UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

AN EMPIRICAL EXAMINATION OF UNDER-REPORTING OF OCCUPATIONAL HEALTH AND SAFETY ACCIDENTS IN THE CONSTRUCTION SECTOR IN GHANA

CLIFFORD DARIMAANI

2019

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

AN EMPIRICAL EXAMINATION OF UNDER-REPORTING OF OCCUPATIONAL HEALTH AND SAFETY ACCIDENTS IN THE CONSTRUCTION SECTOR IN GHANA

CLIFFORD DARIMAANI

(8171760035)

A Thesis in the Department of CONSTRUCTION AND WOOD TECHNOLOGY EDUCATION, 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 Philosophy (Construction Technology) degree.

JULY, 2019

DECLARATION

STUDENT'S DECLARATION

I, CLIFFORD DARIMAANI, declare that this thesis, with the exception of quotations and references contained in 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 another degree elsewhere.

SIGNATURE:…….....

DATE:……..……..……

SUPERVISOR'S DECLARATION

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

NAME: Dr. Nongiba Alkanam Kheni

SIGNATURE……..

DATE…….

ACKNOWLEDGEMENTS

I wish to first of all thank God for protecting and guiding me throughout this programme of study. My sincere thanks and appreciation go to my supervisor Dr. Nongiba Alkanam Kheni of the University of Winneba, Kumasi Campus for his immense contribution, professional and personal invaluable guidance, and endless encouragement. His criticisms, suggestions, insight comments and advice contributed immensely to the final outcome of this study. Indeed, he taught me how to be a better researcher, a better student, and mostly a better person. I am also grateful to all the lecturers in the Department of Design and Technology Education, University of Education, Winneba, Kumasi campus for their criticisms and suggestions which shaped this work.

My indebtedness goes to all the respondents that responded to the questionnaire and interview. Without their co-operation, this work would have been difficult to accomplish. They all received me with the greatest friendliness and gave me not only hospitality but also many hours of their valuable time. I am also indebted to the many intellectuals whose works provided valuable scholarly contributions to the successful completion of this piece of work.

I owe lots of gratitude to my siblings, Cornelia Darimaani, Felix Darimaani, Florence Darimaani, Hilda Darimaani and Linus Darimaani for their financial and moral support offered for this study, the almighty God richly bless you.

Finally, I also wish to thank all my friends and course mates for their support, constructive criticisms and encouragement during the period of study.

DEDICATION

I dedicate this thesis to my wife, Josephine Kuusunnang and my pretty children, Queenster, Queendaline, and Queenna for their inspiring support, prayers, love and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Globally, governments have a shared responsibility for the management of occupational health and safety (OHS). In recognition of this responsibility, governments enact OHS laws with the prime objective of controlling occupational health and safety risks. The aim of the study was to explore under-reporting of OHS accidents by employees and employers in the construction industry in Ghana. The study adopted a cross-sectional survey design with a mixed methods research strategy involving the administration of questionnaires and semi-structured interviews. A sample size of 250 involving site managers and operatives was used. Descriptive statistics, and LISREL factor analysis and multiple linear regression were used. The findings revealed that, job security, workers' attitude, education and training, blame culture, interpersonal relationships, poor safety culture, lack of management commitment, poor communication, and company's goal contribute significantly to under-reporting of OHS accidents within the construction firms. Their mean scores exceeded the significant mean level of 4.0. The study also identified education and training, environment, politics/government, legal/regulations and socio-cultural practices as factors that influence under-reporting of accidents on construction sites to statutory authorities. Their mean scores were greater than the significant mean level of 4.0. It was established that temporary employment, lack of financial and management resources, lack of knowledge of health and safety issues, lack of human resource personnel, bureaucratic procedures, poor safety culture of companies, language barrier, and workload of workers are critical constraints to reporting of accidents. The study recommends that management of construction firms should always organise safety inductions, training and performance programmes for operatives, particularly casual and temporary workforce.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The construction sector plays an important role in the achievement of socio-economic development goals in many countries across the globe. It is seen as one of the largest sectors that drives economic growth in the world, contributing 6% of global GDP (Shakil, Habibur & Ikramul, 2018; Wef, 2016). According to Khan (2008), the sector and its activities are considered to be one of the major sources of economic growth and development. Ameh and Odusami (2010) indicate that the sector comprises a group of heterogeneous and fragmented firms with great diversity of activities. A large construction company may be engaged in activities ranging from general building and civil engineering to material manufacturing, property development, material supply, plant hiring and trade specialization. The activities in the sector often offer varied job opportunities to many categories of workforce, including the unskilled, semi-skilled and skilled workforce thereby uplifting economic development.

Despite the significant contribution of the construction sector to the socio-economic development of many nations, the sector is saddled with many risk factors which have consequential effects on the health and safety of the workers on construction site. According to Fang and Wu (2013), because of the complexity and unique nature of the construction sector, it is considered one of the most hazardous sectors. Cheah (2007) adds that the sector is highly fragmented, and therefore marginalizes efforts to safeguard safety

and health standards. In the view of Popov, Lyon and Hollcroft (2016), construction workers are mostly exposed to serious hazards, such as falling from rooftops, encountering unguarded machinery, and being struck by heavy construction equipment. Kheni (2008) enumerates that, the frequently encountered hazards in the construction sector are dangerous chemicals, dust, exposure to vibration, high noise levels, manual lifting of heavy weights, unguarded openings, ionizing radiations, fire; exposure to live cables, and, moving mobile construction plant on site.

The International Labour Organisation (ILO) (2012) asserts that the construction sector consists of high self-employed workers, and large number of seasonal and migrant workers; many of them are unfamiliar with construction processes. These workers involve in many different trades and occupations and are mostly exposed to bad weather.

Global estimates by the ILO (2010:2012) show that occupational health and safety (OHS) problems in the construction sector are more extensive than previously recorded. Universally, poor performance in the sector accounts for more than 100,000 fatalities annually, equating to approximately 30-40% of the world's work-related fatal injuries (Jill & John 2010). Kheni (2008) citing ILO (2005) acknowledged that 25–40% of fatalities in the world's occupational settings are contributed by construction. A large body of evidence indicates that illnesses, traumatic injuries, and fatalities are more prevalent among workers in the construction sector than in other occupational groups (Probst, Brubaker, & Barsotti, 2008). These fatalities, according to Suhair, Julie and Anil (2013) have great effect on the mental health of victims as well as others who witnessed the incident. ILO (2010)

highlights that, the protection of the worker against sickness, diseases and injury arising out of employment is fundamental element of social justice.

In realizing the health and safety hazards that the construction sector and other workplaces pose on workers, concerns have been raised by international community to deal with all forms of OHS accidents. Consequently, the ILO standards and Conventions on OHS, and other OHS legislation and regulation setting have been passed. The OHS convention (1981, no.155), and its accompanying recommendation (no. 164) provide for guidance on national system of recording and notification of OHS accidents. The convention is complemented by protocol 2002 (no.155) and list of OHS accidents and diseases recommendation 2002 (no. 194). The protocol incorporates further provisions on the establishment and periodic review of requirements and procedures for recording and notification of OHS accidents and diseases, and for the publication of related annual statistics (World Day for Safety and Health at Work, 2015). According to the Health and Safety Executive (2005), the OHS Management System, International Standard Organisation (ISO) 45001, is also international standard that provides a framework for organizations to manage risks and opportunities to help prevent work-related injury and ill health to workers. The ISO 45001 follows the high-level structure approach that is being applied to other ISO management system standards, such as ISO 9001 (quality) and ISO 14001 (environment).

In line with these standards, conventions and protocols on OHS, ILO (2010) indicates that all countries are expected to develop OHS guidelines for their organisations, and form departments to handle OHS issues. Consequently, Chileshe and Dzisi (2012) indicate that, various departments and agencies are formed in some of the developed countries to gather

data and deal with OHS accidents. For example, the European Commission's Senior Labour Inspectors' Department, the United States (US) Bureau of Labour Statistics Department, US OSH Association, the United Kingdom (UK) Health and Safety Executive (HSE) Office or Department, UK Institute of Occupational Safety and Health (IOSH) and the Royal Society for the Prevention of Accidents (ROSPA), New Zealand Occupational Health Service Department, American Occupational Safety and Health Association, Japanese Industrial Safety and Health Department and others.

The formations of these departments enable data to be collected and analyse on OHS accidents. For example, the US Bureau of Labour Statistics (2015) indicates that the construction sector shared 19% of the nation's work-related deaths. The statistics from the Great Britain Health and Safety Executive Department (2018) indicates that about 38% of OHS accidents come from the construction sector. Again, the US Occupational Safety and Health Association (OSHA) (2016) indicates that the US has a reported fatality of 4379 of which 21.4% were from the construction sector. All these data are obtained as a result of the fact that every construction firm has an employee representative and OHS officer who reports OHS accidents to the appropriate statutory Departments for documentation.

In joining the ILO crusade against OHS, Ghana also put in place legislations to deal with OHS issues. The legislative acts that protect the health and safety of workers include Labour Act, 2003, Act 651 and Factories, Shops and Offices Act 1970, Act 328. The Labour Act makes it obligatory for the employer to "ensure that every worker employed in Ghana works under satisfactory, safe and healthy conditions" (Labour Act, 2003 Act 651, Article 118:1). According to Kheni (2008), other bodies which actively influence OHS and

welfare include employers' associations, trade unions, clients, financiers, and end users. The Factory Inspectorate Department has sole responsibility for OHS. Other public departments and agencies with some health and safety responsibilities include the Labour Department, the Environmental Protection Agency (EPA), Occupational Health Services Unit, and the Attorney General's Department.

Though Ghana has some legislation on OHS, Danso (2010) indicates that there are no OHS regulations developed specifically for the construction sector. Considering the high-risk nature of the sector, Fugar (2009) is of the opinion that, this limitation seriously handicaps the implementation of OHS standards on construction sites. Fugar (2009) indicates that most of the construction firms do not have Human Resource Management (HRM) departments, safety department, safety representative from the government and other safety personnel to deal with accidents on sites. Kheni (2008) establishes that, owners or managers of most construction firms have little or no knowledge of the legal frame work governing OHS and as such Danso (2010) says that most firms in the construction sector in Ghana do not have safety guidelines.

Consequently, the construction firms either fail to report accidents cases or under-report accident cases to the statutory authority (Dong, Fujimoto, Ringen, Stafford, Platner, Gittleman, & Wang, 2011). African Newsletter (2013) reports that the construction sector exhibits the poorest record keeping of OHS, with huge financial and human costs. The factors that account for this low reporting or under-reporting of accidents in the construction sector needs to be unearth for proper record keeping of construction related accidents in the country and for proper policy to be developed to improve the health and

safety of workers on construction sites. Therefore, it is believed that if a study of this kind is undertaken, the factors that influence under-reporting of OHS accidents in the construction sector in the country will be identified and acknowledged for the development of a proper framework on OHS to guide employees on construction sites.

1.2 Problem Statement

The prevalence of OHS issues in most of the African countries is due to inadequate attention given to OHS by industry and the government (Bill & Samuel, 2012). In the study of Obeid (2015), OHS is a continual global problem, and that everyday new OHS risks arise due to new production methods, machinery and construction technology. These oftentimes require special and well-trained workforce. However, in Ghana and in most Africa countries, contractors rely on temporary workforce to complete a construction project. Although proper safety management in construction is of utmost importance, evidence in the study of Durdyev et al (2017) suggest that safety is not adequately considered in many developing countries.

Consequently, there is evidence in the studies of Hamalainen, Takala, and Leena (2007) and Chiocha et al (2011) that, there is scarcity of reliable information on occupational accidents in developing countries. Proper recording and notification systems on OHS are challenges. The Disease Control Priorities Project (2007) establishes that data for estimating non-fatal illness and injury are not available in most developing countries. Phoya (2012) also indicates that data on OHS accidents pertaining to construction works, communication and control in construction management is inadequate.

However, Hedlund (2013) indicates that effective recording and notification of occupational accidents are instrumental in the design of prevention interventions. ILO (1996) reports that, statistics on occupational accidents serve as a tool for measuring level of success in compliance, enforcement and preventive action. Accurate reporting of accidents in the construction sector is essential to monitor construction site health and safety, and to identify and develop the interventions that are needed most. The Commonwealth of Australia (2012), indicates that every country should have a national code of practice for induction for construction works. The code of practice should spell out in clear terms construction health and safety measures indicating reporting and recoding procedures of accidents.

In Ghana, the Ministry of Employment and Labour Relations (MELR) (2017) reports that, work accidents in 2016 numbered 1,096 with the Manufacturing Industry recording the highest (270). The Community, Social and Personal Services Industry recorded 242 work accidents being the second highest, with the Construction Industry recording 185 work accidents. The Mining and Quarry Industry recorded a decline, from 552 in 2015 to 53 in 2016. Out of the 1,096 cases reported, 241 work injuries cases were finalised with 855 of the cases outstanding. Relative to 2015, the number of cases reported reduced by 1,601. Just as the number of cases reported declined in 2016, the number of cases finalised, declined from 860 in 2015 to 241 in 2016. In relation to the above statistics, there is lack of empirical evidence to affirm that the decline in number of accidents reported and OHS cases finalized between 2015 and 2016 are due to effective OHS management interventions aimed at enhancing OHS performance and not as a result of a decline in accident reporting and laxity in enforcement activity by OHS regulatory institutions. Under-reporting of OHS

accidents to regulatory institutions remains a plausible factor in the disparity between the accident cases reported in 2015 and 2016. Exacerbating the issue of under-reporting is evidence suggesting that statistics on accidents are often highly inaccurate. Again, the statistics from the Factory Inspectorate Board of the Upper West and Upper East Regions from 2010- 2018 show no accident records, though there are empirical evidence of construction accidents in the regions. Durdyev, Omarov, and Ismail (2017) are of the view that, only major construction accidents are often reported but improperly documented. Insufficient number of reported construction occupational accidents, inadequate reporting and nondisclosure of construction occupational incidents remains limited in many developing countries including Ghana.

According to ILO (2012), statistics on occupational accidents and diseases are often incomplete because under-reporting is common and official reporting requirements frequently do not cover all categories of workers. Samson (2014), noted that the statistics on the number of occupational accidents and injuries reported to the Department of Factories Inspectorate in Accra from 2000-2013, is inaccurate due to under-reporting. Further, Samson (2014) asserts that, Ghana is struggling with reporting of OHS accidents to statutory authorities.

In the view of Samson (2014), most research in relation to the construction sector are often concentrated on risk management, OHS management and practices of construction firms, and perception on OHS issues. Apparently, few organisational and national research in developing countries, and for that matter Ghana focus on issues of under-reporting of OHS accidents to statutory authorities (Mustapha, Aigbavboa & Thwala, 2015). In the view of

Mustapha et al. (2015), accidents that occur in factories and industries are expected to be reported to the Department of Factory Inspectorate (DFI), but companies and individual employees hardly report such events to the inspectorate for investigation and correction. They further are of the view that, OHS Acts in most developing countries are not specific to whom accidents and occupational illnesses should be reported to.

The development of strategies for addressing issues of under-reporting of OHS accidents in developing countries would require concerted research effort of which few, if any such efforts exist presently. In recognition of this gap in the current literature on OHS management and administration in developing countries particularly Ghana, this project seeks to explore under-reporting OHS accidents by construction companies in Ghana which acknowledged that reporting of accidents is a dual communication issue; internal (from site operatives to management of company) and external (from management of construction company to OHS regulatory institutions).

1.3 Aim and Objectives of the Study

The aim of this study is to explore under-reporting of occupational accidents in the construction industry in Ghana. The specific objectives of the study are to:

- determine critical factors contributing to under-reporting of OHS accidents within construction firms in the construction sector in Ghana;
- determine critical factors contributing to under-reporting of OHS accidents on construction sites to statutory authorities in Ghana;

- determine critical constraints to reporting of OHS accidents in the construction sector in Ghana;
- determine the nature of the interaction between factors influencing under-reporting of accidents in the construction sector in Ghana; and,
- develop recommendations for improving the reporting of occupational accidents in the construction sector in Ghana.

1.4 Research Questions

Based on the aims and objectives of the study, the following research questions have been formulated to guide the conduct of the study.

- What critical factors influence under-reporting of OHS accidents within construction firms in the construction sector in Ghana?
- What critical factors influence under-reporting of OHS accidents on construction sites in Ghana?
- What are the critical constraints to reporting of OHS accidents in the construction sector in Ghana?
- How can the nature of the interaction between factors influencing under-reporting of OHS accidents in the construction sector in Ghana be explained?
- What recommendations will improve reporting of occupational accidents in the construction sector in Ghana?

1.5 Significance of the Study

The construction sector is saddled with many risk factors that cause health and safety fatalities and ill- health problems. Many of these accidents, fatalities or ill-health are under-reported to the appropriate authorities to fine-tune measures to address the reoccurrence of such accidents. The reason for this under-reporting of such accidents is what the study seeks to address.

It is hoped that the findings of the study will be informative for all actors on construction project management such as project supervisors, designers, project managers, construction managers, the procurement system, project investments, project insurances, project economics, institutional and regulatory bodies concerning the factors that influences under-reporting of OHS accidents on construction sites so that measures could be put in place to avert the occurrence of accidents on sites. The study intends to create a larger awareness of under-reporting and identify the critical factors influencing under-reporting of OHS accidents on construction sites and within construction firms in Ghana.

The study seeks to develop a framework that will improve OHS accidents reporting in the construction sector in Ghana. It will momentously contribute to development strategies and policy making decisions in OHS management. It will recommend to authorities, and employees in the construction sector appropriate reporting channels of OHS accidents in the country. The outcome of the study will immensely contribute to theory building in the area of critical factors influencing under-reporting of OHS accidents in the construction sector.

1.6 Limitations of the Study

The study holistically looks at the critical factors that influence under-reporting of OHS accidents in the construction sector in Ghana. Due to time constrain and resources, the study could not cover all the regions in the country. The study was conducted in Upper West and Upper East regions. This therefore limited the extent of the research generalization. The outcome of the study is based on the information solicited from the respondents and such might be subjected to human errors, omissions and possibly mis-statements. The respondents may not be willing to divulge core information in the name of confidentiality.

Again, due to the nature of the construction work, it was impossible to administer questionnaires and get prompt responses. The researcher left the questionnaires with the respondents to make time to answer them after which they were collected later. This situation compromised the genuineness and fairness of the responses since the respondents may consult each other before responding to the questions. However, being aware of this possible constraint, the researcher triangulated the study by conducting a semi-structured interview in addition to the questionnaire.

1.7 Delimitations of the Study

The study is narrowed down to assess critical factors influencing under-reporting of OHS accidents in the construction sector in Ghana. The research participants for the purpose of the data collection was drawn from construction firms in some selected regions in the country. The content scope of the study was centered on the core objectives as follows; Identifying critical factors contributing to under-reporting of OHS accidents within

construction and on construction sites, identifying critical constraints to reporting of OHS accidents in the construction sector, and developing a framework for improving OHS accidents reporting in the construction sector in Ghana.

1.8 Organisation of the Study

The study is organised into six chapters. Chapter One encompasses the background of the study, problem statement, aims and objectives of the study, research questions, significance of the study, limitations and delimitations of the study, and organisation of the study. Chapter Two concerns itself with an exhaustive and incisive relevant literature review on the subject. It embodies theoretical and conceptual frameworks, and identifies the gap in the literature which the study seeks to fulfill. Chapter Three examines the methodology used for the study and covers the research strategy, research design, the study area, population, sampling technique, sample size, source of data, data collection instruments, procedure, research axiology and data analysis. Chapter Four entails the results or findings of the study whilst Chapter Five identifies, interprets and discusses the significant and novel findings of the study. Chapter Six provides the summary, conclusion, and policy recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines a review of the literature relevant to achieving the objectives of the study. It identifies certain fundamental concepts on the topic to help the researcher draw conclusions. The chapter is organised into the following main sections:

- overview of the construction sector in Ghana;
- concept of occupational health and safety (OHS) and related constructs;
- global perspectives of OHS administration;
- legal and institutional arrangements for OHS management in Ghana;
- relevant theories on OHS;
- occupational health and safety management by construction companies;
- under-reporting of accidents in the construction sector; and
- summary of literature review and conceptual framework.

2.2 Overview of the construction sector in Ghana

According to Laryea (2010), Ghana is renowned as an emerging market in sub-Saharan Africa with its large part of contributions from the construction sector. The sector, in the view of Owoo and Lambon-Quayefio (2018), appears to be performing well, and indeed contributes substantially to Gross Domestic Product (GDP) and employment within the economy. The share of GDP associated with construction increased from 5% in 1975 to 9% in 2000 and then to 15% by 2007 (Sutton & Kpentey, 2012). In 2006, construction was the fastest-growing sector in the economy, with a growth rate of 8% against the national

average of 6% (Ministry of Education, 2010). Even when Ghana's economy registered its lowest growth rates in 2013, the construction sector still experienced growth higher than the national average. The sector's growth rate was 8.4% while the national economy grew only at 5.4% in 2013 (Institute of Statistical, Social and Economic Research, 2015). The estimate of growth rate in construction for 2014 was 14% (Darko & Löwe, 2016). Oxford Business Group (2019) indicates that, the sector's importance to the economy has grown accordingly, accounting for 8.1% of total GDP in 2017, up from 7.7% in 2016. In the first three quarters of 2018 the construction sector was valued at GHS14.2 billion ($3.1 billion). Given the strong push for investment by the government, and the need for modern housing and commercial, retail and industrial property, industry players are upbeat about the outlook for the sector. Ghana is enjoying a strong recovery after a slowdown in the middle of the decade. Rebased GDP growth stood at 5.4% in both the first two quarters of 2018. The Oxford Business Group (2019) citing Pan-African Bank Ecobank, and the IMF expects that full-year growth for 2018 will reach a pace of 6.3%. The government is targeting a growth rate of 7.6% in 2019, which would make Ghana one of the world's fastest-growing economies two years in a row. Darko and Löwe (2016), and MELR (2017) indicate that Ghana's economy has grown rapidly in the past 20 years, and the construction sector has contributed to the growth.

The sector employs 2% of young people in Ghana and provides more training and apprenticeship opportunities to young people than any other sector. Ofori (2012) has identified the sporadic development of the construction industry in local areas as a means of alleviating poverty in the country. Songwe (2014) posits that, the sector is dominated by physical infrastructure and asset-based-lending as a means for growth and development.

In the view of Osei (2013), the domestic construction sector happens to be one of the fastest growing sectors, with an impressive average growth of 7-8 per cent per annum. The foundation of a higher growth rate rests on a sound and efficient infrastructural development which makes the construction sector a key sector. The rapid expansion of infrastructure by both government and the private sector has triggered off construction activities and fuelled demand in many key sectors like cement, steel, paints and chemicals, glass, timber and earth moving equipment and machinery. Rameezdeen and Ramachandra (2008) affirm that the sector has a strong linkage with many economic activities, and whatever happens to the sector will directly and indirectly influence other sectors and ultimately, the wealth of a country. Hence, the construction industry is regarded as an essential and highly visible contributor to the process of economic growth in the country.

Danso (2010) indicates that the Ghanaian construction sector deals with all economic activities directed to the creation, renovation, repairs or extension of fixed assets in the form of buildings, land improvements of an engineering nature and other such engineering constructions such as roads, bridges, railways, ports, dams. According to him, the Ghanaian construction sector has two branches which are building construction and civil engineering. The building construction aspect undertake projects such as the construction of schools, hospitals, health centres, hotels, offices. Again, it undertakes external works which sometimes involved "simple" engineering construction such as drive ways. The civil engineering aspect deals with heavily engineering characteristics projects such as bridges, roads, railways and dams.

Owoo and Lambon-Quayefio (2018) indicate that, the Ghanaian construction industry comprises building project consultants, engineers, architects, quantity surveyors, building contractors, and artisans. There is currently no national authority that governs and regulates the activities of the industry. In the absence of this authority, the various sectors within the industry have individual governing institutions. The Ministry of Works and Housing supervises all building and civil works in the country while the Ministry of Roads and Highways oversees the activities of players in the construction and maintenance of roads, highways, railways, airports, and other structures. These two ministries are therefore jointly responsible for the registration and classification of contractors within the industry. Nonetheless, there is no national database of industry players with information on the respective sizes and capabilities of the members.

The Ministry of Works and Housing (MWH) and the Ministry of Roads and Highways (MRH) responsible for the housing, road infrastructure and construction throughout the country, classifies building contractors into four groupings: D1K1, D2K2, D3K3 and D4K4 (Danso, 2010; Owoo & Lambon-Quayefio, 2018; Ahmed, Lamia & Valva, 2014). The D1K1 class of contractors are termed as larger firms, whereas D2K2 construction firms are medium and D3K3 and D4K4 are small firms. According to Owoo and Lambon-Quayefio (2018), these classifications have direct implications for the types of projects that contractors within the sector can bid for, with varying degrees of competition from one classification to the other. The larger firms, according to Ahmed et al (2014), Frimpong and Kwasi (2013) and Danso (2010) citing MWH are registered as financial class 1, capable of undertaking projects of any value, class 2 (the medium firms) are capable of undertaking projects up to US$500,000 or GH¢750,000.00, while the small firms (financial

class 3) are also capable of undertaking projects up to US$200,000 or GH¢ 300,000.00 or class 4 to undertake projects up to US$75,000 or GH¢112,500.00. Oxford Business Group (2014, 2018) indicates that majority of the construction companies in Ghana fall under D4K4 and D3K4 classification.

The sector has some challenges in growth in the last few years. According to Oxford Business Group (2018), the sector experienced slowdown in growth in 2017. However, New government initiatives and increased oil revenues are hoped to bring further opportunities for infrastructure and real estate projects, with a range of factory, roadway, airport and railway initiatives in the pipeline The sector's growth has led to renewed calls for the establishment of an official body to regulate and promote construction business, particularly to support domestic companies and tackle malpractice (Oxford Business Group, 2018). In the view of Darvas and Palmer (2014), the construction sector has a large skills gap. Lack of training quality over the few years has led to significant demand for skilled artisans in the sector. More recently, the World Bank estimated there was a shortfall of 60,000 artisans and tradespeople in construction, and that a further 250,000 skilled artisans would be required by 2020.

Asamoah and Decardi-Nelson (2014) posit that, the Ghanaian construction sector is characterized by unprofessional practices. The industry suffers from a lack of planning, including inappropriate water and energy use, building material consumption, failure to meet consumer/tenant needs, and disjointed stakeholders' cooperation in the industry. Ahmed et al (2014) laments on the myriad challenges facing the construction industry in Ghana today. Increasingly, insurmountable social, environmental, health and economic

challenges continue to hinder the growth of Ghana's construction sector. An inconsistent electrical grid, overburdened public water distribution system, poor public sanitation, overcrowded living conditions and failing infrastructure make both the industry's future success and present state difficult to sustain. If not addressed soon, further 'upstream' problems, such as dependence on fossil fuels, overburdened hydroelectric power for energy, rapid deforestation of timber, toxification of ground water, and unregulated 'horizontal' growth resulting in urban sprawl will have long term detrimental impacts on Ghana's construction. Energy inconsistency as a result of recent droughts have created water shortages, resulting in sporadic electricity fluctuation throughout the country, affecting the timely completion of construction projects in Ghana.

Additionally, Ofori (2012) notes that the construction industry in Ghana performs poorly in minimizing their environmental impact. Construction activities are linked to excessive resource consumption causing land degradation, loss of habitats, air and water pollution and high-energy usage. Ahmed et al (2014) describe that, a typical Ghanaian building often depends largely on timber and other forest products. In traditional building construction, wood from timber is used to make the formwork and scaffolding. A major limitation with this approach is the inability to either recycle or reuse after initial use. This has caused dependency on natural resources, depleting major evergreen rain forests in the country. As a result, certain species of wood such as 'Wawa,' which were in abundance in the 1970's, are now difficult to find. These building procedures have taken a significant toll on the environment. Ahmed et al (2014) citing Imaralu (2013) and United Nations Human Settlement Program estimates that Ghana will need two million new housing units by 2020 to meet the demand for housing. Current population density is exerting stress on resources

and services, meeting the increasing demand will further exacerbate the sustainability challenge.

2.3 Concept of Occupational Health and Safety and related constructs

2.3.1 Occupational Health

Occupational Health is the general condition of a worker in mind, body and spirit, usually meaning to be free from illness, injury or pain (Phoya, 2012). Salminen (2015) citing ILO (1958) defines occupational health as a strategy for promoting and maintaining the highest degree of physical, mental and social well-being of workers in all occupations, by preventing health deviation, risks and hazards control and the adaptation of workers to both the job and working environment.

Nghitanwa (2016) defines occupational health as the maintenance and promotion of physical, mental and social well-being of workers by ensuring that workers are free from injuries, illness or pain that can arise from workplace activities. The ILO/WHO (2001) definition of occupational health is “The promotion and maintenance of the highest degree of physical, mental social well- being of workers in all occupation. WHO (1994) indicates that occupational health has gradually developed from a monodisciplinary risk-oriented activity, to a multidisciplinary and comprehensive approach that considers the individual’s physical, mental and social well-being, general health and personal development.

2.3.2 Occupational Safety

Occupational safety refers to the relative freedom from danger, harm and risk to people or properties caused accidentally or deliberately at work (Phoya, 2012). Acutt and Hattings (2011) defines occupational safety as the prevention of accidents and maintenance of workplaces free from injuries. In the view of Nghitanwa (2016) occupational safety means a state of maintaining the health and wellbeing of workers in a work environment to ensure that the workers are free from harm, danger, workplace illnesses, accidents, injuries and fatalities. According to Tente (2016) occupational Safety is a condition of being protected from or not exposed to danger at workplace. Phoya (2012) defines it as the control of recognized hazards to achieve an acceptable level of risk at workplace.

2.3.3 Occupational Health and Safety (OHS)

According to Alli (2008), OHS refers to the science of workplace hazard anticipation, recognition, evaluation and control that could impair the health and well-being of workers, workplaces surrounding communities and the environment. In the view of Amponsah-Tawiah and Dartey-Baah (2011), OHS entails the physical, mental and psychosocial well-being of the worker in relation to the work and the working environment aimed at providing a safer working environment. Obeid (2015) views OHS as the science concerned with the health and safety of people involved in any work by providing a safe working environment free of the causes of accidents, injuries or occupational diseases. This can be achieved by securing, protecting and preventing the labourers from being exposed to risks and hazards in any field through the control of the work environment.

According to WHO (1998, 2003), OHS is a multidisciplinary activity aiming at:

- protection and promotion of the health of workers by eliminating occupational factors and conditions hazardous to health and safety at work;
- enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work; and
- development and promotion of sustainable work environments and work organizations.

According to Tadesse and Admassu (2006), OHS aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations.

