

**UNIVERSITY OF EDUCATION WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION**

**ASSESSING THE IMPACT OF DIAMOND CEMENT FACTORY GHANA
LIMITED ON HEALTH AND SAFETY OF WORKERS AND THE PEOPLE IN
AFLAO TOWNSHIP STUDY OF THE AFLAO DIAMOND CEMENT FACTORY
IN VOLTA REGION**



STEPHEN KWESI AFEAMENYO

AUGUST, 2018

**UNIVERSITY OF EDUCATION WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION
DEPARTMENT OF CONSTRUCTION AND WOOD TECHNOLOGY
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STEPHEN KWESI AFEAMENYO



**A Dissertation in the Department of Construction and Wood Technology, Faculty of
Technical Education, Submitted to the School of Graduate Studies, University of
Education, Winneba in Partial Fulfillment of the Requirements for the Award of
Master of Technology Education (Construction) Degree**

AUGUST, 2018

DECLARATION

I, STEPHEN KWESI AFEAMENYO declare that this Dissertation, with the exception of quotations and references contained in the published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for any another degree elsewhere.

.....

SIGNATURE

.....

DATE

DECLARATION BY SUPERVISOR:

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Dissertation as laid down by the University of Education, Winneba.

.....

SIGNATURE

.....

DATE

SUPERVISOR'S NAME: MR. MICHEAL TSORGALI

DEDICATION

This research work is dedicated to my lovely wife, Madam Rose Gidi, my daughter,

Jessica Dotsey and my sisters: Rebecca, Dora and Victoria.



ACKNOWLEDGEMENTS

I wish to express my greatest thanks to God Almighty, who gave me the knowledge, courage and patience to accomplish this research work. I am also thankful to my supervisor Mr. Michael Tsorgali for his criticisms, constant assistance, guidance, and ideas in this research in spite of his busy schedule. My indebtedness to him cannot be over emphasized.

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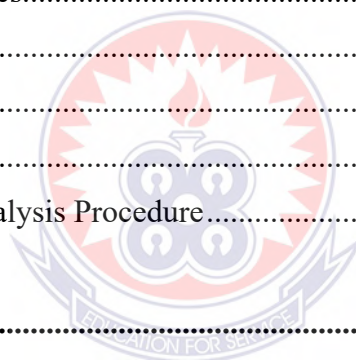
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ABSTRACT

The study assessed the impact of Diamond Cement Factory Ghana limited on health and safety of workers and the people in Aflao Township. The researcher used descriptive and interpretive research design for the study. Qualitative and quantitative research approaches were used. The population for this study involved the Management and Workers of Aflao Diamond Cement Limited and nearby residents of the Cement factory in the Volta Region of Ghana. Random sampling technique was used to select 165 respondents for the study (100 workers, 20 Management staff and 45 residents). Questionnaires and interview guide were the main instruments used to gather data. Statistical package for social sciences version 18 was used to analyse data. The study revealed that workers at the factory were provided with personal safety equipment, hoisting equipment, rain gears, ladder scaffold platforms, and safety signs, hearing protection, and first-aid equipment. Moreover, poor working conditions affected the environment in which the workers live in and these have adverse effects on workers and their families and other people around them. The study showed that EPA pays routine visits to the company's workplace, by advance notice to the management before the visit but they offer little training to employees on health and safety issues. The study results concluded that the workers respected all the rules and regulations governing the factory and that accidents are reported immediately to supervisor/foreman, and prior to leaving the workplace. Furthermore, all workers have a prove of training indicating that they are trained in good health and safety practices, workers wore appropriate protective clothing and equipment when and where required. The study recommended that the Management of the factory should continue to provide safety equipment to enhance employee's safety.

CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Industrialization of the economy is the key to breaking the poverty cycle and ensuring the growth and development of the country, Ghana. It is against this background that successive Governments try to establish industries to create employments for the teeming youth in the country. Anna (2010), noted that the rate of industrialization in Ghana is in ascendancy and this has led to larger percentage of the Ghanaian workforce being exposed to workplace physical chemical biological and psychological stresses. But has the nation got a system of anticipating, monitoring evaluating, controlling and preventing such exposures to the workforce? Employers in Ghana are required by the Ghana Labour Act 203, Act 651 to ensure their employees are not exposed to conditions that would lead them to work related injuries or illnesses. Employees are also required to exhibit their duty of care insuring that they work as per the employers' standard operating procedures which must incorporate safety and health requirements. However, are the Ghanaian workers and the employers aware of their safety and health responsibilities and obligations? The existence of different types of industries such as cement manufacturing, mining, construction, energy, food / agro processing, transport and the current oil and gas in Ghana led to the existence of large Ghanaian workforce with many Similar Exposure Groups (SEGs), indicating varying modes extents and frequencies of exposures to chemical, physical, ergonomic and biological agents at different workplaces.

The nation has different agencies under different jurisdictions which monitor different industries for workplace and employee safety. However, there is no national body, policy work process that governs occupational safety and health management in the country. Numerous injuries, illnesses, property damages and process losses take place at different

workplaces but due to under reporting or misclassification due to lack of thorough standards or unfamiliarity with the existing guidelines, people are not normally in the known of such events as well as their actual or potential consequences and effective corrective actions required.

Anna (2010) again, identified that there are currently two (2) major edicts that have provided guidance in the provision of occupational / industrial safety and health services, practices and management in Ghana. These include the factories, offices and shops Act 1970, Act 328 and the Mining Regulations 1970 LI 665, but these have only driven the mining and the labour sectors and are therefore very limited in scope, given the multifaceted distribution of industrial operations that we have in Ghana. There is the Workmen's Compensation Law (PNDC 187) which relates to compensation of personal injuries caused by accident at work and hence, impact on monitoring workplace safety.

There are other statutes which indirectly impact on occupational safety and health and these include the Environmental Protection Agency Act 490 1994, the Ghana Health Service and Teaching Act 526, 1999 and National Road Safety Commission Act 567 1999. Though Ghana is among the 183 member countries of International Labour Organisation (ILO), which requires, as per the ILO convention number 155 1981, that member countries formulate, implement and periodically review a coherent policy on occupational safety and health and work environment. Ghana has not yet rectified this convention and the nation has not established authority dedicated to occupational safety and health to guide and facilitate the implementation.

In this vein, an article in Ghana Business News (2011), indicates that in recent times, many employees in Ghana agitate for increase in market premium and payment of arrears in order to enhance their satisfaction at the work places. At times when these agitations are not met by the employer or the government, it often leads to strike actions that affect

performance and productivity at the workplaces. It is thus realized that much discussion about conditions of services have most of the time centered on salary, wage increases and payment of arrears. However, health and safety practices if properly develop, effectively implemented and managed, would help bring about work in happiness, ensure harmony in employer-employee relationship, reduce risk and work hazards and sicknesses which can lead to job satisfaction and performance enhancement.

According to the World Health Organisation (WHO, health for all principles and International Labour Organisation (ILO) Conventions on Occupational Safety and Health (No. 155) and on Occupational Health Services (No. 161), every worker irrespective of the sector and organisation, must work or the type occupation and assignment (job) engaged in, has the right to enjoy a safe and healthy working environment (WHO, 2005, extracted from Tawiah & Baah, 2011).

Under the African Chapter on Human and People's Right (1991) cited in Ampong (2010), dealing with Economic Social and Cultural Rights, Article 16 states that 'every employer must ensure healthy and safe working conditions. There must be necessary measures to protect the health of the people being employed and to ensure that they receive medical attention when they are sick. In Ghana, many workers have tended to fight for job security while neglecting the need to promote quality work life, because of the level of unemployment rates in the country. Occupational health and safety has become an important issues for many organisations and the country as a whole, this is because of the high value the place on their human resource. Also, in Ghana , Labour Act 2003 (Act 651) Part XV on Occupational Health, Safety and Environment (Article 118) sub section (1) states that it is the duty of an employer to ensure that every worker employed by him or her work under satisfactory safe and healthy conditions. Diamond Cement (Ghana) Limited (DCGL) at Aflao was established by former President John Agyekum Kufuor in

year 2002 in the then Ketu District, now Ketu South Municipality of the Volta Region. The company has provided about 400 direct and 1000 indirect employments. It is noted that Aflao Diamond Cement (Ghana) Limited operates in eco-friendly environment and it is only manufacturing company which has been rated GREEN rating (that is, very good) by the Environmental Protection Agency (EPA) for the AKOBEN rating four consecutive years since 2010 out 100 manufacturing companies. The company compliments the government industrialization programme and provides employments for the citizenry and as a result economic development of the country. Additionally, the company uses the latest technology of Programmable Logical Control (PLC) system in the cement production process to maintain consistency in quality.

The environment of Aflao Diamond Cement Factory is well equipped with huge machinery and various equipment as well as large volume of population of workers of various kinds. In an environment like this there may be work related problems, accidents and injuries as well as health related issues which are faced by such a company. It is the wish of this research to check or find out whether management of Aflao Diamond Cement Factory has put in place to ensure that its operational environment is still being kept safe and healthy to enhance maximum employees' performance. Also, this research would like to seek whether the company has impact on people and environment negatively or positively.

1.1 Statement of the Problem

The researcher realised that the activities of Aflao Diamond Cement Factory causes environmental impacts at all stages of the process. These include emissions of airborne pollution in the form of dust, gases, noise and vibration when operating machinery and during blasting in quarries, and damage to residents and workers from quarrying.

Illiteracy rates and poverty are reported as main problems affecting developing countries and play a key role in solving many problems. It was analysed that the maximum occupational accidents reported because the workers who begin to work in the industry is unskilled labour and do not receive adequate training before work. These raw hands begin as unskilled labour and through working in the practical field and in result they become experts with time. Whereas, these workers suffered from numerous industrial accidents every year that cause fatalities and injuries. These fatalities and injuries significantly affect national economy, as it causes loss of productive hours, workforce absenteeism compensation cost and more suffering for the victims and their families.

Equipment to reduce dust emissions during quarrying and manufacture of cement is widely used, and equipment to trap and separate exhaust gases are coming into increased use. Environmental protection also includes the re-integration of quarries into the countryside after they have been closed down by returning them to nature or re-cultivating them.

It is imperative to make and update the occupational health and safety practices in the companies more especially that of Aflao Diamond Cement Factory Limited to save lives, disabilities, health problems and money. One of the best strategies is prevention of such occupational accidents and health problems which is crucial because majority of occupational accidents and health problems are preventable. It is analysed that good intentions in many firms have not always been implemented or sustained. Few firms believe that health and safety practices are economic burden on firm but the reality is the other way round. The firms have to accept “good safety is good business”. Therefore, this study would highlight on the possible occupational accidents and health problems in cement industry with possible direct and indirect causes of accidents, sicknesses and others on the health of people as well as the environment. To safeguard and protect the lives of employees at Aflao Diamond Cement Factory from worker- related accidents and

illnesses, the management in the organisation perhaps might be implementing Occupational Health and Safety (OHS) policies or may have put in place some measures for safety. However, workers in the Aflao Cement Factory Company may still be experiencing some work-related accidents and illnesses as well as environmental problems. This research or study is therefore to find out whether the company or the management has put in place OHS policies at work place so as to enhance workers' performance and also to assess effectiveness of those policies as well as environmental impact of the factory.

