

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF BUILDING AND TECHNOLOGY

**HEALTH AND SAFETY AT THE SOURCING STAGE OF PUBLIC WORKS
PROCUREMENT: A CASE OF PROCUREMENT ENTITIES IN THE BRONG
AHAFO REGION OF GHANA**

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INDEX NUMBER: (PG7171112)

**A THESIS SUBMITTED TO THE DEPARTMENT OF BUILDING AND
TECHNOLOGY, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE AWARD OF MASTER OF SCIENCE IN PROCUREMENT
MANAGEMENT**

NOVEMBER, 2014

DECLARATION OF AUTHORSHIP

This work or any part thereof has not previously been submitted in any form to the University or to any other body whether for the purpose of assessment, publication or for any other purpose. Put aside any expression, acknowledgements, reference and/or bibliographies cited in the work, I confirm that the intellectual content of this work is the result of my own efforts and no other person.

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DEDICATION

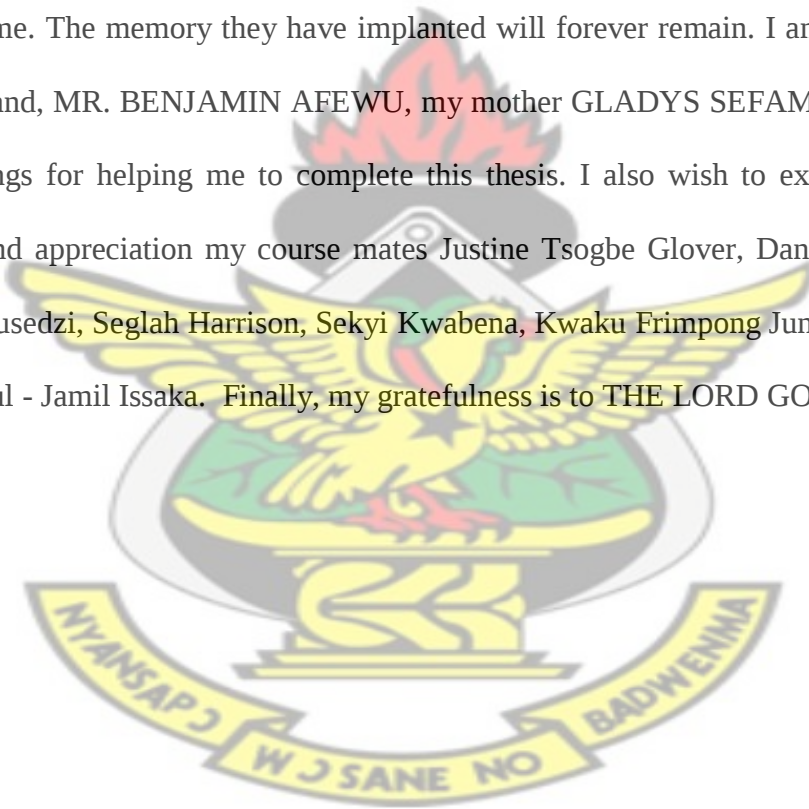
This Dissertation is dedicated to MR. BENJAMIN AFEWU and MASTER DANIEL
MESIOTSO KOMLA AFEWU

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ACKNOWLEDGEMENT

First, I wish to express my special thanks and appreciation to HON. JOE HACKMAN, for his dedicated supervision and helpful suggestions offered throughout the study. My indebtedness to him cannot be over emphasised. Second, to PROFESSOR JOSHUA AYARKWA, the Head of the Building Technology Department, KNUST Kumasi, DR. ADJEI-KUMI and DR. ADINYIRA for their immense assistance provided in terms of guidance, suggestions and encouragements throughout the years of undertaking the programme. The memory they have implanted will forever remain. I am also grateful to my husband, MR. BENJAMIN AFEWU, my mother GLADYS SEFAM ANSAH and all my siblings for helping me to complete this thesis. I also wish to express my special thanks and appreciation my course mates Justine Tsogbe Glover, Daniel Adjorkatcher, Moses Kusedzi, Seglah Harrison, Sekyi Kwabena, Kwaku Frimpong Junior, Kofi Inkoom and Abdul - Jamil Issaka. Finally, my gratefulness is to THE LORD GOD ALMIGHTY.



ABSTRACT

Public authorities may legitimately wish to ensure that the candidates they select have endorsed certain policies in their general professional behavior including safe working environment in achieving value for money. Once contract has been signed for the tenderer to start work, it may be extremely difficult and costly for the contracting authorities to modify or terminate the contract where the chosen candidate is not performing to the required health and safety standards.

The study became necessary from observation that some clients secure a low price tender at the expense of the health and safety of workforce resulting in winning tenderers likely to be the ones that do not provide health and safety for their workforce. The implications of such action prompt for investigation into the extent to which health and safety issues are considered by public entities during the sourcing stage of the public procurement process.