2.3.4 Occupational Accident

An occupational accident is defined as unplanned and undesired circumstances arising out of or during work that give rise to ill health or injury, damage to property, the plant or the environment, and lead to production losses or increased liabilities (ILO, 2012). It refers to a work-related exposure to an unplanned event which results in injury or ill-health or damage experienced by workers while working at workplace (Nghitanwa, 2016). It is an unforeseen and unplanned event or circumstance at workplace, often with lack of intention or necessity. It usually implies a generally negative outcome which might have been avoided or prevented had circumstances leading up to the accident been recognized and acted upon, prior to its occurrence (Adu-Boateng, 2014). Occupational Accidents are unforeseen events, which cause damages or injuries unintentionally and unexpectedly at workplace (Asanka & Ranasinghe, 2015). Health and Safety Executive (HSE) (2006)

defines accident as any unplanned event that may result in injury or ill-health of people, or damage or loss to property, plant, materials or the environment or a loss of business opportunity. It includes all forms of injuries and diseases emanating from construction works on site. This definition of HSE (2006) constitutes the operational definition for the study.

2.3.5 Types of Occupational Accidents

According to Miller, Ballard, Suff, Bates, Hursfied & Akroyd (2005), data on reported accidents from Health and safety executive (HSE) (2004) and the local under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulation (RIDDOR) (1995) categorised accidents fatal accidents, major accidents and minor accidents. The fatal accidents often result into deaths of workers arising from work activity. The major accidents result into fractures, amputations, dislocations and other injuries leading to resuscitation or 24-hour admittance to hospital, whilst the minor accidents lead to workers absenting themselves from work or inability to do their normal job for more than three consecutive days not including the day of the accidents.

The ILO (2012) classifies occupational accidents into reportable accidents (Severity category 1), compensated accidents (Severity category 2), and fatal accidents (severity category 3). The reportable accidents constitute accidents that lead to an absence from work of more than three days (not counting the day of the accident). The compensated accidents often lead to compensation of employees, where the employee is incapacitated to perform his or her duties again. For the fatal accidents, death is inevitable but does not always occur

immediately after an accident; depending on the extent of injury, the injured person sometimes dies after a period of medical treatment at the hospital.

2.3.6 Occupational Disease

An occupational disease is an illness contracted due to an exposure to the risk factors arising from work activities (ILO, 2013). An occupational disease is any chronic ailment that occurs as a result of work or occupational activity. It is an aspect of OHS. It is typically identified when it is shown that it is more prevalent in a given body of workers than in the general population, or in other worker populations (Coenraads & Diepgen, 1998). Morse (2018) occupational disease is any illness associated with a particular occupation or industry. Such diseases result from a variety of biological, chemical, physical, and psychological factors that are present in the work environment or are otherwise encountered in the course of employment. The diseases are typically harder to detect than injuries, since they often occur over longer periods of time, and can have multiple (including non-occupational) risks.

2.3.7 Occupational Fatality

An occupational fatality refers to the death that occurs while a person is at work or performing work-related activities (ILO, 2012). It is a death that occurs while a person is at work or performing work related tasks. Occupational fatalities are also commonly called “occupational deaths” or “work-related deaths/fatalities” and can occur in any industry or occupation (Bureau of Labour Statistics, 2009).

2.3.8 Occupational Hazard

Occupational hazard is defined as the potential of something in the workplace to cause harm, injury or damage to property or a person, plant or the environment and thus leading to production losses or increased liabilities (Hughes & Ferret, 2008). Hazards take many forms, for example, chemicals, electricity and working from a ladder.

2.3.9 Risk

Risk refers to the likelihood of a specified undesired event or damage occurring due to the realisation of a hazard or during work activities or by the products and services created during work activities (Acutt & Hattingh, 2011).

2.3.10 Underreporting of Accident

Underreporting of accident occurs when an organization or individual fails to report injuries occurring at work to regulatory authorities (Laura, Tahira & Claudio, 2015).

2.3.11 Work Environment

Work environment refers to the place or a premise of the environment where a person performs work in her/his employment (Acutt & Hattingh, 2011). According to Nghitanwa (2016), work environment is a site or location where workers perform their duties during the time of data collection.

2.4 Global Perspectives of OHS Administration

The ILO set up international standards such as conventions that should be ratified by all member states, including Ghana, in an attempt to maintaining health and safety of all

workers at workplaces (ILO, 2013). The realisation of a threat to the OHS of the employees led to the establishment of the ILO in 1919 to promote health and safety for the employees, facilitate social protection and demand employers' accountability for the well-being of the employees (Geminiani, 2008 as cited in Nghitanwa, 2016).

2.4.1 ILO Conventions

The Convention 155 of 1981 (Occupational Health and Safety Convention) advocates for the prevention of occupational related injuries, fatalities and diseases (ILO, 2006). The convention provides for the adoption of a coherent national occupational safety and health policy, and advice on action to be taken by governments and organisations to promote occupational safety and health and to improve the workers' employment conditions by preventing occupational accidents and diseases (ILO 1981: article 4). This national occupational safety and health policy should consider the context of each country (ILO 1981: article 4). Furthermore, member states that have ratified this convention should ensure the establishment and review of the requirements and procedures for the recording and notification of occupational accidents and diseases, and for the publication of annual statistics (ILO 1981: article 11).

The ILO Convention 167 of 1988 (Safety and Health in Construction Convention) states the legal requirements that should be practiced by member countries to ensure the health and safety of workers in the construction industry (ILO 1988: article 1). The convention encourages an assessment of the occupational safety and health hazards, and the adoption and enforcement of relevant laws and regulations which ensure the application of the provisions of the convention (ILO 1988: article 7). In addition, the convention advocates

for the co-operation between employers and workers so that health and safety at construction sites can be promoted (ILO 1988: article 6). The convention states further the health and safety responsibilities at construction sites when there is a principal contractor and sub-contractors. Thus, the principal contractor should have an overall primary responsibility to ensure that all contractors are complying with the national laws and regulations to ensure the health and safety of all workers at construction sites (ILO 1988: article 8). This convention states the right of workers in promoting occupational health and safety by participating in the adoption of safe working procedures and through proper use of equipment to prevent accidents (ILO 1988: article 10).

Occupational Health Services Convention, 1985 (No 161) provides for the establishment of occupational health services to advice the employers, workers and their representatives in the enterprise on maintaining a safe and healthy working environment in order to prevent work-related health and safety problems (ILO 1985: article 1).

Promotional Framework for the Occupational Safety and Health Convention, aims at promoting a continuous preventative safety and health culture in order to achieve a safe and healthy working environment (ILO 2006: article 2). It requires ratifying states to develop a national policy, national system, and national programme on occupational safety and health in consultation with the workers' unions (ILO 2006: article 2). The national systems shall ensure the implementation and compliance with the occupational health and safety national policy and programmes, such as laws and regulations (ILO 2006: article 4). National programmes should be measurable and indicate the time frame so that programs success or failure could be measured (article 5).

The Working Environment (air pollution, noise and vibration) Convention, 1977 (No 148) provides that, the working environment shall be kept free from any hazards due to air pollution, noise or vibration (ILO 1977: article 3). To achieve this, technical measures shall be applied to working environments, and where this is not possible, supplementary measures regarding the organisation of work shall be taken (ILO 1977: article 4).

Chemical Convention 1990 (No 170) provides for the adoption and implementation of a coherent policy on safety in the use of chemicals at work, which includes the production, handling, storage, exposure limit, transporting of chemicals and the disposal and treatment of waste chemicals (ILO 1990: article 2). The convention also covers the release of chemicals resulting from work activities, and the maintenance, repair and cleaning of equipment and containers of chemicals (ILO 1990: article 13). In addition, it allocates specific responsibilities to suppliers and exporting states (ILO 1990: article 9).

2.5 Legal and Institutional Arrangements for OHS Management in Ghana

Ghana's OHS legislation is inherited from a British legal and institutional framework at the time when Ghana was a British dependency (Kheni, 2008). According to Kheni and Braimah (2014), regulatory systems and institutions in many developing countries including Ghana have been inherited from developed countries with very little revisions or updating of such regulations or restructuring of the institutions to reflect their current level of development and cultural milieus. The factory Ordinance 1952 was the sole legislation protecting health and safety workers in the mining and wood processing industries at that time. Kheni (2008) indicates that the regulations made under the Factory Ordinance 1952 were:

- the Factories (Woodworking) Regulations, 1959;
- the Food Factories (Welfare) Regulations, 1959; and
- the Factories (Docks Safety) Regulations, 1960.

These regulations were passed in line with ILO principles and conventions (Kheni, Gibb & Dainty, 2010). Ghana ratified some of the principal ILO conventions relating to OHS which include:

- work (Women) Convention 1935 (No. 45);
- radiation Protection Convention 1960 (No. 115);
- guarding of Machinery Convention 1963 (No. 119);
- hygiene (Commerce and Offices) Convention 1964;
- working Environment (Air Pollution, Noise and Vibration) Convention, 1977; and,
- labour Inspection Convention 1947.

Although, Ghana formulated some legislations to address OHS issues, Tetteh (2003) comments that OHS in Ghana has shortcomings. The health and safety statutes evolve without due regards to existing ones, resulting in fragmentation, overlapping areas of jurisdiction and inconsistencies in OHS laws of the country. Ghana lacks a policy defining the responsibilities of stakeholders namely; government, employers and employees. In the view of Danso (2010), the Ghanaian construction sector have not developed well enough to have a separate OHS legislation. For example, "The Construction Law of the People's Republic of China", "The Occupational Health and Safety Act of 1993 of South Africa". Ghana still depend only on the ratified ILO conventions relating to OHS. In the study of Muchiri (2003), African countries including Ghana lack comprehensive OHS policy.

Muchiri (2003) adds poor infrastructure and funding, insufficient number of qualified OHS practitioners, and the general lack of adequate information as the main drawbacks to the provision of effective enforcement of OHS regulations.

Despite the shortfalls in OHS regulations in Ghana, Kheni and Braimah (2014) indicate that Ghana has institutionally put in place ministries to be responsible for ensuring that OHS standards are maintained at workplaces. According to Kheni (2008), these ministries include:

- the Ministry of Manpower Development and Employment (MMDE),
- the Ministry of Environment and Science (MES),
- the Ministry of Health (MOH),
- the Ministry of Roads Transport (MRT); and
- the Ministry of Lands, Forestry and Mines (MLFM)

These ministries are responsible for policy formulation and, departments under them implement the policies. Other bodies which actively influence OHS and welfare of employees, according to Kheni and Braimah (2014) include employers' associations, trade unions, clients, financiers, and end users. The Factory Inspectorate Department has sole responsibility for OHS. Other public departments and agencies with some health and safety responsibilities include the Labour Department, the Environmental Protection Agency, Occupational Health Services Unit, and the Attorney General's Department. Kheni (2008) indicates that the Occupational Health Service Unit of the Ministry of Health has the responsibility for providing curative care, first aid, worker education on health issues, health surveillance of workplaces and conducting risk assessments. Ghana's health

ministry is proactively engaged in ensuring work environments are descent for workers. The Labour Department is responsible for labour administration in Ghana. Accordingly, issues affecting labour, including workers' health and safety, fall within its jurisdiction. The department implements labour standards in conformity with the country's labour laws and International Labour Conventions ratified by Ghana. Two national labour laws are implemented by the Department; the Workmen's Compensation Law and the Labour Act. In the study of Hodges and Baah (2006) as cited in Kheni and Braimah (2014), forty-six ILO conventions have been ratified by Ghana. Where an employer persistently abuses rights of workers with regards to their health and safety, he or she will be liable on summary conviction to a fine or imprisonment or to both.

Contrary to the institutional functions, Tetteh (2003) and Kwesi and Kwasi (2014), indicate that close collaboration, networking, and coordination in respect of the health and safety functions of these institutions have been poor, resulting in health and safety being accorded a low profile within occupations in the country. There are no consultations with employers' organisations, trade unions, and health and safety stakeholders on policy issues affecting OHS at national level.

2.6 Relevant Theories on OHS

The importance of theories in research cannot be overemphasized. According to Higgs (2015), theories help to explain how certain phenomena occur. Theories provide lens through which to understand the research envisaged and provide a framework to develop a deeper understanding of practice. They are used to generate conceptual models, which are often represented as graphical figures that display variables and their interrelationships. As a result, the study spines on the following theories:

2.6.1 Theory of Accident Causation on Construction Sites

The theory is the systematic way of ascertaining causes of accidents at all workplaces (Ndege, 2004). In the views of Safety Institute of Australia Ltd (SIA) (2012) and Abdelhamid and Everett (2000), the theories of accident causation are tools for accident prevention programs. Some of the theories include:

- the domino theory;
- the Bird and German's loss causation theory;
- the Multi-causation theory; and
- the Perrow's normal accident theory.

2.6.1.1 The Domino Theory

In the study of Safety Institute of Australia Ltd (SIA) (2012), Abdelhamid & Everett (2000), and Asanka and Ranasinghe (2015), the Domino theory states that an accident results from sequence of five metaphorical dominoes (factors) as shown in figure 2.1.

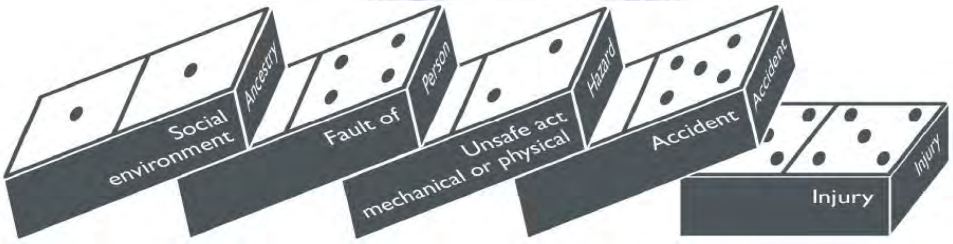

Figure 2.1: The five metaphorical dominoes

Source: SIA (2012)

SIA (2012) citing Heinrich (1931) explains that, accidents could be prevented by removing one of the factors and so interrupting the knockdown effect. According to SIA (2012), Heinrich proposed that unsafe acts and mechanical hazards constituted the central factor in

the accident sequence and that removal of this central factor made the preceding factors ineffective. He focused on the human factor, which he termed "Man Failure", as the cause of most accidents. In the Domino theory, 88% of accidents are due to unsafe act of workers, 10% are due to unsafe condition, 2% are Acts of God (SIA, 2012; Asanka & Ranasinghe, 2015).

2.6.1.2 Bird and German's Loss Causation theory

In the study of Sabet, Aadal, Jamshidi, and Rad (2013), though, Heinrich's theory was understandable and perceptible, blaming only human failure (personal) is not practical without emphasizing responsibility of the management of the organization. Due to this weakness, SIA (2012) indicates that the sequential domino representation was continued by Bird and Germain (1985) who acknowledged that the Heinrich's domino sequence had underpinned safety thinking for over 30 years. They recognised the need for management to prevent and control accidents in what were fast becoming highly complex situations due to the advances in technology. They developed an updated domino model which they considered reflected the direct management relationship with the causes and effects of accident loss.

2.6.1.3 Multi-causation theory

The Multi Causation Theory (Complex Linear Theory) states that the contributing causes together in a random fashion result in an accident. The theory expressed that, the accident is a result of many factors, causes and sub-causes (Hosseinian & Torghabeh, 2012). SIA (2012) and Viner (1991) listed key theories developed under the multi-causation theory to include energy damage theory, epidemiological theory and systemic theory.

The energy damage theory is based on the supposition that "Damage (injury) is a result of an incident energy whose intensity at the point of contact with the recipient exceeds the damage threshold of the recipient" (Viner, 1991). In the energy damage theory (figure 2.2), Viner (1991) explains that, the hazard is a source of potentially damaging energy and an accident, injury or damage may result from the loss of control of the energy when there is a failure of the hazard control mechanism. These mechanisms may include physical or structural containment, barriers, processes and procedures. The space transfer mechanism is the means by which the energy and the recipient are brought together assuming that they are initially remote from each other. The recipient boundary is the surface that is exposed and susceptible to the energy.

Figure 2.2: The Energy Damage Theory

Source: Viner (1991)

The epidemiological accident theory can be traced back to the study of disease epidemics and the search for causal factors around their development (SIA, 2012). Gordon (1949) recognised that "injuries, as distinguished from disease, are equally susceptible to this approach", meaning that our understanding of accidents would benefit by recognising that accidents are caused by "a combination of forces from at least three sources, which are the

host – and man is the host of principal interest – the agent itself, and the environment in which host and agent find themselves". SIA (2012) mentions that, Benner (1975) contributed to the development of epidemiological accident theory which moved away from identifying a few causal factors to understanding how multiple factors within a system combined. This theory proposed that an accident combined agents and environmental factors have an influence on the host environment (like an epidemic) which has a negative effect on the organism. According to Reason (1990), accident prevention methods matching an epidemiological accident theory focus on performance deviations and understanding the latent causes of the accident. These causes might be found in deviations or unsafe acts and their suppression or elimination can prevent the accident happening again.

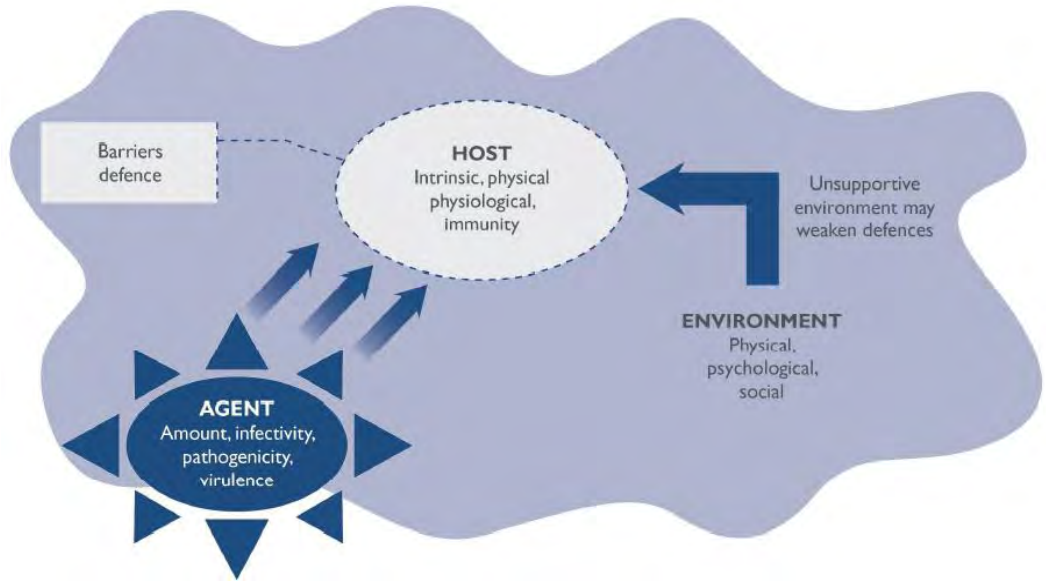

Figure 2.3: The generic epidemiological accident models

Source: Reason (1990)

By the 1980s, OHS researchers realised that previous accident theories did not reflect any realism as to the true nature of the observed accident phenomenon (Rasmussen, 1990). The systemic accident theory examines the idea that systems failures, rather than just human failure, were a major contributor to accidents (SIA, 2012). The theory recognises that, events do not happen in isolation of the systemic environment in which they occur.

2.6.1.4 Perrow's Normal Accident Theory

According to SIA (2012), considerable overlap in the development of various conceptual approaches to accident causation has led to the birth of the Perrow's normal accident theory. In the early 1980s, SIA (2012) indicates that, Perrow began to argue that technological advances had made systems not only tightly coupled but inheritably complex, so much so that he termed accidents in these systems as being "normal". Perrow's normal accident theory postulates that tightly coupled systems had little tolerance for even the slightest disturbance which would result in unfavourable outcomes.

According to Haslam, Hide, Gibb, Gyi, Atkinson, Pavitt, Duff, and Suraji (2003), contemporary theories of accident causation highlight the role of organisational issues, management actions and early decisions in contributing to workplace accidents. Lingard, Zhang, Harley, Blismas, and Wakefield (2014) indicate that, some construction accidents can be, at least in part, attributed to failures arising before on-site activities start.

2.6.2 Social Network Theory

Social Network Theory (SNT) is the study of how people, organizations or groups interact with others inside their network (Claywell, 2012). Eysenbach (2008) as cited in Le and Park (2011) views Social networking as a potential and powerful tool to engage, motivate

user to share, update, and manage information. It plays an important role in exchanging resources among partners, improving communication and enhancing OHS performance (Le & Park, 2011). Hanneman and Riddle (2011) indicate that social networking offers a means of mapping and exposing the hidden channels of communication and information flow, collaboration and disconnects between people in strategically important groups within an organization, thereby improving the effectiveness and efficiency of communication, reporting and decision-making processes in the organization.

In the study of Zanko and Dawson (2012), they noted the importance of socialization among colleagues, the attitudes of fellow employees and peer pressure as key factors in encouraging employees to adopt safe working practices. Each of these is predicated on relationships highlighting the importance of social networking as crucial factor enabling or constraining safety practices at work places. Pilbeam, Davidson, Doherty and Denyer (2015) have the opinion that, leaders that have health and safety orientation are able to influence others to ensure safe working conditions and practices. Influence is achieved not only by the validity and persuasiveness of messages, but also by the relationships between individuals. Those employees who are well connected to many others, either directly or indirectly through others who are themselves well connected, have greater opportunity to influence than those who are distant from most people in the organization. Taking a social network perspective, individuals who sit between many others in the relationship network may be able to influence more than those who do not connect to other people. Pirzadeh (2018) adds that, social networking explores the patterns of interaction among project participants ensuring that health and safety plans are well disseminated among employees.

2.6.3 Social Exchange Theory

According to Cropanzano and Mitchell (2005), the Social Exchange Theory (SET) was developed by George Homans in 1958. He defined social exchange as the exchange of activity, tangible or intangible and more or less rewarding or costly, between at least two people. Cropanzano and Mitchell (2005) citing Homans (1958) summarized the system of SET into three propositions:

- Success proposition – when a person is rewarded for his or her actions, he or she tends to repeat the action.
- Stimulus proposition – the more often a particular stimulus has resulted in a reward in the past, the more likely it is that a person will respond to it.
- Deprivation – the more often in the recent past a person has received a particular reward, the less valuable any further unit of that reward becomes.

By inference, West and Turner (2007) indicate that human's only take part in exchange relationships, when expecting rewards from it. To them, SET helps people to understand relationships well; why some relationships work while others fail. It explains why people choose to start and continue only certain relationships and also explains communication and interaction, as well as the factors governing interaction in humans.

In the opinion of Grefen and Ridings (2002), SET is among the most influential conceptual paradigms for understanding workplace behaviour. Humans base their behaviours on rational calculations designed to maximize individual profit. Most people value acceptance, loyalty, financial support, affection and companionship and so people find it rewarding to be in a relationship with a person who enhances our social status. This is classified as a reward.

Nammir, Marane and Ali (2012), are of the view that SET is best understood as a frame for expounding exchanges of resources, in market conditions which are imperfect, between two parties or a network via a social process. It suggests that resources, whether they are tangible or intangible, are exchanged between two parties, or groups, with the goal of improving, sustaining or terminating interactions or relationship. Further, it enhances interpersonal communication as it develops from shallow relations to intimate relationships. Persons are not only aware of what is around them but also aware of their awareness. The theory implicates that human beings are aware of each other's concerns and needs thus this enhances effective communication amongst people.

In the study of Ashour, Hassan and Alekam (2018), an improvement in safety performance (indicative of safety behaviours) is one typical example of the application of the SET. Relating their position to the present study, the expectation is that, when workers perceive that the activities of management will lead to excellent safety management practices in relationship to the safety of the workers, then the workers will develop positive perceptions of the user-friendly nature of their work environment. This should, in turn, lead to ensuring improvements in their safety performance indicators. By inference, workers will be willing to report accident cases to the appropriate authorities.

2.6.3.1 Safety Citizenship Behaviour

Xuesheng and Xintao (2011) view Safety Citizenship Behaviour (SCB) as a discretionary safety behaviours that are not directly or explicitly recognized by the formal reward system, but ultimately promotes the effective functioning of the organization. Curcuruto and Griffin (2018) indicate that citizenship behaviour at work that has positive consequences for organizations.

Clarke and Ward (2006) observe that, individual active involvement, participation proactiveness, and citizenship towards safety, is more ideal in realizing safety-oriented goals. Neal and Griffin (2006) opine that, SCB is effective at reducing workplace accidents and injuries. Addotey (2016) and Neal and Griffin (2006) equate SCB to safety participation which is a broad group of behaviours that support workplace safety, such as helping co-workers with safety-related issues, seeking to promote safety programs, demonstrating initiative, making suggestions for change, voluntarily attending safety meetings and improving safety. Hofmann, Morgeson, and Gerras (2003) identified dimensions of SCB to cover stewardship, voicing one's opinions, helping co-workers, whistle-blowing (reporting unsafe acts), initiating safety related workplace change, and civic virtue. With SCB, employees are able to communicate effectively and report any unsafe act or accident appropriately.

2.7 Occupational Health and Safety Management by Construction Companies

2.7.1 Behavioural Safety Management

Fishwick, Southam and Ridley (2004) say that Behavioural Safety Management (BSM) is the process of directing and coordinating behaviour of employees at work place. To them, it involves a range of techniques employed at work place in order to reduce the number and severity of injuries and accidents. It is expected that managers of organisations exert influence through creating and communicating a safety vision, through setting expectations, and through displays of positive leadership models.

The Royal Society for the Prevention of Accident (ROSPA) (2018) spells out BSM as a process of getting ahead of accidents by:

- being proactive;
- visualising the potential worst consequences of a particular activity or behaviour;
- working out what might be done to avoid those consequences; and
- putting that into effect in the behaviour, so as to avoid those consequences.

In the view of Fishwick et al (2004), behaviour can be changed by providing positive reinforcement such as 'thank you' and praising employees or workers exhibiting safe behaviour. Again, they are of the view that setting realistic and achievable targets for increasing the percentile change to safer behaviours by both management and other employees, is critical to achievement of the safety vision.

2.7.2 Health and Safety Management Systems

The Safety Association for Canada's Upstream Oil and Gas Industry (2011) views Health and Safety Management System (HSMS) as a systematic approach put in place by an employer to minimize the risk of injury and illness. It involves identifying, assessing, and controlling risks to workers in all work place operations. The Safety Management International Collaboration Group cited in Jazayeri and Dadi (2017) defines HSMS as a series of defined, organization-wide process that provide for effective risk-based decision-making related to your daily business.

The Safety Association for Canada's Upstream Oil and Gas Industry (2011) indicates that, for all workers and organizations, health and safety should be an expressed value. Studies show that organizations committed to health and safety excellence achieve success through a strong HSMS. Many benefits are associated with the development and implementation of an HSMS. Most importantly, an effective HSMS can help prevent injuries and property loss, reduce costs, and support due diligence. Developing a proactive approach to health and safety through an HSMS and its essential elements results in long-term financial and cultural benefits. The industry further indicates that, a successful HSMS includes but is not limited to the following seven elements:

- Management involvement and commitment
- Hazard identification and assessment
- Hazard control
- Training
- Emergency response
- Incident reporting and investigation
- Communications

Jazayeri and Dadi (2017) points out the benefits of HSMS in the construction industry as:

- reducing the number of injuries to personnel and operatives in the work place through the prevention and control of work place hazards;
- minimize the risk of major accidents;
- controlling workplace risks improve employee morale and enhance productivity;
- minimizing production interruptions and reducing material and equipment damage;
- reducing the cost of insurance as well as the cost of employee absences;

- minimizing legal cost of accident litigation, fines, reducing expenditures on emergency supplies; and
- reducing accident investigation time, supervisors' time diverted, clerical efforts, and the loss of expertise and experiences.

In ensuring accident free in organisations, McCabe, Hamilton, and Renny (2017) indicate that all companies, industries or organisations should:

- recognizes that each employee has a right to a work environment which will not adversely affect his or her health and safety
- be committed to providing safe workplaces for all its employees
- diligently carry out the employer duties contained in OSHA's directives.
- minimize the risk of occupational injury, illness, and property damage through: implementing a comprehensive health and safety programme; ensuring the Safety Manager, Safety Committees, and supervisors identify and control workplace hazards and communicate information about those hazards throughout the workplace; provide training, support, and work cooperatively with the Company Safety Manager and Safety Committees.
- require supervisors to be informed of all the known or foreseeable hazards in the areas where they work.
- ensure workers are familiar with these hazards and the acceptable ways to control them.

McCabe et al (2017) and Kobb and Stikova (2013) indicate that recording and reporting of accidents, injuries and illness structures should be put in place by industries as part of their HSMS. These structures will require employers to report work-related accidents and

fatalities and all work-related in-patient hospitalizations that require care or treatment, all amputations, and losses of an eye to Occupational Health and Safety Association (OHSA) or any other authority responsible for dealing with occupational accident cases within 24 hours.

2.8 Under-reporting of Accidents in the Construction Sector

The past decade has witnessed an increasing number of publications addressing interventions aimed at preventing work-related accidents, illnesses and injuries and employee health (Kwasi & Kwesi, 2014). Although the right to health and safety at work has been stipulated in the Constitution of the WHO and ILO and is supported by a number of other United Nations documents, no country has so far been fully successful in achieving this objective for all workers (Kwasi & Kwesi, 2014). Despite the institutional arrangement for OHS management in most developing countries like Ghana, OHS still remains an important consideration for all organisations, particularly organisations engaged in high risk operations like the mining, logging and construction industries. Good OHS practices not only provide a safer working environment but also improve worker morale and productivity (Australian Safety and Compensation Council, 2006).

In the quest to ensuring safety on construction sites, it is important that all manner of accidents, injuries and illnesses are accurately reported to statutory authority to identify the interventions that are most needed to prevent future occurrences. Unfortunately, research suggests that a large majority of experienced workplace (including construction sites) accidents go unreported with estimates of individual underreporting ranging from 71 % to 80% (Probst & Estrada, 2010; Probst & Graso 2011). Under-reporting of workplace

accidents, injuries and illnesses is common due to a variety of factors, either internal or external (Pransky, Snyder, Dembe, Himmelstein, 1999). According to Dong et al (2011) and Jeffery, Konstantin, Julie, John and Peter (2013) citing Higgs et al (1992), the high number of reported accidents and injuries may be drastically underestimating what is actually experienced by construction workers since research has shown that under-reporting of work-related accidents or injuries is a widespread phenomenon in construction and other industrial sectors. According to Jeffery et al (2013), although under-reporting of work-related injuries by workers is recognized as a significant problem in construction and other industries, little is known about the factors contributing to such occurrences.

2.8.1 Internal Factors

In the studies of Christine and Marlow (2005), Leigh, Marcing, and Miller (2004), the size of company is a critical factor influencing underreporting of accidents in the construction sector. In their studies conducted in the UK and US, it is thought that small construction firms are more likely to underreport accidents and injuries, or even not report them at all. The explanations they offered include a lack of awareness of legal reporting requirements among smaller firms, penalties for poor record keeping being rarely levied on small firms, and completing relevant paperwork could be a greater relative burden on smaller rather than larger firms. McKnight, Elias, & Wilson (2001) offer an alternative explanation in their research finding that the risk of experiencing a ‘reportable’ workplace injury appears to be lower in smaller construction firms. Their study revealed that workers employed in these smaller (1-10 employees) have lower injury rates than those in larger firms, regardless of whether or not the accident is deemed ‘reportable’.

