to which a regulation does not exist.

If the following elements are present, a "General Duty Clause" citation may be issued:

- (1) An employer failed to keep the workplace free of a hazard to which employees of that employer were exposed.
- (2) The hazard was recognized. (Examples might include: through job-site safety personnel, employees, trade unions and other associations/organizations.)
- (3) The hazard was causing or was likely to cause death or serious physical harm.
- (4) There was a feasible and useful method to correct the hazard.

OSHA believes there is always a feasible and useful method to correct any and all health hazards!

Activities

Step I: The facilitator in each syndicate group welcomes group members to another interactive session of discussion and encourages the secretary of the group to always take notes of all the discussions.

Step II: The facilitator displays the acronym OSHA to the members and asks them to state the full meaning as well as discussing any details known about the acronym

Step III: The facilitator then gives additional information not yet mentioned about Occupational Health and Safety Administration and the Act.

Step IV: The secretary is requested to read the summary of the discussion

Evaluation: Group members are asked the following questions:

- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Act

Unit 2: Employee's Rights and Responsibilities

Objectives

At the end of the session, participants are expected to:

- recognize both employer and employee rights and responsibilities under OSHA law
- get an overview of OSHA's health standard in construction

Contents

Workers' Rights Under OSHA Law

Employees:

You have the right to notify your employer or OSHA about workplace hazards.

You may ask OSHA to keep your name confidential.

You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.

You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the OHS Act.

You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.

Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.

You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.

Your employer must post this notice (OSHA 3165-12-06R) in your workplace.

You must comply with all occupational safety and health standards issued under the OHS Act that apply to your own actions and conduct on the job.

Refusing to Work because Conditions are Dangerous

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an *imminent danger*. “Good faith” means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

Refusing work is protected if:

Your right to refuse to do a task is protected if all of the following conditions are met:

Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; and

You refused to work in “good faith.” This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; and

A reasonable person would agree that there is a real danger of death or serious injury (illness); and

There isn’t enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

When all of these conditions are met, you take the following steps:

Ask your employer to correct the hazard;

Ask your employer for other work;

Tell your employer that you won't perform the work unless and until the hazard is corrected;
and

Remain at the worksite until ordered to leave by your employer.

IF THEN

You believe working conditions are unsafe or unhealthful. Call your employer's attention to the problem.

Your employer does not correct the hazard or disagrees with you about the extent of the hazard.

You may file a complaint with OSHA.

Your employer discriminates against you for refusing to perform the dangerous work.

Contact OSHA immediately.

Health Standards in Construction Overview

OSHA's health standards in construction address issues such as;

- the availability of medical services and first aid,
- sanitation of the job-site (toilet facilities),
- the availability of water (potable and non-potable),
- eating and drinking areas and vermin control.

Health standards also cover exposures to air contaminants and other materials that can lead to illness and disability. These standards regulate chemicals in the forms of gases, vapours, fumes, dusts, fibers and mists; noise and radiation.

Activities

Step I: Members of each syndicate groups are asked if they have legal rights under OSHA regarding their occupational health and safety and then made to discuss some of these rights known to them.

Step II: The facilitator then adds some of the rights which have not been discussed.

Step III: Some health standards in construction as stipulated by OSHA are stated by the facilitator while s/he also encourages members to discuss at length these standards as set by OSHA.

Evaluation: Members of each syndicate group are asked at random to:

- State some of their rights as employees to their occupational health and safety
- Give some of the health standards in construction by OSHA

WEEK 7

PLENARY SESSION

Table of Contents

Unit 1: Reports from syndicate groups

Unit 2: Hazards prevention & control discussions: Health insurance scheme

Introduction

In this session, various reports emanating from the syndicate interaction and experiential discussions will be presented and deliberated upon in order to achieve a conglomeration of the ideas raised in each of the syndicate sessions. Further reviews, discussions and questions will also be considered especially in areas that still needs further clarifications.

Unit 1: Reports from syndicate groups

Objectives

At the end of this session, participants should be able to:

- listen and compare the various reports as read by the secretary of each syndicate group
- state and note additional salient points which are not raised in their respective syndicate group discussions.