1.3 Purpose of the study

The purpose of the study is to devise effective health and safety practices for the Aflao Diamond Cement Factory Limited.

1.2 Objectives of the study

Specifically, the study seeks to:

1. Examine health and safety practice issues of the Aflao Diamond Cement Factory.
2. Identify factors contributing to the poor health and safety practices.
3. Devise strategies to ensure effective health and safety practices of the factory.

1.3 Research Questions

The following research questions have been developed based on the objectives of the study.

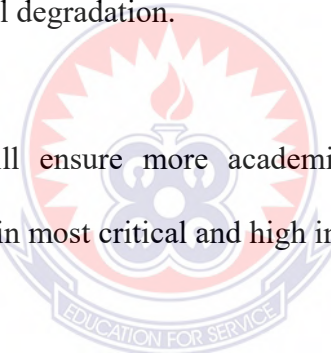
1. What are the health and safety practice issues of the Aflao Diamond Cement Factory?
2. What are the factors contributing to the poor health and safety practices?
3. What are the strategies to ensure effective health and safety practices of the factory?

1.4 Significance of the Study

The following are the significance of the study:

- Assist policy makers such as human resource managers or personnel, occupation health and safety inspectors in formulating policies on health and safety issues in the country.
- Assist the companies or organisations to design policies on safety devices and management at work places.
- Create the awareness and recall of health and safety issues for workers and staff as a whole.
- Create awareness of how best the company can manage the environment to minimize environmental degradation.

On the whole, the study will ensure more academic and social study in field of occupational health and safety in most critical and high incidence and risky jobs.



1.5 Scope of the Study

The study of this nature should have covered all the diamond cement manufacturing factories in Ghana, but due to a number of constraints, this might not be possible. Instead, the study has been restricted only to Aflao Diamond Cement (Ghana) Factory in Ketu Municipality of Volta Region which is more accessible and near to the researcher. Besides, the study seeks to check what impact the Aflao Diamond Cement Factory has on health and safety of workers and people as well as occupational health and safety policies on employees' performance. Also, the study tries to outline the available measures, facilities and devices that are in the company. Finally, the study seeks to know the workers and management understanding and perceptions of OHS culture at work in the company.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This part of the study comprises review of existing literature on the topic. The literature will be reviewed under the following sub-headings as follows: the concept of health and safety in construction, the purposes of health and safety in construction, occupational health and safety practices, review of previous studies conducted in workplace environment, occupational diseases, occupational risks in India, occupational lung diseases and workplace noise pollution. Others include, challenges of health and safety at construction sites, casual workers and their health and safety needs in the Ghanaian cement manufacturing / construction industry and cement production and the hazards it has on cement factory workers.

2.1 The Concept of Health and Safety in Construction

The WHO defines health as the complete state of physical, mental and social well-being not the mere absence of disease or infirmity (WHO, 2016). A joint definition of occupational health endorsed by the ILO and WHO states that: *“Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the workers in an occupational environment adapted to their physiological and psychological capabilities; and, to summarize : the adaptation of work to man and of each man to his job”* (WHO, 2015: 3). Occupational Health and Safety (OHS) refers to the outcome of adequate protection of a worker from sickness, injury and disease arising from

work (ILO, 2013). The purpose of OHS is to provide safe working environment for all employees and workers in every organization irrespective of size, sector or industry. The outcome of such practice and compliance with OHS guidelines at every workplace and environment directly and indirectly impacts productivity as well as performance. Thinking beyond the benefits for both the organization and the country, it is worthy of note that the providing a safe and healthy working environment for workers is a right which is tied to employees fundamental right of “right to live a healthy life”. Effective implementation of OHS in organizations will thwart both fatal and non-fatal accidents as well as illnesses at the work place there ensuring the welfare of the entire workforce. Occupational accident could also be defined as an unexpected and unplanned occurrence, including acts of violence, arising out of or in connection with work which results in one or more workers incurring a personal injury, disease or death. Occupational injury according to the ILO, (2013), is defined as “death, any personal injury or disease resulting from an occupational accident” while Occupational disease is defined as “a disease contracted as a result of an exposure to risk factors arising from work activity”.

The concept of safety is an extensive concept that refers to the avoidance of any kind of accident leading to harm or injury to human beings. The concept is extensive and not limited in scope in that it is regarded as encompassing accidents or incidents that cause minor physical injuries (bruise or small cut) as well as major injuries that demand intense hospital care or that may cause death. Thus, the concept’s emphasis on prevention and avoidance of harm call for understanding accident causes and prevention of new occurrences. Therefore health and safety issues are often concerned with improving the safety related behaviors of the workers.

Such behaviors include complying with safety rules and regulations, taking initiatives to contribute to the enhancement of safety at the workplace, and reporting all accidents and

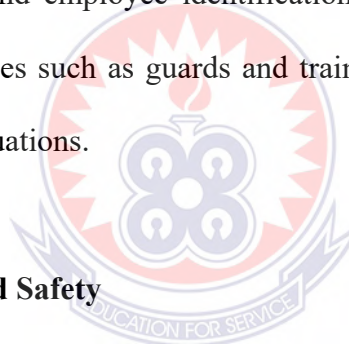
injuries that are experienced or found out about. This last behavior has been increasingly focused on in safety contexts, as findings show that a large number of accidents and injuries in organizations go by unreported. Under reporting could negatively impact on the safety of an organization because it represents missed opportunities to improve safety by learning from mistakes.

2.1.1 The Purposes of Health and Safety in Construction

Today, employees expect their employers to provide work environments that are safe, secure and healthy. However, many employers once viewed accidents and occupational diseases as unavoidable by-products of work. This idea may still be prevalent in many industrial settings in underdeveloped countries. Fortunately in most developed nations, this idea has been replaced with the concept of using prevention and control to minimize or eliminate risks in workplaces. But in many underdeveloped countries significant health, safety concerns exist in workplaces. Health refers to a general state of physical, mental and emotional well-being. A healthy person is free of illness, injury or mental and emotional problems that impair normal human activity. Health management practices in organizations strive to maintain the overall well-being of individuals. Safety on the other hand refers to protecting the physical well-being of people.

The main purpose of effective safety programmes in organizations is to prevent work related injuries and accidents. The purpose of security is to protect employees and organizational facilities. The general goal of providing a safe, secure and healthy workplace is reached when there is cooperation between managers and HR staff members. A human resource manager or safety specialist can help coordinate health and safety programmes, investigate accidents, produce safety programme materials and conduct formal safety training. However, department supervisors and managers play key roles in

maintaining safe working conditions and a healthy workplace. For example, a supervisor in a warehouse has several health and safety responsibilities: reminding employees to wear safety hats; checking on the cleanliness of the work area; observing employees for any alcohol, drug or emotional problems that may affect their work behavior; and recommending equipment changes (such as screens, railings or other safety devices) to engineering specialists in the organization. A position becoming more common in many companies is that of safety/environmental officer. This combination may make sense in situations where danger results from chemical or other sources of pollution that may be hazardous to both employees and the public or the environment. Regarding security, HR managers and specialists can coordinate their efforts with those in other operating areas to develop access restrictions and employee identification procedures, contract or manage organizational security services such as guards and train all managers and supervisors to handle potentially volatile situations.



2.2 Occupational Health and Safety

Jackson et al (2009) defines workplace safety and health as the physiological-physical and psychological conditions of a workplace that result from the work environment provided by the organization. Physiological-physical conditions include occupational disease and accidents such as actual loss of life or limb while psychological conditions encompass symptoms of poor mental health and job burnout. According to ILO/WHO (2015), occupational health should aim at promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; prevention of departures from work caused by their working conditions; the protection of workers from risks and the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities. The health and safety of

employees is crucial in the effectiveness of any organization as it constitutes a major drain on the organization's resources. However, if managed carefully, health and safety management can bring substantial benefits to the organization.

Research presented in the Health and Safety Executive (2014) in 19 case studies established that health and safety management leads to higher productivity, lower absenteeism, improved staff morale and relations. It is because of these benefits that many employers and safety practitioners have adopted three main approaches in managing safety and dealing with safety issues. These are: organizational approach, engineering approach and individual approach. The organizational approach involves designing jobs, developing and implementing safety policies, using safety committees and coordinating accident investigation. The engineering approach on the other hand involves designing work settings and equipment, reviewing equipment and applying ergonomic principles. Finally, there is the individual approach which involves reinforcing safety motivation and attitudes, providing employee safety training and rewarding safety through incentive programs.

Health and safety management is a problem for all employers world over although its adverse impacts on employees and organizational productivity are most felt in developing countries especially in Africa. Most African countries are struggling with occupational health and safety practices such as health and safety training, risk assessments, safety inspections and audit as well as provision of occupational health services. Despite this, several health and safety hazards, risks and diseases are still prevalent in most organizations (Meredith, 2016).

Studies conducted globally on occupational health and safety reveal that most employers have not been able to put in place effective measures to improve and maintain the health and safety of their employees. For instance, a study conducted in the Guatemalan Sugar Industry by COVERCO and the International Labour Rights Fund in 2005 revealed that

the industry has a serious effect on the quality of life of people living near or in the fields. Those working in the industry were prone to accidents and occupational illnesses since only 61% of the cane cutters wear some form of personal protective equipment which didn't meet the standard requirements.

93% of the workers stated that there was no emergency evacuation procedure in case of cane fires. Fumigators in the fields worked for long hours with no protective equipment and they received no training on the dangers associated with their job. Ashraf (2015) in his study in the sugar industry of Pakistan found that there were frequent injuries and accidents and very little has been done to improve the situation. 15% to 20% of workers are injured in every industry every year at their workstations. Only 40% of workers were equipped with safety measures and only 30% to 40% workers were trained about machine operations. 10% of machines had completed their life span while 60% machines needed preventive maintenance during operations.

Similar findings were documented in a report by IUF Global Sugar Programme and Kenya Union of Sugar Plantation Workers (KUSPW) on the occupational health and safety situation in the sugar industry in Kenya. The report revealed a poor health and safety culture among employees, unsafe working conditions and poor enforcement of the health and safety laws by the sugar firms.