Karr (2000) identifies age as a possible factor that can contribute to under-reporting of accident in the construction sector. Karr (2000) establishes that, the incidence of injury decreases with age but the injury severity and the incidence of fatal occupational injuries increase with age. There is a general paucity of scientific literature providing evidence of inaccurate accident reporting by age group (Parker, Carl, French, and Martin, 1994). Parker et al (1994) suggest that there is substantial under reporting of adolescent work injuries, based on findings that two thirds of adolescent work injuries are not reported to the appropriate authority. In the study of Miller et al (2005), older workers are however, more likely not to report an accident than younger workers. For them, fears about accidents or incidents seen or reported implies that they are no longer capable of performing their job.

In the findings of Sim (2000), and Reason (1997), safety culture of organisations or the prevailing norms, values, attitudes, beliefs and practices may clearly impact upon the willingness of employees to report accidents. Christine and Marlow (2005) citing Wagennar (1998) opine that, the health and safety culture within an organisation is a major influence on the health and safety-related behaviour of people at work. Miller et al (2005) contribute to the discourse by agreeing that organisational safety culture contributes considerably to under-reporting of accidents. Adams and Hartwell (1977) as cited in Miller et al (2005) opines that, reporting is hindered in industries and workplaces where a 'blame culture' exists, as people are often reluctant to report incidents for fear of it being used to apportion blame. Miller et al (2005) indicate that health and safety managers who have to report accidents figures to senior managers may be inclined to 'massage' the figures as a high level might indicate poor individual performance. Probst et al (2008) add that organisational safety climate contributes to under-reporting of accidents. They investigate

the association between the organizational safety climate and reporting of workplace injuries among 37 construction companies. Specifically, they found that companies with a poor safety climate had significantly higher rates of under-reporting compared with companies with a positive safety climate.

Underreporting is likely to be a symptom of poor management commitment to a safe workplace (Christine & Marlow, 2005). Clark (1998) corroborated the critical role of management as a factor influencing under-reporting of accidents in sampled workers. Incident reporting by workers was influenced by managers' reactions to reports; workers were less likely to report incidents if they felt that managers would 'take no notice' or would not be concerned. Clark (1998) suggests that incident reporting could be viewed as an objective measure of the level of managerial commitment to safety as perceived by employees. If management truly wants to hide injuries, then they can allow poor administration of records; maintain inadequate injury-reporting requirements or intentionally under report injuries. Accurate reporting will not occur unless a clear message is percolated down from top management and communicated to supervisors and employees at the floor level (Mearns, Whitaker & Flin, 2003).

In the study of Pransky et al (1999), interviews with management further identified a number of organizational factors that might have led to workers not reporting accidents. According to them, unrealistic goals were set by upper level management about the number of recordable accidents and injuries. Furthermore, there were misconceptions among workers and supervisors about requirements for recording injuries. These researchers concluded that the unrealistic expectations of management, in the form of a safety incentive program, discouraged the accurate reporting of accidents and injuries. In addition, Levitt

and Samelson (1993) cited in Christine and Marlow (2005) indicate that, some authors have sought to address, what they believe to be, potentially negative influences of peer pressure, in motivating a suppression of accident reports. This potential has been said to be greatest where incentives are of a financial nature; possess a high exchange value; or, are of the 'all or nothing variety'. According to Grunberg, Moore, and Greenburg (1996), a specific drawback of any organisation electing to use incentives of particularly high value is that, workers may try to hide minor injuries or be encouraged to continue at work despite being injured, so as to avoid jeopardising their chances of receiving the incentive. Smith (1995) and Hansen (1994) argue that the real incentive for many workers is often monetary, hence injuries go under reported and the underlying cause of workplace hazards remains unaddressed. Miller et al (2005) also say that, safety incentives to reduce accidents and injuries may also serve to reduce the numbers of accidents reported.

Grunberg et al (1996) indicate powerlessness and job insecurity as significant factors contributing to under-reporting. These create additional work tensions on the job and less attention to safe working practices. In the study of Pransky et al (1999), job insecurity hampers workers' willingness to report accidents or injuries to the statutory authorities. According to them workers are always having the fear of being assigned to undesirable lighter-duty jobs, loss of overtime, separation from co-workers, concerns about abandoning their team, fear of been sacked from their job, fear of being labelled by their supervisors as unable to do their job or as a complainer, and belief that having symptoms is a sign of weakness. As a result, workers are reluctant in reporting accident and injury cases to management. Miller et al (2005) identify Individual attitude as a factor influencing under-reporting of accidents at workplace. The study of Weddler (1996) found that, workers often

did not report because the injury was considered too minor and they did not want to be seen as careless. Frederick and Lessin (2000) also report that workers are often reluctant to report injuries and illness for fear of being labelled an 'unsafe worker'.

The WDSHW (2015) opines that unavailability of expertise and resources contribute significantly to poor reporting of accidents. Accordingly, many countries still lack the expertise and the resources to collect statistics that would allow a satisfactory and reliable evaluation of the magnitude of work-related accidents and diseases. Besides, in some countries, responsibility for health and safety at work may be split between labour and health ministries, and social security institutions, rendering data collection and analysis difficult. As data on work-related accidents and diseases are essential for prevention, there is a strong need in these countries to improve recording and notification systems and data analysis.

Moreover, the WDSHW (2015) indicates that, the intensification of migration flows, and the increasing numbers of workers in temporary, casual, or part-time work and precarious employment, do not only increase their disposition to accept unsafe working conditions but also makes them invisible to adequate health surveillance, and recording and notification of occupational accidents, injury and diseases, all of which are required for the effective implementation of preventive strategies.

Miller et al (2005) and Glendon (1991) found that onerous and time-consuming reporting procedures deterred reporting. Time-constraint is a critical a factor that can influence under-reporting. Workers might be too busy at work and therefore might not get time to report to management if accident is a minor one. Under-reporting of accidents and injuries

might also be due to lack of time to complete the necessary paperwork or online reporting process. Completing the reporting forms may require more information than readily available, and involve further time-consuming investigation. The Robens Institute (1997) study indicates that, a combination of pressure to maintain output and unfamiliarity with the appropriate forms could deter workers from following the required reporting procedures. The institute also indicates that ignorance of the reporting procedures also stops accidents being recorded.

Eskandari, Jafari, Mehrabi, Kian, Charkhand and Mirghotbi (2018) also mention education and training, and interpersonal relationships as factors that contribute to under-reporting. On the part of education and training, they have the opinion that, lack of safety education and training could result in under-reporting of accidents. According to them safety education and training enhance the knowledge and motivation, and thus improves safety reporting climate. Eskandari et al (2018) are of the view that interpersonal relationship has a potential influence on reporting of accidents. The relationships between workers and supervisors could lead to open discussion and reporting of accidents to the supervisors.

In addition, Nadia (2015) identifies language barrier as a factor that influences under-reporting. He argues that some workers whose native language is not English or a particular language are not able to communicate their needs and ideas accurately, and therefore may hinders workers from reporting their accidents, illnesses and other injuries within the construction firm to their supervisors. Nadia (2015) opines that, lack of intervention could also contribute to under-reporting of accidents. He is of the view that, due to the hierarchical nature of organizations on some projects, it is very challenging to conduct intervention concurrently at multiple levels. Subsequently, that may result in a lack of

intervention by the contractor which may increase the chance of not reporting accidents when they occur at a particle floor level.

2.8.2 External factors

The WDSHW (2015) indicates that, technological and social changes, along with global economic conditions contribute to under-reporting. Many workers are not abreast with the use of technology to report accident cases. Again, global economic conditions affect construction operations generally. Contractors may be interested in completing their projects on time to prevent bad economic conditions from affecting them. This may prevent them from paying attention to accident cases. In addition, McCraven (2012) notes that, insurance cost is one of the possible causes of under-reporting of accidents in companies because companies may fear increased workers' compensation insurance premiums.

Daniel and Marlow (2005) opine that, underreporting of safety incidents is a worldwide phenomenon. According to them, the magnitude of the problem of under-reporting varies from country to country depending on cultural differences as well as variation in reporting systems and legislation. In perspective, Nadia (2015) indicates that, some countries have instituted legislation that fine organisations that have high number of accident cases. As a result, companies or organisations conceal their accident cases by refusing to report to the appropriate statutory authorities. In another situation, Nadia (2015) opines that, some countries also do not have regulations on how accident cases could be reported to statutory authorities. Consequently, workers and organisations do not care keeping statistics of accidents that occur at their workplace.

In the opinion of Bekr (2017), politics has the tendency of influencing reporting of accidents. Every time a presidential political election happens, the construction sector typically gets thrown all-around just like a political soccer. Boateng (2014) indicates that government projects awarded in a previous regime could be re-evaluated provided there is suspicion of procurement breaches. This could lead to termination of a project if found that there are breaches in the procurement act. In most cases, Samir (2015) observes that, contractors try to complete their projects at all cost to avoid the termination of the contract when it is in the political season. The effect of this is that accident reporting procedures become irrelevant. Bekr (2017) indicates that, government officials feel unpopular when the number of accident cases rises in their regime. Therefore, regulators who are in line with government policies down play accident statistics, reporting accident cases to the appropriate authority becomes irrelevant.

Sami, Moafian, Najafi, Aghabeigi, Yamini, Heydari and Lankarani (2013) note that, once level of education is fundamental to influencing accident reporting. In their studies, educated people report accident cases than the uneducated. Amponsah-Tawiah (2017) notes that, socio-cultural practices generally serve an impediment to attaining healthy living conditions among workers. He is of the view that, individuals generally hold onto their spiritual, material, intellectual and emotional features that characterize their society or social group, irrespective of the environment they find themselves. These practices include the tendency to ignore conventional organizational safety rules, which can influence accident reporting

2.9 Summary of Literature Review and Conceptual Framework

In order to improve reporting of occupational accidents in construction firms, there must be some coherence among implementation of health and safety, compliance with OHS laws, implementing and OHS policies. The existence of the necessary national and institutional or organisational infrastructure which supports the control, direction or implementation of a proposed or adopted course of safety regulations, laws, rules, principles and actions will improve occupational accident statistics. Positive national and institutional OHS laws and policies serve as chalazas to enhancing and improving occupational accident statistics. Employees' behaviours equally have a greater magnitude on reporting of accidents. Close collaboration, networking, and coordination in respect of the health and safety functions of institutions will positively influence reporting of accidents and enhances OHS (Tetteh, 2003 and Kwesi & Kwasi, 2014).

The conceptual framework attempts to link the conceptual issues that have been deliberated in the study (Figure 2.4). It establishes that the critical factors indirectly or directly affect accident reporting. Both the internal and external factors have direct influence on construction operations and workers' attitude towards accident reporting.

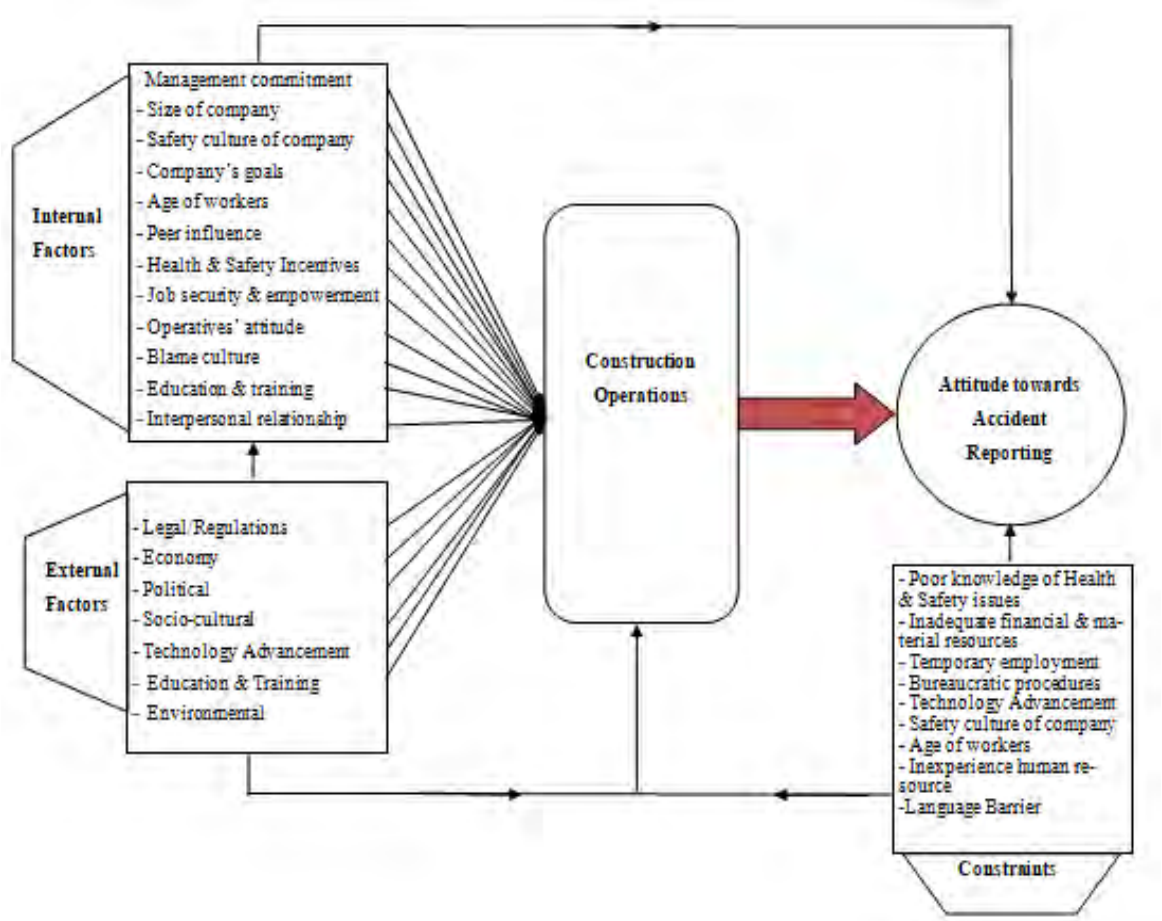

Figure 2.4: Factors influencing accident reporting
Source: Author's construct, 2019

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the general approach and techniques adopted to address the objectives of the study. It looks at the philosophical assumptions of the study, research design, research strategy, research approach, axiology, study area, population, sampling techniques and sample size. It also encompasses data collection and data analysis techniques.

3.2 Philosophical Assumptions of the Study

Philosophical assumption or paradigm, according to Fraser and Robinson (2004) is a set of beliefs about the way in which particular problems exist and a set of agreements on how such problems can be investigated. Hughes (2010) and Mukherji and Albon (2015) assert that a research is undergirded by paradigm, or a specific way of seeing the world and making sense of it. The choice of research methods in management and social sciences according to Creswell and Clark (2007), embodies the researcher's assumptions about the nature of the social world, the nature of the knowledge to be obtained and methods of gaining knowledge.

Adil and Khalid (2016) and Hussey and Hussey (1997) classify research assumptions or paradigms into two philosophically distinct traditions as positivism, and interpretivism or phenomenological paradigm. According to them, positivism assumes that reality exists independently of humans. It is not mediated by our senses and it is governed by immutable laws. According to Adil and Khalid (2016), the ontological position of positivists is that of

realism. Positivists strive to understand the social world like the natural world. In nature, there is a cause-effect relationship between phenomena, and once established, they can be predicted with certainty in the future. Positivistic thinkers adopt scientific methods and systematize the knowledge generation process with the help of quantification to enhance precision in the description of parameters and the relationship among them. The epistemological position of positivists is that of objectivism. Researchers come in as objective observers to study phenomena that exist independently of them and they do not affect or disturb what is being observed. They will use language and symbols to describe phenomena in their real form, as they exist, without any interference whatsoever. In the view of Hesse-Biber and Leavy (2006), positivism considers the social world as if it were a concrete, objective reality, in a way that laws can be found that explain this reality. According to this view, this real world can be studied only through the utilization of methods that prevent human contamination of its apprehension or comprehension. Hussey and Hussey (1997) classify positivistic paradigm as quantitative, objectivist, scientific, and experimentalist research philosophy.

Interpretivism is a "response to the over-dominance of positivism" (Grix, 2004; Hussey & Hussey,1997). Interpretivism rejects the notion that a single, verifiable reality exists independent of our senses. According to Guba and Lincoln (2005), interpretivism has no permanent, foundational standards by which truth can be universally known. In their view, interpretivists believe in socially constructed multiple realities. According to them, truth and reality are created, not discovered. It is not possible to know reality as it is because it is always mediated by our senses. Interpretive epistemology is subjective. External reality cannot be directly accessible to observers without being contaminated by their worldviews,

concepts, and backgrounds. Kheni (2008) indicates that, interpretivist paradigm views the social world as one that individuals create, modify and interpret the environment within which they function. In essence, understanding this interaction of individuals and the environment can produce knowledge of phenomena under investigation. Direct knowledge of the social world according to the interpretivist/subjectivist view is impossible. Hussey and Hussey (1997), Hesse-Biber and Leavy (2006), and Adil and Khalid (2016) associate interpretivism with qualitative, subjectivist, and humanistic research philosophy. Other paradigms indicated by Lincoln and Guba (2000) are postpositivism, constructivism and critical theory.

In the opinion of Perren and Ram (2004), and Kheni (2008) citing Mingers (1997), it is wrong to wholly accept the postulates of one paradigm. These arguments therefore support multiple views of social reality, that is, multi-paradigm research. Kheni (2008) indicates that, the approach to health and safety by construction firms cannot be understood without developing an understanding of construction firms and their relationships with the cultural and socio-economic environments. It is undeniable that the environment, particularly regulations (for this research; health and safety laws), institutions (health and safety administration) and national culture objectively exert some influence on the operations of these construction firms. Such information is needed to shed light on how OHS accidents are managed and reported in a given context. However, these aspects are amenable to the objectivist view of the social world since they do undeniably exist and affect the operations of construction firms. The actions of construction managers, operatives (masons, carpenters, steel benders, electricians, etc), and health and safety stakeholders have the capability to influence reporting of accidents in construction firms. This can best be

understood from a subjectivist/interpretivist view point of the world. Considering the nature of the range of issues relevant to OHS accident management within construction firms, both interpretivist/subjectivist and positivist/objectivist assumptions are relevant to the research. Based on these details, the underlying assumptions of this research fulcrum on a multiple paradigmatic viewpoint of the social world.

3.3 Research Design

According to Denzin and Lincoln (2000) cited in Kheni (2008), a research design sets out guidelines that linkup the elements of methodology adopted for a study namely; relating the paradigm to the research strategy and then the strategy to methods for collecting empirical data. Leedy (1997) explains that, research design is used for the purpose of obtaining data to enable the researcher answer research questions. It is an outline or a scheme that serves as a blueprint or a useful guide as the researcher organises his/her effort to generate data for his/her study.

Akhtar (2016) outlines exploratory, explanatory, experimental, and descriptive survey as the major research designs. Kumar (2005) indicates experimental, non-experimental and quasi or semi-experimental as research designs based on nature of investigation. He further mentions cross-sectional design, before-and-after research design and longitudinal design. These designs normally are based on number of contacts. Again, retrospective, prospective and retrospective-prospective designs are classified as referenced period research design. Kumar (2005) and Leedy and Ormrod (2010) also indicate commonly used research design as action research, feminist research, cohort studies, panel studies, case studies blind studies and descriptive survey. According to them, descriptive survey involves the

collection of data in order to answer questions concerning the status of a problem. In the opinion of Miller (1997) and Meyers, Gamst and Guarino (2006), one of the greatest strengths of the descriptive survey is the richness and depth of explorations and descriptions. With the survey design, the researcher is part of the study itself and must be flexible enough to follow up on observed leads and take on-the-spot decisions.

Since this study intends to investigate the critical factors influencing under-reporting of occupational accidents in the construction sector, the descriptive survey design was found most appropriate for the study.

3.4 Research Strategy

In the studies of Kheni (2008), a research strategy is important to define the course of the research from start to finish. Research strategy connects researcher to specific approaches and methods for collecting and analysing data. Kheni (2008) and Kumar (2005) identify quantitative, qualitative and multi-method strategy (mixed strategy) as the main research strategies.

The quantitative strategy is defined by Creswell (2003) as an enquiry into social or human problem based on testing a theory made up of variables, measured with numbers and analysed with statistical procedures. Kusi (2012) views quantitative research as a strategy that concerns itself with the acquisition and interpretation of data which can be presented in the form of discrete units that can be compared with other units by using statistical techniques. Naoum (2006) indicates that, the role of quantitative research is fact-finding based on evidence or records, and the nature of the data is hard and reliable.

Creswell (1998) cited in Kusi (2012) sees qualitative research strategy as an inquiry process of understanding based on distinct methodological traditions of inquiry that explores a social or human problem. Saunders, Lewis, and Thornhill (2009) indicate that Qualitative research is subjective in nature and mainly concentrates on opinions and perceptions rather than hard measurable data. It deals with non-numerical data which are in various forms such as words, texts, sound bites, and pictures.

In the view of Morgan (2007) as cited in Kheni (2008), the assumptions underlying qualitative and quantitative methods represent bipolar extremes, whereas the former tends to emphasize an inductive–subjective–contextual approach, the latter tends to emphasize a deductive– objective–generalizing approach. Consequently, Creswell (2003, 1994) is of the view that, the mixed strategy helps improve the external validity of the findings of a study. Creswell and Clark (2007) point that mixed strategy provides a more comprehensive approach to examining a research problem than either one of quantitative or qualitative methods. It provides opportunities for combining wide range of methods of data collection suited to the research question rather than being restricted to methods of data collection associated with qualitative methods or quantitative methods alone. Curran and Blackburn (2001) and Hussein (2009) indicate that, research problems can be understood better by employing both methods rather than using only one of the approaches.

The study therefore employs the mixed research strategy to have a balance, fair and an in-depth information on the subject matter. The strategy encourages the researcher to be flexible and practical in the use of procedures for conducting an inquiry, techniques of data collection and methods of analysis.

3.5 Research Approach

In the studies of Hussey and Hussey (1997), Soiferman (2010), Anthony (2018) three research approaches exist. They are inductive, deductive and abductive research reasoning approaches. Moroşan (2014) explains inductive research approach as the reasoning approach that infer from singular statements (descriptions, observations, experiments, calculations made for certain sizes) to general statements. When using the inductive reasoning, the similarities and/or differences observed are extended, thereby characterizing the overall population. In the opinion of Burney and Saleem (2008), inductive research approach works from specific observations to broader generalizations and theories. Informally, it is called a "bottom up" approach. Conclusion is likely based on premises, and involves a degree of uncertainty. Hussey and Hussey (1997) indicate that, inductive reasoning, by its very nature, is more open-ended and exploratory, especially at the beginning. They further assert that the inductive approach is an extremely effective process for obtaining general, observation-based information about the world. The inductive approach is one of the most common and natural forms of making logical assumptions about what we observe. Inductive reasoning allows researchers to gather ideas about an infinite number of events or phenomena in real life.

Deductive, according to Anthony (2018) begins with the general observations and ends with specific statement. Sometimes this is informally called a "top-down" approach. Conclusion follows logically from premises (available facts). Hussey and Hussey (1997) opine that, deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses. Soiferman (2010) explains that arguments based on experience or

observation are best expressed inductively, while arguments based on laws, rules, or other widely accepted principles are best expressed deductively.

Abductive reasoning is concern with imaginative reasoning, a process through which new ideas or hypotheses come into existence based on observations (Anthony, 2018). According to Anthony (2018), abductive reasoning also referred to as 'abductive approach', is set to address weaknesses associated with both deductive and inductive approaches. It follows a pragmatist perspective, taking incomplete (or 'messy') observations from experience and reality that may then lead to a best prediction of the truth, and perhaps even to a new theory. With the abductive approach, according to Kovács and Spens (2005), the research process starts with 'surprising facts' or 'puzzles' and is then devoted to their explanation. A researcher may encounter an empirical phenomenon that cannot be explained by the existing range of theories. The researcher then seeks to choose the 'best' answer from among many alternatives in order to explain the 'surprising facts' or 'puzzles' identified at the start of the research process.

The study fell within the parameters of indeterminate theories. The study aims at examining the under-reporting of occupational health and safety accidents in the construction sector in Ghana, determining critical factors contributing to under-reporting of OHS accidents within construction firms. The study will also be offering recommendations for improving OHS accidents reporting. This aims and objective are specific geared towards making general conclusions. Again, the study relent on appropriate theories obtained as well as tested from published works. These generalized theories reviewed will explain specific concepts OHS accident reporting and proffer specific recommendations. In view of this, both the inductive and deductive approaches are useful. The study therefore adopts the

abductive approach. Davenport (2009) argues that adopting multiple perspectives, leads to better decisions and robust conclusions, typically overcoming bias and weakness from single method approaches.

3.6 Research Axiology

Kivunja and Kuyini (2017) citing Finnis (1980) view research axiology as the ethical issues that need to be considered when planning a research proposal. It considers the philosophical approach to making decisions of value or the right decisions. It involves defining, evaluating and understanding concepts of right and wrong behaviour relating to the research. It considers what value to be attributed to the different aspects of research, the participants, the data and the audience to which the findings of the research shall be reported to. It looks at morality, plagiarism, confidentiality, privacy of respondents or participants, and accuracy of data collection.

In lieu of this axiological perspective, the study takes various steps to ensure the protection and freewill of participants or respondents as much as possible. The researcher sought ethical clearance from the university through the supervisor before going to the field for data collection. Again, permission was sought from the contractors and site managers of the various construction firms before workers were administered the data instruments. The objective of the study was explained to participants in a language they understand before seeking their consent for participation in the survey. The researcher considered the rights of the respondents or informants, ethics such as voluntary participation, anonymity, confidentiality and the acknowledgement of other authors' work. The respondents were assured of the protection of their personal and geographic data and that the study was purely

for academic purposes. These pieces of information were kept confidential throughout the study.

3.7 Study area

Ghana currently has 16 regions namely: Upper West, Upper East, Northern, Central, Ashanti, Eastern, Greater Accra, Volta, Western, Western North, Oti, Bono East, Ahafo, Bono, North East, and Savannah as shown in figure 4. There are 260 metropolitans, municipals, and districts Assemblies (Ghana Statistical service, 2019).

The study was conducted in two geographical regions namely: Upper West and Upper East regions of Ghana. These regions constitute the study area. Christine and Marlow (2005) and Leigh, Marcing, and Miller (2004) indicate that, the size of company is a critical factor influencing under-reporting of accidents in the construction sector. In their studies conducted in the UK and US, it is thought that small construction firms are more likely to under-report accidents and injuries, or even not report them at all. In the studies of Banyen (2016) and Richard (2017) most of the larger construction firms in Ghana are in the larger cities such as Accra, Kumasi, Sekondi-Takoradi, Koforidua, Cape Coast and Sunyani, and that the smaller firms are located in the smaller regions, towns and cities. Consequently, the study targets the small construction firms in the smaller regions, since these smaller construction firms have the potential of under-reporting accidents on sites to statutory authorities, hence the selection of the Upper West and Upper East regions. Again, time constraints and limited financial resources of the researcher restricted the study to only these two regions, though there are other smaller regions in Ghana.

3.7.1 Upper West Region

The Upper West Region is situated in the north-western part of Ghana. It lies between longitude 1.6°- 3.0º West and latitudes 9.8°- 11.0° North. It is bordered to the south by the Northern region, to the north and west by Burkina Faso, to the east by the Upper East region. It covers a geographical area of 18.476 sq. km, which constitutes 12.7 percent of the total land area of Ghana. The population density ranges from 13 per square kilometre in the Sissala districts to 97 per square kilometre in the Lawra district, with a regional average of 33 per square kilometre. There is strong socio-cultural relationship among the border communities and an extensive inter-boundary mobility of people. This has health implications in terms of disease epidemiology, health service utilisation and management. The rocks in this Region are predominantly Precambrian granites and the Birimian formation. These contain clay, iron ore and gold deposits. In this connection, the Region also has its share of the menace of illegal miners known as 'Galamsey' operators in the country. The water table for the Region is between 40 and 60 metres with 80% success rate for drilling boreholes (Ghana Statistical Service (GSS), 2012). Again, according to the GSS (2012), the region has a population of 702,110 and is made up of eleven (11) districts. The 2019 population projection, according to the Ghana Statistical Service (2019), is 849,123. By virtue of its location, it has the potential for international and inter-regional trade and other bi-lateral relations, but the overspill of criminal activities and disaster, such as bush fires, diseases and pestilence, armed robbery etc., from our neighbours also pose a threat to the region.

3.7.2 Upper East Region

The Upper East Region is located in north Ghana, occupying a total land surface of 8,842 square kilometers or 2.7 per cent of the total land area of Ghana. The Upper East regional capital is Bolgatanga, sometimes referred to as Bolga. Other major towns in the region include Navrongo, Paga, Bawku and Zebilla. It is located in the north-eastern corner of Ghana, precisely located in the Kingdom of Dagbon, and bordered by Burkina Faso to the north and Togo to the east. It lies between longitude 0° and 1° West, and latitudes 10.3° N and 11° N. The region shares boundaries with Burkina Faso to the north, Togo to the east, Upper West Region to the west, and the Northern Region to the south. The Upper East region is divided into 15 districts, each headed by a district chief executive. The population of the region is 1,046,545 with about 79% scattered in dispersed rural settlements. Only 21 percent of the population live in urban areas. In fact, together with Upper West, they are the two regions with a less than 20 per cent urban population (Ghana Statistical Service, 2012).