Contents

Reports from each of the syndicate group to be delivered by the secretary of each group and/or chairman

Activities:

Step I: The facilitator welcomes the participants from their different syndicate groups and further briefs them on the next activity which is basically reporting and collation of the ideas gathered from the syndicate groups

Step II: Each secretary of the syndicate group is asked to present the summary of their syndicate discussions and their findings on how to improve the occupational health and safety competencies of the construction workers while others listen and take notes of salient points raised.

Step III: Another secretary is appointed among the participants who will note the salient points which can be deduced from the presentation of each group.

Step IV: After each of the presentations, the participants are allowed to react, ask questions and add to any of the issues raised by the group which just presented.

Step V: Generalisations are then made and rehearsed from the submissions of all the syndicate groups.

Step VI: The facilitator then gives a recap of the presentations.

Evaluation: Some of the training participants are asked to:

- compare the various reports as read by the secretary of each syndicate group
- state additional salient points which are not raised in their respective syndicate group discussion

WEEK 8
CONCLUSION

Table of Content
Unit 1: Lessons Learnt / Key Messages
Unit 2: Way forward / Suggestions
Unit3: Post-Test Administration

APPENDIX IV
EXPERIMENTAL GROUP TWO

GUIDED-PRACTICE TRAINING MANUAL ON OCCUPATIONAL HEALTH AND
SAFETY COMPETENCIES

WEEK 1

ORIENTATION AND ADMINISTRATION OF PRE-TEST INSTRUMENT

Table of Contents

Introduction

Unit 1: General Orientation
Unit 2: Administration of Pre-test

Introduction

Unit 1: General Orientation

Objectives

At the end of this session, the participants should be able to:

- get acquainted with the purpose and procedures to be used for the training programme
- get themselves ready to participate fully in the programme in view of the benefits they will get from the programme
- have the ground rules for the training at the back of their minds
- identify with a group

Content: Introduction of the researcher and participants

Activities:

Step I: Opening prayer is said after which the participants are asked to sing the solidarity song and national anthem.

Step II: The facilitator welcomes the participants, introduces herself and other research assistants and also asks each of the participants to do self-introduction.

Step III: The facilitator explains what the programme is all about and the benefits which can accrue to them by participating in the training programme.

Step IV: The facilitator with the help of the research assistants also describes the procedures to be used for the training. The training will lapse for eight weeks covering:

- general orientation and pre-test administration
- group briefing
- discussions on occupational health and safety competencies
- practice sessions and post-test administration

Step V: The facilitator encourages the participants to be punctual throughout the period of training in order to fully benefit from it.

Step VI: The facilitator with the participants set ground rules to be followed during the training period:

Step VII: The participants are allowed to contribute by commenting briefly or asking questions on areas not cleared to them on the commencement of the training.

Practice Session: Each of the participants is asked the following questions and led to rehearse what has been taught earlier

- What are the benefits which can be derived from the training?
- Mention some of the activities which will make up the training.
- State some of the ground rules to be observed during the training.

Learning Points

Unit 2: Administration of Pre-test

Objectives

At the end of this section, the participants should have adequately filled the pre-test instrument with the assistance of the facilitators.

Content

Step I: Administration of pre-test questionnaire to the training participants by the facilitators

Step II: The facilitators supervise the filling of the instrument and make clarifications where necessary.

Evaluation: The exercise of questionnaire administration.

WEEK 2

GENERAL GROUP BRIEFING

Table of Contents

Introduction

Unit 1: Concepts and Principles of Occupational Health and Safety

Unit 2: Occupational Health and Safety Competencies

Introduction

Unit 1: Concepts and Principles of Occupational Health and Safety

Objectives

At the end of the session, participants should be able to:

- mention some of the concepts which are used in occupational health and safety
- define health, safety, work and other key concepts in occupational health and safety.

Contents

Activities

Step I: The facilitators welcome the participants to the second session of the training and remind them of the purpose, procedures and ground rules for the training.

Step II: The facilitators explain that the second session will cover basic concepts and principles in occupational health and safety.

Step III: The facilitators state and display the key concepts to be examined for the participants and encourage them to define or describe them.