An investigation by Agbola (2012) on the impact of health and safety management on employee safety at Ghana Ports Authority revealed that there are poor health and safety management practices, poor training on safety, lack of information on dangerous chemicals and hazardous materials, lack of monitoring and enforcement of safety rules as well as essential safety equipment. On the contrary, Yiquan et al (2012) noted that after developing and implementing a new framework to cultivate good safety culture in

workplaces, Singapore saw a drop in workplace fatalities between 2004 and 2010 from 4.9% to 2.2% per 100,000 workers.

2.3 Occupational Health and Safety Practices

Occupational health practices and safety practices include all activities, programmes and measures undertaken by employers, workers and their organizations as well as designers and architects to protect employee health and promote safety. Most organizations today have adopted a number of measures to improve and maintain employee health and safety at the workplace. The effectiveness of health and safety management at the workplace depends upon the nature of the work performance systems and organizational work practices as well as the leadership and managerial resilience in seeking continuous improvement of employee health and safety (Armstrong 2016). Some of the health and safety practices are discussed below:

Wellness programs are gaining popularity in most organizations today. An increasing number of employers are establishing stress management programmes and physical health and wellness programme to ensure employees retain an essential balance among their life activities. This can be a catalyst to high performance and a measure to reduce medical costs (Torrington et al 2008).

According to Gupta (2009), wellness programmes promote employee health by providing education on health issues, encouraging lifestyle changes designed to reduce risk of illness or providing early warning of developing health problems through screening for cases like high blood pressure, high cholesterol, blood sugar levels, HIV/AIDS and other illnesses. Such programmes boost employee morale and increase job satisfaction. In addition, wellness programmes encourage employees to make lifestyle changes through better

nutrition, regular exercise programmes, and abstinence from smoking and alcohol consumption, stress counseling and annual physical examinations.

Safety training and education on health and safety is paramount in the acquisition of skills, knowledge and attitudes necessary for the completion for any task. Training for all levels of management personnel and employees is vital for successful safety programmes. Mamoria & Gankar (2011) note that safety education aims at building up a favorable attitude towards safety measures and precautions while training is concerned with providing immediate job knowledge, skills and methods of work and creating awareness on the hazards likely to be encountered in the course of work. The process also enables understanding the causes of accidents and how they may be prevented, importance of good house-keeping and handling materials safely.

Furthermore, safety training allows employees to acquire greater competencies to control their work, leading them to perform their jobs more safely. According to Saleemi (2009), safety education and training develops safety- consciousness among employees and results in safe handling of equipment. It ensures safe work performance on the part of the employee by developing his skill in the use and operation of safety equipment. Training should be continuous to ensure effectiveness. Piran & Reynolds (2016) found that the response to safety campaigns and training was very good in the short term but later, the safety behaviour of employees normalized. Management should therefore ensure regular and frequent refresher courses to produce long term results.

Accident prevention and safety has escalated in the recent past because modern industrial workers are subject to, in the wake of rapid industrial advancement, mechanical, chemical, electrical and radiation hazards. According to Gupta (2009), safety engineering has several elements. These include guarding of those machines that pose danger to workers. They should be fenced or covered to prevent access and protect against unforeseen operational

contingencies. Secondly, the flow of materials should be properly planned to eliminate hazards and there should be a well-designed system for detection, prevention and control of fires. In addition, inflammable liquids and materials should be stored and handled with care.

Another important element is the provision of safety devices such as safety glasses, hard caps or helmets, gloves, gas masks and safety shoes. These equipment should be easy to wear, comfortable, lightweight and durable. Finally, there is need for regular maintenance of all equipment and machines to ensure that they are kept in perfect working condition.

Almost all large organizations provide a medical unit to service the needs of employees. They deal with illnesses or injuries incurred by workers on the job and provide physical examinations for new employees. Organizations must provide adequate emergency care and hospitalization facilities. Also, there should be a professional physician and nurses who should ensure maintenance of adequate and confidential medical records. The management should show active cooperation with public health agencies as well as maintenance and supervision of satisfactory sanitation and hygiene in the factory or offices. Upon employment, all employees must undergo proper medical examination and thereafter annual medical checkup of those occupational diseases.

It is also important to ensure that health education and information services are readily provided to all employees at times (Gupta, 2009). Apart from health care, the employers must provide adequate and clean drinking water in the offices and residences of the workers. High levels of cleanliness should be maintained throughout and adequate sanitary materials in the washrooms provided.

Occupational health and safety is concerned with protecting the safety, health and welfare of people engaged in work or employment. It ensures a safe and healthy work environment, protects co-workers, family members, employers and customers from

hazards. According to Armstrong (2009), the achievement of a healthy and safe place of work and the elimination of the maximum extent possible of hazards to health and safety is the responsibility of everyone employed in an organization as well as those working there under contract. By reducing the rates and severity of occupational accidents, diseases, work-place violence and stress-related illnesses, and by improving the quality of work life for their employees, organizations can become significantly more effective (Jackson et al. 2009). They further point out positive consequences of safe and healthy workplaces which include higher productivity owing to fewer lost workdays, increased efficiency and quality from a healthier workplace, reduced medical and insurance costs, lower workers' compensation rates and direct payments and improved reputation as an employer of choice.

Health and safety practices are concerned with protecting employees and other people affected by what the company produces and does against the hazards arising from their employment or their links with the company. Safety programmes deal with prevention of accidents and with minimizing the resulting loss and damage to people and property. They relate more to systems of work than the working environment. Occupational health programmes deal with the prevention of ill-health arising from working conditions. It involves the diagnosis and prevention of health hazards at work. It also deals with ill-health or stress, which occurs in spite of preventive actions, measurement and control of environmental hazards (Armstrong, 2009).

Flippo (2014) asserts that a health programme should have a stated health and medical policy and the performance of periodic physical examinations on all employees exposed to health hazards. There should be adequate facilities for voluntary periodic physical examination for all employees and competent medical consulting staff. Systematic attention should be paid to sanitation, safety precautions and industrial hygiene. Above all,

there should be a well-equipped dispensary for emergency cases and physical exams and properly qualified medical and nursing personnel. Torrington (2011), adds that positive health programmes display a variety of different approaches aimed at relieving and preventing stress and associated problems and promoting healthy lifestyles.

On the other hand, a safety programme deals with prevention of accidents with minimizing the resulting loss and damage to persons and property. The function is to identify potential hazards, provide safety facilities and equipment and take prompt remedial action. A safety programme should be given due consideration like other areas such as wages and salary administration, recruitment, selection and training. It should be developed to educate all employees in safety and to secure their active cooperation in order to eliminate industrial accidents (Saleemi, 2009).

2.5 Review of Previous Studies Conducted in Workplace Environment

2.5.1 Occupational Diseases

When prevention and control measures at work fail, occupational diseases can occur. ILO report (2011) has estimated 2.02 million deaths 160 million non-fatal work-related disease annually in global industrial sector. Occupational diseases have social and economic costs for individuals and for the country as a whole due to loss of productivity. Direct financial costs include the value of lost production, lower incomes for the workers concerned, health and rehabilitation costs, and administrative and transfer costs. The costs for cancer, in particular, are exceptionally high. In addition, there are further costs due to pain and suffering for individuals and their families and communities. International Labour Office (ILO, 2013) reported that in the United States, skin diseases, hearing loss and respiratory conditions were the three leading diseases among the 224,500 reported cases of non-fatal occupational illness in 2009.

The WHO estimates occupational health risks as the tenth leading cause of morbidity and mortality. In the world health report 2002, stated that occupational risk factors account for a number of morbid conditions globally, including 37% back pain, 16% hearing loss, 13% chronic obstructive lung disease, 11% asthma, 10% injuries, 9% cancer, and 2% leukemia. In Argentina 22,013 cases are reported in 2010, with noise-induced hearing loss, musculoskeletal diseases and respiratory diseases as the leading diseases (ILO report; 2013).

2.5.2 Occupational Risks in India

Legislation on occupational health and safety has existed in India for over 50 years. The principal health and safety laws are based on the British Factories Act. The concept of general awareness about occupational safety and occupational and environmental hazards were not spread forward in the society toward the poor working conditions, it resulted in the deteriorating health conditions of Indian labour (Mandel, 2009). The Factories Act, 1948 has been amended from time to time, especially after the Bhopal gas disaster, which could have been prevented. Leigh *et al* (2009) have estimated an annual incidence of occupational disease ranged between 924,700 to 1,902,300 and 121,000 deaths in India. Major risks associated to Indian occupations are work related accidents, pneumoconiosis, musculoskeletal injuries, chronic obstructive pulmonary diseases, pesticide poisoning, byssinosis, asbestosis, noise induced hearing loss and workplace stress (Pingle; 2012). Gupta *et al* (2015) recorded a very high respiratory morbidity from a cross-sectional survey on mango plantation workers in Lucknow. This respiratory morbidity was attributed to prolonged inhalation of organic dusts during the farming operation. The aspects of health and safety in the small scale industries hardly received any attention. As a result working conditions in most of small scale industries is not satisfactory and posing a

great risk to the health and safety of the personnel working in such units (Dubey; 2010). He also noted the reasons like lack of resources, knowledge and one-man management for the less attention paid towards safety and health in small scale units.

National Institute of Health and Family Welfare reported prevalence of silicosis in India was 6.2 - 34 % in mica miners, 4.1 % in manganese miners, 30.4% in lead and zinc miners, 9.3% in deep and surface coal miners, 27.2% in iron foundry workers, and 54.6% in slate-pencil workers. Prevalence of asbestosis was extended from 3% in asbestos miners to 21% in mill workers. In textile workers the byssinosis was as common as 28-47%. Agnihotram (2015) studied the condition of adult carpet weavers in Mirzapur and reported respiratory problems as major occupational risk, the causal factors are carpet dust particles. Sing *et al* (2012) noted high levels of noise ranged between 86.5 and 110 dB (Leq) in forging units of North India.

2.5.3 Occupational Lung Diseases

Occupational lung diseases are caused primarily by long-term exposure to irritating or toxic agents at the workplace. Occupational lung diseases are a leading cause of lost work productivity. World Health Organization reported that occupational exposures account for about 10.3 percent of lung cancer cases worldwide. An estimated 14 % of chronic obstructive pulmonary disease (COPD) is due to occupational exposure. Many occupational lung diseases are related to a specific occupation or exposure to hazardous materials, such as asbestosis, coal workers' pneumoconiosis (black lung), silicosis (exposure to fine sand as in ceramic workers), berylliosis, byssinosis (brown lung, exposure to raw cotton) and farmer's lung. Workplace exposures can cause or worsen adult-onset asthma, COPD (which includes emphysema and chronic bronchitis) and lung cancer (Webber *et al*, 2009).