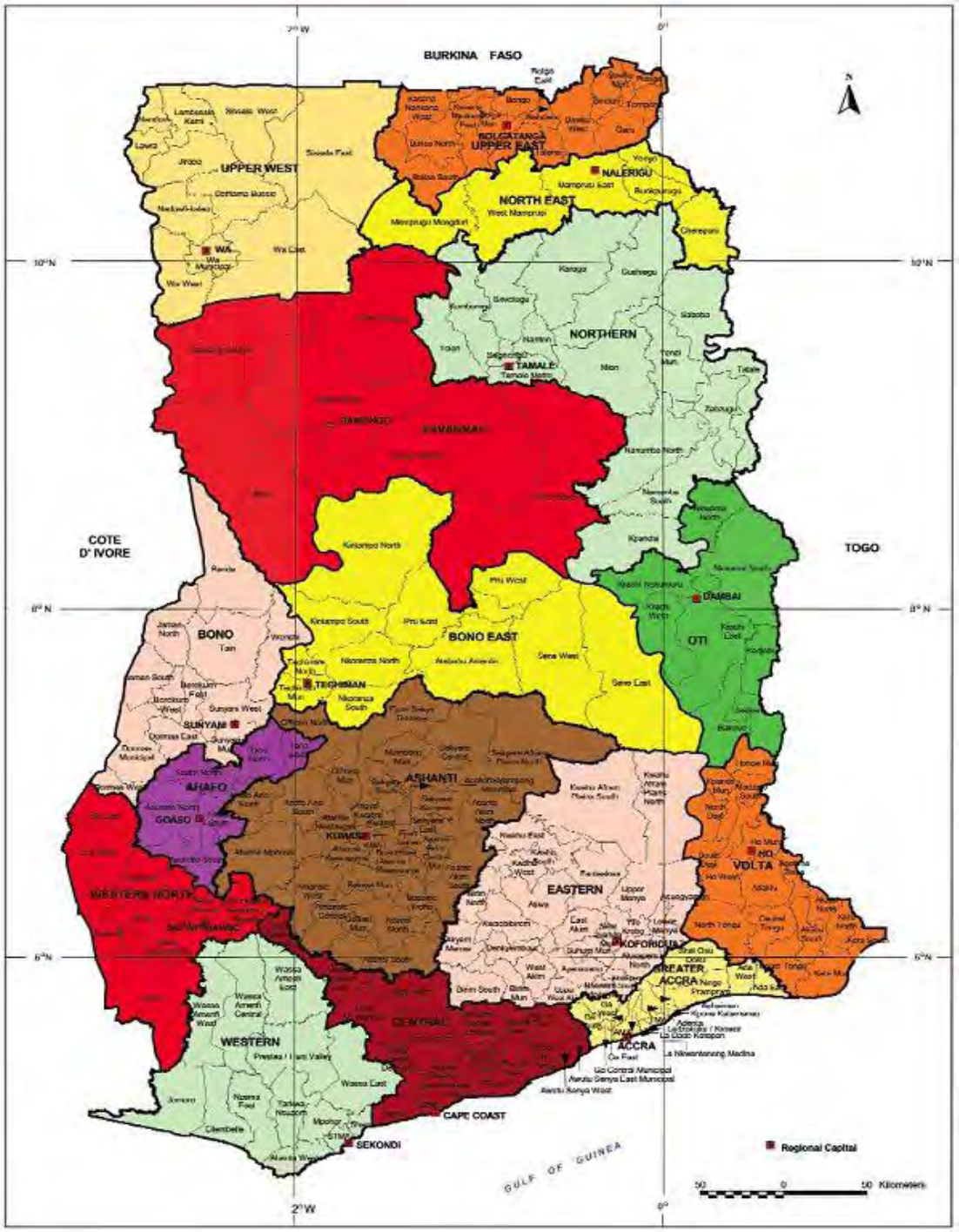

Figure 3.1: Map of Ghana
Source: Ghana Statistical Service Geographical Information System (GIS) section

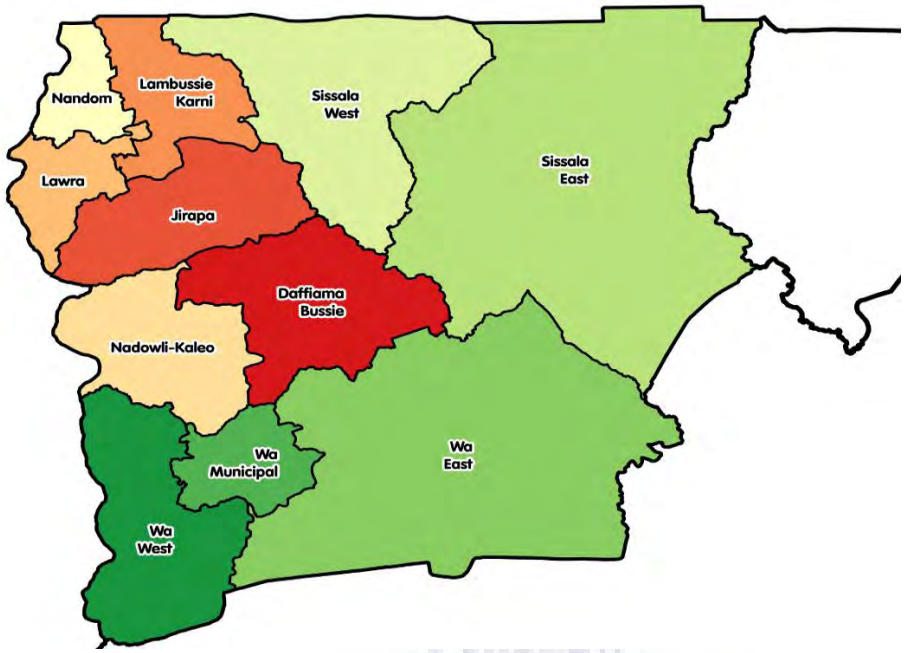

Figure 3.2: Map of Upper West Region

Source: Ghana Statistical Service Geographical Information System (GIS) section

Figure 3.3: Map of Upper East Region

Source: Ghana Statistical Service Geographical Information System (GIS) section

3.8 Population of the Study

Research population refers to the group of entities to which the findings of the study could be universally applied (Koul, 2001). It refers basically to the universe of units from which a sample is to be selected (Ofori & Dampson, 2011). A population, according to Banyen (2016) often has common characteristics of interest to the researcher and about which a study seeks understanding.

The research targets the local construction firms because they operate within the domestic construction market and have their offices situated at the regional or district capitals of the country. These local/domestic contractors are either registered under the Association of Road Contractors of Ghana (ASROC), the Association of Building and Civil Engineering Contractors of Ghana (ABCECG) or the Electrical Contractors Association of Ghana (ECAG) and have their head offices situated in Accra, the national capital, with regional and district offices.

In getting active contractors to partake in a study, Kheni (2008) indicates that, the Contractors' associations are more reliable because they provide a more up to date sampling frame. Their lists comprise contractors actively engaged in projects and who pay their annual levies. Consequently, the Contractors' Associations registered an active total membership of one hundred and ninety-five (195) in the study regions for 2019 as indicated in table 1 below.

Table 3.1: Registered active construction firms in the Upper West and Upper East Regions

Association	Upper West Region	Upper East Region	Total
ASROC	15	15	**30**
ABCECG	48	52	**100**
ECAG	30	35	**65**
Total	**93**	**102**	**195**

Sources: Contractors Association's Register, 2019

The target population of the study comprises of the operatives (masons, carpenters, electricians, plumbers, etc) and site managers working with contractors registered with the contractors' association. The operatives are the ground workers, who get in touch with the real work and therefore will be able to speak on issues of OHS affecting them. The site managers are usually responsible for ensuring that occupational health and safety (OHS) policies and programmes on sites are duly followed by the operatives. They work closely with the main contractor.

3.9 Sampling Technique

Sampling is the process of selecting units from a population of interest so that by studying the sample a researcher may fairly generalize his or her results back to the population from which they were chosen (Trachoma, 2006). According to Leedy & Ormrod (2010), sampling is the process of selecting a portion of the population to represent the entire population. Sampling methods are classified as either probability or non-probability.

In probability samples, each member of the population has a known non-zero probability of being selected. Probability methods include random sampling, systematic sampling, stratified sampling., multistage sampling, multiphase sampling, and cluster sampling. In non-probability sampling, members are selected from the population in some non-random manner. These include convenience sampling, judgmental or purposive sampling, quota sampling, and snowball sampling (StatPac, 2012; Phrasisombath, 2009; Alvi, 2016). Alvi (2016) adds volunteer sampling, matched sampling, genealogy-based sampling as some of the non-probability sampling methods.

To achieve the objectives of the study, the stratified and simple random sampling of the probability sampling technique and that of purposive sampling of the non-probability sampling technique were used to select the sample size. The stratified sampling technique was used because of the heterogeneous nature of the study population. The population is made of workers of ASROC, ABCECG and ECAG of two different regions. After the stratification, a simple random sampling technique was used to select the contractors from the associations for the study. This was done using a randomizer.

The purposive sampling technique was because, in the study of Danso and Manu (2013) citing Bernard (2002) and Lewis and Sheppard (2006), it allows researchers to decide what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. It is often used when the researcher has in mind the classes of respondents who are knowledgeable on the subject under study.

3.10 Sample size

3.10.1 Sample size of registered construction firms

To determine the minimum sample size of these registered construction firms in the study regions, Kish (1965) cited in Boateng (2015) and Yankah (2012) says a procedure for calculating minimum sample size has to be applied. They used the following equation in their studies to determine sample size, which is also suitable for this study.

$$n= \frac{K}{\left\{1+\left(\frac{k}{N}\right)\right\}}$$

Where: n = Sample Size, K= S^2/V^2, N = Population Size

S = Maximum standard deviation in the population element (at a confidence level of 95%)

V = Standard error of sampling distribution = 0.05

P = the population elements

S^2 = P (1-P) = 0.5(1-0.5) = 0.25,

To find V^2, let V=0.05 level of confidence, $V^2= (0.05)^2$, $V^2= 0.0025$

K= S^2/V^2, =0.25/0.0025 = 100

3.10.1.1 Upper West Region

The total number of registered construction firms of all the categories in the Upper West region is 93. Therefore, in determining the minimum sample size of Registered Construction firms in the Upper West region given that N = 93

$n = \frac{K}{\left\{1+\left(\frac{k}{N}\right)\right\}}$

n (Constructional Firms with good standing) $\frac{100}{\left\{1+\left(\frac{100}{93}\right)\right\}}$ = 48 firms across Upper West region.

3.10.1.2 Upper East Region

Therefore, in determining the minimum sample size of Registered Contractor firms in Upper East region given that N = 102

$n = \frac{K}{\left\{1+\left(\frac{k}{N}\right)\right\}}$

n (constructional firms with good standing) = $\frac{100}{\left\{1+\left(\frac{100}{102}\right)\right\}}$ = 50 firms across Upper East Region.

Therefore, the minimum number of construction firms for this survey by the Kish (1965) formula is 48 in Upper West Region and 50 in Upper East Region. Israel (1992) cited in Boateng (2015) indicates that 30% of non-response rate must be added. Hence, the study used 127 construction firms as displayed in table 3.2.

Table 3.2: Sample size distribution of registered construction firms

Region	Frequency/Sample size	Percentage (%)
Upper West	62	48.8
Upper East	65	51.2
Total	**127**	**100**

Source: Field data (2019)

3.10.2 Respondent Sample Size

The names of the construction firms in the Upper West region, was labelled 1-93 and a randomiser set according to the label. Out of the 93 firms, 62 was sampled randomly using the randomiser. The same procedure was followed to get the sample list of firms in the Upper East Region, thus 65 sampled construction firms. Each construction firm of any of the categories (ASROC, ABCECG and ECAG) stand the chance of being selected for the study. In each of the sampled firm, 1 site manager and 2 operatives were selected for the study. This gave a respondent sample size of 381, comprising of 127 site managers and 254 operatives.

3.11 Data Collection

The study adopted both secondary and primary sources of data in order to accomplish the study objectives. The secondary source of data comprised of data from desk review of both published and unpublished material including policy documents, newspapers, internet, journals, articles, reports, bulletins, newsletters, and site safety text books available in tertiary institutions main library or other resourced libraries. The primary source of data included data from direct questionnaires, and interviews with site managers, and site operatives (Masons, carpenters, Electricians, plumbers, etc).

3.11.1 Questionnaire

The study used questionnaires to collect the necessary data. This was chosen because questionnaire could be administered even in the absence of the researcher. According to Robson (2002) and Kumar (2005), questionnaires are known to be quite valid and reliable if well-constructed. These instruments do not disclose the identity of respondents.

Responses are mostly treated as confidential. Less time is also used. In the study of Kusi (2012) questionnaire could either be closed-ended, open-ended or a combination of both.

This study used both the closed-ended and open-ended type of questionnaire. According to Kusi (2012) and Kumar (2005), the closed-ended questions give forthright and reliable information for the study because they limit the respondents to particular responses. Glasow (2005) indicates that, close-ended questions are easy for respondents to answer and it also help researchers to analyze their data easily. Salant and Dillman (1994) are also of the view that closed-ended questions with unordered choices, for example the multiple-choice questions are useful for ranking items in order of preference. The open-ended questions allow the respondents to express their views in detail on the issues relating to study. These independent views help the researcher to draw more reliable conclusions on the study (Kumar, 2005). Mcintyre (1999) and Salant and Dillman (1994) assert that objectionable statements that reflect the researcher's bias and questions that require difficult calculations should be avoided in the case of wording of the questionnaires.

The questionnaires collected data on the following issues:

- factors influencing reporting of OHS accidents within construction firms,
- factors influencing reporting of OHS accidents on construction sites to Statutory authorities, and
- critical constraints to reporting of OHS accidents in the construction sector

3.11.2 Interview

Interview is a method of gathering information through oral quiz using a set of pre-planned core questions (Dicicco-Bloom & Crabtree, 2006). Gill, Stewart, Treasure, and Chadwick (2008) indicate that, interviews can be very productive since the interviewer can pursue specific issues of concern that may lead to focused and constructive suggestions. The main advantages of interview method of data collection as indicated by Gill et al (2018) are that, a direct contact with the users often leads to specific, constructive suggestions; they are good at obtaining detailed information. Ejohwomu (2014) indicates that, interview permits the researcher to solicit for detailed description and holistic understanding of an interviewee's view and opinion on a subject. The subject of the interview included the nature of the interaction between factors influencing under-reporting of accidents in the construction sector in Ghana.

3.11.2.1 Types of Interview

According to Gill et al (2008), Kumar (2005), Dicicco-Bloom and Crabtree (2006), and Ejohwomu (2014), interview could be structured, unstructured or semi-structured.

In the structured interview, the interviewer uses a set of predetermined questions which are short and clearly worded; in most cases, these questions are closed and therefore, require precise answers in the form of a set of options read out or presented on paper. This type of interviewing is easy to conduct, and can be easily standardised as the same questions are asked to all participants. Structured interviews are most appropriate when the goals of the study are clearly understood and specific questions can be identified (Gill et al, 2008, Kumar, 2005).

The unstructured type of interview, according to Gill et al (2008), allows the interviewer to pose some open-ended questions and the interviewee to express his/her own opinion freely. This requires both the interviewer and the interviewee to be at ease because it is like a discussion or brainstorming on the given topic. The direction of the interview is determined by both the interviewee and interviewer, not predetermined. They further indicate that, this type makes it difficult to standardise the interview across different interviewees, since each interview takes on its own format. However, it is possible to generate rich data, information and ideas in such conversations because the level of questioning can be varied to suit the context and that the interviewer can quiz the interviewee more deeply on specific issues as they arise; but it can be very time-consuming and difficult to analyse the data.

In the view of Dicicco-Bloom and Crabtree (2006), the semi-structured interview has features of both structured and unstructured interviews and therefore use both closed and open questions. As a result, it has the advantage of both methods of interview. In order to be consistent with all participants, the interviewer has a set of pre-planned core questions for guidance such that the same areas are covered with each interviewee. As the interview progresses, the interviewee is given opportunity to elaborate or provide more relevant information if he/she opts to do so. Semi-structured interview was adopted for the study in light of the type of research questions developed and the need to explore the responses obtained in the questionnaire survey in more detail. Semi-structured interview also allowed meanings and perceptions of the OHS accidents reporting to be generated, in line with a subjectivists mode of creating knowledge in the study context.

3.11.2.2 Selection of Interview Participants

Two workers from the regional Factory Inspectorate Board, 2 consultants, 4 site managers and 4 operatives (mason, carpenters, electricians, plumbers) were selected randomly for the interview across the regions.

3.11.3 Data Collection Procedure

The questionnaire was designed and structured to reflect on the demographic information of the respondents, health and safety considerations on construction sites, factors contributing to under-reporting of OHS accidents within construction sites and firms, critical constraints to reporting of OHS accidents in the construction sector, and framework for improving OHS accidents reporting in the construction sector in Ghana.

The researcher employed self-administered questionnaires. According to Kothari (2010), questionnaire is an instrument of data collection that are handed out to respondents and are filled by them without assistance from the researcher. The questionnaires will be developed and distributed to the respondents either directly or through emails. A period of one week will be given to them to answer the questions after which the researcher will go for them. This will give the respondents sufficient time to answer the questions.

The interview consisted of questions that had no possible options for the respondents to select from. The answers provided by the respondents were written against the respective questions. Before the interviews commenced, the researcher assured the respondents of confidentiality regarding the information that they will give. The respondents' names were not be included in any analysis. After the conformation of information confidentiality, the

researcher then proceeded with asking the respondents the questions as stated in the schedule.

3.12 Data Analysis

The data collected from the respondents were cleaned up and rectified of errors. The questionnaires were then coded and fed into SPSS 21.0 for Windows. Analysis was undertaken to generate a descriptive picture of the data gathered. Means and standard deviations of the data were obtained using SPSS 21.0. Observed variables were transformed into latent variables using SPSS, and a regression analysis performed. The SPSS data was also exported to Linear Structural Relationships (LISREL) software, and was then used for the Exploratory Factor Analysis (EFA). Variable path loading, and standard errors were generated using the software, and used to determine indicator-factor relationships and confirm the main factors influencing under-reporting of accidents from the respondents' perspective.

The research participants' thoughts, ideas, and perceptions are primary data, and as such some of the participants were interviewed to obtain qualitative data. The qualitative data was reduced and condensed by system of coding. The data was further categorised and summarized into themes, and interpreted. The table below indicates the entire data analysis plan.

Table 3.3 Data Analysis Plan

S/N	Research Question	Variables	Method of Analysis	Outcome
1	What critical factors influence under-reporting of OHS accidents within construction firms in the construction sector in Ghana?	Independent variable Factors influencing under-reporting. Dependent variable under-reporting	Quantitative data Descriptive statistics; frequencies, mean and standard deviation. Factor analysis	Objective 1 achieved. Critical factors influencing under-reporting within companies
2	What critical factors influence under-reporting of OHS accidents on construction sites in Ghana?	Independent variable: factors influencing under-reporting. Dependent variable: under-reporting	Quantitative data Descriptive statistics; frequencies, mean and standard deviation. Factor analysis	Objective 2 achieved. Critical factors influencing under-reporting to OHS regulatory authorities
3	What are the critical constraints to reporting of OHS accidents in the construction sector in Ghana?	Constraints to reporting of OHS accidents	Quantitative data Descriptive statistics; frequencies, mean and standard deviation. Ranking	Objective 3 achieved. Critical constraints found.
4	How can the nature of the interaction between factors influencing under-reporting of OHS accidents in the construction sector in Ghana be explained?	All relevant variables of the study (factors influencing under-reporting, constraints and under-reporting)	Qualitative data. Content analysis, developing codes, reflecting, analyzing relationships and creating models	Objective 4 achieved. An explanatory model of how the factors or variables interact.

Source: Author's Data Analysis Plan

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULTS

4.1 Introduction

The chapter presents the analysis of the field data in relation to the research objectives. The chapter is organized into six main themes namely: response rate, demographic characteristics of the respondents, critical factors contributing to Under-Reporting of OHS accidents within construction firms, critical factors contributing to under-reporting of OHS accidents on construction sites, critical constraints to reporting of OHS accidents in the construction sector, and nature of the interaction between factors influencing under-reporting of accidents in the construction sector.

4.2 Response Rate

The questionnaires were distributed to the construction firms in the study regions. From Table 4.1, 381 questionnaires were distributed. One hundred and eighty-six (186) questionnaires were distributed in Upper West region, whilst 195 questionnaires were distributed in Upper East region. Two hundred and seventy-two (272) were returned, out of which 250 were accurately answered and therefore useable for the analysis as follows: 140 questionnaires representing 75% from Upper West region and 110 questionnaires representing 56% from Upper East region. Twenty-two (22) questionnaires representing 9% were found to be unacceptable for the analysis because of improper filling resulting an effective response rate of approximately 66%.

The low response rate from Upper East region could be attributed to the fact that the researcher resides in Wa in the Upper West Region, which is far from Upper East Region. Obviously, contacting contractors on site would be difficult. Though, the researcher puts in measures to contact the contractors by hiring the services of questionnaire administrators, the inherent attitude of these administrators could result in the low response rate. However, this response rate, is considered adequate. According to Oladapo (2006), and Boateng (2015) citing Newman and Idrus (2002), a 30% response rate is good enough in construction studies.

Table 4.1: Percentage of Questionnaires Distributed and Responses Received

Number of Questionnaires	Upper West Region	Upper East Region	Total
Number of questionnaires distributed	186	195	381
Number of questionnaires returned	152	120	272
Number of questionnaires useable	140	110	250
Response rate (%)	75	56	66

Source: Field data, 2019

4.3 Demographic Characteristics of Respondents

The study analyses relevant aspects of the respondents' demographic backgrounds. The significance of this is to assess the implications it could have with respects to the key issues in view of the study. These include; the gender distributions, age category, academic qualification, and number of years the workers have been working in the construction firms.

4.3.1 Gender of Respondents

The study set to gather information on the gender of the respondents. The gender distribution of the respondents is presented in Table 4.2. Out of the 250 respondents, a little above 95% were males whilst approximately 5% were females. This proportion indicates that male workers dominate in the construction sector in both Upper West and Upper East regions than the female workers.

Table 4.2: Gender of Respondents

Gender	Frequency	Percentage
Male	238	95.2
Female	12	4.8
Total	**250**	**100.0**

Source: Field data, 2019

4.3.2 Age group of Respondents

Table 4.3 provides information on the age distribution of the respondents. Out of the 250 respondents, 10.4% were below 20 years, 26.4%% were within the age brackets of 20-29 years, 35.6% were within 30-39 years, 20% were within 40-49 age category, and 7.6% were within the age brackets of 50-59 years. The field data indicates that majority of the respondents were in their youthful age. Few of the respondents were almost within the retirement age, but were still found in the construction sector. These age variations helped the researcher to obtain different views from the respondents.

Table 4.3: Age Category of Respondents

Age (Years)	Frequency	Percentage
Below 20 years	26	10.4
20-29 years	66	26.4
30-39 years	89	35.6
40-49 years	50	20.0
50-59 years	19	7.6
Total	**250**	**100.0**

Source: Field data, 2019

4.3.3 Academic qualifications of respondents

The respondents were asked to indicate their level of education. The results are shown in Table 4.4. The results obtained indicate that less than 1% of the respondents had master's degree, 2.4% had O'/A' level, 2.4% were first degree holders, 6% had no formal education, 16% had WASSCE/SSSCE, close to 18% had HND certificates whilst the majority of them (55.2%) had NVTI certficates. This implies that most of the construction activities are carried out by NVTI and HND certificate holders.

Table 4.4: Educational Level of Respondents

Education	Frequency	Percent
O'/A' Level	6	2.4
NVTI	138	55.2
HND	44	17.6
First Degree	6	2.4
Master's Degree	1	0.4
No Education	15	6.0
WASSCE	40	16.0
Total	**250**	**100.0**

Source: Field Data, 2019

4.3.4 Number of Years worked in the Company

The workers were asked to indicated their years of working in the companies. As indicated in Table 4.5, 3.2% of the respondents worked in the companies for above 10 years and less than 15 years, 3.2% also have been working in the companies for 10-15 years, 26.4% have been working in the companies for 5-10%. A little above 67%, which constitutes the majority of the respondents have been working in the companies for less than 5 years. A year or more experience in the companies is enough for the respondents to give information regarding the research objectives.

Table 4.5: Number of years worked in the Company

Number of Years	Frequency	Percent
Under 5 years	168	67.2
5-10 years	66	26.4
Above 10 but less than 15	8	3.2
15-20 years	8	3.2
Total	**250**	**100.0**

Source: Field Data, 2019

4.3.5 Employees' work status

Figure 4.1 describes the employees' status. Out of the 250 employees, 49% were permanent whilst 51% were casual /temporary workers. More casual or temporary workers were employed in the construction firms than permanent workers.

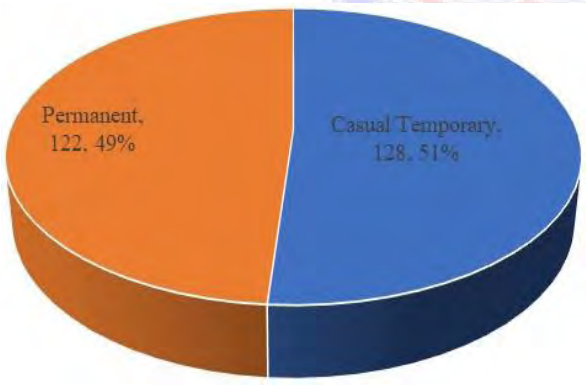

Figure 4.1: Employees' work status

Source: Field Data, 2019

4.4 Factors Influencing Reporting of OHS Accidents within Construction Firms in Ghana

The literature review identifies thirteen (13) critical internal factors influencing under-reporting of accidents within the construction sector in Ghana. From these factors, indicators were established and given to the respondents to indicate how significant these factors were using a five (5) point likert scale ranging from one to five with the label from strongly disagree to strongly agree. The respondents' responses were analysed in the form of descriptive statistics. Factor-indicator relationships were also established to determine the significance of these factors.

4.4.1 Descriptive Statistics of Respondents' views about critical Factors Influencing Under-reporting of OHS Accidents

Descriptive statistics was used to show the internal factors that influence under-reporting. The statistics were obtained based on the site managers' and operatives' views about factors influencing under-reporting of accident within the construction firms in Ghana. The results obtained are ranked in descending order as shown in Table 4.6. The views of the respondents about the factors were measured by thirteen constructs and 3 indicators each. The factors were measured by mean and standard deviations. The significant mean level was pegged at 4.0. Anything above the 4.0 threshold is considered as a strong factor and those factors below the cut-off point are considered as either medium or weak factors.

From table 4.6, the construct "Lack of Management Commitment" has three indicators. They include;

- There are inadequate safety performance programmes in the company;

- There are limited or lack of personnel to handle accident cases in the company; and
- The company has no annual Health and Safety policy.

The indicators have mean scores of 4.156, 4.048 and 4.040 respectively, which are all above 4.00. The average mean score of the construct is 4.081, which is above 4.00. This suggest that majority of the respondents have agreed that lack of management commitment is a critical factor influencing under-reporting of accidents within the construction sector in Ghana.

The construct "Poor Communication" also has 3 indicators. From the table 4.6, the indicators, "The company lacks system for reporting and investigation of accidents" and "There are ineffective communication safety policies and procedures in the company" have mean scores of 4.204 and 4.096 respectively, which are above 4.00. This means that the respondents agree to these indicators. The indicator "There is bureaucracy in communication in the company" has a mean score of 3.844 lower than the cut-off point. This means the respondents either disagree or were uncertain. However, the average mean score (4.048) suggests that, poor communication is one of the critical internal factors influencing under-reporting of accidents.

The three indicators of the construct "Company's size" have all their mean scores (3.980, 3.800, and 3.664) below 4.00, and an average mean score (3.815) also below the cut-off mean score. The respondents were either "uncertain" or "disagree" with these indicators which therefore suggests that Company's size, either small size or large, per the views of the respondent is a weak internal factor that influence under-reporting of accidents.

The next construct on the table is “Safety Culture” with the following indicators:

- Poor safety culture contributes considerably to under-reporting of accidents;
- Poor safety climate influences under-reporting of accidents; and
- Norms, values, beliefs and practices of our company clearly impact on the willingness of workers to report accidents.

The mean scores of these indicators are 4.276, 4.176, and 3.812 respectively. The respondents were uncertain or disagree with the indicator that “Norms, values, beliefs and practices of our company clearly impact on the willingness of workers to report accidents”. This indicator is below the expected mean of 4.00. Notwithstanding, the construct recorded an average mean score of 4.088 which suggests that majority of the respondents strongly agree that it is a critical factor.

Again, as to whether company’s goal have influence on under-reporting, the respondents agree with the indicators that “the company sets goals and expected to achieve them within time frame”, and “Company put pressure on workers to achieve their targets”. These indicators have mean scores of 4.154 and 4.002 respectively. The respondents were uncertain or disagree with the indicator that “Unrealistic expectations of management in the form safety incentives influences under-reporting”. However, the average mean score (4.041) of all the indicators, suggests that Company’s Goal is one of the critical internal factors that influences reporting of accidents within the construction firms.

To probe further, the respondents were asked whether workers' age has an influence on under-reporting of accident. The three indicators in table 4.6 all have their mean scores

above the 4.00 threshold. The mean average score of all the indicators is 4.016, which suggest that workers' age has significant influence on under-reporting of accidents.

The study also reveals that "Peer Influence" is a critical internal factor that influence reporting of accidents. The indicators, "coworkers discourage others to be safe and report accident cases" and "peer group influence accident reporting" recorded mean scores of 4.128 and 4.068 respectively. It was noted that the indicator "Peer group influences safety behaviour" has the least mean score of 3.844 which shows that the respondents were either uncertain or disagree with this indicator. The average mean score of the construct "Peer Influence", however was above the 4.00 threshold depicting its strength as a critical internal factor.

As to whether "Health and Safety Incentives" have influence on reporting of accidents, two of the indicators; "Real incentives in the form of monetary influences underreporting" and "Safety incentives for workers to reduce accidents end up reducing the number of accidents reported" have mean scores of 4.340 and 4.332 above the 4.00 threshold. The indicator "Management encourages workers to visit their first aid box when they have accidents/injury" has a mean score of 2.867 which is far below the threshold. The resultant mean score of 3.846 shows that "Health and Safety Incentives" is not a critical factor that influence under-reporting. The respondents were either uncertain or disagree to this factor. Job Security and Empowerment is one of the constructs with the following indicators:

- Workers who raise safety concerns have fear of retribution
- Job insecurity hampers workers' willingness to report accident
- Workers who raise safety concerns are seen as trouble makers

The mean scores of these indicators are 4.604, 4.588, and 4.196 respectively. The resultant mean score of the construct "Job Security and Empowerment" is 4.463, which suggests that respondents strongly agree that it is a critical factor.

In ascertaining whether "Workers' Attitude" has influence on under-reporting, the respondents strongly agree. This construct has an average mean score of 4.372 above the 4.00 threshold. All the indicators have their mean scores above the threshold. The indicators "Management practices affect workers' attitude to report accident cases", "Workers' attitude to under-report accident cases is dependent on their age" and "Workers are often reluctant to report accident cases because of existing company's culture" have mean scores of 4.512, 4.372 and 4.368 respectively.

The respondents also agree that "Blame culture" is a critical factor. The average mean score of all the indicators is 4.230, which is above the threshold. The respondents agree to all the indicators as follows:

- There are no clearly defined individuals with safety responsibilities;
- Management focuses on how to complete projects than solving safety problems;
- Workers are often reluctant to report accident for fear of it being used to apportion blame.

The mean scores as indicated in table 4.6 are 4.384, 4.184 and 4.122 respectively.

The Construct "Education and Training" has three indicators which are all above 4.0 threshold and they are all considered as strong as shown in Table 4.6. They are:

- Site inductions for workers and supervisors are rare in the company
- The company provides no education to workers on safety posters and boards
- Workers have formal education up to at least WASSCE/NVTI level

Education and Training, in the opinion of the respondents is a critical factor. It has a resultant mean score of 4.255.

With regards to "Interpersonal Relationships" as a critical internal factor that influence reporting of accidents, the respondents agree, with a mean score of 4.176 above the 4.00 threshold. They agree to the statements or indicators that "interpersonal relationships influence accident reporting at workplace" and "Company maintain good relations with employees and concerned authorities". The mean scores of these indicators are 4.800 and 4.004 respectively. They however indicated their disagreement or uncertainty with the indicator "Supervisors discourage workers to express their ideas and opinions about OHS accident at work". The mean score of this indicator is 3.724.