The objectives were to identify how Health and Safety considerations are applied and the effect of considering health and safety at the sourcing stage of works procurement on project performance in terms of cost, quality and timely delivery by public entities.

Procurement Entities of all the Municipal and District assemblies in the Brong Ahafo Region were chosen for the study. The total population for the research was made up of Heads of the Procurement Entities of all the Twenty Seven (27) Municipal and District Assemblies in the Brong Ahafo Region for whom questionnaires as research instrument were administered to for data collection. A response rate of 70.37% was obtained for analysis.

The research concluded that though most of the procuring entities perform quite well in considering health and safety at the sourcing stage of works procurement, there is certainly more that could be done.

In the recommendations clients were urged to act more responsibly in protecting the health and safety of workers while aiming at value for money in at the sourcing stage and enforce the implementation of all requirements in the procurement processes.

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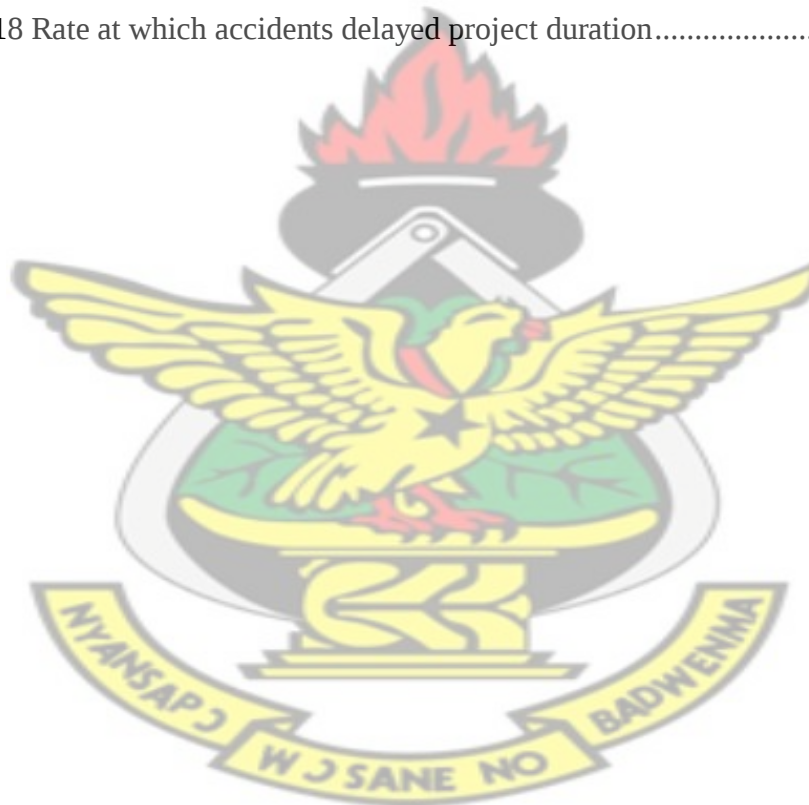
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CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Governments are major procurers of buildings, civil infrastructure and related construction services, commissioning approximately 30 per cent of construction output each year Cotton et al (2005).

The economic contributions of the construction industry in Ghana cannot be over emphasized. The industry is playing a vital role to achieve socio-economic development goals, providing shelter, infrastructure and employment, and above all contributing significantly to the Gross Domestic Product (GDP) of the country. For instance, since 2003 to 2008, the industry has consistently provided an average GDP growth of 6.1% to the economy. Indeed, the construction industry in Ghana was the third largest growing economic sector outstripping the manufacturing industry in 2004 with a constant GDP growth of about 7.3% in 2008 (IMF, 2009).

The procurement entity has a leadership role in preventing work-related death, injury and disease in workplaces. The inherent hazards in construction work means safety must be a priority well before work commences on a site (Wells, and Hawkins, 2013). The anus then lies with the procurement entities to scrutinize various proposals they evaluate and approve for the award of contract.

As procurers, clients/employers/entities can also promote better health and safety by requiring projects to include a range of safety measures, such as specifying the safety budget, building layout or the use of certain construction materials (Site safe, 2000).

The inclusion of health and safety principles in the procurement process also has a number of commercial advantages, including: improved productivity, reduced costs, better prediction and management of production and operational costs over the lifecycle of the project and innovation in design and construction (Site safe, 2000).

The way health and safety should be incorporated into the procurement process depends on the size and complexity of the construction project. For example, in cases where a single manager or small project team is established to manage and deliver the project and oversee those who manage the construction work, a designated person could be given the responsibility for health and safety issues as part of the process.

According to Site safe (2000), an expertise advice may be required on an as-needs basis. The expertise may be of a trained Occupational Health and Safety (OHS) professional who has an appropriate level of knowledge, experience and competence (preferably in building and/or civil construction). This will help prioritize health and safety throughout the project (Site safe, 2000).