Step IV: The facilitators then define and describe each of the concepts while he/she guides each of the participants to rehearse what has been explained.

Practice Session: Each of the participants is asked the following questions and led to rehearse what has been taught earlier

- mention three of the concepts used in occupational health and safety
- describe two of the concepts

Learning Points

Unit 2 : Occupational Health and Safety Competencies

Objectives

At the end of this unit, the participants should be able to:

- describe occupational health and safety competencies
- state the importance of occupational health and safety competencies

Contents

Activities

Step I: The facilitator reviews the previous unit with the participants and introduces the concept of occupational health and safety competencies

Step II: The facilitator mentions some activities which can show competent safety behaviour by workers while she also highlights and explains the basic features of competent workers

Step III: The facilitator explains to the participants some of the importance which can be derived from being safety-competent.

Step IV: The facilitator then guides the participants to state the importance of occupational health and safety competencies.

Practice Session: Each of the participants is asked the following questions and is led to rehearse what has been taught earlier

- describe occupational health and safety competencies
- mention some importance of occupational health and safety competencies to different stakeholders

Learning Points

WEEK 3

ACCIDENTS AT WORKPLACE

Table of Contents

Introduction

Unit 1: What is an accident?

Unit 2: Why do accidents occur?

Unit3: What are the Causes of accidents?

Introduction

Unit 1: What is an accident?

Objectives

At the end of the training session, participants should be able to:

- discuss and state the meaning of accident
- list the different outcomes of accident at the construction sites

Content

Activities

Step I: The facilitator welcomes the participants to another session and reminds them what was discussed the previous session

Step II: The researcher instructs each participants to note the proceedings of the discussions which will be practised at the end of the session.

Step III: The facilitator introduces the topic of discussion, ‘what is an accident’

Step IV: The facilitator then briefs the group on the meaning of accidents and also cites examples within the industry.

Step V: The facilitator also leads each of the participants to highlight the various outcomes of accident at the construction sites with practical examples of his/her own experience while s/he summarises the points raised and give additional points not raised.

Practice Session: The participants are asked to briefly comment on what has been discussed

- describe accident at the construction site
- list the different outcomes of accidents at the construction site

Learning Points

Unit 2: Why accidents occur?

Objectives:

At the end of this session, participants should be able to :

- state the factors that could cause accident
- discuss practical examples of the factors that could cause accident

Activities

Step I: The facilitator introduces the topic of discussion as “why accidents occur?” S/he further emphasises that accidents do not just occur as discussed earlier.

Step II: The participants are led to itemize some of the factors which they think can necessitate the occurrence of accident.

Step III: The facilitator then mentions the factors which could result into accident and leads each of the participants to give practical examples relating to their work environment on each of the factors highlighted.

Practice Session

The facilitator asks each of the participants at random to:

- state the factors that could cause accident
- discuss practical examples of the factors that could cause accident

Learning Points

Unit 3: The causes of accidents

Objectives

At the end of this unit, participants should be able to:

- state the three types of typical causes of accident at the construction sites
- give examples of each of these causes as it relates to their work environment

Contents

Activities

Step I: The facilitator introduces the new topic as causes of accidents at the construction sites.

Step II: The facilitator explains that these causes refer to specific conditions that can lead to accident at their workplace and then encourages participants to demonstrate examples of such causes as applicable to their workplace.

Step III: The facilitator then mentions the three categories of these causes and leads participants to classify the examples they cited under each of these categories while s/he gives additional points on each category.

Practice Session: Participants are asked to:

- briefly state the factors that could influence the risk of an accident
- explain the causes of accidents in their workplace

Learning Points

WEEK FOUR

IDENTIFICATION AND AWARENESS OF HAZARDS

Table of Contents

Introduction

Unit 1: Health Hazards in Construction

Unit 2: Anticipation of Health Hazards

Unit3: Recognition of Health Hazards

Introduction

Unit 1: Health Hazards in Construction

Objectives

At the end of the session, participants should be able to:

- identify the main forms or categories of health hazards in associated with construction activities
- give practical examples of each form of health hazards peculiar to their workplace

Content

Activities

Step I: The facilitator welcomes the members to another session of discussion

Step II: The facilitator introduces the topic for discussion by reminding their members the meaning of hazards as explained during the introduction session.