In ranking the factors based on their level of significance in contributing to under-reporting of accidents, Job security and empowerment influences under-reporting of accidents the most in the construction sector. It has the highest mean score of 4.463. Workers attitude is the second factor with a mean score of 4.417. Education and training is the third factor that influences under-reporting with a mean score of 4.255. Blame culture has a mean score of 4.230, interpersonal relationship is the fifth factor with a mean score of 4.176. Poor safety culture, lack of management commitment, poor communication, company's goal, workers' age, and peer influence occupy the 6^{th}, 7^{th}, 8^{th}, 9^{th}, 10^{th} and 11^{th} positions respectively with mean scores of 4.088, 4.081, 4.048, 4.041, 4.016, and 4.013 respectively. Health and Safety Incentives, and Company's size recorded the lowest mean scores of 3.846, and 3.815 respectively and occupy the 12^{th} and 13^{th} positions respectively.

Table 4.6: Descriptive Statistics of Respondents' views about critical Internal Factors

S/n	Factors	N	Mean	Std. Deviation	Rank
1.0	**Lack of Management Commitment**	**250**	**4.081**	**1.267**	
1.1	There are inadequate safety performance programmes in the company.	250	4.156	1.207	1st
1.2	There are limited or lack of personnel to handle accident cases in the company	250	4.048	1.269	2nd
1.3	The company has no annual Health and Safety policy	250	4.040	1.326	3rd
2.0	**Poor Communication**	**250**	**4.048**	**1.251**	
2.1	The company lack system for reporting and investigation of accidents	250	4.204	1.278	1st
2.2	There are ineffective communication safety policies and procedures	250	4.096	1.144	2st
2.3	There is Bureaucracy in communication in the company	250	3.844	1.331	3rd
3.0	**Company's size**	**250**	**3.815**	**1.293**	
3.1	Small construction firms affect reporting of accidents than large firms	250	3.980	1.214	1st
3.2	Workers in smaller firms normally have lower accident rates	250	3.800	1.245	2nd
3.3	Size of company affects reporting of accidents	250	3.664	1.420	3rd
4.0	**Poor Safety Culture**	**250**	**4.088**	**1.066**	
4.1	Poor safety culture contributes considerably to under-reporting of accidents	250	4.276	0.901	1st
4.2	Poor safety climate influences under-reporting of accidents	250	4.176	0.928	2nd
4.3	Norms, values, beliefs and practices of our company clearly impact on the willingness of workers to report accidents	250	3.812	1.371	3rd
5.0	**Company's Goals**	**250**	**4.041**	**1.263**	
5.1	Company sets Goals and expected to achieve them within time frame	250	4.154	1.153	1st
5.2	Company put pressure on workers to achieve their target	250	4.002	1.327	2nd
5.3	Unrealistic expectations of management in the form safety incentives influences under-reporting	250	3.967	1.308	3rd
6.0	**Workers' Age**	**250**	**4.016**	**1.093**	
6.1	Accidents and Injury decreases with age	250	4.232	0.707	1st
6.2	Older age group underreport accident cases	250	3.972	1.302	2nd
6.3	Adolescent group underreport accident cases than middle age group	250	3.844	1.269	3rd

Table 4.6: Contd.

S/n	Factor	N	Mean	Std Deviation	Rank
7.0	**Peer Influence**	**250**	**4.013**	**1.087**	
7.1	Coworkers discourages others to be safe and report accident cases	250	4.128	0.982	1st
7.2	Peer group influences accident reporting	250	4.068	1.126	2nd
7.3	Peer group influences safety behaviour	250	3.844	1.153	3rd
8.0	**Health and Safety Incentives**	**250**	**3.846**	**1.268**	
8.1	Real incentives in the form of monetary influences under-reporting	250	4.340	1.045	1st
8.2	Safety incentives for workers to reduce accidents end up reducing the number of accidents reported	250	4.332	1.067	2nd
8.3	Management encourages workers to visit their first aid box when they have accidents/injury	249	2.867	1.693	3rd
9.0	**Job Security and Empowerment**	**250**	**4.463**	**0.842**	
9.1	Workers who raise safety concerns have fear of retribution	250	4.604	0.688	1st
9.2	Job insecurity hampers workers' willingness to report accident	250	4.588	0.757	2nd
9.3	Workers who raise safety concerns are seen as trouble makers	250	4.196	1.082	3rd
10.0	**Workers' Attitude**	**250**	**4.417**	**0.697**	
10.1	Management practices affects workers attitude to report accident cases	250	4.512	0.724	1st
10.2	Workers' attitude to under-report accident cases is dependent on their age	250	4.372	0.628	2nd
10.3	Workers are often reluctant to report accidents because of the existing company's culture	250	4.368	0.740	3rd
11.0	**Blame Culture**	**250**	**4.176**	**1.136**	
11.1	Company has no clearly defined individuals with safety responsibilities	250	4.384	0.947	1st
11.2	Management focuses on how to complete projects than solving safety problems	250	4.184	1.329	2nd
11.3	Workers are often reluctant to report accident for fear of it being used to apportion blame	250	4.122	1.133	3rd
12.0	**Education and Training**	**250**	**4.255**	**1.189**	
12.1	Site inductions for workers and supervisors are rare in the company	250	4.480	1.080	1st
12.2	The company provides no education to workers on safety posters and boards	250	4.272	1.310	2nd
12.3	Workers have formal education up to at least WASSCE/NVTI level	250	4.013	1.176	3rd

Table 4.6: Contd.

S/n	Factor	N	Mean	Std Deviation	Rank
13.0	**Interpersonal Relationships**	**250**	**4.176**	**0.885**	
13.1	Interpersonal relationships influence accident reporting at workplace	250	4.800	0.401	1st
13.2	Company maintain good relations with employees and concerned authorities	250	4.004	0.779	2nd
13.3	Supervisors discourage workers to express their ideas and opinions about OHS accident at work	250	3.724	1.475	3rd

Source: Field Data, 2019

4.4.2 Factor Analysis of Respondents' views about Critical Factors Influencing Under-reporting of OHS Accidents within construction firm

The Linear Structural Relationships (LISREL) application was used to determine the relationships among the variables as confirmation to the adequacy of the variables. According to Trustees Indian University (TIU) (2008), when the unstandardized loadings of the latent variable are equal to or greater than at least twice the size of the standard errors, the estimates are significant at the 0.05 level. Again, when the squared multiple correlation coefficients (R^2) of the observed variable is greater than or equal to the 0.05 significant level, it means that the variable fits well with the model and suggest a positive correlation between the observed variable and the latent or unobserved variable.

From Table 4.7, the indicators "The company has no annual Health and Safety policy", "There are inadequate safety programmes in the company", and "There are limited or lack of personnel to handle accident cases in the company" all have their squared multiple correlation coefficients (R^2) greater than 0.05 significant level. These mean that the indicators are adequate and correlate strongly to their latent variable "Lack of Management Commitment".

All the indicators for factor 2 "Poor Communication" have their R^2 above 0.05 significant level depicting adequacy of the indicators and strong correlation to the latent variable. For factor 3 and 11, all the indicators have their R^2 below 0.05 significant level. The indicators did not fit well with the model. There is no correlation between the observed variables (indicators) and the latent variable.

For factor 4, two of the indicators (observed variables) "Norms, values, believes and practices of our company clearly impacts on the willingness of workers to report accidents" and " Poor safety culture contributes significantly to under-reporting of accidents" have their R^2 above 0.05 significant level whilst the observed variable "Poor safety climates influences under-reporting of accidents" recorded R^2 below the significant level. This observed variable poorly correlate with the latent variable.

Again, all the observed variables of factor 5 "Company's Goal" recorded R^2 above 0.05. The observed variables correlate well with the latent variable. For factor 6 (Workers' Age), two of the observed variables recorded R^2 below 0.05 significant level whilst one observed variable correlate well with the latent variable. Factor 7 "Peer Influence" also have two of its indicators (observed variables) in disarray recording an R^2 value below 0.05 significant level.

Factors 8, and 9 have two of their observed variables recording R^2 above 0.05 significant level whilst one observed variable each recorder lower R^2. Factor 10, 12 and 13 have only one of their indicators in strong correlation. The two of the indicators did not correlate with the factors.

Table 4.7 Observed variable loadings and Squared Multiple Correlation Coefficients (R^2)

S/n	Latent Variable /Factor	Observed variable /Indicator	Loading	R^2	Rule	Comment
1	Lack of Management Commitment	There are no annual Health and Safety policy in the company	1.00	0.37	**R^2=>0.05**	Fits well into the model
		There are inadequate safety programmes in the company	0.97 (0.12)	0.42	**R^2=>0.05**	Fits well into the model
		There are limited or lack of personnel to handle accident cases	1.00 (0.13)	0.41	**R^2=>0.05**	Fits well into the model
2	Poor Communication	There is bureaucracy in communication in the company	1.00	0.4	**R^2=>0.05**	Fits well into the model
		There are poor communication safety policies and procedures	0.51 (0.093)	0.14	**R^2=>0.05**	Fits well into the model
		The company lack system for reporting and investigation of accidents	0.71 (0.11)	0.22	**R^2=>0.05**	Fits well into the model
3	Company's Size	Small construction firms affect reporting of accidents than larger firms	1.00	0.00041	**R^2<0.05**	Does not Fits well into the model
		Size of company affects reporting of accidents	-2.02 (1.51)	0.013	**R^2<0.05**	Does not Fits well into the model
		Workers in smaller firms have lower accident rates	1.98 (1.44)	0.017	**R^2<0.05**	Does not Fits well into the model
4	Bad Safety Culture	Norms, values, beliefs and practices of our company impact on the willingness of workers to report accident	1.00	0.075	**R^2=>0.05**	Fits well into the model
		Poor safety culture contributes considerably to under-reporting of accidents	0.36 (0.23)	0.022	**R^2<0.05**	Does not Fit well into the model
		Poor safety climate influences under-reporting of accidents	0.51 (0.26)	0.043	**R^2=>0.05**	Fits well into the model

Table 4.7: Contd

S/n	Latent Variable/Factor	Observed Variable/Indicator	Loading	R^2	Rule	Comment
5	Company's Goal	The company sets goals and expected to achieve them within timeframe	1.00	0.120	**R2=>0.05**	Fits well into the model
		There is always pressure on workers to achieve the company's target	2.59 (1.86)	0.058	**R^2=>0.05**	Fits well into the model
		Unrealistic expectations of management in the form of incentives influences under-reporting	9.47 (2.51)	0.8	**R^2=>0.05**	Fits well into the model
6	Workers' Age	Adolescent group under-reports accidents cases than the middle age group	1.00	0.12	**R^2=>0.05**	Fits well into the model
		Older age group under-report accident cases	0.91 (0.77)	0.096	**R^2=>0.05**	Fits well into the model
		Accidents and injury decrease with age	-0.039 (0.16)	-0.0006	**R^2<0.05**	Does not Fits well into the model
7	Peer Influence	Coworkers discourage others to be safe and report accident cases	1.00	5.36	**R^2=>0.05**	Fits well into the model
		Peer group influences safety behaviour	0.016 (0.024)	0.00096	**R^2<0.05**	Does not Fit well into the model
		Peer group influences accident reporting	-0.013	0.00072	**R^2<0.05**	Does not Fit well into the model
8	Health and Safety Incentives	Management encourages workers to visit first aid box when they have accident/injury	1.00	0.2	**R^2=>0.05**	Fits well into the model
		Safety incentives for workers to reduce accidents end up reducing the number of accidents reported	0.48 (0.32)	0.11	**R^2=>0.05**	Fits well into the model
		Real incentives in the form of monetary influence under-reporting	-0.041 (0.51)	0.00087	**R^2<0.05**	Does not Fit well into the model

Table 4.7: Contd

S/n	Latent Variable/Factor	Observed Variable/Indicator	Loading	R^2	Rule	Comment
9	Job Security and Empowerment	Workers who raise safety concerns have fear of retribution	1.00	1.99	**R^2=>0.05**	Fits well into the model
		Job insecurity hampers workers' willingness to report accidents	7.27 (3.58)	1.28	**R^2=>0.05**	Fits well into the model
		Workers who raise safety concerns are seen as trouble makers	0.22 (0.41)	0.02	**R^2<0.05**	Does not Fit well into the model
10	Workers' Attitude	Management practices affect workers attitude to report accident cases	1.00	1.21	**R^2=>0.05**	Fits well into the model
		Workers' attitude to under-report accident cases is dependent on their age	0.089 (0.081)	0.02	**R^2<0.05**	Does not Fit well into the model
		Workers are often reluctant to report accidents because of existing company's culture	-0.084 (0.081)	0.014	**R^2<0.05**	Does not Fit well into the model
11	Blame Culture	Company has no clearly defined individuals with safety responsibilities	1.00	-0.064	**R^2<0.05**	Does not Fit well into the model
		Workers are often reluctant to report accidents for fear of it being used to apportion blame	-1.57 (0.83)	-0.062	**R^2<0.05**	Does not Fit well into the model
		Management focuses on how to complete projects than solving safety problems	-1.57 (0.83)	-0.081	**R^2<0.05**	Does not Fit well into the model
12	Education and Training	Site inductions for workers and supervisors are rare in the company	1.00	0.012	**R^2<0.05**	Does not Fit well into the model
		The company provides no education to workers on safety posters and boards	-2.16 (0.69)	0.047	**R^2<0.05**	Does not Fit well into the model
		The company provides no education to workers on safety posters and boards	-9.28 (1.70)	0.69	**R^2=>0.05**	Fits well into the model
13	Interpersonal Relationships	Supervisors discourage workers to express their ideas and opinions about OHS accident	1.00	4.06	**R^2=>0.05**	Fits well into the model
		Company maintain good relations with employees and concerned authorities	0.033 (0.026)	0.016	**R^2<0.05**	Does not Fit well into the model
		Interpersonal relationships influence accident reporting at workplace	0.22 (0.41)	0.00059	**R^2<0.05**	Does not Fit well into the model

Source: Field Data (2019)

Table 4.8 confirms 10 internal factors out of 13 factors that critically influence under-reporting of accidents within construction firms. Interpersonal relationships, Jobs security and empowerment, poor communication, lack of management commitment, bad safety culture, blame culture, education and training, company's goal, workers' age and workers' attitude are the most critical factors influencing under-reporting of accidents within the construction firms. Their path loadings are equal to or greater than twice their standard errors confirming the assertion of TIU (2008) in LISREL factor analysis.

Table 4.8: Internal Factor loadings and standard errors

Latent Variable (Factors)	Loading (L)	Standard Error (SE)	2SE	Rule	Comment
Interpersonal Relationships	8.86	3.40	6.80	**L= or >2SE**	Fits well into the model
Peer Influence	5.15	5.24	10.48	**L<2SE**	Does not Fit well into the model
Job Security and Empowerment	0.94	0.31	0.62	**L= or >2SE**	Fits well into the model
Poor Communication	0.71	0.15	0.30	**L= or >2SE**	Fits well into the model
Lack of Management Commitment	0.66	0.14	0.28	**L= or >2SE**	Fits well into the model
Health and Safety Incentives	0.56	0.43	0.86	**L<2SE**	Does not Fit well into the model
Workers' Age	0.20	0.03	0.06	**L =or >2SE**	Fits well into the model
Bad Safety Culture	0.34	0.14	0.28	**L= or >2SE**	Fits well into the model
Blame Culture	0.06	0.02	0.04	**L= or >2SE**	Fits well into the model
Education and Training	0.03	0.01	0.02	**L= or >2SE**	Fits well into the model
Company's Goal	0.02	0.01	0.02	**L= or >2SE**	Fits well into the model
Workers' Attitude	0.02	0.01	0.02	**L= or >2SE**	Fits well into the model
Company Size	0.01	0.02	0.04	**L<2SE**	Does not Fit well into the model

Source: Field Data (2019)

4.5 Factors Influencing Under-reporting of OHS Accidents on Construction sites to Statutory Authority

4.5.1 Descriptive Statistics of Respondents' views about critical Factors Influencing Under-reporting of OHS Accidents on Construction Sites to Statutory Authority

Descriptive statistics was used to show all the external factors that influence reporting of accidents on construction sites to statutory authority. The statistics were obtained based on the respondents' views with regards to these external factors. The results obtained are ranked in descending order as shown in Table 4.9 The significant mean level was pegged at 4.0. Anything above the 4.0 threshold is considered as a strong factor and those factors below the cut-off point are considered as either medium or weak factors.

The researcher wanted to investigate whether legal or regulations enacted by parliament have significant influence on accident reporting on construction sites to statutory authority. The respondents strongly agree that legal or regulations have significant influence on under-reporting of accidents. The resultant mean score of this construct is 4.261 which is above the threshold. The respondents agree to the factor indicators; "Our Company has no regulations that cover accident reporting procedures", "Ghana's laws and regulations have not included OHS accident reporting procedures", and "The company rarely report accident cases to statutory authority". The mean scores of these indicators are 4.364, 4.240, and 4.180 respectively.

As to whether Economy has an influence on under-reporting, the respondents expressed their strong agreement to that. The average mean score is 4.493. The mean scores of the indicators in Table 4.9 are 4.664, 4.612, and 4.204. All these depict a strong agreement that

Economy contributes significantly to under-reporting of accidents on construction sites to statutory authority.

The respondents also agree that Politics/Government is a critical external factor. Its average mean of 4.230 is above the threshold. The respondents agree to the statements that "Government policies affects construction projects", "Government officials feel unpopular when the number of accident cases rises in their regime", and "The statutory authorities treat accident report from construction firms with contempt". These statements have mean scores of 4.532, 4.496 and 4.092 respectively.

Again, Socio-cultural Practices construct also has all the indicators above the 4.0 threshold. The resultant mean score of this construct is 4.084 which is considered a strong external factor. It means that majority of the respondents have expressed strongly that "Socio-cultural Practices" is a critical external factor.

Technological Advancement in table 4.9, is also confirmed to be a critical external factor as identified in the literature. The resultant mean score is 4.480 which is above the threshold. All its indicators have mean scores above 4.00.

In probing further as to whether "Education and Training" contributes significantly to under-reporting of accidents, the respondents expressed a strong agreement. The three indicators in table 4.9 all have their mean scores above the 4.00 threshold. The resultant mean score of the construct "Education and Training" is 4.485, which suggest it has significant influence on under-reporting of accidents.

The construct "Environment" and all its three indicators were also indicated by the respondents to be significant. The three indicators have mean scores of 4.488, 4.412 and

4.352. The resultant mean score of all the three indicators is 4.417, which indicates that "Environment" is a critical factor that significantly contributes to under-reporting of accidents.

The resultant mean scores of all the identified external factors have exceeded the 4.0 threshold, connoting that the respondents have agreed that these factors really influence under-reporting of accidents within construction firms in Ghana. In table 4.9, Economy, Education and Training, Technological Advancement, and Environment occupy the 1st, 2nd, 3rd, and 4th positions respectively with resultant mean scores of 4.493, 4.485, 4.480, and 4.417 respectively. Politics/Government, Legal/Regulations and Socio-cultural Practices also occupy the 5th, 6th and 7th positions respectively with resultant mean scores of 4.373, 4.261, and 4.080 respectively.

Table 4.9: Descriptive Statistics of Respondents' views about Critical External Factors

S/n	Factors	N	Mean	Std. Deviation	Rank
14.0	**Legal/Regulations**	**250**	**4.261**	**1.096**	
14.1	Our Company has no regulations that cover accident reporting procedures	250	4.364	0.952	1st
14.2	Ghana's laws and regulations have not included OHS accident reporting procedures	250	4.240	1.082	2nd
14.3	The company rarely report accident cases to statutory authority	250	4.180	1.253	3rd
15.0	**Economy**	**250**	**4.493**	**0.711**	
15.1	The employees are not insured against accidents and injuries	250	4.664	0.699	1st
15.2	The economy of the country affects our construction works	250	4.612	0.681	2nd
15.3	Workers are much interested in meeting their financial needs	250	4.204	0.751	3rd

Table 4.9: Contd

S/n	Factor	N	Mean	Std Deviation	Rank
16.0	**Politics/Government**	**250**	**4.373**	**0.863**	
16.1	Government policies affects construction projects	250	4.532	0.665	1st
16.2	Government officials feel unpopular when the number of accident cases rises in their regime	250	4.496	0.762	2nd
16.3	The statutory authorities treat accident report from construction firms with contempt	250	4.092	1.163	3rd
17.0	**Socio-Cultural**	**250**	**4.084**	**1.013**	
17.1	Employees prefer treating injuries and accident at home than reporting	250	4.116	1.041	1st
17.2	Norms, values and beliefs of community where projects are to be sited have influence on safety behaviour	250	4.084	0.997	2nd
17.3	Language barrier prevents workers from reporting accident cases to supervisors and statutory authorities	250	4.052	1.003	3rd
18.0	**Technological Advancement**	**250**	**4.480**	**0.758**	
18.1	The company has no online accident reporting system	250	4.440	0.830	1st
18.2	The company has not put in place system to monitor employees' safety behaviour	250	4.480	0.772	2nd
18.3	Many workers are not abreast with the use of technology to report accident cases	250	4.520	0.672	3rd
19.0	**Education and Training**	**250**	**4.485**	**0.755**	
19.1	The level of education of the workers have influence on accident reporting to statutory authorities	250	4.624	0.485	1st
19.2	The level of education of the workers have influence on their safety behaviour	250	4.476	0.756	2nd
19.3	No site inductions for workers and supervisors regularly to improve on their safety behaviour	250	4.356	1.024	3rd
20.0	**Environment**	**250**	**4.417**	**0.803**	
20.1	The nature of the environment at a particular time influence reporting of accident	250	4.488	0.724	1st
20.2	Weather conditions at times affects construction activities	250	4.412	0.746	2nd
20.3	Environmental factors influence safety behaviour	250	4.352	0.938	3rd

Source: Field Data, 2019

4.5.2 Factor Analysis of Respondents' views about Critical Factors Influencing Under-reporting Reporting of OHS Accidents on Construction Sites to Statutory Authority

From Table 4.10, the indicators of factor 1, "Ghana's laws and regulations have not included OHS accident reporting procedures", Our Company has no regulations that cover accident reporting procedures", and "The company rarely report accident cases to statutory authority" all have their R^2 greater than 0.05 significant level which suggest that all these indicates are adequate and correlate strongly with their latent variable "Legal or Regulations"

All the indicators for factor 2 "Economy" have their R^2 below 0.05 significant level depicting inadequacy and disassociation with the latent variable. For factor 3, the indicators "Government policies affects construction projects" and "Government officials feel unpopular when the number of accident cases rises in their regime" have their R^2 above 0.05 significant level. The indicators fit well with the model. There is a strong correlation between these observed variables (indicators) and the latent variable. The observed variable "The statutory authorities treat accident report from construction firms with contempt" disarrayed with the latent variable.

For factor 4, 6 and 7 have two of their indicators (observed variables) having their R^2 above 0.05 significant level whilst one of the observed variables recorded R^2 below the significant level. Again, factor 5 have only one of its observed variables well correlated. Two of its observed variables could not correlate well with the latent variable.

Table 4.10: Observed variable loadings and Squared Multiple Correlation Coefficients (R^2)

S/n	Latent Variable /Factor	Observed variable /Indicator	Loading	R^2	Rule	Comment
1	Legal/ Regulation	Ghana's laws and regulations have not included OHS accident reporting procedures	0.32 (0.16)	0.051	**R^2=>0.05**	Fits well into the model
		Our Company has no regulations that cover accident reporting procedures	0.34 (0.15)	0.061	**R^2=>0.05**	Fits well into the model
		The company rarely report accident cases to statutory authority	0.52 (0.32)	0.18	**R^2=>0.05**	Fits well into the model
2	Economy	The employees are not insured against accidents and injuries	0.036 (0.12)	0.0027	**R^2<0.05**	Does not Fits well into the model
		The economy of the country affects our construction works	-0.11 (0.30)	0.025	**R^2<0.05**	Does not Fits well into the model
		Workers are much interested in meeting their financial needs	0.036 (0.12)	0.023	**R^2<0.05**	Does not Fits well into the model
3	Politics	Government policies affects construction projects	0.27 (0.12)	0.16	**R^2=>0.05**	Fits well into the model
		Government officials feel unpopular when the number of accident cases rises in their regime	0.30 (0.13)	0.15	**R^2=>0.05**	Fits well into the model
		The statutory authorities treat accident report from construction firms with contempt	0.21 (0.14)	0.032	**R^2<0.05**	Does not Fits well into the model

Table 4.10: Contd

S/n	Latent Variable/ Factor	Observed Variable/Indicator	Loading	R^2	Rule	Comment
4	Socio-cultural	Language barrier prevents workers from reporting accident cases to supervisors and statutory authorities.	0.42 (0.42)	0.18	**R^2=>0.05**	Fits well into the model
		Norms, values and beliefs of community where projects are to be sited have influence on safety behaviours	0.22 (0.23)	0.052	**R^2=>0.05**	Fits well into the model
		Employees prefer treating injuries and accident at home than reporting	0.077 (0.15)	0.0055	**R^2<0.05**	Does not Fits well into the model
5	Technology	The company has not put in place system to monitor employees' safety behaviour	1.12 (1.71)	2.11	**R^2=>0.05**	Fits well into the model
		The company has no online accident reporting system	0.021 (0.048)	0.0061	**R^2<0.05**	Does not Fits well into the model
		Many workers are not abreast with the use of technology to report accident cases	-0.094 (0.15)	0.02	**R^2<0.05**	Does not Fits well into the model
6	Education & Training	The level of education of the workers have influence on their safety behaviours	1.20 (0.90)	2.51	**R^2=>0.05**	Fits well into the model
		The level of education of the workers have influence on accident reporting to statutory authorities	0.035 (0.028)	0.051	**R^2=>0.05**	Fits well into the model
		No site inductions for workers and supervisors regularly to improve on their safety behaviours	0.020 (0.060)	0.00036	**R^2<0.05**	Does not Fits well into the model

Table 4.10: Contd

S/n	Latent Variable/ Factor	Observed Variable/ Indicator	Loading	R^2	Rule	Comment
7	Environment	Weather conditions at times affects construction activities	0.17 (0.083)	0.051	**R^2=>0.05**	Fits well into the model
		The nature of the environment at a particular time influence reporting of accident	0.13 (0.081)	0.032	**R^2<0.05**	Does not Fit well into the model
		Environmental factors influence safety behaviours	-0.37 (0.15)	0.16	**R^2=>0.05**	Fits well into the model

Source: Field Data (2019)

From Table 4.11, six (6) external factors were confirmed to critically influence under-reporting of accidents within construction sites to statutory authority. They include Laws and Regulations, Politics and Government, Socio-Cultural Practices, Technological Advancement, Education and Training, and Environment factors.

Although Economy has its average mean score above 4.0, it did not meet the rule of TIU (2008). It has its loading less than twice the standard error. This suggests that its adequacy and relationship with other variables could not be validated and confirmed as critical factor that influence under-reporting of accidents on construction sites to Statutory Authority.

Table 4.11: External Factor loadings and standard errors

Factors	Loading (L)	Standard Error (SE)	2SE	Rule	Comment
Laws and Regulations	0.13	0.013	0.026	**L= or >2SE**	Fits well into the model
Economy	0.02	0.15	0.3	**L<2SE**	Does not Fit well into the model
Politics/Government	0.62	0.2	0.4	**L= or >2SE**	Fits well into the model
Socio-Cultural	0.32	0.12	0.24	**L= or >2SE**	Fits well into the model
Technological Advancement	0.35	0.15	0.3	**L= or >2SE**	Fits well into the model
Education and Training	2.47	0.78	1.56	**L=or>2SE**	Fits well into the model
Environment	1.09	0.37	0.74	**L= or >2SE**	Fits well into the model

Field survey (2019)

4.6 Critical constraints to reporting of OHS accidents in the construction sector

The study determines the critical constraints to reporting of OHS accidents in the construction sector in Ghana. This was done using descriptive statistics to show all the constraints to reporting of OHS accidents. The statistics were obtained based on the respondents' views and the results ranked in descending order as shown in Table 4.12. A significant mean of 4.0 was pegged.

As to whether lack of knowledge of health and safety issues is a critical constraint to reporting of accidents in the construction sector, the respondents agreed that it is a constraint. The indicators "Knowledge of OHS is a major constraint to accident reporting", "The workers have no knowledge of OHS issues" and "Lack of OHS knowledge affects workers safety behaviours" had mean scores of 4.464, 4.352 and 4.076 respectively which are all above the 4.0 threshold. The resultant or average mean of these indicators is 4.297 which depicts the respondents' high level of agreement.

Lack of financial and material resources was also agreed by the respondents to be a critical constraint to reporting accidents. All the indicators to this construct have their means above 4.0. The average mean score of this factor is 4.320.

Again, the respondents indicated that temporary or casual employment is a constraint to reporting of accidents. In response to whether the construction firms hire temporary or casual workers than permanent workers, the respondents highly agree with a mean score of 4.496. They indicated that most workers on temporary, casual, or part-time often accept unsafe working conditions (mean score = 4.412), and that, it is easy to deal with temporary workers than the permanent workers (mean score = 4.412).

Bureaucratic Procedures in construction firms was also agreed by the respondents to be a critical constraint to reporting of accidents. This was revealed based on the responses given to the following statements:

- workers' ignorance of the reporting procedures stops accidents being recorded;
- bureaucratic procedures in the company hamper reporting; and
- reporting accident cases procedures is quite bureaucratic

The mean scores of these statements or indicators were 4.316, 4.312 and 4.184 respectively. The average mean score was 4.271 which indicates the level agreement.

Work load was is a critical constraint to reporting of accidents in the construction firms. The respondents were asked to indicate their level of agreement or disagreement to the following statements:

- under-reporting of accidents and injuries might be due to lack of time;
- time-constraint is a critical limitation to under-reporting; and
- workers work in all jobs irrespective of their area of expertise.

The mean scores of 4.252, 4.200, and 3.792 respectively of the statements confirm that work load is a critical constraint to reporting of accidents. The resultant mean score of "work load" is 4.048.

Technological Advancement is a critical constraint to reporting of accidents in the construction sector. Its average mean of 4.071 is above the threshold. The respondents agree to the statements that "Under-reporting of accidents and injuries might be due to rigorous online reporting process", "Integrating technology in companies' operations is a major challenge" and "Workers' lack of knowledge in technology prevents them from reporting accident cases". These statements had mean scores of 4.264, 4.008, and 3.940 respectively indicating a strong level of agreement.

In probing further as to whether "Religion and Culture" is considered a significant constraint to reporting of accidents, the respondents expressed a strong agreement. The three indicators in table 4.12 all have their mean scores above the 4.00 threshold. The resultant mean score of the construct "Religion and Culture" was 4.244, which is also above the threshold.

Furthermore, "age of workers" also has three indicators. From Table 4.12, all the three indicators of this construct had mean values above the 4.0 threshold. It is therefore considered as a critical constraint. Age of workers recorded an average mean score of 4.036.