The role of the project OHS professional in the procurement process cannot be over emphasized as they advise on the project's safety requirements, collaborate with the project team and where necessary with other stakeholders (eg. with contractors during site audits), identify the need for technical safety specialists (eg. ergonomists, hygienists,

engineers), assist with developing safety requirements in contracts and tender documents, contribute towards construction planning and decision making, regularly report on the project OHS performance linked to project risks and assist in monitoring contractor OHS performance (Wells, and Hawkins, 2013).

While there is a range of different considerations that are made during procurement under the generic set of key stages such as Planning, Design, Tender, Contract, Construction and Evaluation, the health and safety issues which are relevant prior to the award of contract are substantive elements necessary for the tendering stage. Occupational health and safety should be a fundamental part of the selection process when tendering for construction work.

Procuring entities need to take reasonable steps to be satisfied that both the general duties under the Labour Act 657 and the safety risks and requirements identified during the planning and design phases – can be adequately addressed by the company who is selected to do the work. Tender documents provide an opportunity to assess all aspects of potential contractors' performance and it is essential all relevant information is provided to allow for a meaningful evaluation of each bid. Tender documents should not only specify that contractors are expected to comply with relevant OHS legislation but should also require them to demonstrate their safety capabilities with respect to the project (Wells, and Hawkins, 2013).

1.2 STATEMENT OF THE PROBLEM

Currently the most common procedure for awarding procurement of works contracts in Ghana by procuring entities is by open competitive tendering in which tenders are evaluated primarily on the basis of price, quality and time, with and the lowest evaluated tenderer winning the contract (PPA, Act 663, 2003).

The cost of procuring works has been the most factor of consideration without paying premium to health and safety issues in the entire procurement process of most tenderers. The entities too barely looked at health and safety certification but the track records of the eventual winner in terms of historical records of health and safety in undertaking an effective and efficient works are less considered.

In order to win bids, the primary objective of each bidder is to keep labour costs to the barest minimum, with little or no provision made for health and safety. The winning tenderer is therefore likely to be the one that does not provide safety equipment, welfare facilities and a safe working environment. In this context a low price for the client is secured at the expense of the health and safety of the workforce who are prone to hazards when working in the construction industry and not forgetting that when injuries occur, the costs are high – in people and profits as well as causing damaging image to the industry (Site safe, 2000).

It is in the light of the above that the researcher seeks to find out the extent to which health and safety issues are considered by procuring entities during the sourcing stage of the procurement process to create value for money as envisaged by the Act (PPA, Act 663, 2003).

1.3 RESEARCH QUESTIONS

- a) How are health and safety considerations applied by public entities at the sourcing stage of the procurement process?
- b) What is the effect of considering health and safety at the sourcing stage of works procurement on project performance in terms of cost, quality and timely delivery?

1.4 AIM OF STUDY

The aim of the study is to examine the extent of health and safety considerations by public entities during the sourcing stage of the public procurement.

1.5 OBJECTIVES OF THE STUDY

- a) To identify how Health and Safety considerations are applied by public entities at the sourcing stage of the procurement process.
- b) To identify the effect of health and safety consideration at the sourcing stage of works procurement on project performance in terms of cost, quality and timely delivery.

1.6 SCOPE OF STUDY

The Ghana Education Service in an effort to create a conducive environment for teaching and learning in schools across the country is complemented by the Ghana Education Trust Fund (GETFund) to provide educational infrastructures for basic and second cycle schools in the country. The GETFund website provides that 215 of these educational infrastructures for basic and second cycle schools have been completed in the Brong

Ahafo Region and from observation are still under construction. The 215 projects which were initiated and completed between 2009 and 2012 were made up of 54 Emergency Intervention Projects (EIPs) in Senior High Schools (SHS) and 161 Classroom Blocks in Basic Schools to address the problem of Schools Under Trees (SUT) in the Region. The EIPs are in the form of Classroom Blocks, Dormitories, Science Laboratories, Assembly and Dining Halls. These were provided to deal with the emergencies that came up as a result of the four years SHS programme implemented by the Government.

A visit to the GETfund Official website indicated that the SUTs and EIPs cut across all the Twenty-Seven (27) Municipal and District Assemblies of the Brong Ahafo Region and are still under construction gathering from personal observations and interviews with officials of the Ghana Education Trust Fund.

The scope of the study has been limited to the activities of the procurement entities in each of Municipal and District Assemblies in the Brong Ahafo Region of Ghana in considering Health and Safety during the sourcing stage of procurement and the effect of these considerations on the performance of the SUTs and EIPs in terms of cost, quality and timely delivery for the provision of value for money as indicated by the Public Procurement Authority of Ghana, Act 663, 2003.