Byssinosis (brown lung disease) is a chronic condition involving obstruction of the small airways, severely harming lung function. It is caused by exposure to dusts from hemp, flax and cotton processing. As the length of exposure increases over the working years of the employee, symptoms of the chest tightness and shortness of breath occur more frequently and on workdays other than on the first day of the workweek. Medical monitoring, which includes a questionnaire and pulmonary function testing, is important for early identification of workers experiencing breathing problems that may be related to their workplace (NCDOL, 2007). Dr. Richard Schilling reported that the degree or severity of response for individuals with symptoms of byssinosis is related to the dust level at the workplace. In 1995, Jiang and Kong studied 1320 cotton workers and reported that the median of respirable dust concentrations ranged from 0.41 to 1.51 mg/m³, while the median of total dust concentrations ranged from 3.04 to 12.32 mg/m³.

2.5.4 Workplace Noise Pollution

Since last one-decades extensive research work has been in progress in the field of effects of noise on the health, comfort and performance of people and also to improve workplace environment. The review of the literature indicates that noise has a series of health effects, in addition to hearing impairment. Some of these, such as sleep deprivation, are important in the context of environmental noise, but are less likely to be associated with noise in the workplace. For occupational noise, the best-characterized health outcome is hearing impairment. The first effects of exposure to excess noise are typically an increase in the threshold of hearing (threshold shift), as assessed by audiometry. This is defined as a change in hearing thresholds of an average 10 dB or more at 2000, 3000 and 4000 Hz in either ear (poorer hearing) (NIOSH, 2008).

Other consequences of workplace noise, such as annoyance, hypertension, disturbance of psychosocial well-being, and psychiatric disorders have also been described (De Hollander *et al.*, 2014). Noise is one of the physical environmental factors affecting our health in today's world. Noise is generally defined as the unpleasant sounds which disturb the human being physically and physiologically and cause environmental pollution by destroying environmental properties (MELNICK, 2009). Many occupational studies have suggested that individuals chronically exposed to continuous noise at levels of at least 85dB have higher blood pressure than those not exposed to noise (Zhao *et al.*, 2011).

David (2010) reported occupational noise-induced hearing loss (ONIHL) has been a common occupational disorder for many years. David (2010) reported that basic principle in diagnosis and assessment is that there must be a "suitable and sufficient" history of noise exposure to cause the hearing loss at hand: although the audiometric notch is a sign of ONIHL, it is not pathognomonic. The history of noise exposure is elicited by taking a careful occupational history, noting "significant" noisy jobs, tasks undertaken doing jobs and noisy equipment used. From this the likely noise exposure levels experienced can be defined.

Davies (2008) recommended that hearing conservation can be done thorough noise monitoring, engineering and administrative controls, audiometric evaluation, hearing protection, education, record keeping, and programme evaluation. Questionnaire survey is important to conduct effective study on impact of workplace noise. The information collected through questionnaire survey viz. ontological, occupational and environmental history is a key component of making a reasonable diagnosis of occupational hearing loss and of determining the importance of the various components. Study conducted by Atmacal *et al* (2015) observed 77 workers (30.70) have hearing loss and, according to these results, distribution of these workers with hearing problems to industries is: 37.66%

in concrete traverse factory, 25.97% textile factory, 20.77% iron and steel factory, and 15.58% cement factory.

Charles and Geoffery (2014) conducted their study on impact of noise pollution on hearing capabilities of 818 workers in saw mills, corn mills and printing houses. They observed high noise level prevailing in these industries. They reported a total of 49 (10.6%) of workers in saw mills had hearing loss at speech frequencies, 38 (77.6%) of 49 had mild hearing loss and 18.4% had moderate hearing loss. With regard to workers in the corn mills, out of total 193 workers 14.1% had hearing loss. While, only 3% of the workers from printing houses had hearing loss.

Effects of workplace noise can be easily controlled through awareness among the workers about effects of noise and providing the hearing protectors in noisy workplaces. Zohar *et al* (2010) undertook a programme to promote awareness of the damaging effects of noise on hearing among workers who were at risk and to increase their motivation to wear ear protection. In addition to a conventional hearing conservation lecture, workers took hearing tests before and after their work shift to demonstrate how much temporary hearing loss occurred with or without use of ear protectors. Use of the protectors minimized such loss and the audiograms of those who routinely wore protection were posted along with those who did not to show the benefits of the protection. The non-users' audiograms showed profound permanent hearing losses which further accentuated the programme's end goals. This approach yielded a 50% increase in ear protector usage. One explanation for the relationship between noise and absenteeism is that noise contributes to detrimental physiological effects that reduce workers capacity to perform their duties (Clarke 2014). Another explanation is that an unpleasant work environment increases a psychological aversion to return to work each day (EPA, 2016).

In many workplaces workers avoid use of hearing protectors with number of reasons. Some studies observed the lack of knowledge related to the issues of noise exposure. Hughson *et al.* (2012) stated that around two third workers had medium levels of knowledge and one third had high levels, with only 2% being judged to have low knowledge of noise exposure issues. This shows that almost all workers surveyed had at least a basic overall knowledge of noise related issues, however knowledge of certain particular aspects were reported to be lacking. For example, less than 4% of all respondents could name the 85dB level at which they should wear hearing protection, and less than 10% knew that a sound level of 93dB was twice the level of exposure as 90dB.

The above review of literature shows that there is need to conduct study on occupational health and safety. There is a need to make people aware about workplace health management to improve workers efficiency. The results of such studies can be used to plan and manage workplace to reduce work related illness and injuries. European Agency for Safety and Health at Work (2013) reported that more research is needed to design workplace properly and work organised to meet the needs of people with chronic diseases and health condition. They also noted need to identify modifiable factors and possible interventions in order to prevent work disability and unnecessary job loss.

Many researchers claim that small enterprises have special problems with work environment because risk is higher and ability to control risk lower (Hasle and Limborg, 2016). Agnihotram (2015) suggested that there is a tremendous potentiality for large-scale epidemiological research to determine the exposure and occupational risks. The public-private partnerships are very important to success of this goal. Record occupation on various data bases of public use (ration cards, driving license etc.), surveillance of disease occurrence in industrial belts, analyzing occupation on death certificates, using

record-linkage techniques between various resources may also improve the research potentiality on occupation health (Agnihotram, 2015).

A longer working life is an economic and social necessity: research can contribute to this aim by developing solutions that help workers remain healthy, engaged and willing to extend their careers. Keeping people healthy and active for longer has a positive impact on productivity and competitiveness.

2.6 Challenges of Health and Safety at Construction sites

In their article on “occupational health and safety: key issues and concerns in Ghana” Amponsah-Tawiah and Dartey-Baah reckon what former UN Secretary General, Kofi Annan said “ *Safety and health at work is not only a sound economic policy - it is a basic human right*”. Just as many of the human rights that are abused every day, even though right of life is a fundamental human right, yet the International Labor Organization reports there is 2.2 million people deprive of that right by occupational accidents and work related diseases (ILO, 2015). Worse yet, a further estimate of 270 million workers suffer occupational accidents and about 160 million occupational diseases annually (ILO, 2015). Of course these alarming statistics may only be underestimation because there is under-reporting and unavailability of data in most developing countries on non-fatal illness and injuries at the workplace (Probst, Brubaker, & Barsotti, 2008). In addition, the estimates that about 10 million cases of Disability-Adjusted Life Years (DALYs) lost, or healthy years of life lost whether to disability or premature death can be attributed to occupational injuries alone, and 8% of unintentional injuries globally result from occupational injuries as well. The impact of the general problem of poor occupational health cannot be underestimated too. For instance it is estimated that reduced working capacity of workers may cause economic loss up to 10-20% of the Gross National Product

of a country, a figure that differs from country to country and from region to region. It is further estimated that about 4 percent of Gross Domestic Product (GDP) is lost due to occupational deaths, diseases, and illnesses.

It is worse in some countries as the cost of such injuries even reaches as much as 10 percent of their GDP. In monetary terms, according to the International Labour Organization, the direct or indirect cost of occupational illness and accidents at work is estimated at US\$2.8 trillion worldwide (ILO, 2014).

2.7 Casual Workers and their Health and Safety Needs in the Ghanaian Cement

Manufacturing / Construction Industry

A study by Danso (2005), revealed that poor working conditions of any type have the potential to affect a worker's health and safety. Unhealthy or unsafe working conditions are not limited to factories — they can be found anywhere, whether the workplace is indoors or outdoors. For many workers, such as construction workers or miners, the workplace is “outdoors” and can pose many health and safety hazards. Anaman and Osei-Amponsah (2007), also believe that poor working conditions can affect the environment workers live in, since the working and living environments are the same for many workers. This means that occupational hazards can have harmful effects on workers, their families, and other people in the community, as well as on the physical environment around the workplace. A classic example is the use of heavy machines the site work. Workers can be exposed to dust and chemicals in a number of ways when spraying clearing and applying bitumen, they can inhale the chemicals during and after spraying, the chemicals can be absorbed through the skin, and the workers can ingest the chemicals if they eat, drink, or smoke without first washing their hands, or if drinking water that has become contaminated with the chemicals. Kheni (2008), also noted that workers' families can also be exposed in a

number of ways: they can be exposed to residues which may be on the workers' clothes. Other people in the community can all be exposed in the same ways as well. Overall, efforts in occupational health and safety must aim to prevent industrial accidents and diseases, and at the same time recognize the connection between worker health and safety, the workplace, and the environment outside the workplace.

Danso (2005) further stated in his work that workers in every occupation can be faced with a multitude of hazards in the workplace. Occupational health and safety addresses the broad range of workplace hazards from accident prevention to the more insidious hazards including toxic fumes, dust, noise, heat, stress, etc. Preventing work-related diseases and accidents must be the goal of occupational health and safety programmes, rather than attempting to solve problems after they have already developed.

The fragmented nature of the construction industry, its transient nature and especially the fluctuating nature of jobs execution makes it unattractive for contractors to keep a lot of permanent workers, making construction firms rely enormously on the use of casual workers. Before proceeding, it would be appropriate to define and to understand who a casual worker is. The Ghana Labour Act 651, 2003, defines a casual worker as a worker who is engaged to work temporarily for a period not exceeding six (6) months, and whose remuneration is calculated on daily basis. It has been observed that this type of employment in the Ghanaian construction industry has increased over the years with its accompanying occupational health and safety issues. Interestingly, very little research on the real occupational health and safety issues confronting casual workers in the Ghanaian cement manufacturing / construction industry has been done. However, literature available indicates that the presence of casual workers in the cement manufacturing / construction industry is fraught with many shortcomings. As noted earlier on, within 2.3% of the active workforce in the construction sector are a considerable proportion of workers who cannot

read and write and contributing significantly to the country's Gross Domestic Product (GDP). This assertion is buttressed by the fact that the Ghanaian cement manufacturing / construction industry is dominated with many workers who are not able to read and write, and that within Ghana's population of about 22.2 million is a large pool of cheap unskilled workers with low level of education. Again, Kheni (2008), noted the negative attitudes and indifference of site workers in general to health and safety and seems that the negative attitudes and indifference of site workers stem from the prevailing socio-economic conditions in Ghana. This was briefly expressed by a site worker.