Step III: Each of the participants is led to mention and identify some examples of these hazards which are peculiar to their workplace and where they can be found around them.

Step IV: The participants are told that these hazards in construction can be categorized under three forms, while the facilitator encourages the participants to categorize each of the identified hazards under the three forms.

Practice Session: The participants are asked to answer the following questions:

- identify the main forms or categories of health hazards in associated with construction activities
- give practical examples of each form of health hazards peculiar to their workplace

Learning Points

Unit 2: Anticipation of health hazards

Objectives

At the end of this session, participants should be able to:

- mention different ways of anticipating health hazards at their workplace
- state the various occupational hazards and health threats which can be anticipated at the workplace

Contents

Activities

Step I: The facilitator introduces the topic by explaining the meaning of anticipation of health hazards and also state the ways in which hazard can be anticipated on construction sites.

Step II: The participants are then guided in stating some examples of health hazards which can be anticipated on the work site and how they can be anticipated.

Step III: The facilitator then show members other examples not yet mentioned by the participants.

Practice Session: The participants are asked to answer the following questions:

- mention different ways of anticipating health hazards at their workplace
- state the various occupational hazards and health threats which can be anticipated at the workplace

Learning Points

Unit 3: Recognition of Health Hazards

Objectives

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs.

Content

Activities

Step I: The participants are asked to name their sense organs and discuss how it can be useful for their safety generally and specifically at work.

Step II: The participants are then led into discussion about how each of the sense organs can help them to recognise health hazards at the construction industry, making members to discuss further on each point raised relating to their own environment and also collating the ideas raised by the group members.

Step III: The participants are also exposed to recognition of unsafe behaviour and unsafe acts which may constitute health hazards at work by leading them in a discussion of various examples of such acts.

Practice Session

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs

Learning Points

WEEK FIVE

CONTROL OF HAZARDS

Table of Contents

Unit 1: Hierarchy of Control

Unit 2: Job hazard analysis

Introduction

Unit 1: Hierarchy of Control

Objectives

At the end of the session, participants should be able to:

- state the meaning of hazard abatement

- describe the hierarchy of control
- explain and demonstrate the process of controlling construction hazards

Activities

Step I: The facilitator introduces the topic of discussion hazard abatement by explaining that it means elimination of its effects using control strategy.

Step II: Hierarchy of control is also introduced, by explaining that the methods of controlling hazards come in stages basically four stages

Step III: Each of the stages is introduced while participants are asked to demonstrate some examples with special reference to their work environment.

Practice Session: Participants are asked to the following questions:

- state the meaning of hazard abatement
- describe the hierarchy of control
- explain and demonstrate the process of controlling construction hazards

Learning Points

Unit 2: Job Hazard Analysis

Objectives

At the end of the session, participants should be able to:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Contents

Activities

Step I: The participants are asked to demonstrate some examples of hazard analysis after the facilitator has introduced the topic by explaining the hazard analysis.

Step II: The participants are guided in stating various questions which they may need to ask to analyse job hazards with particular reference to their own job based on materials and equipment, process and people.

Step III: Facilitator discusses some of the importance or values of job hazard analysis

Step IV: The various factors which can determine existence of hazard in at worksite are also highlighted and discussed.

Practice Session: Participants are asked the following questions:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Learning Points

WEEK SIX

OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION: EMPLOYEES' RIGHTS

Contents

Unit 1: Occupational Health and Safety Administration

Unit 2: Employee's Rights and Responsibilities

Introduction

Unit 1: Occupational Health and Safety Administration

Objectives

At the end of the session, participants should be able to:

- identify the Occupational Safety and Health Administration (OSHA) as being the authority for protecting worker's health and safety on the job.
- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Act

Contents

Activities

Step I: The facilitator welcomes participants to another practical session of discussion

Step II: The facilitator explains the acronym OSHA to the participants and also its establishment to the participants.