1.7 JUSTIFICATION OF THE STUDY

In Ghana, the Association of Building and Civil Engineering Contractors have been concerned about increasing reports of deaths and injuries at construction sites' which it said could be avoided if contractors and other workers are duly licensed to operate (GNA

May, 30th 2013). They contend that there is an increasing need for health and safety in the industry to be regulated to ensure players act professionally to improve service.

More so, while it is often argued that the monitoring and enforcement of Health and Safety regulations is the responsibility of regulatory authorities, the large number and wide dispersion of construction sites, coupled with inadequate staffing of these regulatory bodies, make it practically impossible to achieve such objective. In this context the procurement process and the terms and conditions of the contract can be seen as complementary mechanisms for ensuring compliance with legislation and or the terms and conditions of the project (Wells and Hawkins, 2013).

Furthermore, the Public Procurement Act 663, 2003 does not fully address the issues of health and safety in the procurement process in order to champion the concept of value for money especially in the sourcing stage of procurement (PPA, Act 663). Equally notable is the issue of sustainability and compliance in the procurement process as indicated by Lee et al., (2013).

In addition to the above, the under listed highlights the significance of this study.

- i. The findings of the study will specifically help procuring entities in their tendering process if they are to improve on procurement process.
- ii. The study will also help policy makers to formulate ways on how to improve health and safety issues in their procurement practices.
- iii. The study will also serve as a basis for further research to other researchers.

1.8 RESEARCH METHODOLOGY

The research methodology employed in carrying out the research comprised of the population, design of the questionnaire, distribution and collection of the data and data analysis. The details of these were discussed in Chapter three.

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CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents key definitions relevant to the study. Presents the Significance of Construction Procurement and the Ghanaian Construction Industry, Reveals the Health and Safety conditions in the Ghanaian Construction Industry and Highlights the importance of Construction project performance.

2.2 DEFINITION OF TERMS

2.2.1 PROCUREMENT

Procurement may be defined as the acquisition of goods, works and services according to Peter B. et'al, 2008. This embraces not only purchasing, that is, buying of goods, but it also includes hiring of contractors and consultants to carry out services. Standards required in procurement are high quality service, economy and efficiency and fairness in competition. Thus a procedure must be followed and is applicable to all contracts for goods and works.

The Oxford Advanced Learner's Dictionary (2001) defines procurement as the process of obtaining supplies of something, especially for a government or an organization. Procurement can also be defined as the acquisition of goods, buying or purchase of works, hiring contractors and consultancy services (International Bank for Reconstruction and Development Guidelines for Procurement, 2004).

The definition of procurement according to (Mangan, et'al, 2008) states that procurement is a process of identifying and obtaining goods and services. It includes sourcing, purchasing and covers all activities from identifying potential suppliers through to delivery to the users or beneficiaries. It is favorable that the goods/services are appropriate and that they are procured at the best possible cost to meet the needs of the purchaser in terms of quality and quantity, time, and location.

Henchliffe (2005) also define procurement as a business management function that ensures identification, sourcing, access and management of the external resources that an organization needs or may need to fulfill its strategic objectives.

2.2.2 WORKS

Works means work associated with the construction, reconstruction, demolition, repair or renovation of a building or structure or surface and includes site preparation, excavation, erection, assembly, installation of plant, fixing of equipment and laying out of materials, decoration and finishing, and any incidental activity under a procurement contract (Mangan, et'al, 2008).

2.3 SIGNIFICANCE OF CONSTRUCTION PROCUREMENT

In the procurement of Construction works, there can be no direct acquisition of a building (unless it is a small prefabricated unit, for example a school classroom). New buildings are seldom standard items and the refurbishment of existing buildings can never be standard. The act of creating a new or extending or refurbishing an existing building cannot be directly compared to the procurement of goods which can be requisitioned, are

often 'off the shelf' and where an immediate choice can generally be made in terms of cost and quality (RIBA, 2005).

The procurement of a building involves commissioning professional services and creating a specific solution. The process is complex, involving the interaction of the Client, design team, contractor(s) (who provide the construction expertise, labour, materials and plant resources), suppliers and various statutory/public interest bodies. Building procurement is often the subject of joint funding, with the different parties having varying degrees of interest in the outcome of the building process. An agreement should be entered into with the various funders (RIBA, 2005).

2.4 THE CONSTRUCTION PROCUREMENT CYCLE

The Public Procurement Board (2006), describe the Procurement cycle as the road map of the procurement process which establishes the key activities required at every stage of the procurement process. The PPB (2006) identifies that not only does the procurement cycle give direction and step-by-step approach to the implementation of the procurement activity but also provides useful benchmark for procurement monitors and evaluators to carry out their duties effectively. The stages as established by the PPB (2006) have been identified as follows:

2.4.1 PLANNING

Under this stage, procurement requirements are determined and specified by the user. The approach or strategy is decided considering also whether to produce the product(s) in-house or source them externally. Decisions is also taken on the funding, the applicable procurement rules and the method of procurement, which should be used (e.g. open or

restricted tendering, request for quotations or proposals, single source etc). A timetable for the procurement process will be prepared under this stage (PPB, 2006).