Again, “lack of human resource personnel” also has all the indicators above the 4.0 threshold. The indicators “The company has no safety personnel”, Lack of expertise and resources prevents workers from reporting accident cases”, and “Lack the expertise and the resources affects accident statistics” had mean scores of 4.372, 4.260, and 4.208 respectively. The resultant mean score of this construct is 4.280 which is considered a constraint.

The respondents were probed, whether language barrier could be a critical constraint to reporting of accidents. The three indicators had mean scores of 4.252, 4.232, and 4.212, with an average mean score of 4.232. These suggest that language barrier a critical constraint to reporting of accidents in the construction sector.

From the statistics, temporary employment, lack of financial and material resources, lack of knowledge of health and safety issues, lack of human resource personnel, and bureaucratic procedures occupy the 1st, 2nd, 3rd, 4th and 5th positions respectively with average mean scores of 4.440, 4.320, 4.297, 4.280 and 4.271 respectively. Religion and culture, language barrier, workload, technological advancement, and age of workers occupy the 6th, 7th, 8th, 9th and 10th positions respectively with average mean scores of 4.244, 4.232, 4.080, 4.071 and 4.036 respectively.

Table 4.12: Descriptive statistics of Respondents' views about critical constraints to reporting of OHS Accidents in the Construction Sector

S/n	Constraint -indicator	N	Mean	Std. Deviation	Rank
1.0	**Lack of Knowledge of Health & Safety issues**	**250**	**4.297**	**0.844**	
1.1	Knowledge of OHS is a major constraint to accident reporting	250	4.464	0.500	1st
1.2	The workers have no knowledge of OHS issues	250	4.352	0.942	2nd
1.3	Lack of OHS knowledge affects workers safety behaviours	250	4.076	1.089	3rd
2.0	**Lack of Financial and Material Resources**	**250**	**4.320**	**0.765**	
2.1	Inadequate financial and material resources hamper accident reporting procedures	250	4.440	0.626	1st
2.2	Construction companies generally have financial and material resource constraints	250	4.292	0.573	2nd
2.3	The company have inadequate financial and materials resources to deal with accident cases	250	4.228	1.098	3rd
3.0	**Temporary Employment**	**250**	**4.440**	**0.929**	
3.1	The company hires temporary workers than permanent	250	4.496	0.777	1st
3.2	Workers on temporary, casual, or part-time often accept unsafe working conditions	250	4.412	0.983	2nd
3.3	It is easy to deal with temporary workers than the permanent workers	250	4.412	1.027	3rd
4.0	**Bureaucratic Procedures**	**250**	**4.271**	**0.970**	
4.1	Workers' ignorance of the reporting procedures stops accidents being recorded.	250	4.316	0.914	1st
4.2	Bureaucratic procedures in the company hamper reporting	250	4.312	1.097	2nd
4.3	Reporting accident cases procedures is quite	250	4.184	0.900	3rd
5.0	**Work load**	**250**	**4.081**	**1.294**	
5.1	Under-reporting of accidents and injuries might be due to lack of time	250	4.252	1.059	1st
5.2	Time-constraint is a critical limitation to under-reporting.	250	4.200	1.137	2nd
5.3	Workers work in all jobs irrespective of their area of expertise	250	3.792	1.687	3rd
6.0	**Technological Advancement**	**250**	**4.071**	**1.129**	
6.2	Under-reporting of accidents and injuries might be due to rigorous online reporting process	250	4.264	0.962	1st
6.3	Integrating technology in the company's operations is a major challenge	250	4.008	1.267	2nd

Table 4.12: Contd

S/n	Constrain-Indicator	N	Mean	Std Deviation	Rank
6.1	Workers' lack of knowledge in technology prevents them from reporting accident cases	250	3.940	1.158	3rd
7.0	**Religion and Culture**	**250**	**4.244**	**1.037**	
7.1	Poor organizational safety culture is a major constraint to reporting of accident cases	250	4.324	1.011	1st
7.2	Workers' religion and their extended family system are constraints to reporting of accident	250	4.248	1.011	2nd
7.3	Poor safety climate is a constraint to reporting of accidents	250	4.160	1.090	3rd
8.0	**Age of Workers**	**250**	**4.036**	**1.191**	
8.1	Age has influence on productivity of workers	250	4.108	1.144	1st
8.2	Age of workers is a major constraint to under-reporting of accidents	250	4.012	1.230	2nd
8.3	Age of workers has influence on their safety behaviour	250	3.988	1.197	3rd
9.0	**Human Resource personnel**	**250**	**4.280**	**1.013**	
9.1	The company has no safety personnel	250	4.372	0.910	1st
9.2	Lack of expertise and resources prevents workers from reporting accident cases	250	4.260	0.990	2nd
9.3	Lack the expertise and the resources affects accident statistics	250	4.208	1.139	3rd
10.0	**Language Barrier**	**250**	**4.232**	**0.941**	
10.1	Some of the workers have problem with medium of communication and as such find it difficult reporting issues	250	4.252	0.876	1st
10.2	Workers whose native language is not English or a particular language are not able to report accident	250	4.232	0.966	2nd
10.3	Provision is made to enable workers report accident cases irrespective of the language they speak	250	4.212	0.981	3rd

Source: Field Data (2019)

4.7 Nature of the interaction between factors influencing under-reporting of accidents in the construction sector

4.7.1 Results of Exploratory Interviews

4.7.1.1 Inspectorate Board and Consultants

The interviews with key participants such as health and safety personnel in the Regional Factory and Inspectorate Board, and consultants suggested a low level of involvement of the appropriate authorities in the construction firms. One of the respondents said:

> "Our responsibilities with regards to inspections, monitoring and OHS accident documentations has always been a challenge. It is a difficult task, considering the huge constraints facing the department. Lack of logistics, transport and finance are the major challenges".

A respondent from the factory inspectorate board indicated that:

> "Many people do not want to work in the factory inspectorate. As you can see, our office is just a single room with no logistics. Our scheme of service is not attractive so we recruit staff, they get trained for the basic rudiments of factory inspection and then after one year they find some lucrative places to go and work. As a result, many construction firms do not even know that there is an inspectorate board in the region, where they can get support on health and safety. Many of these firms do not have health and safety professionals".

4.7.1.2 Project Nature and Time, Environment, Economic and Political Influences

One of the site managers interviewed said:

> "Our company deals with time and as such our major concentration is to finish our project, time is money".

It was also said from one of the site managers that:

> "We are not really abreast with OHS issues. Our major goal is to finish our project. As you know in construction, we work to tight schedules to meet deadlines and even sometimes have to work overtime and in the night. Mostly, we employ casual workers. They are easy to deal with. For projects, we work so that we don't run at a lost. Much pressure is put on the workers to achieve our goal. If you delay with a project, it comes with cost, and if you

don't take time we will run at a lost. It becomes worst during the rainy season where we have to work aggressively to avoid the effect of rain on our work. With government projects, we work assiduously to complete work with the regime of the government. Most new governments halt projects and at time delay contract payments which affects our work. Economic conditions can also change which will affect as. As a result, we use all means to complete projects awarded to us on schedule. For small government projects, normally there are no provisions for health and safety and as such, the management of health and safety becomes a problem. We provide only the basic items needed for the health and safety of workers which we can afford".

4.7.1.3 Workers Attitude and Age

Concerning workers attitude towards health and safety, one of the site managers said:

"The attitudes of workers towards health and safety issues is a concern. They work to get paid. Is only that, we try to monitor their activities so that they don't get hurt on site". Most of our workers are young within the ages of 20-45. Few are below this range and few are above this range. Attitude and age could influence them from reporting accident cases".

4.7.1.4 Education and Training

One of the operatives interviewed indicate that:

"The site manager does not organise induction training for the site workers. We just commence work and work till the project finishes".

This was also confirmed by one of the managers:

"We actually do not organised induction training for the workers. When the need arises, we give the on-the-job demonstration. Most of the workers are NVTI graduates with few from SHS and JHS". There is the need to train them but the resources and project time will not permit us to do so. Again, taking off some time to train staff on the site is difficult, though training enhances the competence of operatives to increase their productivity"

Another site manager indicated that:

"Some workers are illiterates and difficult to educate; even some of them at times come to the site drunk or influence by drugs which is wrong. If a colleague worker should tell another worker to pick a nail on site, he will reply by saying you should have picked the nail on the road while coming to work. He thinks it is a waste of time. They need constant education and counselling on the site".

4.7.1.5 Health and Safety Policy

On health and safety policy guidelines, an interviewee (Site manager) indicate that:

> "In truth, we do not have a health and safety policy guidelines. Essentially, what we normally do on our various sites is to discuss health and safety with our site operatives by stressing on things we see as hazards on the site and reminding them from time to time".

4.7.1.6 Accident Reporting and Recording

One of the managers indicate that:

> "In fact, we do not keep accident records at our sites. Workers do not report accident cases to me. However, when we witness an accident, we try to take the patient to Health Facility and normally we pay the medical expenses. We actually don't keep records of accidents".

One of the site managers also said:

> "We have not experienced serious accidents on our sites before except minor ones, which do not require the victim taking some time off, and so we really have not recorded such accidents or seriously investigated them".

Another manager explained that:

> "Scarcely do serious accidents happen on our sites just as in many small construction businesses which carry out small works. We carry out simple projects where the risk of hazards is lower than say complex multi-storey projects. If the work is hazardous then the contractor will have to prepare for it but where there are only little health and safety problems a contractor may not adopt any measures to control the risks. In my few one reason why most of us don't keep such records is that, some site managers or site supervisors rose to the position by virtue of their experience. Poor writing skills therefore is a reason why we do not keep records on health and safety".

Again, a mason who was interviewed said:

> "I have never reported any injury to my Forman. I manage it alone and continue to work. The site doesn't have first aid, so when I am going to work, I normally go with plaster, bandage and other things in case I get injured".

4.7.1.7 Technology

The construction managers agreed that technology play important role in modern construction works. One of the managers said:

> "Construction is dynamic; introduction of new technology means we need to change our approach to safety on site. Unfortunately, upgrading courses in the Universities, Polytechnics, and Technical institutions to reflect new methods and new hazards is a problem. Apart from phone calls, we don't apply any other technology here. Our schedules are just sketches on paper."

4.7.1.8 Job Security

An operative lamented on the issue of health and safety and the behaviour of construction workers and put it this way:

> "…. Jobs are hard to come by nowadays. So, if you make a mistake, they will dismiss you. Reporting accident cases is handled within ourselves".

One of the managers contributed to job security by saying that:

> "..because of lack of jobs, some workers feel they have suffered before getting the job or staying at home without a job is a bitter lesson; so, they are afraid of asking of their rights. He or she is afraid to tell management that look, if I am not wearing a helmet, I cannot go up this ladder because he may be sacked which may not be the case". As a result, they do not report injury or accident cases".

4.7.2 Multiple Linear Regression of factors

Multiple regression was done to determine how much of the variance in the dependent variable can be explained by independent variables. It gives indication of relative contribution of the independent variable. The equation below is the multiple linear regression equation:

$$(y)= b_0+b_1(x_1) +b_2(x_2) +b_3(x_3) +b_4(x_4) +b_5(x_5)\ldots\ldots\ldots +b_n(x_n),$$

where b_1, b_2, b_3……are partial regression coefficients and the intercept b_0 is the regression constant, and x_1, x_2, x_3 are the predictor or independent variables.

From table 4.13, the equation becomes:

$$(y)= 0.073+0.055(x_1)+0.053(x_2)+0.055(x_3)+0.050(x_4)+0.054(x_5)\ldots. +0.058(x_{20}),$$

This equation means that, a unit change in ineffective or lack of management commitment to health and safety issues will influence underreporting by 0.055. A unit change in poor communication in construction firms will affect accident reporting by 0.053. Company size, whether small or large has significant influence on underreporting. A unit change in Poor Safety Culture, Company Goal, Peer Influence, Safety Incentive, Job Insecurity, Blame Culture, Education and Training, Interpersonal Relationship, Worker's Age, and Worker's Attitude will influence underreporting of accidents by .055, .050, .054, .052, .058, .056, .038, .057, .054, .053, and .050 respectively. Again, a unit change in OHS regulations will influence underreporting of accident by 0.058. Poor economic foundations will affect accident reporting in the construction sector by 0.059. A unit change in Politics and poor Governance, Socio-cultural, Technology, Education, and Environment will affect OHS accident reporting by .058, .050, .056, .051, and .058 respectively.

The nature of the interaction between these factors can be explained using Table 4.14. From the table 4.14, the p-value (sig.) is 0.000, which is less than the alpha value of 0.05. This indicates that, all the factors (internal and External factors) jointly influence underreporting of accidents. There is association among these factors. This further implies that much attention should be paid to these factors to enhance OHS accident reporting. Management commitment, good communication, good company size, and good company's safety

culture will reduce underreporting of accidents. Achievable Company's Goal, Good Peer Influence, good safety Incentive, Job security, absence of Blame Culture, regular Education and Training, good Interpersonal Relationship, Youthful age of Worker, and good Worker's Attitude are factors that will enhance accident reporting in the construction sector.

Table 4.13: Multiple Linear Regression of Factors

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	.073	.034		2.165	.031	.007	.139
Lack of Management Commitment	.055	.002	.300	35.402	.000	.052	.058
Poor Communication	.053	.002	.262	31.133	.000	.049	.056
Company's Size	.055	.001	.230	37.465	.000	.052	.058
Safety Culture	.050	.002	.177	27.804	.000	.046	.053
Company Goal	.054	.001	.248	40.991	.000	.052	.057
Peer Influence	.052	.002	.181	29.446	.000	.049	.056
Safety Incentive	.058	.001	.256	39.820	.000	.056	.061
Job insecurity	.056	.002	.166	25.860	.000	.051	.060
Blame Culture	.038	.002	.152	25.018	.000	.035	.041
Education and Training	.057	.002	.221	35.280	.000	.053	.060
Interpersonal Relationship	.054	.002	.154	25.066	.000	.050	.058
Worker's Age	.053	.002	.180	29.535	.000	.050	.057
Worker's Attitude	.050	.002	.141	22.585	.000	.046	.055
Regulation	.058	.002	.204	33.202	.000	.054	.061
Economy	.059	.003	.138	22.582	.000	.054	.064
Politics/Government	.058	.002	.179	29.410	.000	.054	.061
Socio-cultural	.050	.002	.171	28.244	.000	.046	.053
Technology	.056	.003	.132	20.618	.000	.051	.061
Education	.051	.002	.131	21.227	.000	.047	.056
Environment	.058	.003	.148	23.078	.000	.053	.063

A. Dependent Variable: Underreporting
Source: Field Data (2019)

Table 4.14: ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	7.775	20	.389	1442.193	.000[b]
	Residual	.061	228	.000		
	Total	7.836	248			

a. Dependent Variable: Underreporting

b. Predictors: (Constant)

Source: Field Data (2019)

CHAPTER FIVE

DISCUSSION OF RESULTS OF THE STUDY

5.1 Introduction

This chapter presents and discusses the data analysed in chapter four. The discussion is basically on "an empirical examination of under-reporting of OHS accidents in the construction sector in Ghana". The results and findings from the analysed data are discussed and presented in three themes based on the research objectives: critical factors contributing to under-reporting of OHS accidents within construction firms in the construction sector in Ghana; critical factors contributing to under-reporting of OHS accidents on construction sites to statutory authorities in Ghana; critical constraints to reporting of OHS accidents in the construction sector in Ghana; and nature of the interaction between factors influencing under-reporting of accidents in the construction sector in Ghana.

5.2 Critical Factors Contributing to Under-reporting of OHS Accidents within Construction Firms in the Construction Sector in Ghana

The questionnaire was designed for site managers and site operatives to indicate their levels of agreement or disagreement to 39 statements which serve as indicators of 13 constructs or factors. It was established from LISREL factor analysis that, only 10 factors out of the 13 factors, critically contribute to under-reporting of accidents within the construction firms. The remaining 3 factors were considered to be very weak factors.

The construct or factor, “Lack of Management Commitment” was identified as a critical factor that contribute to under-reporting of accidents within the construction firms. It was identified that inadequate safety performance programmes, limited or lack of personnel to handle safety issues, and absence of annual health and safety policy were critical issues of management that contribute significantly to under-reporting of accident within the construction firms. McCabe et al (2017) and Kobb and Stikova (2013) indicate that personnel or structures should be put in place as part of organizational HSMS to record and report accidents, injuries and illness. According to Clark (1998), accident reporting is an objective measure of level of managerial commitment to safety. If management truly wants to improve on accident reporting, they should improve on proper records administration; maintain adequate accidents reporting requirements; institute adequate safety programmes; and ensure that the required health and safety personnel are available to handle accident cases.

The results revealed that poor communication is a critical factor that contribute to under-reporting of accidents within the construction firms. The results indicated that many of the construction firms lack systems for reporting and investigation of accidents. According to Mearns et al (2003), accurate reporting will not occur unless a clear message is percolated down from top management and communicated to site managers and employees at the floor level. However, it was identified from the field data that, many of the construction firms have bureaucracy in communication and have poor communication safety policies and procedures.

The factor “Poor Safety Culture of Company” is one of the critical factors contributing significantly to under-reporting. The results of the study revealed that poor safety climate influences under-reporting of accidents within the construction firms. The results also demonstrated that norms, values, beliefs and practices of construction firms clearly impact on the willingness of workers to report accidents. This confirms the views of Christine and Marlow (2005) citing Wagennar (1998) that, the health and safety culture within an organisation is a major factor that influence on the health and safety-related behaviour of workers. Curcuruto and Griffin (2018) indicate that good organizational and citizenship behaviour at workplace have positive consequences on organizations. Probst et al (2008) indicate that, organizations should adopt proper safety climates, ensuring that all accidents and injuries are properly recorded, handled and reported.

The data collected and analysed indicated that “company’s goal” contributes to under-reporting of accidents. It was revealed that construction firms normally set goals and expect to achieve them within time frame and that normally put undue pressure on workers to achieve the set goals. It was observed also that, unrealistic expectations of management in the form of a safety incentive program normally discourage workers from accurately reporting accidents and injuries to site managers or higher authority, which supports the views of Pransky et al (1999).

The results of the study further identified workers' age to be a factor that influence under-reporting of accidents. It was established that, accidents and injury normally decrease with age, and that adolescents and the older age group under-report accident cases than middle age group. These study results confirm the view of Karr (2000) that, the incidence of

accidents or injury decreases with age and that, the accident or injury severity and the incidence of fatal occupational injuries increase with age. The results also confirmed the view of Parker et al (1994) that, there is substantial under-reporting of adolescent work accidents or injuries, and that two thirds of adolescent work accidents or injuries are not reported to the appropriate authority. In the study of Miller et al (2005), older workers are more likely to under-report accident than younger workers. For them, fears about accidents or incidents seen or reported implies that they are no longer capable of performing their job.

Job Security and Empowerment is one of the factors that contributes to under-reporting of accidents within the construction firm. The results of the study indicated that workers who raise safety concerns have fear of retribution, and that job insecurity hampers workers' willingness to report accident within the construction firms. It was established by the study results that, workers who raise safety concerns are seen as trouble makers. These results are evidence of the views of Grunberg et al (1996) that, job insecurity contributes to under-reporting. According to Pransky et al (1999), workers are always having the fear of being assigned to undesirable lighter-duty jobs, loss of overtime, separation from co-workers, concerns about abandoning their team, fear of been sacked from their job, fear of being labelled by their supervisors as unable to do their job or as a complainer, and belief that having symptoms is a sign of weakness.

The results also identified “Workers’ Attitude” as a factor that contributes to under-reporting of accidents. It was established that management practices affect workers’ attitude to report accident cases and that workers’ attitude to under-report accident cases is

dependent on their age. The results also revealed that, workers are often reluctant to report accident cases because of existing company's culture. The results confirmed the views of Miller et al (2005) that, individual attitude influences under-reporting of accidents at workplace.

Blame culture was also confirmed by the results to be a critical factor that contributes to under-reporting of accidents within construction firms. It was ascertained that, individuals in the firms are not defined with safety responsibilities. Management focuses on how to complete projects than solving safety problems and as such workers are often reluctant to report accident for fear of it being used to apportion blame.

The results of the factor "Education and Training" suggest that, it is a critical factor that contributes to under-reporting of accidents. The results revealed that, many of the construction firms rarely organise inductions courses for their workers and supervisors. The field data established that, construction firms provide no education to workers on safety posters and boards, meanwhile majority of the workers had only WASSCE/NVTI certificates that need further training or induction programmes. This may be in line with the opinion of Eskandari et al (2018) that, safety education and training enhance knowledge and motivation, and thus improves safety reporting climate.

The data analysed has established that "Interpersonal Relationships" is a critical internal factor that influence reporting of accidents. The results revealed that, interpersonal relationships influence accident reporting at workplace and that, company or firms must maintain good relations with employees and concerned authorities. It was established from

the field data that, most supervisors discourage workers from expressing their ideas and opinions about OHS accident at work. In the views of Eskandari et al (2018), interpersonal relationship has a potential influence on reporting of accidents. The relationships between workers and supervisors could lead to open discussion and reporting of accidents to the supervisors. Hanneman and Riddle (2005) indicate that, interpersonal relationships or social networking offers a means of mapping and exposing the hidden channels of communication and information flow which improves the effectiveness and efficiency of communication, reporting and decision-making processes in organizations.

5.3 Critical Factors Contributing to Under-reporting of OHS Accidents on Construction Sites to Statutory Authorities in Ghana

In assessing the critical factors that contribute to under-reporting of OHS accidents on construction sites to statutory authorities, respondents involving site managers and operatives were asked to indicate their levels of agreement or disagreement to 7 constructs with 21 statements or indicators. Each construct has 3 statements or indicators. Out of the 7 constructs, 6 of them were validated and confirmed by LISREL to be the critical external factors contributing to under-reporting of accidents.

The study showed that, legal or regulations significantly contributes to under-reporting of accidents. It was confirmed that, firms have no regulations that cover accident reporting procedures. The study also revealed that, Ghana's laws and regulations have not included OHS accident reporting procedures, and as such many of the firms rarely report accident cases to statutory authorities. This result is in line with the assertion of Danso (2010) that, Ghanaian construction sector have not developed well enough to have a separate OHS legislation. In the view of Tetteh (2003), close collaboration, networking, and coordination

in respect of the health and safety functions of institutions responsible for OHS management have been poor, resulting in health and safety being accorded a low profile within occupations in the country. Muchiri (2003) indicates that poor infrastructure and funding, insufficient number of qualified OHS practitioners, and the general lack of adequate information are the main drawbacks to the provision of effective enforcement of OHS regulations. In the opinion of Kheni (2008), accident reporting to Factory Inspectorate Department is poor due to the fact that companies rarely register their sites as required under the Factories, Offices and Shops Act, and he established that factory inspectors do not regularly visit construction sites to enforce compliance with health and safety legislation.

Politics/Government is considered one of the critical external factors that affects under-reporting. The results of the study indicated that, government officials feel unpopular when the number of accident cases rises in their regime and as such the statutory authorities treat accident report with contempt. The study revealed that, government policies affects construction projects. These assertions are in line with the opinion of Bekr (2017) that, politics has the tendency of influencing reporting of accidents. Bekr (2017) indicates that, every time a presidential political election happens, the construction sector typically gets thrown all-around just like a political soccer. Boateng (2014) indicates that government projects awarded in a previous regime could be re-evaluated and re-awarded provided there is suspicion of procurement breaches.

The study confirmed Socio-cultural practices to be one of the critical external factors contributing to under-reporting. It was ascertained that norms, values and beliefs of

community where projects are sited have influence on safety behaviour of the construction workers. The study revealed that, workers prefer treating injuries and accident at home than reporting because of their cultural beliefs. This supports the opinion of Daniel and Marlow (2005) that, the magnitude of the problem of under-reporting varies from country to country, city to city, village to village depending on cultural differences. The study also confirmed the view of Amponsah-Tawiah (2017) that, individuals generally hold onto their spiritual, material, intellectual and emotional features that characterize their society or social group, irrespective of the environment they find themselves. The results of the study also revealed that, language barrier of workers prevents them from reporting accident cases to supervisors and statutory authorities.

Technological Advancement was also identified and confirmed to be one of the critical factors that contributes to under-reporting of accidents on construction sites to statutory authorities. The study established that, many of the construction firms or companies have no online accident reporting systems. It was revealed that, firms have not put in place system to monitor employees' safety behaviour, and that many workers are not abreast with the use of technology to report accident cases to statutory authorities.

The field data provides evidence that, Education and Training have influence on under-reporting of accidents. The results of the study indicated that, the level of education of the workers have influence on accident reporting to statutory authorities. It was established that, the level of education of the workers have influence on their safety behaviour. However, many of the firms have no site inductions for workers and supervisors to improve on their safety behaviour.

The results indicated that, workers' health and safety behaviour is partly determined by the state of environment. The field data established that, the nature of the environment at a particular time influence reporting of accident, and that, weather conditions at times affects construction activities.

5.4 Critical constraints to reporting of OHS accidents in the construction sector

The study determines the critical constraints to reporting of OHS accidents in the construction sector in Ghana. Questionnaire was designed for respondents to indicate their levels of agreement or disagreement to 30 statements which serve as indicators of 10 identified constraints. It was established from the descriptive statistics that, all the 10 constraints were critical to under-reporting of accidents in the construction sector.

The results of the study indicated that, lack of knowledge of health and safety issues is a critical constraint to reporting of accidents in the construction sector. It was established that the workers have no knowledge of OHS issues, and lack of OHS knowledge affects workers safety behaviour.

The respondents agreed that, lack of financial and material resources is a critical constraint to reporting accidents. The field data revealed that, inadequate financial and material resources hamper accident reporting procedures. It was established that many of the construction companies generally have financial and material resource constraints and as such dealing with accident cases is a major challenge.

Again, the results of the field study indicated that, temporary or casual employment is a constraint to reporting of accidents. The study revealed that, many of the construction firms hire temporary or casual workers than permanent workers. Further, it was established that many of the workers on temporary, casual, or part-time often accept unsafe working conditions. This work class according to the field study, is easy to deal with than permanent workers.

The respondents indicated that, one of the critical constraints to reporting of accidents is bureaucratic procedures in construction firms. It was established that bureaucratic procedures in the firms hamper accident reporting. Workers' ignorance of the reporting procedures stops accidents being recorded. Rigorous accident reporting procedures in some firms constrained workers from reporting accident cases. This is in line with Miller et al (2005) that, completing reporting forms in some firms require more information than readily available, and involve further time-consuming.

Again, work load is confirmed by the respondents to be a critical constraint to reporting of accidents in the construction firms. The study reveals that, workers work in all jobs irrespective of their area of expertise, and as such time-constraint limits them from reporting accident cases. This supports the assertion of Miller et al (2005) and Glendon (1991) that, workers might be too busy at work and therefore might not get time to report to management if accident is a minor one.

The results of the study also provide evidence of Technological Advancement as a critical constraint to reporting of accidents in the construction sector. It is established that integrating technology in companies' operations is a major challenge and workers' lack of

knowledge in technology prevents them from reporting accident cases. Under-reporting of accidents and injuries might be due to rigorous online reporting process of which some workers might not have the technological skills.

The respondents perceived religion and culture to be a significant constraint to reporting of accidents. From the field survey, it was found that, poor organizational safety culture is a major constraint to reporting of accident cases. Workers' religion and their extended family system are all restrictions to reporting of accident. In the study of Kheni (2008), values which have their origins in traditional religion and extended family system have significant influence on organisations and workers' attitudes to risks to their health and safety at workplaces. According to Kheni (2008), "religious and cultural practices for example, prayers, observance of holy times, and native customs are intertwined with workplace activities". This might be a limitation to the individual worker to report accident cases appropriately.

Furthermore, the age of workers is a limitation to accident reporting. The researcher posed three statements of which all of them were agreed by the respondents to be constraint-indicators on the five- point likert scale. The age of the workers limits their ability to report accident cases. The younger ones and the aged fear to report accident cases. Parker et al (1994) assert that, there is a general paucity of scientific literature providing evidence of inaccurate accident reporting by age group, and their study further suggests that, there is substantial under-reporting of adolescent work injuries to the appropriate authority.

Again, lack of human resource personnel is confirmed by respondents to be a critical constraint to reporting of accidents. The field survey establishes that some firms have no safety personnel to handle reports from workers, and that lack of expertise and resources prevents workers from reporting accident cases which consequently affects accident statistics. This is in line with the assertion of WDSHW (2015) that, unavailability of expertise and resources contribute significantly to poor reporting of accidents.

The study results confirmed "language" to be a barrier to reporting of accidents on construction sites. It was established that, some of the workers have problem with medium of communication and as such find it difficult reporting issues. Workers whose native language is not English or a particular language are not able to report accident. This is in line with the assertation of Nadia (2015) that, some workers whose native language is not English or a particular language are not able to communicate their needs and ideas accurately, and therefore may hinders workers from reporting their accidents, illnesses and other injuries within the construction firm to their supervisors. However, the study reveals that some of the construction firms make provision to enable workers report accident cases irrespective of the language they speak.

5.5 Nature of the interaction between factors influencing under-reporting of accidents in the construction sector

Many of the construction firms do not have health and safety policy guidelines which is a result of lack of management commitment of the construction firms. Many of them work to tight schedules to meet deadlines. Much pressure is therefore put on the workers to achieve their goal. If a project delays, it comes with cost. The environment, poor economic

conditions and government regimes affects construction operations. These affect health and safety, thereby preventing workers from reporting accident cases to supervisors and appropriate authorities since every worker works aggressively to complete the project. The attitudes and ages of workers towards health and safety issues is a concern, since it affects health and safety, and accident reporting. Education and training of workers influence their attitudes which affects the workers safety behaviours, preventing them from reporting accident cases. Again, some site managers or site supervisors rose to the position by virtue of their experience. Poor writing skills therefore prevents them from keeping records on health and safety. In recent time, construction is dynamic with the introduction of new technologies, however, these firms are not abreast with technology to monitor accident, report and record them appropriately. Because of economic hardship and lack of jobs, some workers feel they have suffered before getting the job. So, they are afraid of asking of their rights, and as a result, they do not report injury or accident cases.

A multiple linear regression analysis on the factors the factors, explains that these factors interact and jointly influence underreporting of accidents. There is association among them. Much attention should therefore be paid to these factors to enhance OHS accident reporting. Management commitment, good communication, good company size, and good company's safety culture will reduce underreporting of accidents. Achievable Company's Goal, Good Peer Influence, good safety Incentive, Job security, absence of Blame Culture, regular Education and Training, good Interpersonal Relationship, Youthful age of Worker, and good Worker's Attitude are factors that will enhance accident reporting in the construction sector.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents a summary of the key findings, conclusions and recommendations of this research. The conclusions and recommendations are based on the key findings of the study.

6.2 Summary of Findings

This section outlines the key findings and outputs of the study. This section is divided into three sub-sections to facilitate an appropriate correspondence of the outcomes with the aims and objectives of the study enumerated in chapter one. The study was made successful through these clearly defined objectives as the basis of the study. The objectives were: determining critical factors contributing to under-reporting of OHS accidents within construction firms in the construction sector in Ghana, determining critical factors contributing to under-reporting of OHS accidents on construction sites to statutory authorities in Ghana, determining critical constraints to reporting of OHS accidents in the construction sector in Ghana, and developing recommendations for improving the reporting of occupational accidents in the construction sector in Ghana. The study design employed was descriptive survey. Questionnaire was used as the method of data collection, with a valid sample size of 250.