"Our workers' unions sign a collective agreement with the management, and the agreement consists of salaries, working conditions, health and safety, and welfare of workers. However, our major concern is salaries, once the workers agree on the salaries; the other areas are not of much concern to us". In a preliminary survey conducted by the researcher in Kumasi Metropolis in 13th December 2011 as to who was responsible for medical costs involving work related accidents, one casual worker responded that: "If the contractor is kind, he gives us some money; otherwise in most cases, we have to spend our own money for all treatment fees." As indicated earlier, currently, there is no documented data on such issues on casual workers in the Ghanaian /cement manufacturing construction industry. However, given the similarities in the construction industries in some developing countries such as Tanzania, Kenya, South Africa there is little doubt that the trends observed might be different in Ghana since Ghana is also a developing country (Kheni, 2008).

2.8 Cement Production and the Hazards it has on Cement Factory Workers

Cement factories represent one of the most important strategic basic elements in the economic development of any country. Workers in this sector constitute an important

productive aggregate in the community (David & Hamdy, 2005) and Baskett (2007:7). Furthermore for period of time the national development was measured by production and consumption size of the cement (Pipilikaki, 2009). The cement industry operates in virtually all countries around the world; however more than 70 percentages of the global cement are produced and consumed in the developing countries where the cement development is much higher pace (John, 2003). This industry has all the features to be a successful sector especially in some developing countries, like South Africa.

Portland cement is the most commonly used today and is successor to hydraulic lime. The invention of Portland cement is usually attributed to Joseph Aspdin, who took out a patent in 1824 for a material that was produced from a mixture of limestone and clay. It is called “Portland” because the concrete made from it looks like natural stone from the Isle of Portland. Since Roman times, cement has been one of the synthetic materials with the largest production and widest usage by mankind. Its properties have allowed fascinating works till date. In the cement factory sector, workers exposed themselves to many occupational hazards that might contribute to diseases and injuries at the cement factory but a considerable interactive effort with exchange of ideas in many organisations within and outside the cement industry have been trying the need of stressing on how to improve occupational health and safety performance for workers. Furthermore a periodic check-ups and early detection of hazards to monitor the health status of every cement factory work-related accidents and diseases continue to be a major problem in the world today, because the human and economic costs of occupational accidents and diseases remain high major tieback for cement factory (Abongomera, 2008). Working is viewed as important part of one’s life experience of all adults, as most people spend about one third of their lives at work. About 45% of the world's population and 58% of the population over ten years of age constitute the global workforce Rogers (2005) and Gupta *et al.* (2007). El -

Sobky (2008), indicates that workers are exposed to many health hazards which are tremendously harmful on their health, these hazards may result from physical, chemical and mechanical agents, which could have a detrimental influence on their health. Cement can cause ill health in workers through skin and eye contact or inhalation. The risk injury attached to the cement factory workers depends on the duration and level of exposure and individual sensitivity. (Saucier and Jane, 2004:45). The term “cement” was derived from the Latin word *cementum*, which means stone chippings that were used in Roman mortar. This hydraulic cement was discovered during ancient Greece and Rome where it was made from volcanic ash mixed with slaked limes, and the Roman engineer Vitruvius describes the surprising properties of this mixture differed completely from all other materials and was even able to set under water by Smeaton, 1758. There are difficulties to determine the extent of work-related illnesses and diseases because of the delayed period of most occupational diseases on workers in the cement factory. Environmental Health and Safety Management (2009) explains that some of the diseases do not emanate on the workers’ health quickly as expected. When the diseases finally manifest it is often difficult to trace the root causes to the workers’ past exposure (El-Sobky, 2008). The International Labour Organisation (ILO) observed in 2008 that more than two million workers die each year from work-related accidents and diseases, and added that this is probably an underestimation. The ILO estimates that workers suffer 270 million accidents and at least 335 000 fatal injuries annually, while avoidable occupational diseases affect 160 million people every year. The results of a study by (McCann and Babin 2007), show a need for good dilution ventilation and additional protective gear such as goggles and NIOSH-approved toxic dust masks for workers in the chemical industry. This is very important for the cement chemical section; as such masks will protect the workers from

hazardous toxic materials. Many cement factories around the globe are re-examining their factory operations in a fundamental way.

Many health and safety legislative and regulatory frameworks specify, in clear terms, how the employer must address any given condition. Taylor (2003,) explained that the standards and regulations tend to support the traditional command-and-control, deemed to comply or prescriptive approach of addressing unsafe situations as well as existing and potential hazards, while ignoring the responsibility of the employer in addressing unsafe worker behaviour, cement Factories have started making significant changes to their policies and commitments to health and safety strategies to improve the sustainability of cement production, providing and enforcing prescriptive rules and procedures that promote the safe behaviour of workers (Haupt, et al, 2001).



CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter contains the methodology of the study. The methodology focused on the profile of the study area, research design, research strategy, population, sampling techniques and sample size, and research instruments and data analysis procedure.

3.2 Profile of the Study Area (Aflao Diamond Cement Factory Limited)

Diamond Cement Ghana Limited is an Indian-owned Portland cement producing company located at Aflao in the Volta Region of Ghana near the border with Togo. Diamond Cement Ghana Limited (DCGL) was established in the year 2002 at Aflao in the Ketu south District of the Volta Region. The ceremonial sword cutting of the factory was done by the late President, Professor John Evans Atta Mills. The Company started with one (1) grinding mill at initial capacity of 1,000,000mt per annum in 2002 and gradually increased to 1,800,000mt per annum by the addition of a second mill in 2008. DCGL does eco-friendly operation and is the only manufacturing company rated GREEN (Very good) by the Environmental Protection Agency (EPA) for the AKOBEN rating for four (4) consecutive years since 2010 out of 100 manufacturing companies. The Cement company plant compliments the Government Industrialization Program and economic up-lift. The Company is using the latest technology of Programmable Logic Control (PLC) system in the cement production process to maintain consistency in the quality.

The company in February 2014, completed a 2.5 km rail siding connecting it to the Togo Railway network, giving access to the port of Lomé, Togo, for easy delivering of clinker for cement production.

3.3 Research Design

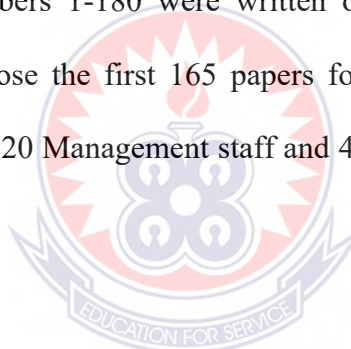
The researcher used descriptive research design for the study. These methods specify the nature of a given phenomenon. They determine and report the way things are. Descriptive research involves collecting data in order to test hypotheses or answer research questions concerning the current status of the subject of the study. Both primary and secondary data will be used for the research even though they differ from each other in various aspects. In secondary data, information relates to a past period. Primary data is about the actual events or phenomenon as reported first and by the people associated with it. Primary data is accumulated by the researcher particularly to meet up the research objective of the project. Research methods can be placed into two basic categories: quantitative or qualitative data. Quantitative research largely involves collecting data that can be analysed with numbers. Such data may be subjected to descriptive and inferential statistical analysis and may also involve the formulation and testing of hypothesis. Qualitative research gathers information that is not in numerical form. For example, diary accounts, open-ended questionnaires, unstructured interviews and unstructured observations. Qualitative data is typically descriptive data and as such is harder to analyze than quantitative data. Qualitative research is useful for studies at the individual level, and to find out, in depth, the ways in which people think or feel. Analysis of qualitative data is difficult and requires accurate description of participant responses, for example, sorting responses to open questions and interviews into broad themes. Quotations from interviews might be used to illustrate points of analysis. Expert knowledge of an area is necessary to try to interpret qualitative data and great care must be taken when doing so. The researcher used both qualitative and quantitative methods.

3.4 Population

The population for this study involved the Management and Workers of Aflao Diamond Cement Limited and nearby residents of the Cement factory in the Volta Region of Ghana.

3.5 Sampling Techniques and Sample Size

The researcher used the random sampling technique to select the respondents. The random sampling technique was used because it gave equal opportunity for respondents to participate in the research. Random sampling technique was used to select 165 respondents for the study (100 workers, 20 Management staff and 45 residents). This sample procedure ensured that each and every element of the population had an equal chance of being selected for the study. Numbers 1-180 were written on white papers including blank papers. Respondents who chose the first 165 papers formed part of the sample for the research. In all 100 workers, 20 Management staff and 45 residents were sampled for the study.



3.6 Data Collection Techniques

The data collection techniques used for the study involved questionnaires, interview and observations.

3.6.1 Questionnaires

Questionnaires were designed, developed and distributed to the respondents who are employees in the company. Closed and open ended questionnaire items in Likert Type Scale Form were designed to collect primary data. Questionnaires were designed for workers at the Aflao Diamond Cement Factory Limited. The questionnaire covered items which helped the researcher to get information regarding the health and safety issues in the cement factory.

The questionnaire was in six parts or sections. The first part is on personal / company's details, the second part is on safety items or equipment and third part deals with health and safety issues. Other parts are on workers' awareness of occupational health and safety issues, consequence of poor working environment and last but not the least is on the role of environmental protection agency (EPA).

3.6.2 Interview

The study obtained information from the 20 Management staff of the Aflao Diamond Cement Factory Limited using interview. This was aimed at finding out certain information the researcher needed, more especially on management of health and safety issues in the factory, for which satisfactory response could not be obtained through the written questionnaire. The interview guide contains information regarding assessment of the health and safety issues in the Aflao Diamond Cement Factory Limited.

3.6.3 Observation

The researcher visited Aflao Diamond Cement Factory Limited and carefully observed how workers performed their duties and their compliance with health and safety issues like wearing of gloves, helmets, nose mask, goggles and other related issues.

3.7 Data Presentation and Analysis Procedure

The study analysed data with Statistical Package for the Social Sciences (SPSS). In Saunders et al. (2007), analysis is the ability to break down data and to clarify the nature of the component parts and the relationship between them. The data collected were tabulated and analysed into simple frequencies and percentages. Also, interview responses and observations were analysed through data reduction, display, and conclusion creation and to identify trends.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4. Introduction

This chapter presents the results and discussion from the questionnaires, interviews and observations

4.1 Response rate of the workers questionnaires

The researcher sent 100 questionnaires to collect research data from the workers. Out of 100 questionnaires sent out to collect primary data, 97 questionnaires were received while 3 questionnaires were not received. Therefore, the analysis of the study was based on 97% response rate as shown in Figure 4.1.