2.4.2 SOURCING

The PPB (2006) identifies that activities under this stage may include pre-qualification of potential suppliers, preparation and issue of tender documents, requests for quotation or requests for proposals, evaluation of responses and the selection of the successful tenderer. Negotiations may be required (PPB, 2006).

2.4.3 CONTRACTING

A contract award is made under this phase and a formal contract document will be drawn up, using the agreed terms and conditions, and signed by both parties (PPB, 2006).

2.4.4 CONTRACTS MANAGEMENT

Management of the awarded contract is done under this phase to ensure that both the client and contractor perform their contractual obligations. Activities may include, verifying documentation, technical supervision by an engineer and making payments.

2.4.5 UTILISATION

In works procurement, Utilization starts when the facility is certified practically complete by the Engineer and therefore capable of performing the desired function for which it was designed to perform. Apart from the objective of performing the function for which it was designed, the facility should be aesthetically appealing and structurally safe for habitation for its entire useful life.

2.4.6 EVALUATION

This has to do with evaluating how well the procurement process has gone, identify any weaknesses or problems and agree actions to prevent similar problems in the future. Evaluation may include a formal procurement audit (PPB, 2006).

2.5 THE SIGNIFICANCE OF THE GHANAIAN BUILDING CONSTRUCTION INDUSTRY

The construction industry plays an important role in any economy and its activities are also vital to the achievement of the socio-economic development goals of providing shelter, infrastructure and employment (Anaman and Osei-Amponsah 2007). Indeed, the interdependence between the construction sector and the economic development has been addressed by various writers and in all cases, there is evidence indicating a direct link between investment in construction and economic growth. For instance in an extensive study by Lopes (1998) as cited by Danso (2010) it was revealed that countries that invest at least a minimum of 4% in construction industry are likely to grow faster in their Gross Domestic Product (GDP).

In Ghana, just like many other developing countries, the industry is playing a vital role in socio-economic development goals, providing shelter, infrastructure and employment and above all contributing significantly to the GDP of the country. For instance, since 2003 to 2008, the industry has consistently provided an average GDP growth of 6.1% to economy.

The construction industry in Ghana, as at 2003 had a GDP growth of 5.8% and experienced a constant GDP growth of about 5.8 % from 2004 to 2005. This remarkable

consistent growth increased to 6.2 % in 2006. In 2007, it had picked up again from 6.2%, 7.3% in 2008 (GSS, 2008). Then in 2009 it increased to 8.8%, dropped slightly to 8.5% in 2010 and peaked at 8.9% in 2011, resulting in an average GDP growth of 8.7% from 2009 to 2011 (GSS, 2013). Anaman et al (2007) also did an extensive study by monitoring the subsector growth of construction industry with other sectors. Anaman et al (2007) concluded that the construction sector is the third fastest growing economic sector based on value added to GDP and that the construction industry outstripped the manufacturing industry 2004.

Besides these important GDP contributions, the construction industry in Ghana has a huge potential of contributing to employment creation. For example, Aryeetey (2004) noted that within the active working population of 15-64 year-olds in the formal sector, construction employment increased from about 22,400 in 1980 to about 23,200 in 1985. Further evidence from the Ghana Living Standards Survey (GLSS) indicate that the construction sector in 1991/1992 accounted for 1.2% of active working population of 602,000, and in 1998/1999 it accounted for 1.4% with the active working population of 102,000.

The construction sector experienced a constant employment growth of about 1.2% from 1991 to 1995. Employment growth increased from 1.5% in 1995 to about 2% in 1997. Between the periods of 1999 to 2008 constructions employment has significantly grown between 1.4% and 3.9% (GSS1995; GSS 2008). Indeed, it can be seen that, the construction sector over the years in Ghana has proven to be a source of employment to individuals.

2.6 THE GHANAIAN BUILDING CONSTRUCTION INDUSTRY AND HEALTH AND SAFETY

Due to the fact that construction is carried out in a constantly changing work environment, it is relatively prone to accident. Construction is risky and prone to health and safety risks. This is due to the nature of the construction work operations, construction methods, construction materials, heavy equipment used, and physical properties of the construction project itself. Indeed, based on the world statistics, the accident rate in the construction industry is almost three times higher than that of the manufacturing sector Sengupta, (1999). According to Haslam (2005), construction is widely regarded as an accident prone industry. Armstrong (2006) also states that, thousands of people are killed at work every year and several hundred thousands more are injured or suffer ill-health.