6.2.1 Critical Factors Contributing to Under-reporting of OHS Accidents within Construction Firms in the Construction Sector in Ghana

The first objective of the study was to determine critical factors contributing to under-reporting of OHS accidents within construction firms in the construction sector in Ghana. This objective has been fulfilled in that; 13 factors were empirically identified in the literature review. Each of this factor has 3 indicators. Out of these thirteen factors, 10 of them were validated and confirmed to be the most highly ranked internal factors contributing to under-reporting of OHS accidents within the construction firms.

- Job Security and Empowerment contributes to under-reporting of accidents within the construction firm. It is noted that, job insecurity hampers workers' willingness to report accident within the construction firms. Workers who raise safety concerns have fear of retribution, fear of being assigned to undesirable lighter-duty jobs, loss of overtime, separation from co-workers, concerns about abandoning their team, fear of been sacked from their job, and fear of being labelled by their supervisors as unable to do their job or as a complainer.
- Workers' attitude contributes significantly to under-reporting of accidents. This attitude of workers is attributed to management practices. Workers are often reluctant to report accident cases because of existing company's culture, which subsequently influences under-reporting of accidents at workplace.
- Many of the construction firms rarely organise inductions courses for their workers and supervisors. They also do not provide education to workers on safety posters and boards, meanwhile majority of the workers had only WASSCE/NVTI certificates that needs further training or induction programmes. It was established

therefore that insufficient education and training contribute to under-reporting of accidents within construction firms.

- Individuals in the firms are not defined with safety responsibilities, and this often leads to blame culture which affects accident statistics. Again, management often focuses on how to complete projects than solving safety problems and as such workers are often reluctant to report accident for fear of it being used to apportion blame.
- Interpersonal relationship was one of the factors influencing reporting of accidents. Most supervisors often discourage workers from expressing their ideas and opinions about OHS accident at work. However, it is noted that interpersonal relationships between workers and supervisors could lead to open discussion and reporting of accidents to the supervisors.
- The study confirmed poor safety culture as a critical factor contributing to under-reporting of accidents. Poor safety climate influences under-reporting of accidents within the construction firms. It was found that norms, values, beliefs and practices of construction firms clearly impact on the willingness of workers to report accidents.
- Lack of management commitment is one of the critical factors contributing to under-reporting of accidents within the construction firms. Inadequate safety performance programmes, limited or lack of personnel to handle safety issues, and absence of annual health and safety policy were critical issues of management that contribute significantly to under-reporting of accident within the construction firms.

- Many of the construction firms lack systems for reporting and investigation of accidents. Many of these firms have bureaucracy in communication and have poor communication safety policies and procedures.
- Many of the construction firms normally set unrealistic goals and expect to achieve them within a specific time frame, and that normally put undue pressure on workers to achieve the set goals. Management unduly and unrealistically provides safety incentive program, which end up discouraging workers from accurately reporting accidents and injuries to site managers or higher authority.
- The study established that, adolescents and the older age group under-report accident cases than middle age group, for fears of been seen as not capable of performing their job.

6.2.2 Critical Factors Contributing to Under-reporting of OHS Accidents on Construction Sites to Statutory Authorities in Ghana

The second objective of the study was to determine critical Factors contributing to under-reporting of OHS accidents on construction sites to statutory authorities in Ghana**.** The questionnaire for this objective was divided into 7 parts which constitute the critical factors identified in the literature review. Each of these factors has 3 indicators. Descriptive statistics was used to summarise the results. These results were confirmed by LISREL. Out of the 7 factors, 6 of them were validated and confirmed.

- Education and Training is noted to be a critical factor that contributes to under-reporting of accidents. The level of education of the workers have influence on their safety behaviour and on accident reporting to statutory authorities. However, many

of the firms have no site inductions for workers and supervisors to improve on their safety behaviour.

- Technological Advancement is one of the critical factors that contributes to under-reporting of accidents on construction sites to statutory authorities. Many of the construction firms or companies have no online accident reporting systems. The firms have not put in place system to monitor employees' safety behaviour. Many of the workers are not abreast with the use of technology to report accident cases to statutory authorities.
- Workers' health and safety behaviour is partly determined by the state of environment. The nature of the environment at a particular time influence reporting of accident, and also weather conditions at times affects construction activities.
- Politics/Government is noted to be one of the critical factors that affects under-reporting. In most cases, government officials feel unpopular when the number of accident cases rises in their regime and as such the statutory authorities treat accident report with contempt. Politics/Government has the tendency of influencing reporting of accidents. Every time a presidential political election happens, government projects awarded in a previous regime is re-examined, re-evaluated and re-awarded in most cases. Contractors always want to complete projects elections at all cost to the neglect of health and safety issues.
- Legal or regulations significantly contributes to under-reporting of accidents. Many companies or firms have no regulations that cover accident reporting procedures. This is attributable to the fact that the country's laws and regulations have not

included OHS accident reporting procedures. Factory inspectors do not regularly visit construction sites to enforce compliance with health and safety legislation.

- Socio-cultural practices contribute to under-reporting. Norms, values and beliefs of community where projects are sited have influence on safety behaviour of the construction workers. Workers that are deeply oriented in their culture prefer treating injuries and accident at home than reporting because of their beliefs. Language, which is a socio-cultural element prevents workers from reporting accident cases. Language barrier among workers and supervisors is inimical to reporting of accident cases.

6.2.3 Critical Constraints to Reporting of OHS Accidents in the Construction Sector in Ghana

This section was also to determine critical constraints to reporting of OHS accidents in the construction sector in Ghana. The major findings of the critical constraints to reporting of OHS accidents were identified, confirmed and ranked as follows:

- Many of the construction firms hire temporary or casual workers than permanent workers. This work class according to the field study, is easy to deal with.
- Inadequate financial and material resources hamper accident reporting procedures. Many of the construction companies generally have financial and material resource constraints and as such dealing with accident cases is a major challenge
- Majority of the workers have no knowledge of OHS issues. Lack of OHS knowledge affects workers safety behaviour, which constrains them to report accidents.

- Lack of human resource personnel is a critical constraint to reporting of accidents. Some firms have no safety personnel to handle reports from workers, and that lack of expertise and resources prevents workers from reporting accident cases which consequently affects accident statistics.
- Bureaucratic procedures in construction firms hamper accident reporting. Workers' ignorance of the reporting procedures stops accidents being recorded. Rigorous accident reporting procedures in some firms constrained workers from reporting accident cases.
- Workers' religion and their extended family system are restrictions to reporting of accident. Religious and cultural norms and values have significant influence on under-reporting of accidents.
- Language is a barrier to reporting of accidents on construction sites. Workers whose native language is not English or a particular language are not able to report accident.
- Work load of workers constrains them to report accidents in the construction firms. Workers work in all jobs irrespective of their area of expertise, and as such time-constraint limits them from reporting accident cases.
- Technological Advancement as a critical constraint to reporting of accidents. Many companies find it difficult integrating technology in their operations. Therefore, most workers lack knowledge in technology.
- The age of workers is a limitation to accident reporting. The age of the workers limits their ability to report accident cases. The younger ones and the aged fear to report accident cases.

6.2.4 Nature of the interaction between factors influencing under-reporting of accidents in the construction sector

The factors interact and jointly influence underreporting of accidents. There is association among them. Much attention should therefore be paid to these factors to enhance OHS accident reporting. Management commitment, good communication, good company size, and good company's safety culture will reduce underreporting of accidents. Achievable Company's Goal, Good Peer Influence, good safety Incentive, Job security, absence of Blame Culture, regular Education and Training, good Interpersonal Relationship, Youthful age of Worker, and good Worker's Attitude are factors that will enhance accident reporting in the construction sector.

6.3 Conclusions

Based on the findings of this study, the following conclusions were made:

- Job security, workers' attitude, education and training, blame culture, interpersonal relationships, poor safety culture, lack of management commitment, poor communication, company's goal and workers age are the critical factors that contribute significantly to under-reporting of OHS accidents within the construction firms. These are internal factors and must be critically look at to enhance accident reporting.
- The study concludes also that, education and training, technological advancement, environment, politics/government, legal/regulations and socio-cultural practices are critical factors that significantly contribute to under-reporting of accidents on construction sites to statutory authorities.
- Furthermore, one can conclude based on the findings of the study that, the critical constraints to reporting of accidents include temporary employment, lack of financial

and management resources, lack of knowledge of health and safety issues, lack of human resource personnel, bureaucratic procedures, poor safety culture of companies, language barrier, workload of workers, technological advancement and the age of workers.

- The factors interact and jointly influence underreporting of accidents. There is association among them. Much attention should therefore be paid to these factors to enhance OHS accident reporting.

6.4 Recommendations

Based on the above key findings and the conclusions drawn, the researcher recommends that:

- management of construction firms should organise safety inductions, training and performance programmes for operatives, particularly casual and temporary workforce. This should be done before the start of any project;
- management of construction firms should organise regular safety meetings during the work at their construction sites, post safety signs and posters at the job sites and conduct daily "tool box" safety talks to workers;
- management should also recruit Health and Safety personnel to be solely responsible for OHS issues;
- the construction firms should always have annual health and safety policy that will set objectives for, and provide the framework within which, OSH management on construction sites will be operated in order to ensure the health and safety of workers. The health and safety policy will give a clearer picture to the employees on health and safety compliance at site and procedures in reporting accident cases.

- the workers irrespective of their age should be encouraged and educated on accident reporting procedures. This procedure should be void of bureaucratic tendencies;
- management and supervisors of projects should always create a good rapport among all categories of workers, encourage and inspire them to exhibit safety behaviours on construction sites;
- management should always tackle Health and safety issues with diplomacy. This will enable workers to report accident cases to site managers. Again, the workers role should always be defined to avoid role conflict, and also prevent them from apportioning blames.
- management of construction firms should promote safety culture and educate workers on how to minimize their exposure to health and safety risks on construction sites and also how to report accident cases;
- there should be an enhancement of the competence of site and OHS managers in the construction industry by introducing health and safety in the curricula of tertiary and technical/vocational institutions. They must introduce construction training programmes accessible to persons without formal educational qualifications;
- procurement boards that award contracts to contractors, should be independent, and non-partisan. This will prevent successive governments from reviewing and rewarding contracts that have already been awarded. Contractors will feel safe and have confident that, their contract will not be rewarded to a different contractor when a new regime of government comes to power;
- firms should put in place systems to monitor employees' safety behaviour, and ensure that workers are abreast with technology in reporting accident cases.

REFERENCES

Abdelhamid T. S. & Everett, J. G. (2000). Identifying Root Causes of Construction Accidents. *Journal of Construction Engineering and Management*, vol. 126 (1), pp. 52-60.

Acutt, P. & Hattingh, S. (2011). Occupational health management and practice for health practitioners. 4th edition. *C*ape Town: Juta

Adams, N.L., & Hartwell, N. M. (1977). Accident-Reporting Systems: A basic problem area in industrial society, a journal of occupational psychology, 50, pp. 285-298.

Addotey, A. (2016). Evoking employee safety citizenship behaviour: does leadership styles and professional commitment play a role? A Master of Philosophy in Human Resource Management thesis, University of Ghana, Legon, Accra.

Adil A.R., and Khalid A. (2016). An introduction to research paradigms. Researchgate. https://www.researchgate.net/publication/325022648

Adu-Boateng, S. K. (2014). Management of Contractual Claims in the Road Construction Industry in Ghana. Master of Science Thesis, Kwame Nkrumah University of Science and Technology, Kumasi.

African Newsletter (2013). Occupational Health and Safety. Finnish Institute of Occupational Health, Volume 23, number 3.

Ahmed, K., Lamia, H., & Valva, P. (2014) 'The construction industry in Ghana, West Africa – how can the construction industry in Ghana become sustainable?' Master's Thesis, Blekinge Institute of Technology.

Akhtar, I. (2016). Research Design. Research in Social Science: Interdisciplinary Perspective. New Delhi.

Alli, B. O. (2008). Fundamental Principles of Occupational Health and Safety, 2nd Ed. Geneva, Switzerland: ILO Publications

Alvi, M. H. (2016). A Manual for Selecting Sampling Techniques in Research. University of Karachi, Iqra University

Ameh O. J. & Odusami K. T. (2010). Professionals' Ambivalence toward Ethics in the Nigerian Construction Industry. *Journal of Professional Issues in Engineering Education and Practice*, 136(1),9.

Amponsah-Tawiah, K. & Dartey-Baah, K. (2011). Occupational Health and Safety: Key Issues and Concerns in Ghana. *International Journal of Business and Social Science,* Vol. 2 No. 14. www.ijbssnet.com

Amponsah-Tawiah, K. (2017). Socio-Cultural Practices and Health and Safety Behaviors among Ghanaian Employees. DOI:10.5772/intechopen.75821

Anthony, J.M. (2018). A Review of Mixed Methods, Pragmatism and Abduction Techniques. *Electronic Journal on Business Research Methods,* Volume 16 Issue 3.

Asamoah, R. O. & Decardi-Nelson, I. (2014). Promoting Trust and Confidence in the Construction Industry in Ghana through the Development and Enforcement of Ethics. *Information and Knowledge,* Vol.3, No.4: 63-68.

Asanka, W.A, & M. Ranasinghe, M. (2015). Study on the impact of Accidents on Construction Projects. *6th International Conference on Structural Engineering and Construction Management*. Kandy, Sri Lanka.

Ashour, A., Hassan, Z., & Alekam, J.M.E. (2018). A conceptual Framework for Upgrading Safety Performance by Influence Safety Training Management Commitment to Safety and Work Environment: Jordanian Hospitals. *International Journal of Business Research*. https://www.researchgate.net/publication/328080378

Australian Safety and Compensation Council (2006). Media Release www.ascc.gov.au

Banyen, B. S. (2016). Effects of Work Pressure on Employee Safety Behavior in the Construction Industry in Ghana. A Master of Science thesis, Nkrumah University of Science and Technology, Kumasi, Ghana

Bekr, G. (2017). Factors affecting performance of Construction Projects in unstable Political and Economic Situations. *Journal of Engineering and Applied Sciences 12(19):5384*

Benner, L. (1975). Accident investigation: Multilinear events sequencing methods. Journal of Safety Research, 7(2):67-73.

Bernard, H.R. (2002). Research Methods in Anthropology: Qualitative and quantitative methods. 3rd edition. California: AltaMira Press.

Bill, B. P. & Samuel, H. Q. (2012). Key Issues on Occupational Health and Safety Practices in Ghana: A Review. *International Journal of Business and Social Science,* Vol. 3, No. 19

Boateng, C. (2015). Improving Health and Safety Performance in the Construction Sector in Ghana: The Role of Site Managers. A Dissertation in the Department of Construction and Wood Technology Education, Faculty of Technical Education, submitted to the School of Graduate Studies, University of Education.

Boateng, V. (2014). An Examination of Tender Evaluation Practices in Metropolitan, Municipal and District Assemblies in Ashanti Region. A Master of Science thesis, Kwame Nkrumah University of Science and Technology, Kumasi

Bureau of Labor Statistics (2009). Survey of Occupational Injury and Illness. http://www.bls.gov/iif/oshsum.htm

Burney, S.M.A; Saleem, H., (2008). Inductive & Deductive Research Approach, Lecture delivered on 06-03-2008 at Auditorium of Faculty of Arts and Science, University of Karachi, Karachi, Pakistan

Cheah, C.Y.J. (2007). Construction Safety and Health Factors at the Industry Level: The Case of Singapore. *Journal of Construction in Developing Countries*, Vol. 12, No. 2,

Chileshe, N., & Dzisi, E. (2012). Benefits and barriers of construction health and safety management (HSM). *Journal of Engineering, Design and Technology, 10*(2), 276–298. https://doi.org/10.1108/17260531211241220

Chiocha, C., Smallwood, J., & Emuze, F. (2011). Health and safety in the Malawian construction industry. *Acta Structilia, 18*(1), 68–80.

Christine, D. & Marlow, P. (2005). Literature Review on the Reporting of Workplace Injury Trends. *Health & Safety Laboratory*, Science Group.

Clarke S. (1998). Organisational Factors affecting the Incident of Reporting Train Drivers, Work Stress, 12, pp. 6-66.

Clarke, S., & Ward, K. (2006). The Role of Leader Influence Tactics and Safety Climate in engaging employees' Safety Participation. *Risk Analysis, 26*(5), 1175-1185.

Claywell C.R. (2012). Social Network Theory. https://socialnetworking.lovetoknow.com .

Coenraads, P. J.& Diepgen, T. L. (1998). Risk for hand eczema in employees with past or present atopic dermatitis. *International Archives of Occupational and Environmental Health. 71 (1): 7–13.* doi:10.1007/s004200050243. ISSN 0340-0131. PMID 9523243.

Commonwealth of Australia (2012). Occupational Health and Safety Management Systems: A Review of their Effectiveness in securing Healthy and Safe Workplaces. National Occupational Health and Safety Commission, Sydney.

Contractors' Association (2019). Membership List. Upper East Region

Contractors' Association (2019). Membership List. Upper West Region

Creswell, J. W. & Clark, V. L. P. (2007). Designing and Conducting Mixed Methods Research. Sage Publications, Thousand Oaks

Creswell, J. W. (1994). Research Design: Qualitative & Quantitative Approaches, London: SAGE Publications.

Creswell, J. W. (1998). Qualitative Inquiry and Research Design: Choosing among five Traditions. London: Sage Publications.

Creswell, J. W. (2003). Research Design, Qualitative, Quantitative and mixed method Approach (2nd Ed.) London: Sage Publications.

Cropanzano, R. & Michell M.S. (2005). Social Exchange Theory: An Interdisciplinary Review. *Journal of Management,* Vol. 31 No. 6,

Curcuruto, M., Griffin, M. (2018). Prosocial and proactive 'safety citizenship behaviour' (SCB): The mediating role of affective commitment and psychological ownership. https://www.researchgate.net/publication/320866189

Curran, J. & Blackburn, R. (2001). Researching the small enterprise. Sage Publications, London

Daniel, C., & Marlow, P. (2005). Literature Review on the Reporting of Workplace Injury trends. Harpur Hill, United Kingdom: *Health and Safety Laboratory*.

Danso O. F. (2010). Occupational Health and Safety Issues involving casual workers on Building Construction Sites in Ghana. Master of Science thesis, Kwame Nkrumah University of Science and Technology, Kumasi.

Danso, H. & Manu, D. (2013). High Cost of Materials and Land Acquisition Problems in the Construction Industry in Ghana. *International Journal of Research in Engineering & Applied Sciences,* http://www.euroasiapub.org

Darko, E., & Löwe, A. (2016). Ghana's Construction Sector and Youth employment. Overseas Development Institute, 203, Blackfriars Road, London SE1 8NJ

Darvas, P. and Palmer, R. (2014). Demand and supply of skills in Ghana: How can training programs improve employment and productivity? Washington, DC: World Bank. http://dx.doi.org/10.1596/978-1-4648-0280-5.

Davenport, T. (2009). Decision Making: Make Better Decisions HBR, November. pp.117-123

Denzin, N. K. & Lincoln, Y. S. (2000). Introduction: The Discipline and Practice of Qualitative Research. In: Handbook of Qualitative Research (edited by Denzin, N. K. and Lincoln, Y. S.). Sage Publications, Inc., California, 1-28.

Dicicco-Bloom, B. and Crabtree, B.F. (2006). The qualitative research interview. Medical education.

Disease Control Priorities Project, (2007). Developing countries can reduce hazards. http://www.dcp2.org/file/139/DCPP-OccupationalHealth.pdf (Accessed 26-03-2018).

Dong, X.S., Fujimoto, A., Ringen, K., Stafford, E., Platner, J. W., Gittleman, J.L., & Wang, X. (2011). Injury underreporting among small establishments in the construction industry. *American Journal of Industrial Medicine*. 54(5):339-49. doi: 10.1002/ajim.20928.

Durdyev, S., Mohamed, S., Lay, M.L., & Ismail, S. (2017). Key Factors Affecting Construction Safety Performance in Developing Countries: Evidence from Cambodia. *Construction Economics and Building*, Vol. 17, No. 4, UTS e-Press.

Durdyev, S., Omarov, M., & Ismail, S. (2017). Causes of delay in residential construction projects in Cambodia. Civil & Environmental Engineering, Research Article. http://dx.doi.org/10.1080/23311916.2017.1291117

Ejohwomu, J. I. (2014). A Study of Risk Management Practices in the Nigerian Construction Industry. A Master of Philosophy Thesis, University of Wolverhampton.

Eskandari, D., Jafari, M.J., Mehrabi, Y., Kian, M.P., Charkhand, H., & Mirghotbi, M. (2018). A Qualitative Study on Organizational Factors Affecting Occupational Accidents.

Eysenbach, G. (2008) Medicine 2.0: social networking, collaboration, participation, apomediation, and openness. Journal of Medical Internet Research, 10(3), 1-10

Factory Inspectorate Board Statistics (2018). Reports on Accident Cases. Upper West Region.

Factory Inspectorate Board Statistics (2016). Reports on Accident Cases. Upper East Region.

Fang, D. & Wu, H., (2013). Development of a Safety Culture Interaction (SCI) Model for Construction Projects. *Safety Science*, 57(2013), pp.138-49.

Finnis, J. (1980). Natural Law and Natural Rights. Oxford: Clarendon Press.

Fishwick, T. Southam, T., & Dan Ridley, D. (2004). Behavioural Safety Application Guide, Final Version. John Ormond Management Consultants Ltd, Blackpool, Lancashire, England

Fraser, S., and Robinson, C. (2004). Paradigms and philosophy. In S. Fraser, V. Lewis, S. Ding, M. Kellett and C. Robinson (Eds.), Doing Research with Children and Young People. London: Sage.

Frederick, J. & Lessin, N. (2000). Blame the Worker: The rise of Behavioural-based Safety Programmes, National Monitor.

Frimpong, S.K., & Kwasi, O.O. (2013). Analyzing the Risk of Investment in the Construction Industry of Ghana. *European Journal of Business and Management,* Vol.5, no.2: 121-130.

Fugar, F.D.K. (2009), Fundamental of Human Resource Management, Lecture Notes, Project Resource Management-Human Resource (BT553), Faculty of Architecture and Building Technology, KNUST, Kumasi, Ghana

Gefen, D., & Ridings, C.M. (2002). Implementation team responsiveness and user evaluation of customer relationship management: A quasi-experimental design study of social exchange theory. *Journal of Management Information Systems*, 19(1), 47-70.

Geminiani, F. L. (2008). A model to improve the effectiveness of the occupational health and safety inspectorate function relative to South African construction. Doctoral thesis. Nelson Mandela Metropolitan University: South Africa.

Ghana Statistical Service (2012). 2010 Population and Housing Census: Summary Report of Final Results. Accra, Ghana

Ghana Statistical Service (2019). Population Projection of Ghana. Accra, Ghana.

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British dental journal*. 2008;204(6):291-295.

Glasow, P. A. (2005), Fundamentals of Survey Research Methodology, Washington C3 Center Mclean, Virginia, U.S.A

Glendon, A. I. (1991). Accident Data Analysis. *Journal of Health and Safety*, 7, pp. 5-24.

Gordon, J. E. (1949). The epidemiology of accidents. American Journal of Public Health, 39, 504-515.

Great Britain Health and Safety Executive Department (2018). A Guide to Health and Safety Regulation (revised), UK.

Grix, J. (2004). The Foundations of Research. New York, NY: Palgrave Macmillan.

Grunberg, L., Moore, S., & Greenburg, E. (1996). The relationship of employee ownership and participation to workplace safety. *Economic and Industrial Democracy*, 17, 221-241.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research (Vol. 2, pp. 163–194). Thousand Oaks, CA: Sage.

Guba, E. G., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), The Sage handbook of qualitative research (3rd ed., pp. 191–215). Thousand Oaks, CA: Sage.

Hamalainen, P. I., Takala, J. & Leena S. K. (2007). Global Estimates of Occupational Accidents. *Safety Science,* 44 (16), 137-156.

Hanneman, R.A. and Riddle, M. (2011). Concepts and measures for basic network analysis. In J. Scott and P.J. Carrington (Eds.), The SAGE handbook of social network analysis (pp. 340–369). Thousand Oaks, CA: Sage Publication.

Hanneman, R.A. and Riddle, M. (2005) Introduction to social network methods. Riverside, CA: University of California.

Hansen, L. (1994). Rate your B.O.S.S.: Benchmarking Organisational safety strategy. *Professional Safety*, 37-43.

Haslam, R A, Hide, S A, Gibb, A G F, Gyi, D E, Atkinson, S, Pavitt, T C, Duff, R and Suraji, A. (2003). Causal Factors in Construction Accidents. www.hse.gov.uk/research/rrpdf/rr156.pdf.

Health and Safety Executive (2005). A review of safety culture and safety climate literature for the development of the safety culture inspection toolkit (RR 367). www.hse.gov.uk/research/rrpdf/rr367.pdf

Health and Safety Executive (2006). Health and Safety Management and Business Economic Performance: An Econometric Study, Research Report 510, Suffolk: HSE Books.

Hedlund, F. H. (2013). Recorded fatal and permanently disabling injuries in South African manufacturing industry - Overview, analysis and reflection. *Safety Science*, 55, 149–159. DOI: 10.1016/j.ssci.2013.01.005

Heinrich, H. W. (1931). Industrial Accident Prevention: A scientific approach. New York: McGraw-Hill.

Hesse-Biber, S. N. and Leavy, P. (2006). Emergent Methods in Social Research. Sage Publications, Inc., Thousand Oaks, California.

Higgs, L.G (2015). Theory in Educational Research and Practice in Teacher Education. University of South Africa.

Hodges, J. and Baah, A. (2006), National Labour Law Profile: Ghana 2007, International Labour Organisation, and Report.

Hofmann, D. A., Morgeson, F. P., & Gerras, S. J. (2003). Climate as a Moderator of the Relationship between Leader-member Exchange and Content Specific Citizenship: Safety Climate as an Exemplar. Journal of Applied Psychology, 88, 170-178.

Homans, G. C. (1958). Social behavior as exchange. American Journal of Sociology, 63: 597-606.

Hosseinian, S. S., & Torghabeh, Z.J. (2012). Major Theories of Construction Accident Causation Models: A literature review, *Int. J. Adv. Eng. Technol.*, vol. 4, no. 2, pp. 53–66.

Hughes, P. & Ferrelt, E. (2008). Introduction to Health and Safety in Construction Industry, Third Edition, Butterworth-Heinemann, imprint of Elsevier, USA, Pp 2-4.

Hughes, P. (2010). Paradigms, methods and knowledge in G. MacNaughton, S. Rolfe and I. Siraj-Blatchford (Eds.), Doing Early Childhood Research, (2nd ed.,) Maidenhead: Open University Press

Hussein, A. (2009). The use of Triangulation in Social Sciences Research: Can quantitative and qualitative methods be assured? *Journal of Comparative Social Work*, Vol. 1, pp. 1-12.

Hussey, J. & Hussey, R. (1997) Business Research: "A Practical Guide for Undergraduate and Post graduate students", London: Macmillan

ILO (1958). Employment and Occupation Convention No 111 of 1958. International Labour Organization. Geneva. Switzerland.

ILO (1977). Working environment (air pollution, noise and vibration) Convention. No 148 of 1977. International Labour Organization. Geneva, Switzerland: ILO Publications.

ILO (1985). Occupational health services convention. 1985 No 161 of 1985. International Labour Organization. Geneva, Switzerland: ILO Publications.

ILO (2006). Promotional Framework for Occupational Safety and Health Convention No 187 of 2006. International Labour Organization. Geneva. Switzerland. ILO Publications.

ILO (1988). Safety and Health in Construction Convention. No 167 of 1988. International Labour Organization. Geneva. Switzerland. ILO Publications.

ILO (1990). Safety in the Use of Chemicals at Work Convention. No.170 of1990. International Labour Organization. Geneva. Switzerland. ILO Publications.

ILO (1996). Recording and Notification of Occupational Accidents and Diseases. An ILO Codes of Practice.

ILO (2010). The Role of Worker Representation and Consultation in Managing Health and Safety in the Construction Industry. Geneva.

ILO (2012). Improvement of National Reporting, Data Collection and Analysis of Occupational Accidents and Diseases. International Labour Office, Geneva

ILO, (1981). Occupational safety and health convention (No.155). Geneva: International Labour Organisation, Switzerland.

ILO. (2013). Health and Safety at Work: Facts and Figures. Geneva, Switzerland.

ILO/ WHO (2001). Occupational Health and Safety in Africa. Meeting report. World Health Organization with input of WHO/ILO Joint Effort Taskforce 2001.

Imaralu, D. (2013). Of property supply and demand in Ghana. http://www.venturesafrica.com/2013/09/going-going-ghana-property-supply-demand/ (Accessed April 23, 2018).

Institute of Statistical, Social and Economic Research (2015). The State of the Ghanaian Economy Report 2014, University of Ghana, Legon, Ghana.

Jazayeri, E. & Dadi, G.B. (2017). Construction safety management systems and methods of safety performance measurement: A review. Journal of Safety Engineering, 6(2), pp.15-28.

Jeffery, T.M., Konstantin P. C., Julie, M. S., John C. R., & Peter Y. C. (2013). Construction Workers' Reasons for Not Reporting Work-Related Injuries: An Exploratory Study. International Journal of Occupational Safety and Ergonomics.

Jill, W. & John, H. (2010). Promoting Construction Health and Safety through Procurement: A briefing note for developing countries. Institution of Civil Engineers.

Karr, A. (2000). They're falling. Safety and Health; 161(1), 30-35.

Khan, R.A. (2008). Role of Construction Sector in Economic Growth: Empirical Evidence from Pakistan Economy. First International Conference on Construction in Developing Countries (ICCIDC–I), "Advancing and Integrating Construction Education, Research & Practice" August 4-5, 2008, Karachi, Pakistan.

Kheni, N. A. (2008). Impact of health and safety management on safety performance of small and medium-sized construction businesses in Ghana. A doctoral thesis submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University.

Kheni, N.A. & Braimah, C. (2014). Institutional and Regulatory Frameworks for Health and Safety Administration: Study of the Construction Industry of Ghana. *International Refereed Journal of Engineering and Science (IRJES),* Volume 3, Issue 2 (January 2014), PP.24-34

Kheni, N.A., Gibb, A.G.F., & Dainty, A.R.J. (2010). Health and Safety Management within Small- and Medium-Sized Enterprises (SMEs) in Developing Countries: Study of Contextual Influences. *Journal of Construction Engineering and Management.* DOI: 10.1061/_ASCE_CO.1943-7862.0000218

Kish, L. (1965). Survey Sampling. New York: John Wiley and Sons, Inc.