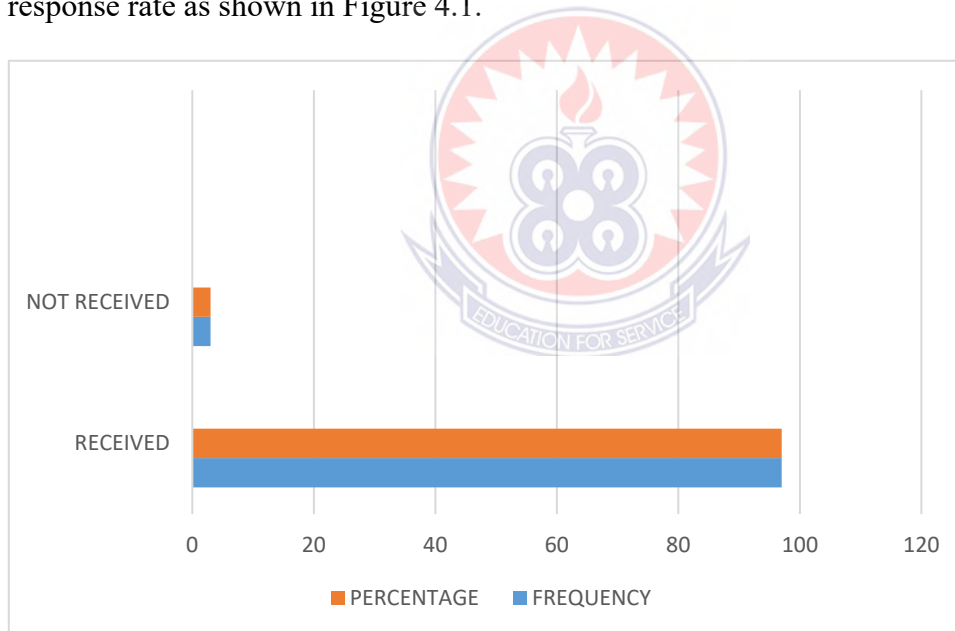


Figure 4.1: Response rate of the workers questionnaires

4.2 Results of the Questionnaire

This section analysed the results of the questionnaire obtained from the workers at the Aflao Diamond Cement Factory.

4.2.1 Results of the Questionnaire from the Workers

Table 4.1 shows that 83 workers representing 85.6% were males while 14 workers representing 14.4% were females. Moreover, 31 workers representing 32% were project managers, 24 workers representing 24.7% were site engineers, 23 workers representing 23.7% were site foremen, while 19 workers representing 19.6% were operators. Furthermore, 37 workers representing 38.1% were holding WASSCE as their highest academic qualifications, 20 workers representing 20.6% were possessing HND certificate holders, 12 workers representing 12.4% were holding Technician (CTC I,II and III) certificates, seven workers representing 7.2% were GCE holders, six workers representing 6.2% were holding MSLC and Masters degrees respectively, five workers representing 5.2% were BECE holders while four workers representing 4.1% were Bachelor's degree holders.

Also, 35 workers representing 36.1% have over 20 years working experience in the building and construction industry. Thirty-three workers representing 34% said that they have 16-20 years working experience in the construction industry. Meanwhile, 14 workers representing 14.4% have 11-15 years working experience, nine workers representing 9.3% have 6-10 years working experience while six workers representing 6.2% have less than five years working experience.

Table 4.1 showed the demographic information of the workers

Table 4.1: Demographic Information of the Workers

<i>Gender</i>	<i>Frequency</i>	<i>Percent</i>
Male	83	85.6
Female	14	14.4
Total	97	100.0
Position in the company		
Operator	19	19.6

Project Manager	31	32.0
Site Engineer	24	24.7
Site Foreman	23	23.7
Total	97	100.0
Educational level		
MSLC	6	6.2
BECE	5	5.2
GCE	7	7.2
WASCE	37	38.1
HND	20	20.6
Technician (CTC I,II and III)	12	12.4
Bachelors degree	4	4.1
Masters degree	6	6.2
Total	97	100.0
How long you have been involved in the building construction industry		
Over 20 years	35	36.1
16-20 years	33	34.0
11- 15 years	14	14.4
6-10 years	9	9.3
Less than 5 years	6	6.2
Total	97	100.0

N=97, Field survey, 2018

Table 4.2: Safety Items or Equipment

<i>SAFETY ITEMS OR EQUIPMENT</i>	<i>Frequency</i>	<i>Percent</i>
Safety signs	6	6.2
Hard hats or helmet	13	13.4
Safety glasses, goggles, and face shields	17	17.5
Safety boots	20	20.6
Rain gear	9	9.3
Hearing protection	5	5.2

Knee pads	2	2.1
Gloves	6	6.2
Ladder Scaffold platforms	8	8.2
Hoisting equipment	11	11.3
Total	97	100.0

N=97, Field survey, 2018

Table 4.2 revealed that 20 workers representing 20.6% indicated that they are provided with safety boots, 17 workers representing 17.5% said that they are provided with safety glasses, goggles and face shields. Besides, 13 workers representing 13.4% used hard hats and helmet, 11 workers representing 11.3% used hoisting equipment, nine workers representing 9.3% used rain gear, eight workers representing 8.2% used ladder scaffold platforms, six workers representing 6.2% wore gloves and safety signs were provided. Meanwhile, five workers representing 5.2% said that they have hearing protection while two workers, representing 2.1% were wearing knee pads.

Studies of construction accidents, indicated that many accidents on construction sites could be prevented by taking appropriate steps in all phases of the project life. Thus, participants in a project have a role to play in improving the health and safety performance of construction sites and completed projects. Current situation on health and safety in cement manufacturing company puts emphasis on integrating health and safety management into the entire cement production process.

Table 4.3: Health and Safety Issues

<i>Provision of health equipment</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Total</i>
	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>		<i>n(%)</i>
Safe drinking water	61 (62.9)	20 (20.6)	8 (8.2)	8 (8.2)		97 (100)
Water for washing and cooking	69 (71.1)	21 (21.6)	7 (7.2)	0	0	97 (100)
Suitable accommodation to rest	52 (53.6)	34 (35.1)	11 (11.3)	0	0	97 (100)
Catering service	78 (80.4)	8 (8.2)	11 (11.3)	0	0	97 (100)
Sanitary facilities (toilets, showers, changing rooms)	55 (56.7)	37 (38.1)	5 (5.2)	0	0	97 (100)
Accommodation to change and store clothing	63 (64.9)	25 (25.8)	9 (9.3)	0	0	97 (100)
First-aid equipment	73 (75.3)	9 (9.3)	15 (15.5)	0	0	97 (100)

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

N=97, Field survey, 2018

Table 4.3 indicates that 61 workers representing 62.9% strongly agree that management provided safe drinking water, 20 workers representing 20.6% agreed, while eight workers representing 8.2% disagreed and were neutral respectively. To add more, 69 workers representing 71.1% strongly agreed that management provided water for washing and cooking, 21 workers representing 21.6% agreed, while seven workers representing 7.2% were neutral. Moreover, 52 workers representing 53.6% strongly agreed that management provided suitable accommodation to rest, 34 workers representing 35.1% agreed, while 11 workers representing 11.3% were neutral. Furthermore, 78 workers representing 80.4% revealed that management provided catering services to feed staff, 11 workers representing 11.3% were neutral, while 8 workers representing 8.2% agreed. Moreover, 55 workers

representing 56.7% strongly agreed that management provided sanitary facilities (toilets, showers, changing rooms), 37 workers representing 38.1% agreed, while five workers representing 5.2% were neutral. Also, 63 workers representing 64.9% strongly agreed that management provided accommodation to change and store clothing, 25 workers representing 25.8% agreed, while nine workers representing 9.3% were neutral.

The study results indicates that 73 workers representing 75.3% strongly agreed that management provided first-aid equipments, 15 workers representing 15.5% were neutral, while nine workers representing 9.3% agreed.

In response, health and safety legislation has been developed to ensure management of construction businesses, and recently many other participants in a project, assume responsibility for managing the risks associated with construction projects. Health and safety management in the cement / construction industry has evolved from measures adopted in accident prevention to more systematic and proactive approaches to minimizing the risk of hazards in the industry. Past research has shown certain practices can lead to improved health and safety performance and therefore constitute good health and safety practices.

Table 4.4: Awareness of Occupational Health and Safety Issues

<i>Health and safety issues</i>	<i>Very Important</i>	<i>Important</i>	<i>Neutral</i>	<i>Not Important</i>	<i>Not Very Important</i>	<i>Total</i>
	<i>t</i> <i>n(%)</i>	<i>t</i> <i>n(%)</i>	<i>n(%)</i>	<i>t</i> <i>n(%)</i>	<i>t</i> <i>n(%)</i>	<i>n(%)</i>
Have knowledge of your right on health issues as a worker.	57 (58.8)	26 (26.8)	14 (14.4)	0	0	97 (100)
Request for safety	61	25	11	0	0	97

gadgets before work starts.	(62.9)	(25.8)	(11.3)			(100)
Workers use safety equipment issued them.	66 (68)	23 (23.7)	8 (8.2)	0	0	97 (100)
Safety personnel on site to check the usage of safety equipment.	60 (61.9)	31 (32)	6 (6.2)	0	0	97 (100)
Have training on health and safety issues.	22 (22.7)	58 (59.8)	17 (17.5)	0	0	97 (100)
Training impacts on the lives of workers.	58 (59.8)	22 (22.7)	17 (17.5)	0	0	97 (100)
First aid promptly administered when accident occurs.	68 (70.1)	22 (22.7)	7 (7.2)	0	0	97 (100)
Have understanding of warning signs at the workplace.	38 (39.2)	48 (49.5)	11 (11.3)	0	0	97 (100)

N=97, Field survey, 2018

Table 4.4 revealed that, 57 workers representing 58.8% indicated that it is very important for workers to acquire knowledge of their right on health issues as a worker, 26 workers representing 26.8% said that it is important, while 14 workers representing 14.4% were neutral. To add more, 61 workers representing 62.9% said that it is very important to request for safety gadgets before work starts, 25 workers representing 25.8% said that it is important, while 11 workers representing 11.3% were neutral. Moreover, 66 workers

representing 68% indicated that it is very important for workers to use safety equipment issued them, 23 workers representing 23.7% said that it is important, while eight workers representing 8.2% were neutral. Furthermore, 60 workers representing 61.9% indicated that it is very important for safety personnel on site to check the usage of safety equipment, 31 workers representing 32% said that it is important, while 6 workers representing 6.2% were neutral. To add more, 58 workers representing 59.8% revealed that it is important to acquire training on health and safety issues, 22 workers representing 22.7% said that it is very important, while 17 workers representing 17.5% were neutral. The study results indicate that 68 workers representing 70.1% said that it is very important to administer first-aid promptly when accident occurs, 22 workers representing 22.7% said that it is important, while 7 workers representing 7.2% were neutral. Moreover, 48 workers representing 49.5% indicated that it is important to understand warning signs at the workplace, 38 workers representing 39.2% affirmed that it is very important, while 11 workers representing 11.3% were neutral.