Step III: Facilitator then gives additional information about Occupational Health and Safety Administration and the Act.

Practice Session:

- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Act

Unit 2: Employee's Rights and Responsibilities

Objectives

At the end of the session, participants are expected to:

- recognize both employer and employee rights and responsibilities under OSHA law

- get an overview of OSHA's health standard in construction

Content

Activities

Step I: The facilitator asks the participants if they have legal rights under OSHA regarding their occupational health and safety and are then made to discuss some of these rights known to them.

Step II: The facilitator then adds some of the rights which have not been discussed.

Step III: Some health standards in construction as stipulated by OSHA are stated by the facilitator while s/he also encourages participants to demonstrate some of the examples.

Practice Session: The participants are asked to:

- state some of their rights as employees to their occupational health and safety
- give some of the health standards in construction by OSHA

WEEK 7

FIELD TRIP

Table of Contents

Unit 1: Practical demonstrations

Introduction

Unit 1: Field Trip

Objectives

At the end of this session, participants should be able to:

- Identify or recognise and classify some hazards present on the construction site
- Apply some forms of control of hazard on the site

Contents

Practical demonstration or application of the lessons learnt on site

Activities:

Step I: The facilitator welcomes the participants to the practical session

Step II: S/he explains the session will involve practical demonstration of some of the lessons learnt in the previous sessions on the site.

Step III: The facilitator then informs them that recognition of hazard and application of control will be emphasised.

Evaluation: Some of the training participants are asked to:

- Identify or recognise and classify some hazards present on the construction site
- Apply some forms of control of hazard on the site

WEEK 8
CONCLUSION

Contents

Unit 1: Lessons Learnt / Key Messages

Unit 2: Way forward / Suggestions

Unit3: Post-Test Administration

APPENDIX V

CONTROL GROUP THREE

TRAINING MANUAL ON OCCUPATIONAL HEALTH AND SAFETY

COMPETENCIES

WEEK 1

Orientation and Administration of Pre-test Instrument

Table of Contents

Introduction

Unit 1: General Orientation

Unit 2: Administration of Pre-test

Introduction

Unit 1: General Orientation

Objectives

At the end of this session, the participants should be able to:

- get acquainted with the purpose and procedures to be used for the training programme
- get themselves ready to participate fully in the programme in view of the benefits they will get from the programme
- have the ground rules for the training at the back of their minds

Content:

Introduction of the researcher and participants

Activities:

Step I: Opening prayer is said, after which the participants are asked to sing the solidarity song and national anthem.

Step II: The facilitator welcomes the participants, introduces herself and other research assistants and also asks each of the participants to do self-introduction.

Step III: The facilitator explains what the programme is all about and the benefits which can accrue to them by participating in the training programme.

Step IV: The facilitator, with the help of the research assistants, also describes the procedures to be used for the training. The training will lapse for eight weeks covering:

- general orientation and pre-test administration
- general briefing and introduction
- lectures on the training contents
- conclusion and post-test administration

Step V: The facilitator encourages the participants to be punctual throughout the period of training in order to fully benefit from it.

Step VI: The facilitator, with the participants sets ground rules to be followed during the training period:

- switching off mobile phones or putting them on silence mode
- regular and punctual attendance at the training
- full participation by all attendants
- No noise-making nor loitering around during the training period

Step VII: The participants are allowed to contribute by commenting briefly or asking questions on areas not cleared to them on the commencement of the training.

Evaluation: Participants are asked the following questions:

- What are the benefits which can be derived from the training?
- Mention some of the activities which will make up the training?
- State some of the ground rules to be observed during the training?

Learning Points

Unit 2: Administration of Pre-test

Objectives

At the end of this section, the participants should have adequately filled the pre-test instrument with the assistance of the facilitators.

Content

Step I: Administration of pre-test questionnaire to the training participants by the facilitators

Step II: The facilitators supervise the filling of the instrument and make clarifications where necessary.