Laryea (2010) has stated that “the study by Kheni (2008) on health and safety practices among construction SMEs in Ghana revealed serious problems. The main problems identified by Kheni included lack of skilled human resources, inadequate government support for regulatory institutions and inefficiency in institutional frameworks responsible for health and safety standards.

2.7 HEALTH AND SAFETY

Health is a sound state of the body and mind of people from illness resulting from the materials, processes or procedures used in the workplace, while safety is the protection of people from physical injury (Hughes et al, 2008). Health has to do with the physical and mental wellbeing of those who are involved in a construction project (Chan and Chan,

2004). Physical health issues such as back injuries are more likely to concern those working at the construction site, while mental health issues such as stress are more likely to be common among offsite workers (Chan and Chan, 2004). Safety is about avoiding accidents of any kind that can cause injuries or even fatalities for those involved in the construction process. A safe project has few accidents in relation to the total man-hours worked on the specific project (Chan and Chan, 2004). International Labour Organization (ILO) and the World Health Organization (WHO) have shared a common definition of occupational health. It was adopted by the Joint ILO/WHO Committee on Occupational Health at its first session in 1950 and revised at its twelfth session in 1995 as the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job. “The main focus in occupational health is on three different objectives: (i) the maintenance and promotion of workers’ health and working capacity; (ii) the improvement of working environment and work to become conducive to safety and health and (iii) development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings.

The concept of working culture is intended to mean a reflection of the essential value systems adopted by the undertaking concerned. Such a culture is reflected in practice in

the managerial systems, personnel policy, principles for participation, training policies and quality management of the undertaking."

2.7.1 THE HISTORY OF HEALTH AND SAFETY

As labor movements arose in response to worker concerns in the wake of the industrial revolution, worker's health entered consideration as a labor-related issue.

In 1833, HM Factory Inspectorate was formed in the United Kingdom with a remit to inspect factories and ensure the prevention of injury to child textile workers.

In 1840 a Royal Commission published its findings on the state of conditions for the workers of the mining industry that documented the appallingly dangerous environment that they had to work in and the high frequency of accidents. The commission sparked public outrage which resulted in the Mines Act of 1842. The act set up an inspectorate for mines and collieries which resulted in many prosecutions and safety improvements, and by 1850, inspectors were able to enter and inspect premises at their discretion. Otto von Bismarck inaugurated the first social insurance legislation in 1883 and the first worker's compensation law in 1884 – the first of their kind in the Western world. Similar acts followed in other countries, partly in response to labor unrest (www.wikipedia.org/wiki/Occupational_safety_and_health).

2.7.2 OVERVIEW OF THE INTERNATIONAL LABOUR ORGANISATION

The International Labour Organization (ILO) as a specialized agency of the United Nations was established in 1919 with the sole objective of protecting Human Rights of workers and to promote decent work for all races.

The ILO, as part of its work, drafts and adopts conventions, and makes the needed recommendations to its member states. In view of this, ILO provides acceptable standards, among other things, to all member states that have adopted and pledged to respect and promote human rights. Consequently, in 1988, the Health and Safety in Construction Convention (No. 167) and its associated Recommendations (No. 175) were adopted to serve as blue print legislations and policies of member states' health and safety concerns. The enactment of the law on occupational health and safety in the construction industry was necessary to reflect the broad approach in tackling the health and safety problems in the construction industry. Therefore, complementing this law is the ILO Code of Practice on Health and Safety on Construction sites which was also approved in 1992.

2.7.3 THE CODE OF PRACTICE ON HEALTH AND SAFETY ON CONSTRUCTION SITES (ILO 1992)

Generally, a code of practice is a set of rules according to which people in a particular profession are expected to behave or practice. The ILO's Code of Practice on Health and Safety on Construction site provides guidelines in the implementation of the Health and Safety practice on construction sites for all workers. The document outlines the steps that have to be taken, such as the provision of adequate welfare facilities, personal protective equipment appropriate for a job and maintenance of safe working environment for all workers on site.

2.7.4 HISTORY OF HEALTH AND SAFETY IN GHANA

So many years ago, production methods created work related hazards which needed to be managed as it has been the case and still remains so that governments have focused on raw material production through foreign companies using a mixture of foreign skilled and unskilled local labour (Dazie, 2013). This therefore led to the passage of the Factories Ordinance in 1952 to provide a code of protection for most production worker (Dazie, 2013). The law was implemented in the mining industry where workers were exposed to serious hazards to their health (Kheni et al, 2008). According to Dumet (1993), occupational health and safety was neglected by Government and mining companies resulting in high mortality rates among migrant workers. Key government institutions in Ghana such as Komfo Anokye and the Korle Bu Teaching Hospitals under the Ministry of Health were not equipped with modern occupational health unit at the time to deal with cases that are brought from the industries. These brought about agitations for better hospital facilities to help handle such cases. Currently these hospitals have managed to make provisions in their occupational health units to better deal with accidents due to falls, electrocution, cuts etc.