These results are in agreement with Ngowi and Mselle (1999), they indicated that certain practices of the industry are a disincentive to the effective management of health and safety. Ngowi and Mselle (1999), observe that cement producers and contractors in developing countries gain little competitive advantage from good health and safety management which, in turn, affects their health and safety. Many workers in developing countries are barely literate. Wilson & Koehn (2000), have stressed that a key barrier to health and safety management is the difficulty in training illiterate workers. High poverty levels compel workers to accept work in unacceptable high risk situations without complaining or demanding their employers put in place health and safety measures. Mitullah and Wachira (2003), have observed that workers, particularly in the informal sector in a developing country such as Kenya, are accorded little health and safety

protection. These workers, according to the authors, do not belong to any form of union making it difficult for them to compel their employers to adhere to good labour standards. The abundance of cheap labour in developing countries means employers can dismiss site workers who perform unsatisfactorily and also replace them with new workers easily. This has been argued by Koehn and Reddy (1999), to cause site workers to often take risks on the job, leading to serious accidents on site. The production process in developing countries is labour intensive, a characteristic which favours the establishment and growth of SMEs in many sectors in developing countries. It is arguable whether managers have the experience and skill in labour intensive technologies. Most owner/managers start businesses in pursuit of autonomy and as a secondary reason, to provide income for their families. This, therefore, brings into doubt their ability to manage the risks of hazards associated with labour intensive methods.

Table 4.5: Consequence of Poor Working Environment

<i>Working environment</i>	<i>SA</i> <i>n(%)</i>	<i>A</i> <i>n(%)</i>	<i>N</i> <i>n(%)</i>	<i>D</i>	<i>SD</i>	<i>Total</i> <i>n(%)</i>
Workers in every occupation can be faced with a multitude of hazards in a work place	41 (42.3)	51 (52.6)	5 (5.2)	0	0	97 (100)
Cement factory workers' work place is mostly indoors/ outdoors	62 (63.9)	30 (30.9)	5 (5.2)	0	0	97 (100)
Working indoors/ outdoors can pose many health and safety hazards	56 (57.7)	30 (30.9)	11 (11.3)	0	0	97 (100)
Poor working conditions can affect the environment workers live in.	55 (56.7)	38 (39.2)	4 (4.1)	0	0	97 (100)
Harmful effects on workers can affect their families and other people around them	60 (61.9)	28 (28.9)	9 (9.3)	0	0	97 (100)

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

N=97, Field survey, 2018

Table 4.5 revealed that 51 workers representing 52.6% agreed that workers in every occupation can be faced with a multitude of hazards in a work place, 41 workers representing 42.3% strongly agreed, while five workers representing 5.2% were neutral. Moreover, 62 workers representing 63.9% strongly agreed that cement factory workers' work place is mostly indoors/ outdoors, 30 workers representing 30.9% agreed, while five workers representing 5.2% were neutral. Furthermore, 56 workers representing 57.7% strongly agreed that working indoors/ outdoors can pose many health and safety hazards, 30 workers representing 30.9% agreed, while 11 workers representing 11.3% were neutral. The study results indicate that 55 workers representing 56.7% strongly agreed that poor working conditions can affect the environment workers live in, 38 workers representing 39.2% agreed, while four workers representing 4.1% were neutral. Moreover, 60 workers representing 61.9% strongly agreed that harmful effects on workers can affect their families and other people around them, 28 workers representing 28.9% agreed, while nine workers representing 9.3% were neutral.

These results are in agreement with Environmental Health and Safety Management (2009), which explains that some of the diseases do not emanate on the workers' health quickly as expected. When the diseases finally manifest it is often difficult to trace the root causes to the workers' past exposure (El-Sobky, 2008). The International Labour Organisation (ILO) observed in 2008, that more than two million workers die each year from work-related accidents and diseases, and added that this is probably an underestimation. The ILO estimates that workers suffer 270 million accidents and at least 335 000 fatal injuries annually, while avoidable occupational diseases affect 160 million people every year. The results of a study by (McCann and Babin 2007), show a need for good dilution ventilation and additional protective gear such as goggles and NIOSH-approved toxic dust masks for workers in the chemical industry. This is very important for the cement chemical section;

as such masks will protect the workers from hazardous toxic materials. Many cement factories around the globe are re-examining their factory operations in a fundamental way. Many health and safety legislative and regulatory frameworks specify, in clear terms, how the employer must address any given condition. Taylor (2003), explained that the standards and regulations tend to support the traditional command-and-control, deemed to comply or prescriptive approach of addressing unsafe situations as well as existing and potential hazards, while ignoring the responsibility of the employer in addressing unsafe worker behaviour, cement Factories have started making significant changes to their policies and commitments to health and safety strategies to improve the sustainability of cement production, providing and enforcing prescriptive rules and procedures that promote the safe behaviour of workers (Haupt, et al, 2001).

Table 4.6: Role of Environmental Protection Agency (EPA)

ITEM	SA n(%)	A n(%)	N n(%)	D	SD	Total n(%)
Company has been certified by EPA	33 (34)	56 (57.7)	8 (8.2)	0	0	97 (100)
EPA pays routine visits to the company's workplace.	34 (35.1)	46 (47.4)	17 (17.5)	0	0	97 (100)
EPA offers training to employees on health safety issues.	17 (17.5)	76 (78.4)	4 (4.1)	0	0	97 (100)
Workers report concern issues to EPA.	14 (14.4)	63 (64.9)	20 (20.6)	0	0	97 (100)
EPA responds promptly to concerns.	34 (35.1)	55 (56.7)	8 (8.2)	0	0	97 (100)

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

N=97, Field survey, 2018

Table 4.6 revealed that 56 workers representing 57.7% agreed that the company has been certified by EPA, 33 workers representing 34% agreed, while eight workers representing 8.2% were neutral. Moreover, 46 workers representing 47.4% agreed that EPA pays routine visits to the company's workplace, 34 workers representing 35.1% strongly agreed, while 17 workers representing 17.5% were neutral. To add more, 76 workers representing 78.4% agreed that EPA offers training to employees on health safety issues, 17 workers representing 17.5% strongly agreed, while 4 workers representing 4.1% were neutral. Moreover, 63 workers representing 64.9% agreed that workers report concern issues to EPA, 20 workers representing 20.6% were neutral, while 14 workers representing 14.4% strongly agreed. To add more, 55 workers representing 56.7% agreed that EPA responds promptly to concerns, 34 workers representing 35.1% strongly agreed, while eight workers representing 8.2% were neutral.

Health and safety management is a challenge to governments as well as owners of businesses. The business environment is one which may be described as harsh and unpredictable such that any attempt at implementing management interventions without taking it into account is bound to fail. Regulatory systems and institutions in many developing countries have been inherited from developed countries. Furthermore, in many of these countries, such regulations have not been updated to reflect their current level of development and cultural milieus. Health and safety regulations are incomprehensive and limited in coverage (Suazo and Jaselskis 1993).

4.3 Results of the Interview from Management

This section analysed the interview from management of Aflao Diamond Cement Factory. Twenty management staff were interviewed at the Aflao Diamond Cement Factory. The analysis of the outcome of the interview is analysed below;

“Majority of the management staff said that the cement factory provided safety equipment like safety boots, safety glasses, goggles, face shields, nose masks, hard hats and helmet, hoisting equipment, rain gear, ladder scaffold platforms, gloves and safety signs as well as hearing protection equipment and knee pads were provided. Adding that “these equipment were provided to protect workers from injury and harm”.

Furthermore, most of the management staff revealed that “the Aflao Diamond Cement factory have quality health care services provided at the company clinic to ensure the welfare of the workers”. Adding that workers injured while on duty receive emergency treatment at the clinic and if severe injuries occur, workers are referred to major hospitals and the factory pays the cost of workers medical treatments”

“Majority of the management staff indicated that the cement factory provided safety training and education programmes to enhance workers expertise and safety management skills to ensure that workers are able to work independently or less supervision and minimise accidents at the workplace. Others revealed that ttraining is provided on the use of new equipment or technology in the workplace”

Finally, most of the management staff interviewed revealed that annually safety audits and inspections are carried out to identify risks and hazards at the cement factory. Adding that fighters and marshals have been t rained to respond to fire outbreaks in the company premises and all accidents occurring at the workplace are investigated within specified time-lines.

4.4 Results of the Interview from the Residents of the Area

This section analysed the interview from the people staying closer to the Aflao Diamond Cement Factory. Forty five residents were interviewed at the Aflao Diamond Cement Factory. The analysis of the outcome of the interview is analysed below;

Most of the people living closer to the factory cried that cement dust is causing a lot of harm to their health as they always inhale cement dust from the factory. The people of Aflao in Ketu South Municipality of the Volta Region, accused Diamond Cement Factory (Ghana) Limited of environmental pollution in the area. Moreover, they cautioned the management and the workers of the factory to adopt the best safety practices in order to avoid environmental pollution and degradation as well as workers being injured or killed by any of the processing machines.

“Most of the residents indicated that the factory management reacted to fresh complaints of cement dust pollution and noise in the community around the factory, said the company had remained 100 percent responsive to safety and health regulations of the Environmental Protection Agency (EPA) of Ghana and other international organisations. Adding that the company had installed highly efficient and high volume cement dust samplers within the plant to suck and suppress dust emissions, claiming cement dust levels were below limits permissible by EPA. To add more, they said that the factory would construct what they called a green belt around the factory to mop dust emissions”. Most residents also said that the company had since resettled about six households, thought to be too near or close to the factory at the cost of fifty thousand Ghana Cedis (GHS50.000). Meanwhile, some of the residents complained that the management of the factory is not doing much to minimise their suffering hence, they have been agitating for more compensations from the company.

4.5 Results of Observation

4.5.1 Results of observation at Aflao Diamond Cement Factory Limited

The researcher visited Aflao Diamond Cement Factory Limited and critically observed how workers performed their duties and their compliance to health and safety issues like

wearing of gloves, helmets, nose mask, goggles and safety boots. The researcher observed the workers at the Aflao Diamond cement factory as they work with their protective equipment on to protect them from injury.



Figure 4.2: A Worker with a Hard Hat on his Head Working at the Factory

Figure 4.2: A worker at the Aflao Diamond Cement Factory working with his protective helmet to protect his head from injury and nose mask on to avoid inhaling cement particles. This observation contradicts with Ngowi and Mselle (1999), they stressed that the culture of the construction industry in developing countries does not promote health and safety. Certain practices of the industry are a disincentive to the effective management of health and safety. Ngowi and Mselle (1999), observe that cement producers and contractors in developing countries gain little competitive advantage from good health and safety management which, in turn, affects their health and safety. Many workers in developing countries are barely literate.