Evaluation

WEEK 2

GENERAL GROUP BRIEFING

Table of Contents

Introduction

UNIT 1: Concepts and Principles of Occupational Health and Safety

UNIT 2: Occupational Health and Safety Competencies

Introduction

Unit 1: Concepts and Principles of Occupational Health and Safety

Objectives

At the end of the session, participants should be able to:

- mention some of the concepts which are used in occupational health and safety
- define health, safety, work and other key concepts in occupational health and safety.

Contents

Activities

Step I: The facilitators welcome the participants to the second session of the training and remind them the purpose, procedures and ground rules for the training.

Step II: The facilitators explain that the second session will cover basic concepts and principles in occupational health and safety.

Step III: The facilitators define and describe each of the concepts

Evaluation: The participants are asked the following questions:

- mention three of the concepts used in occupational health and safety
- describe two of the concepts

Learning Points

Unit 2 : Occupational Health and Safety Competencies

Objectives

At the end of this unit, the participants should be able to:

- describe occupational health and safety competencies
- state the importance of occupational health and safety competencies

Content

Activities

Step I: The facilitator reviews the previous unit with the participants and introduces the concept of occupational health and safety competencies

Step II: The facilitator highlights and explains the basic features of competent workers

Step III: The facilitator states some of the importance which can be derived from being safety competent.

Evaluation: The participants are asked to:

- describe occupational health and safety competencies
- mention some importance of occupational health and safety competencies to different stakeholders

Learning Points

WEEK 3

ACCIDENTS AT WORKPLACE

Table of Contents

Introduction

Unit 1: What is an accident?

Unit 2: Why do accidents occur?

Unit3: What are the Causes of accidents?

Introduction

Unit 1: What is an accident?

Objectives

At the end of the training session, participants should be able to:

- discuss and state the meaning of accident
- list the different outcomes of accident at the construction sites

Content

Activities

Step I: The facilitator welcomes the participants to another session and reminds them what was discussed the last session

Step II: The facilitator introduces the topic of discussion, “what is an accident” and explains the meaning and outcome of accident at workplace.

Evaluation: The participants are asked to briefly comment on what has been discussed

- describe accident at the construction site
- list the different outcomes of accidents at the construction site

Learning Points

Unit 2: Why accidents occur?

Objectives:

At the end of this session, participants should be able to :

- state the factors that could cause accident
- discuss practical examples of the factors that could cause accident

Activities

Step I: The facilitator introduces the topic of discussion as “why accidents occur” S/he further emphasises that accidents do not just occur as discussed earlier.

Step II: The facilitator then mentions the factors which could result into accident and some examples.

Evaluation

The facilitator asks participants at random to:

- state the factors that could cause accident
- discuss practical examples of the factors that could cause accident

Learning Points

Unit 3: The causes of accidents

Objectives

At the end of this unit, participants should be able to:

- state the three types of typical causes of accident at the construction sites
- give examples of each of these causes as they relate to their work environment

Content

Activities

Step I: The facilitator introduces the new topic as causes of accidents at the construction sites.

Step II: The facilitator explains that these causes refer to specific conditions that can lead to accident at their workplace.

Step III: The facilitator then mentions the three categories of these causes and examples of each category.

Evaluation: Participants are asked to:

- briefly state the factors that could influence the risk of an accident
- explain the causes of accidents in their workplace

Learning Points

WEEK FOUR
IDENTIFICATION AND AWARENESS OF HAZARDS

Table of Contents

Introduction

Unit 1: Health Hazards in Construction

Unit 2: Anticipation of Health Hazards

Unit3: Recognition of Health Hazards

Introduction

Unit 1: Health Hazards in Construction

Objectives

At the end of the session, participants should be able to:

- identify the main forms or categories of health hazards in associated with construction activities
- give practical examples of each form of health hazards peculiar to their workplace

Contents

Activities

Step I: The facilitator welcomes the members to another session of discussion

Step II: The facilitator introduces the topic for discussion by reminding their members of the meaning of hazards as explained during the introduction session.

Step III: The facilitator identifies some examples of these hazards which are peculiar to their workplace and where they can be found around them.

Step IV: The participants are told that these hazards in construction can be categorized under three forms and also categorize each of the identified hazards under the three forms.