Kivunja, C. & Kuyini, A .B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, 6 (5). http://ijhe.sciedupress.com

Kobb, T. & Stikova, E. (2013). Occupational Health and Safety Management System and Workplace Risk Assessment. Conference Paper · November 2013 DOI: 0.13140/RG.2.1.1954.8000.: https://www.researchgate.net/publication/265334752

Kothari C.R., (2010), Research Methodology: Methods and Technique, New Delhi: New Age International Publishers, p. 31

Koul, L. (2001). Methodology of Educational Research. New Delhi Wikas Publication House PWT Ltd.

Kovács, G. Spens, K.M. (2005). Abductive reasoning in logistics research. *International Journal of Physical Distribution & Logistics Management*, Emerald 35 (2), pp. 132 -144.

Kumar, R. (2005). Research Methodology: A step-by-step guide for beginners. Sage Publications, London

Kusi, H. (2012). Doing Qualitative Research: a guide for researchers. Department of Psychology and Education, University of Education, Winneba. Emmpong. Press, Accra-Newtown

Kwesi, A., & Kwasi, D. (2014). Occupational Health and Safety: Key Issues and Concerns in Ghana. International Journal of Business and Social Science, Vol. 2 No. 14 www.ijbssnet.com

Laryea, S. (2010). In: Laryea, S., Leiringer, R. and Hughes, W. (Eds). *Proceedings of the West Africa Built Environment Research (WABER) Conference,* 27-28 July 2010, Accra, Ghana: 215-226.

Laura P., Tahira, M. P., Claudio, B. (2015). Safety Culture, Moral Disengagement, and Accident Underreporting. *J Bus Ethics*, 141:489–504

Le, Q. & Park, C. (2011). A Social Network System for Sharing Construction Safety and Health Knowledge. Chung-Ang University, Seoul, Republic of Korea.

Leedy P.D. & Ormrod J.E. (2010) Practical Research: Planning and Design. (9th ed). Pearson Educational International, Boston

Leedy, P (1997) Practical research, planning and Design. 6th Edition. New Jersey, Patience Hall.

Leigh, J. P., Marcing, J. P. and Miller, T. R. (2004). An estimate of the U.S. Government's Undercount of Nonfatal Occupational Injuries. *Journal of Occupational and Environmental Medicine*, 46 (1), 10-18.

Levitt, R.E. and Samelson, N.M. (1993). Construction Safety Management. 2nd Edition. New York: John Wiley & Sons Inc.

Lewis, J.L., & Sheppard, S.R.J. (2006). Culture and Communication: Can Landscape Visualization Improve Forest Management Consultation with Indigenous Communities? Landscape and Urban Planning, 77: 291–313.

Lincoln, Y. S. and Guba, E. G. (2000). Paradigmatic Controversies, Contradictions, and Emerging Confluences. In: The Sage Handbook of Qualitative Research (edited by Denzin, N. K. and Lincoln, Y. S.). Sage Publications, Inc., Thousand Oaks, California, 163-188.

Lingard, H., Zhang, R. P., Harley, J., Blismas, N., & Wakefield, R. (2014). Health and Safety Culture: RMIT University's Centre for Construction Work Health and Safety. Commissioned by the Australian Constructors Association.

McCabe, Hamilton, & Renny (2017). Occupational Health and Safety Management System OH & S Manual. McCabe, Hamilton, and Renny Co. Ltd, Honolulu, Hawaii

McCraven, S. (2012). Can Underreporting Injuries Increase Management Costs? http://precast.org/2012/11/can-underreporting-injuries-increase-managementcosts/

Mcintyre, L. J. (1999). The Practical Skeptic: Core Concepts in Sociology, Mountain View, CA: Mayfield Publishing

McKnight, A., Elias, P. and Wilson, L. (2001). Workplace Injuries and Workplace Trends. Prepared by the Institute for Employment Research for the Health & Safety Executive. http://www.hse.gov.uk/research/crr_pdf/2001/Crr01281.pdf

Mearns, K., Whitake, S. M. & Flin, R. (2003). Safety Climate, Safety Management Practice and Safety Performance in Offshore Environments. *Safety Science, 41(8),* 641-680.

Meyers, L. S., Gamst, G., and Guarino, A. J. (2006). Applied Multivariate Research: Design and Interpretation, Sage Publications Ltd., London

Miller, G. (1997). Introduction: Context and Method in Qualitative Research. Sage Publications, London.

Miller, L., Ballard, J., Suff, P., Bates, P., Hurstfield, J., & Akroyd, K. (2005). Review of the Reporting of Accidents and Incidents Involving Learners. Institute for Employment Studies, Brighton BNI 9RF, UK.

Mingers, J. (1997). Multi-Paradigm Multimethodology. In: Multi-Methodology, The Theory and Practice of Combining Management Science Methodologies (edited by Mingers, J. and Gill, A.). John Wiley and Sons, Chichester.

Ministry of Education (2010). Assessment report of the construction industry skills demand and supply in Ghana. COTVET, Accra:

Ministry of Employment and Labour Relations (2017). 2016 Statistics Report. RSIM Directorate, Ghana.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods. Journal of Mixed Methods Research 1(1), 48-76.

Moroşan A. (2014). The use of Inductive, Deductive or Abductive Reasoning in Economics. *Revista Economică.* Lucian Blaga University, Sibiu, Romania

Morse, T. (2018). Occupational Disease in Connecticut. Prepared for the State of Connecticut Workers' Compensation Commission, Occupational Disease Surveillance Program. Farmington, CT 06030.

Muchiri, F.K. (2003). Occupational health and development in Africa, Challenges and the way forward. *African Newsletter on Occupational Health and Safety, 13.*

Mukherji, P. & Albon, D. (2015). Research Methods in Early Childhood. An Introductory Guide (2nd ed.). London: Sage Publications.

Mustapha, Z., Aigbavboa, C.O. & Thwala, W.D. (2015). Examination of Safety Performance Regulations in the Ghanaian Building Construction Industry, *Proceedings of the DII-2015 Conference on Infrastructure Investments in Africa*, 16-18 Sept 2015, Livingstone. Zambia.

Nadia A. A. (2015). Factors affecting Underreporting of Construction Safety incidents on Capital Projects. A Doctor of Philosophy thesis, University of Texas, Austin

Nammir, D., Marane, B., & Ali, A. (2012). Determining the role of CUSTOMER engagement on Relationships Quality and Relationship Performance, European *journal of Business and Management*, 4(11), 27-36.

Naoum, S.G. (2006). Dissertation Research and Writing for Construction Students, 2nd Ed. Oxford: Elsevier Butterworth-Heinemann

Ndege, O. R. (2004). Safety Awareness in Informal Construction Sector: A Case Study f Nairobi City. Master of Arts Thesis, University of Nairobi

Neal, A. & Griffin, M.A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of applied psychology*. 91(4):946.

Newman, I., & Iddrus, N.A. (2002). Qualitative-Quantitative Research Methodology: Sage Publications, London

Nghitanwa, E. M. (2016). Development of Practical Guidelines to Promote Occupational Health and Safety for Workers in the Construction Industry in Windhoek, Namibia. A Doctor of Literature and Philosophy thesis, University of South Africa.

Obeid, A. R (2015). Health and Safety in Construction Industry of Lebanon. A Master of Science in Civil Engineering thesis, Eastern Mediterranean University, Gazimağusa, North Cyprus

Ofori, G. (2012). Developing the Construction Industry in Ghana: the case for a central agency. National University of Singapore

Ofori, R., & Dampson, D.G. (2011). Research Methods and Statistics Using SPSS. Ghana, Amakom-Kumasi: Payless Publication Limited.

Oladapo A. A. (2006). The impact of ICT on professional practice in the Nigerian construction industry, *Electronic Journal of Information Systems* in Developing Countries, 24(2), 1-19.

Osei, V. (2013). The Construction Industry and its Linkages to the Ghanaian Economy-Polices to Improve the Sector's Performance. *International Journal of Development and Economic Sustainability,* Vol. 1, No.1, pp. 56-72

Owoo, N.S., & Lambon-Quayefio, M.P. (2018). The role of the construction sector in Ghana. *WIDER Working Paper 2018/119*

Oxford Business Group (2014). Laying the cornerstones: Government expenditure. http://www.oxfordbusinessgroup.com/news/layingcornerstones- government expenditure-supporting-increased-activity (Assessed May 19, 2018).

Oxford Business Group (2018). Strong prospects: Government signal establishment, new regulator and priotises infrastructure. https://oxfordbusinessgroup.com/overview/strong-prospects-government-signals-establishment-new-regulator-and-prioritises-infrastructure (24/04/2018)

Oxford Business Group (2019). Strong Prospects: Government Signal Establishment, New Regulator and Priotises Infrastructure. https://oxfordbusinessgroup.com/overview/strong prospects-government-signals-establishment-new-regulator-and-prioritises-infrastructure (24/04/2018)

Parker, D.L., Carl, W.R., French, L.R. & Martin, F.B. (1994). Characteristics of Adolescent Work Injuries reported to the Minnesota Department of Labor and Industry. *American Journal of Public Health,* 84(4), 606-611.

Perren, L. and Ram, M. (2004). Case-study method in small business and entrepreneurial research: mapping boundaries and perspectives. International Small Business Journal.

Phoya, S., (2012). The Practice of Risk Assessment, Communication and Control Health and Safety Risk Management in Building Construction Sites. Master Science Degree thesis, Chalmers University of Technology: Gothenburg, Sweden.

Phrasisombath, K. (2009). Sample size and sampling methods. Faculty of Postgraduate Studies and Research. University of Health Sciences, GFMER -WHO -UNFPA-LAO PDR

Pilbeam, C., Davidson, R., Doherty, N., & Denyer, D. (2015). Networks of influence: Practising Safety Leadership in low Hazard Environments. Cranfield University – School of Management.

Pirzadeh, P. (2018). A Social Network Perspective on Design for Construction Safety. A Doctor of Philosophy thesis, RMIT University.

Popov, G., Lyon, B.K. & Hollcroft, B. (2016). Risk assessment: A practical guide to assessing operational risks, 1st ed. Australia: Wiley.

Pransky G, Snyder T, Dembe A, Himmelstein J. (1999). Under-reporting of work-related disorders in the workplace: a case study and review of the literature. Ergonomics. 1999;42(1):171–82.

Probst, T.M, & Estrada, A.X. (2010). Accident under-reporting among employees: Testing the moderating influence of psychological safety climate and supervisor enforcement of safety practices. Accident Analysis and Prevention 42 (2010) 1438–1444.

Probst, T.M. & Graso, M. (2011). Reporting and investigating accidents: Recognizing the tip of the iceberg. In: S. Clarke, C. Cooper, & R. Burke (Eds.). Occupational health and safety: Psychological and behavioral challenges. United Kingdom

Probst, T.M., Brubaker, T.L., Barsotti, A. (2008). Organizational Injury Rate Underreporting: The Moderating effect of Organizational Safety Climate. J Appl Psychol. 2008;93(5): 1147–54.

Rameezdeen, R. & Ramachandra, T. (2008). Construction linkages in a developing economy: the case of Sri Lanka. *Construction Management and Economics 26*(5), 499. 506.DOI: 10.1080/01446190802017706

Rasmussen, J. (1990). Human error and the problem of causality in analysis of accidents. Paper presented at the Human Factors in Hazardous Situations. *Proceedings of a Royal Society Discussion Meeting*.

Reason J. (1990). Human Error. New York: Cambridge University Press, 1990

Reason, J. (1997). Managing the Risk of Organizational Accidents. Aldershot, England: Ashgate Publishing Limited

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) (1995). In RIDDOR Explained (2003). Health and Safety Executive HSE31 (rev1). Retrieved February 18, 2019, from www.hse.gov.uk/pubns/hse31.pdf

Richard, K. O. (2017). Assessing the Feasibility of Implementing Value Engineering in The Ghanaian Construction Industry. A Master of Philosophy dissertation, University of Education, Winneba, Kumasi.

Robens Institute (1997). An Investigation of the reasons for the Non-reporting of Accidents to Participants in Training Programmes Funded by the DfEE, University of Surrey.

Robson, C. (2002). Real world research, Blackwell Publishing, Malden, Massachusetts, US.

Royal Society for Prevention of Accidents (ROSPA)(2018). ROSPA's Behavioural Safety e-book. www.rospa.com

Sabet, P. G. P., Aadal, H., Jamshidi, M.H.M., & Rad, K.G (2013). Application of Domino Theory to Justify and Prevent Accident Occurrence in Construction Sites. *IOSR J. Mech. Civ. Eng.*, vol. 6, no. 2, pp. 72–76.

Safety Association for Canada's Upstream oil and Gas Industry (2011). Introduction to Health and Safety Management Systems Program Development Guideline. www.enform.ca

Safety Institute of Australia Ltd (SIA) (2012). Core Body of Knowledge for the Generalist OHS Professional. Tullamarine, Victoria, Australia

Salant, P., & Dillman, D. A. (1994), How to Conduct Your Own Survey, New York: John

Salminen, S. (2015) Workplace Safety and Health. International Encyclopedia of Social & Behavioral Sciences, 727-723.

Sami, A., Moafian, G., Najafi, A., Aghabeigi, M.R., Yamini, N., Heydari, S.T., & Lankarani, K.B. (2013). Educational level and age as contributing factors to road traffic accidents. *Hinese Journal of Traumatology 2013;16(5):281-285. 281*

Samir, S.A.S. (2015). Factors Affecting the Performance of Construction Projects in the Gaza Strip. A Thesis Submitted in Partial Fulfillment of the Requirements for Degree of Master of Science in Construction Management, Islamic University of Gaza ñ Palestine.

Samson, O.A. (2014). Workplace Safety and Accidents Among Artisans at Kokompe. A PhD in Sociology thesis, University of Ghana, Legon, Accra, Ghana.

Saunders, M., P. Lewis, & Thornhill, A. (2009). Research Methods for Business Students 4th Edition Pearson Education Limited.

Shakil, A., Habibur, R. S., & Ikramul, H. (2018). Accidents on Construction Sites in Bangladesh: A Review. *Proceedings of the 4th International Conference on Civil Engineering for Sustainable Development.*

Sims, B. J. (2000). Effective motivation. *Occupational Health and Safety, 69(10),* 91-93.

Smith, P. (1995). The unintended consequences of publishing performance data in the public sector. *International Journal of Public Administration*, 18(2), 277-310.

Soiferman, L. K. (2010). Compare and Contrast Inductive and Deductive Research Approaches. University of Manitoba

Songwe, V. (2014). Africa's Capital Market Appetite: Challenges and Opportunities for Financing Rapid and Sustained Growth. Foresight Africa Report: 1-44.

StatPac (2012). Survey Sampling Methods. http://ww.statpac.com/surveys/sampling.htm.

Suhair, Z. A., Julie, J., Anil, S. (2013). Issues of Construction Health and Safety in Developing Countries: A Case of Jordan

Sutton, J. & Kpentey, B. (2012). An Enterprise Map of Ghana. *International Growth Centre*, London.

Tadesse, T & Admassu, M. (2006). In collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health and, and The Ethiopia Ministry of Education, University of Gondar.

Tente, P. (2016). Safety and Health in the Construction Industry in Zambia. A Master of Engineering in Construction Management Dissertation, University of Zambia, Lusaka.

Tetteh, S. N. (2003). Occupational health and safety policy and legislation in Ghana - Stakeholders' workshop report. In: *African Newsletter on Occupational Health and Safety*, 13, 19-21

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) (1995). http://www.hse.gov.uk/statistics/sources.htm

The Trustees of Indiana University (TIU) (2008). Confirmatory Factor Analysis using Amos, LISREL, and Mplus. http://www.indiana.edu/~statmath

Trachoma, W.M.K. (2006). Sampling. http://www.socialresearchmethods.net/kb/sampling.php

United State Occupational Safety and Health Association (2016). Commonly Used Statistics: OSHA; Available from: https://www.osha.gov/oshstats/commonstats.html.

United States Bureau of Labor Statistics (2015). TED: The Economics Daily. Hispanics and Latinos in industries and occupations. http://www.bls.gov/opub/ted/2015/hispanics-and-latinos-in-industries-andoccupations.htm

Viner, D. (1991), Accident analysis and risk control, Derek Viner Pty Ltd, Melbourne

Wagennar, A. (1998). The effects of Job (In)security and Safety Incentive Schemes on Accident Reporting rates and Levels of Risk Taking Behaviour. HSL Report EWPS/98/22.

Weddle, M.G. (1996). Reporting Occupational Injuries: The first step. *Journal of Safety Research*, 27(4), pp. 217-223.

Wef (2016). Industry Agenda Shaping the Future of Construction: A Breakthrough in Mindset and Technology. www.Weforum.org.

West, R.L., & Turner, L.H. (2007). Introducing communication theory: Analysis and Application (3rd Edition ed.): McGraw-Hill

WHO (2003). Work Organization and Stress. Protecting Workers' Health Series, No. 3. Geneva:

WHO (1994). Global strategy on occupational health for all: The way to health at work. Geneva.

WHO (1950). Healthy Workplace Framework and Model. Geneva.

WHO (1998). Occupational Health Services and Practice. *International journal of health development. 19*(4), 390-396.

World Day for Safety and Health at Work (WDSHW) (2015). Global trends on Occupational Accidents and Diseases. Join in building a culture of prevention on OSH.

Xuesheng, D., & Xintao, Z. (2011). An empirical investigation of the influence of safety climate on safety citizenship behaviour in coal mine. Procedia engineering, 26, 2173-2180

Yankah, K. (2012). Health and Safety Management Practices by Building Contractors in the Ashanti Region. Master of Science dissertation in Construction Management, Kwame Nkrumah University of Science and Technology, Kumasi.

Zanko, M., Dawson, P. (2012). Occupational Health and Safety Management in Organizations: a review. *International Journal of Management* Reviews 14(3), 328-344.

APPENDIX 1

QUESTIONNAIRE

Cover Letter

16th October, 2018

Dear Sir/Madam,

I am a postgraduate student of the Department of Construction and Wood Technology, University of Education Winneba–Kumasi (UEW-K). I am conducting this research as part of partial fulfilment of the award of Master of Philosophy Degree in Construction Technology (M.Phil. Construction Technology) Programme. Your organisation has been chosen for a survey. The study is for learning purposes and It is intended to empirically examine under-reporting of Occupational Health and Safety (OHS) accidents in the construction sector in Ghana. Your consent and help are being sought to enable me carry out this exercise for the betterment of the Ghanaian construction industry. All information provided by you in this exercise will be strictly confidential and used for academic purposes only, and no information will be disclosed without your consent.

If you require clarification and any further information, kindly contact me on my mobile 0249041183/0263238763/0205477859.

Thank you for your co-operation.

Yours faithfully,

CLIFFORD DARIMAANI

(M.Phil. Construction Technology)

SECTION A

Demographic Characteristics

1. Please, indicate your gender. (*Please tick*)

   Male [ ] Female [ ]

2. What is the age category you belong? (*Please tick*)

   Below 20 years [ ] 20-29 years [ ] 30-39 years [ ] 40-49 years [ ] 50-59 years [ ] 60 years and above [ ]

3. What is your highest academic qualification(s)? (*Please tick or write in the space below)* O' / A' Level [ ] WASSCE/NVTI [ ] HND [ ]

   Bachelor's Degree [ ] Master's Degree [ ]

   Other (s), please state.....

4. What is the number of years you have been working in this firm? (*Please tick*)

   Under 5 years [ ] 5 – 10 years [ ] Above 10 but less than 15 years [ ]

   15 – 20 years [ ] Above 20 but less than 25 years [ ]

   25 – 30 years [ ] Above 30 years [ ]

5. Indicate your status of work, Casual [ ] Permanent [ ]

SECTION B:

Factors Influencing Reporting of OHS Accidents within Construction Firms

6. To what extent do you agree or disagree with the following statements? Please rate on a scale of 1 to 5, where 1 = strongly disagree, 2= disagree, 3= uncertain, 4= agree, and 5= strongly agree.

No	Measurement Items	1	2	3	4	5
6.1	**Lack Management Commitment**					
6.1.1	The company has no annual health and safety policy					
6.1.2	There are inadequate safety performance programmes in the company					
6.1.3	There are limited or lack of personnel to handle accident cases in the company					

6.2	**Poor Communication**					
6.2.1	There is Bureaucracy in communication in the company					
6.2.2	There are ineffective communication safety policies and procedures					
6.2.3	The company lack system for reporting and investigation of accidents					
6.3	**Size of Company**					
6.3.1	Size of company affects reporting of accidents					
6.3.2	Small construction firms affect reporting of accidents than large firms					
6.3.3	Workers in smaller firms normally have lower accident rates					
6.4	**Poor Safety Culture**					
6.4.1	Norms, values, beliefs and practices of our company clearly impact on the willingness of workers to report accidents					
6.4.2	Poor safety culture contributes considerably to under-reporting of accidents					
6.4.3	Poor safety climate influences under-reporting of accidents					
6.5	**Company's Goal**					
6.5.1	Company sets Goals and expected to achieve them within time frame					
6.5.2	Company put pressure on workers to achieve their target.					
6.5.3	Unrealistic expectations of management in the form safety incentives influences under-reporting					
6.6	**Age of Workers**					
6.6.1	Adolescent group under-report accident cases than middle age group					
6.6.2	Accidents and Injury decreases with age					

6.6.3	Older age group under-report accident cases					
6.7	**Peer Influence**					
6.7.1	Coworkers discourages others to be safe and report accident cases					
6.7.2	Peer group influences safety behaviour					
6.7.3	Peer group influences accident reporting					
6.8	**Health and Safety Incentives**					
6.8.1	Management encourages workers to visit their first aid box when they have accidents/injury					
6.8.2	Safety incentives for workers to reduce accidents end up reducing the number of accidents reported					
6.8.3	Real incentives in the form of monetary influences under-reporting					
6.9	**Job Security and Empowerment**					
6.9.1	Workers who raise safety concerns have fear of retribution					
6.9.2	Job insecurity hampers workers' willingness to report accident					
6.9.3	Workers who raise safety concerns are seen as trouble makers					
6.10	**Workers' Attitude**					
6.10.1	Workers' attitude to under-report accident cases is dependent on their age					
6.10.2	Workers are often reluctant to report accidents because of the existing company's culture					
6.10.3	Management practices affects workers attitude to report accident cases					
6.11	**Blame Culture**					
6.11.1	Company has no clearly defined individuals with safety responsibilities					

6.11.2	Workers are often reluctant to report accident for fear of it being used to apportion blame					
6.11.3	Management focuses on how to complete projects than solving safety problems					
6.12	**Education and Training**					
6.12.1	Site inductions for workers and supervisors are rare in the company					
6.12.2	Workers have formal education up to at least WASSCE/NVTI level					
6.12.3	The company provides no education to workers on safety posters and boards					
6.13	**Interpersonal Relationships**					
6.13.1	Supervisors discourage workers to express their ideas and opinions about OHS accident at work					
6.13.2	Company maintain good relations with employees and concerned authorities					
6.13.3	Interpersonal relationships influence accident reporting at workplace					

7. What other factors contribute to under-reporting of OHS accidents within construction firms? *Please state them.*
   …….

SECTION C

Factors Influencing Reporting of OHS Accidents on Construction Sites to Statutory Authorities

8. To what extent do you agree or disagree with the following statements? Please rate on a scale of 1 to 5, where 1 = strongly disagree, 2= disagree, 3= uncertain, 4= agree, and 5= strongly agree.

No	Measurement Items	1	2	3	4	5
8.1	**Legal/Regulations**					
8.1.1	Ghana's laws and regulations have not included OHS accident reporting procedures					
8.1.2	Our Company has no regulations that cover accident reporting procedures					
8.1.3	The company rarely report accident cases to statutory authority					
8.2	**Economy**					
8.2.1	The employees are not insured against accidents and injuries					
8.2.2	Workers are much interested in meeting their financial needs					
8.2.3	The economy of the country affects our construction works					
8.3	**Politics/Government**					
8.3.1	Government officials feel unpopular when the number of accident cases rises in their regime					
8.3.2	The statutory authorities treat accident report from construction firms with contempt					
8.3.3	Government policies affects construction projects					
8.4	**Socio-cultural Practices**					
8.4.1	Language barrier prevents workers from reporting accident cases to supervisors and statutory authorities					
8.4.2	Norms, values and beliefs of community where projects are to be sited have influence on safety behaviour.					

8.4.3	Employees prefer treating injuries and accident at home than reporting					
8.5	**Technological Advancement**					
8.5.1	The company has not put in place system to monitor employees' safety behaviour					
8.5.2	Many workers are not abreast with the use of technology to report accident cases					
8.5.3	The company has no online accident reporting system					
8.6	**Education and Training**					
8.6.1	The level of education of the workers have influence on their safety behaviour					
8.6.2	No site inductions for workers and supervisors regularly to improve on their safety behaviour					
8.6.3	The level of education of the workers have influence on accident reporting to statutory authorities					
8.7	**Environment**					
8.7.1	Environmental factors influence safety behaviour					
8.7.2	Weather conditions at times affects construction activities					
8.7.3	The nature of the environment at a particular time influence reporting of accident					

9. State other factors that contribute to under-reporting of OHS accidents on construction sites?

   …….

SECTION D

Critical constraints to reporting of OHS accidents in the construction sector

10. To what extent do you agree or disagree with the following statements? Please rate on a scale of 1 to 5, where 1 = strongly disagree, 2= disagree, 3= uncertain, 4= agree, and 5= strongly agree.

No	Constraints Measurement Items	1	2	3	4	5
10.1	**Knowledge of Health & Safety issues**					
10.1.1	The workers have no knowledge of OHS issues					
10.1.2	Lack of OHS knowledge affects workers safety behaviours					
10.1.3	Knowledge of OHS is a major constraint to accident reporting					
10.2	**Financial and Material Resources**					
10.2.1	The companies have inadequate financial and materials resources to deal with accident cases					
10.2.2	Construction companies generally have financial and material resource constraints					
10.2.3	Inadequate financial and material resources hamper accident reporting procedures					
10.3	**Temporary Employment**					
10.3.1	The company hires temporary workers than permanent					
10.3.2	Workers on temporary, casual, or part-time often accept unsafe working conditions					
10.3.3	It is easy to deal with these temporary workers than the permanent workers					
10.4	**Bureaucratic Procedures**					
10.4.1	Reporting accident cases procedures is quite bureaucratic					
10.4.2	Workers' ignorance of the reporting procedures stops accidents being recorded					

10.4.3	Bureaucratic procedures in the company hamper reporting					
10.5	**Work load**					
10.5.1	Time-constraint is a critical limitation to under-reporting					
10.5.2	Under-reporting of accidents and injuries might be due to lack of time					
10.5.3	Workers work in all jobs irrespective of their area of expertise					
10.6	**Technological Advancement**					
10.6.1	Integrating technology in the company's operations is a major challenge					
10.6.2	Workers' lack of knowledge in technology prevents them from reporting accident cases					
10.6.3	Under-reporting of accidents and injuries might be due to rigorous online reporting process					
10.7	**Religion and Culture**					
10.7.1	Poor organizational safety culture is a major constraint to reporting of accident cases					
10.7.2	Poor safety climate is a constraint to reporting of accidents					
10.7.3	Workers' religion and their extended family system are constraints to reporting of accident					
10.8	**Age of Workers**					
10.8.1	Age of workers is a major constraint to under-reporting of accidents					
10.8.2	Age of workers has influence on their safety behaviour					
10.8.3	Age has influence on productivity of workers					
10.9	**Human Resource**					

10.9.1	Lack of expertise and resources prevents workers from reporting accident cases					
10.9.2	Lack the expertise and the resources affects accident statistics					
10.9.3	The company has no safety personnel					
10.9	**Language Barrier**					
10.10.1	Workers whose native language is not English or a particular language are not able to report accident					
10.10.2	Provision is made to enable workers report accident cases irrespective of the language they speak					
10.10.3	Some of the workers have problem with medium of communication and as such find it difficult reporting issues					

APPENDIX 2

SEMI-STRUCTURED INTERVIEW GUIDE

Factory Inspectorate Board

The purpose of the interview is to obtain your opinion on your duties and responsibilities and the challenges that you face in inspecting and monitoring construction activities in the region. The interview is estimated to last about 25 minutes. Can I first of all assure you of confidentiality of the data that will be obtained from you through the interview and any documentations obtained from you. No records kept will bear your company's name.

Questions

1. Can you please tell me about your organisation?
2. What are the problems if any, do your organisation face in carrying out its functions?
3. Are construction firms and other small-scale industries aware of the role you play in the region?

Conclusion

I wish to thank you for the insights I have gained from your rich experience and for taking some time off your busy schedule in order to make this meeting possible. I hope you would accord me the same opportunity when the need arises again.

Consultants

The purpose of the interview is to obtain your opinion on your duties and responsibilities and the challenges that you face in inspecting and monitoring construction activities in the region. The interview is estimated to last about 25 minutes. Can I first of all assure you of confidentiality of the data that will be obtained from you through the interview and any documentations obtained from you. No records kept will bear your company's name.

Questions

1. Can you please tell me about your organisation?
2. What are the problems if any, do your organisation face in carrying out its functions?
3. Are construction firms aware of the role you play in the region?

Conclusion

I wish to thank you for the insights I have gained from your rich experience and for taking some time off your busy schedule in order to make this meeting possible. I hope you would accord me the same opportunity when the need arises again.

Site Managers

The purpose of the interview is to obtain your opinion on how you manage occupational health and safety accidents on sites, and some of the factors that influence underreporting of accidents on sites. The interview is estimated to last about 30 minutes. Can I first of all assure you of confidentiality of the data that will be obtained from you through the interview and any documentations obtained from you. No records kept will bear your company's name.

Questions

1. How do you manage occupational health and safety accidents on sites?
2. What are some of your priority areas to ensure a successful completion of your projects?
3. What factors hinder project success in your firm?
4. Comment on the influence of your workers attitude and age on the success of your projects
5. How often do you organise induction training for your workers?
6. Do you have health and safety policy guideline?
7. For the past years you have been operating as a firm, do you keep records of injuries and accidents that occur on sites?
8. Generally, how will you manage an accident or injured worker?
9. Comment on the impact of technology on the successful completion of your projects.
10. Do workers report to you when they have accident or injury?
11. Is there anything you would like to ask me?

Conclusion

I wish to thank you for the insights I have gained from your rich experience and for taking some time off your busy schedule in order to make this meeting possible. I hope you would accord me the same opportunity when the need arises again.

Operatives (Masons, Carpenters, Plumbers, Electricians, etc)

The purpose of the interview is to obtain your opinion on how you report accident cases and some of the factors that influence your choice of reporting. The interview is estimated to last about 15 minutes. Can I first of all assure you of confidentiality of the data that will be obtained from you through this interview. No records kept will bear your company's name.

Questions

1. Have you been reporting injury or accident cases to your supervisors on sites?
2. What is your relationship with your site supervisors?
3. Does your age affect your work output?
4. What factors influence your choice of reporting accident or injury cases to your supervisors on sites?
5. Is there anything you would like to ask me?

Conclusion

I wish to thank you for the insights I have gained from your rich experience and for taking some time off your busy schedule in order to make this meeting possible. I hope you would accord me the same opportunity when the need arises again