2.7.5 HEALTH AND SAFETY INSTITUTIONS IN GHANA

The activities of many government ministries and other organisations affect the construction industry of Ghana. Public institutions may interact directly with the industry by regulating its activities or act on behalf of government as financiers, suppliers, regulators, clients, or paymasters (Edmonds and Miles 1984).

Non-governmental organisations, which significantly influence the activities of the industry, include trade unions, employers' organisation, private clients, donor agencies, professional institutions, research institutions, and private educational institutions. To date, two government ministries have had direct responsibility over activities of construction businesses in Ghana and have had total control of implementation of state policy in the construction sector (Kheni et al, 2008). The key Ministry with respect to these is the Ministry of Roads and Transport. The Ministry of Roads and Transport is responsible for the road sector of the economy and has under it, the Ghana Highways Authority, Department of Urban Roads (DUR) and Department of Feeder Roads. The other is the Ministry of Water Resources, Works and Housing which is responsible for policy development and implementation in respect of works, housing, water supply, sanitation and hydrology, and oversees the activities of building contractors. Generally, physical developments, such as roads, stadia, hospitals, schools churches and housing are normally undertaken, after the relevant state agencies or departments certify and conclude that the project meets the requirements stipulated within the planning and building regulations of Ghana. The Ghana Government conditions of contract delegates all health and safety issues to the client and contractor whereas environmental concerns to be addressed by the Environmental Protection Agency (EPA) .The Labour and the Factory Inspectorate Departments handle labour issues and other issues relating to employment as well as accidents from construction sites and other production units in the country. However, the Ministry of Health, through its Occupational Health Units is responsible for occupational health issues (Kheni, 2008).

2.7.6 HEALTH AND SAFETY LEGISLATION IN GHANA

2.7.6.1 THE LABOUR ACT

Part XV of the Labour Act, 2003 (Act 651) relates to the health and safety and environment of workplaces and provides that: “It is the duty of an employer to ensure that every worker employed by him or her works under satisfactory, safe and healthy conditions” This means the employer should provide and maintain the workplace, plant and ensure the work is safe and without risk to the health of all workers including casual workers. Further, the employer should provide the necessary information, instructions, training and supervision, taking into account the age, literacy level and other circumstances of the worker to ensure, so far as it is reasonably practicable, the health and safety at work of other workers engaged on the particular work. The Act further provides that:

“It is the obligation of every worker to use the safety appliances, fire-fighting equipment and personal protective equipment provided by the employer in compliance with the employer’s instructions”.

- An employer shall not be liable for injury suffered by a worker who contravenes subsection (3) where the injury is caused solely by non-compliance by the worker.
- An employer who, without reasonable excuse, fails to discharge any of the obligations under subsection (1) or (2) commits an offence and is liable on summary conviction to a fine not exceeding 1000 penalty units or to imprisonment for a term not exceeding 3 years or to both.

2.7.6.2 FACTORIES, OFFICES AND SHOP ACT OF 1970

The Factories, Offices and Shop Act 1970 details preventive measures to health and safety in general. This Act caters for factories, offices, shops, ports, and construction. The Act provides for the minister for manpower, development and labour to make regulations in respect of construction works to address specific hazards including imposing duties on persons in respect of the hazards. According to this Act, every contractor or employer shall comply with the requirements designed to ensure the health, safety and welfare of all persons engaged in building operations on building construction sites. Furthermore, it provides that adequate and suitable accommodation in the form of canteen must be provided by the contractor to contain tables and seats or benches for taking meals, with facilities for boiling water. Where the employer or contractor has more than ten persons in his employment on a site, adequate facilities for heating food must be provided as well as drinking water. On the provision on first-aid, the Act states that employers provide first-aid room properly constructed and accessible to workers during working hours (Kheni, 2008).

2.7.6.3 THE WORKMEN'S COMPENSATION LAW

The first Ordinance on health and safety was the Workmen's Compensation Ordinance, 1940 (No. 5) which came into force on the 1st July, 1942 as the Workmen's Compensation Ordinance (Cap.94). Another important provision of the Ordinance of 1954 was that which gave the Minister responsible for Labour the power to extend the scope of the Ordinance to occupational diseases. This was followed by the Workmen's Compensation (Amendment) Act, 1961 (Act 53). It further provided for compensation for

disfiguring and other social injuries to workmen. In 1963, a new law was enacted (Workmen's Compensation Act 1963). In 1966, the Act was further amended by the Workmen's Compensation Act, 1963 (Amendment) Decree, 1966 (N.L.C.D. 86) by substituting a new section 15 for section 15 so as to clarify the effect of the amendments carried out by the Workmen's Compensation (Amendment) Act, 1965 (Act 295). This Decree repealed Act 295. This was later repealed by the Current Workmen's Compensation Law 1987 (PNDCL 187). The Act provides that the employer is required to bear the hospital expenses of the injured worker. The Workmen's Compensation Act 1987 imposes employer liability to pay compensation to employees incapacitated by accidents arising out of and in the course of their employment. Compensation payment to accident victims is independent of negligence on the part of employer or fellow-worker (Kheni, 2008).