Figure 4.3: Workers Working at the Factory with the Stout Boots and Helmets

Figure 4.3: Workers working at factory with their protective boots on and helmets for protection. Koehn et al. (2000), have stressed that a key barrier to health and safety management is the difficulty in training illiterate workers. High poverty levels compel workers to accept work in unacceptable high risk situations without complaining or demanding their employers put in place health and safety measures.



Figure 4.4 Some Workers Working in the Mills with few Safety Protective Equipment

Figure 4.4 shows workers working at the factory mills with their protective equipment on to protective them from injury. Lingard and Rowlinson (2005), have shown the significance of these influences on proactive health and safety management in the cement construction industry.



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter contains the summary of findings, conclusions, and recommendations.

5.2 Summary of Findings

- The study revealed that workers at the Aflao Diamond Cement Factory were not provided with enough safety boots, safety glasses, goggles, face shields, hard hats and helmets, hoisting equipment, rain gears, ladder scaffold platforms, gloves and safety signs, hearing protection, knee pads and first-aid equipment.
- The study indicated that workers had no or little knowledge of their right on health and safety issues and they were reluctant to request for safety gadgets before work starts.
- The study also revealed that workers used safety protective equipment issued them when safety personnel were on site to carry out inspections. This means that in absence of safety personnel, majority of the workers did not use safety protective equipment.
- The study revealed that casual labourers and workers had little or no knowledge on health and safety issues concerning administering first-aid promptly when accident occurs.
- The study showed that most of the workers, more especially, the casual ones did not understand warning signs at the workplace while some sites too did not have the warning signs.

- The study indicated that poor working conditions affected the environment in which the workers live in and these have adverse effects on workers and their families and other people around them.
- The study showed that EPA pays routine visits to the company's workplace, by advance notice to the management before the visit but offer little training to employees on health and safety issues.

5.3 Conclusion

The study results concluded that the workers respected all the rules and regulations governing the factory and that accidents are reported immediately to supervisor/foreman, and prior to leaving the workplace. Furthermore, all workers have proof of training indicating that they are trained in good health and safety practices, workers wore appropriate protective clothing and equipment when and where required. Moreover, workers performed all work following safe work practices and safe job procedures, workers are informed about risks associated with their work and how to prevent accidents through written circulars and meetings, workers maintained good housekeeping, no fighting or horseplay is permitted at the workplace, no theft or vandalism are tolerated at the factory, and no possession or consumption of alcohol or illegal drugs is permitted while at the factory.

Moreover, accidents and incidents are reported, investigated, analyzed and recorded and all workers were required to wear protective clothes and equipment to ensure safety at the factory.

5.4 Recommendations

The study recommended the following to address the findings:

1. The Management of the the Aflao Diamond Cement Factory should from time to time organize safety training and development programmes to educate employees on the importance of wearing protective equipment to improve employee's safety and health at the workplace.
2. The Management of the Aflao Diamond Cement Factory has to continue to provide adequate safety equipment to enhance employee's safety and health on site.
3. Accidents and incidents at workplace should be reported, investigated, analyzed and recorded to improve safety policies at all times.
4. Workers at the Aflao Diamond Cement Factory should be informed about risks associated with their work and how to prevent accidents through on- job training and regular workshops and meetings to prevent accidents.

5.5 Suggestions for Further Research

Based on the limitations of the study, the researcher suggested that a similar study should be conducted to investigate the impact of training and development on employee's safety at the Aflao Diamond Cement Factory.

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APPENDIX 1

ASSESSMENT ON HEALTH AND SAFETY ISSUES OF WORKERS

QUESTIONNAIRE FOR WORKERS

ASSESSING THE IMPACT OF OCCUPATIONAL HEALTH AND SAFETY NEEDS ON THE LIVES OF WORKERS AT AFLAO DIAMOND CEMENT FACTORY LIMITED (ADCFL)

Dear Sir/Madam,

This questionnaire forms part of M-TECH research project which aims to assess the impact of occupational health and safety needs on the lives of workers at Aflao Diamond Cement Factory Limited (ADCFL), for the purpose of highlighting the critical issues affecting the overall welfare and safety of workers in working place on sites. It is expected that this research will help to improve the conditions of these workers on sites and protect the rights. I would like to invite you to participate in the above project. Completion of the questionnaire is completely voluntary and returning the completed questionnaire will be considered as your consent to participate in the survey. The questionnaire will take you about 5 minutes to complete. I appreciate that you are already busy and that participating in this survey will be another task to add to a busy schedule, but by contributing you will be providing important information. **All data held are purely for research purposes and will be treated as strictly confidential.** If you wish to receive feedback on the research findings, please complete the slip below and return it together with your questionnaire. In the event of questions or queries, please do not hesitate to contact us. Thank you for your time and valid contribution in advance.

A. PERSONAL / COMPANY'S DETAILS

1. What is your gender?

Male Female

2. Please Tick to indicate your position in the company.

a. Operator

b. Project Manager

b. Site Engineer

d. Site Foreman

Others please specify _____

3. Tick to indicate your educational level

a. MSLC

b. BECE

c. GCE

d. WASCE

e. HND

f. Technician (CTC I,II and III)

g. DEGREE MASTERS

Others please specify _____

4. Tick to indicate how long you have been involved in the building construction industry

a. Over 20 years

b. 16-20 years

c. 11- 15 years

d. 6-10 years

e. Up to 5 years



A. SAFETY ITEMS OR EQUIPMENT

There is general assertion that management does not provide the safety items or personal equipment(PPE) on working site or work places for workers. Please indicate your reaction to each statement by ticking the cell or box.

5. There is Provision of Safety equipment	SA	A	N	D	SD
Safety signs					
Hard hats or helmet					
Safety glasses, goggles, and face shields					
Safety boots					
Rain gear					
Hearing protection					
Knee pads					
Gloves					
Safety nets					
Flashlights					
Ladder Scaffold platforms					
Hoisting equipment					

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

B. HEALTH AND SAFETY ISSUES

There is general assertion that management do not provide the necessary health related facility on work site workers. Please indicate your reaction to each statement by ticking the appropriate cell.

Provision of health equipment	SA	A	N	D	SD
6. Safe drinking water					
7. Means of heating food					
8. Water for washing and cooking					
9. Suitable accommodation to rest					
10 Catering service					
11.Sanitary facilities (toilets, showers, changing rooms)					
12.Accommodation to change and store clothing					
13.First-aid equipment					

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

C. AWARENESS OF OCCUPATIONAL HEALTH AND SAFETY ISSUES

Please in a scale of Very important to Not very important, indicate the extent to which the following statements influence your health and safety issues on construction site. Please

Tick [] the appropriate cell

Health and safety issues	Very Important	Important	Neutral	Not Important	Not Very Important
14. Have knowledge of your right on health issues as a worker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Request for safety gadgets before work starts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Workers use safety equipment issued them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Safety personnel on site to check the usage of safety equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Have training on health and safety issues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Training impacts on the lives of workers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. First aid promptly administered when accident occurs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Have no understanding of warning signs at the workplace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. CONSEQUENCE OF POOR WORKING ENVIRONMENT

There is an assertion that most contractors work in a poor environment. Please indicate your reaction to each statement by ticking the appropriate cell

Working environment	SA	A	N	D	SD
22. Workers in every occupation can be faced with a multitude of hazards in a work place					
23. Cement factory workers' work place is mostly indoors/ outdoors					
24. Working indoors/ outdoors can pose many health and safety hazards					
25. Poor working conditions can affect the environment workers live in.					
26. Harmful effects on workers can affect their families and other people around them					

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

E. ROLE OF ENVIRONMENTAL PROTECTION AGENCY

There is a law in Ghana that mandates the Environmental Protection Agency to ensure that construction workers work in a safe and healthy environment. Please indicate your reaction to each statement by ticking the appropriate cell.

ITEM	SA	A	N	D	SD
27. Company has been certified by EPA					
28. EPA pays routine visits to the company's workplace.					
29. EPA offers training to employees on health safety issues.					
30. EPA protects the lives of workers.					
31. Workers report concern issues to EPA.					
32. EPA responds promptly to concerns.					

SD-Strongly disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly agree

APPENDIX B

**INTERVIEW GUIDE FOR MANAGEMENT OF AFLAO DIAMOND CEMENT
FACTORY**

**ASSESSING THE IMPACT OF OCCUPATIONAL HEALTH AND SAFETY
NEEDS ON THE LIVES OF WORKERS AT AFLAO DIAMOND CEMENT
FACTORY LIMITED (ADCFL)**

Dear Sir/Madam,

This interview guide forms part of M-TECH research project which aims to assess the impact of occupational health and safety needs on the lives of workers at Aflao Diamond Cement Factory Limited (ADCFL), for the purpose of highlighting the critical issues affecting the overall welfare and safety of workers in working place on sites. It is expected that this research will help to improve the conditions of these workers on sites and protect the rights. I would like to invite you to participate in the above project. Answering this interview guide is voluntary. Answering this interview will take you about 5 minutes to complete. I appreciate that you are already busy and that participating in this survey will be another task to add to a busy schedule, but by contributing you will be providing important information. **All data held are purely for research purposes and will be treated as strictly confidential.** Thank you for your time and valid contribution in advance.

What are the health and safety practice issues of the Aflao Diamond Cement Factory?

Do you have quality health care services provided at the company clinic?

.....

Do workers injured while on duty receive emergency treatment at the clinic?

.....

Do new employees undergo proper medical employees?

.....

Do you have annual medical checkup for all employees?

.....

Do you have high levels of sanitation in the workplace?

.....

What are the factors contributing to the poor health and safety practices?

.....

.....

.....

What are the strategies to ensure effective health and safety practices of the factory.

.....

SAFETY TRAINING AND EDUCATION

Do you provide training during change of jobs or transfer to a new job?

.....

Do you provide quality safety information during safety training?

.....

Are the employees able to apply new skills and knowledge acquired during safety training?

.....

Training is provided on the use of new equip mentor technology in my workplace

.....

Do employees undergo refresher training on safety?

.....

ACCIDENT PREVENTION MEASURES

The working equipment and tools in my work place are safe

.....

Employees are provided with personal protective equipment

.....

Safety audits and inspections are carried out to identify risks and hazards at my workplace

.....

Fire fighters and marshals have been trained to respond to fire outbreaks in the company

Premises

.....

All accidents occurring at the workplace are investigated within specified timelines

.....



APPENDIX C

INTERVIEW GUIDE FOR RESIDENTS

What are the health and safety practice issues of the Aflao Diamond Cement Factory?

.....

.....

.....

What are the factors contributing to the poor health and safety practices.

.....

.....

.....

What are the strategies to ensure effective health and safety practices of the factory.

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.....

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