Evaluation: The participants are asked to answer the following questions:

- identify the main forms or categories of health hazards in associated with construction activities; and
- give practical examples of each form of health hazards peculiar to their workplace

Learning Points

Unit 2: Anticipation of health hazards

Objectives

At the end of this session, participants should be able to:

- mention different ways of anticipating health hazards at their workplace
- state the various occupational hazards and health threats which can be anticipated at the workplace

Contents

Evaluation: The participants are asked to answer the following questions:

- mention different ways of anticipating health hazards at their workplace
- state the various occupational hazards and health threats which can be anticipated at the workplace

Learning Points

Unit 3: Recognition of Health Hazards

Objectives

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs.

Contents

Activities

Step I: The facilitator mentions the basic sense organs and discuss how it can be useful for their safety generally and specifically at work.

Step II: S/he also explains how each of the sense organs can help participants to recognise health hazards at the construction industry

Step III: The participants are also exposed to recognition of unsafe behaviour and unsafe acts which may constitute health hazards at work by discussing various examples of such acts with them.

Evaluation

- Mention different sense organs which can be used in recognizing health hazards
- Recognise the construction hazards arising during the process of working at the site using different sense organs

Learning Points

WEEK FIVE
CONTROL OF HAZARDS

Table of Contents

Unit 1: Hierarchy of Control

Unit 2: Job hazard analysis

Introduction

Unit 1: Hierarchy of Control

Objectives

At the end of the session, participants should be able to:

- state the meaning of hazard abatement
- describe the hierarchy of control
- explain and demonstrate the process of controlling construction hazards

Activities

Step I: The facilitator introduces the topic of discussion by explaining that hazard abatement means to eliminate its effects using control strategy.

Step II: Hierarchy of control is also introduced by explaining that the methods of controlling hazards come in stages basically four stages

Step III: Each of the stages is introduced and discussed with special reference to participants' work environment.

Evaluation: Participants are asked to the following questions:

- state the meaning of hazard abatement
- describe the hierarchy of control
- explain and demonstrate the process of controlling construction hazards

Learning Points

Unit 2: Job Hazard Analysis

Objectives

At the end of the session, participants should be able to:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Contents

Activities

Step I: The facilitator discusses job hazard analysis after s/he has introduced the topic by explaining the word analysis.

Step II: The facilitator explains questions which participants may need to ask to analyse job hazards with particular reference to their own job based on materials and equipment, process and people.

Step III: The facilitator also discusses the importance or values of job hazard analysis

Step IV: The various factors which can determine existence of hazard in at worksite are also highlighted and discussed.

Evaluation: The participants are asked the following questions:

- describe job hazard analysis
- state the value of job hazard analysis and the beneficiaries

Learning Points

WEEK SIX

OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION:

EMPLOYEES' RIGHTS

Table of Contents

Unit 1: Occupational Health and Safety Administration

Unit 2: Employee's Rights and Responsibilities

Introduction

Unit 1: Occupational Health and Safety Administration

Objectives

At the end of the session, participants should be able to:

- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Acts

Contents

Activities

Step I: The facilitator welcomes group members to another interactive session and encourages each participant to take note of salient points during the lecture.

Step II: The facilitator discusses the meaning, establishment and duties of Occupational Health and Safety Administration.

Step III: The facilitator then gives additional information about Occupational Health and Safety Act.

Step IV:

Evaluation: Participants are asked the following questions:

- state and explain the establishment and duties of Occupational Safety and Health Administration
- describe Occupational Safety and Health Act

Unit 2: Employee's Rights and Responsibilities

Objectives

At the end of the session, participants are expected to:

- recognize both employer and employee rights and responsibilities under OSHA law
- get an overview of OSHA's health standard in construction

Contents

Activities

Step I: The facilitator discusses legal rights of employees under OSHA regarding their occupational health and safety.

Step II: Some health standards in construction as stipulated by OSHA are stated and discussed by the facilitator

Evaluation: Members of each syndicate group are asked at random to:

- state some of their rights as employees to their occupational health and safety
- give some of the health standards in construction by OSHA

WEEK 7

No interaction

WEEK 8

CONCLUSION

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Unit 1: Post-Test Administration