2.7.6.4 INSURANCE ACT

The Insurance Act, 2006 Act 724 requires an owner of a commercial building under construction to insure the liability(ies) in respect of constructional risk arising out of negligence of servants, agents or supervisors which may result in the following:

1. (i) Bodily injury to any workman on the site or any member of the public
(ii) Loss of life to any workman on site or any member of the public
(iii) Damage of property of any workman on the site or any member of the public
2. (i) The insurance act also requires of the owner of a commercial building to insure the building against collapse, fire, earthquake, storm and flood.

(ii) The insurance policy obtained from the insurer shall cover the legal obligations of the owner or occupier of such building in respect of loss or damage to property, bodily injury or death suffered by any user of the building and third parties.

The insurance act defines commercial buildings as a privately owned building where member of the public enter and leave for the purpose of (a) obtaining educational or medical services or (b) engaging in commercial activity for the purpose of recreation (Osei-Asibey, 2009)

2.7.6.5 PUBLIC PROCUREMENT ACT

The Legal Framework covering public procurement in Ghana are Public Procurement Act 663 of 2003, Public Procurement Regulations, Public Procurement Manual, Standard Tender Documents, and Guidelines.

The Public Procurement Act of 2003, Act 663 which came into force on the 31 December 2003 has its main objectives of harmonizing public procurement processes in the public service, Securing judicious, economic and efficient use of state resources and Ensuring public procurement is fair, transparent and non-discriminatory.

It functions are to establish the Public Procurement Board, Entity Tender Committees and Tender Review Boards, Specify outline rules for procurement methods, procedures, appeals, by tenderers and disposal of stores, Define offences and applicable penalties, Specify thresholds in Schedules to the Act and authorise the issues of Regulations, which are enforceable under the Act.

The Standard Tender Documents which are issued by the PPB and listed in Schedule 4 of the Act comprise standard invitation and contract documents for procurement of all values. There are separate standard tender documents for goods, works and services

The introduction of the standard tender documents became necessary because of the diversity and unequal quality of tender documents which made the process of preparing and reviewing procurement documents more time consuming and difficult to manage efficiently.

The main purposes of the tender documents are to instruct tenderers on procedure for submission of tenders, describe goods, works or services to be procured, inform the tenderers of the criteria to be used for evaluation of the tenders and tenderers' qualification and define conditions of contract.

The qualifying criteria for the award of the Contract under the standard tender documents for works specify that tenderers shall meet the following minimum qualifying criteria:

- (a) annual volume of construction work of at least the amount specified in the Tender Data;
- (b) experience as prime contractor in the construction of at least two works of a nature and complexity equivalent to the Works over the last 10 years (to comply with this requirement, works cited should be at least 70 percent complete);
- (c) proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed in the Tender Data;

(d) a Contract Manager with five years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and

(e) Liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than the amount specified in the Tender Data.

Health and Safety Convention (No. 167) and its associated Recommendations (No. 175) as has been identified were to serve as a blue print upon which all member states would enact their own legislations and regulations to suit their environment. Recent studies show that China, Australia, South Africa and others have developed separate legislation for their construction workers. For example, China has developed a safety document titled "The Construction Law of the People's Republic of China". Australia in her "worksafe" campaign has established an Australia Occupational Health, Safety and Welfare Act 1986. Further in South Africa, Occupational Health and Safety Act of 1993 has been established for construction workers. Similarly in Saskatchewan, a province in Canada, has established a regulation titled "Construction Industry Labour Relations Act of 1992". In general all these laws have been established with the prime purpose of protecting construction workers, construction materials, and the provision of guidelines to preventing accident occurring on construction sites. Baah et al (2006) indicated that Ghana has so far ratified 46 ILO Conventions including Convention No. 167 and its associated Recommendation No. 175. However, it appears that Ghana has not been able to develop a comprehensive separate legislation and policies (in the context of health and safety) for her construction workers, but rather it appears the industry depends on the

National labour Act 651 of 2003, Factories, Offices and Shop Act of 1970 and Workmen compensation Act 1987 and Building Regulation.

2.8 CONSTRUCTION PROJECT PERFORMANCE

Traditionally, researchers and organisations have focused on the three project performance criteria of cost, time and quality (Dainty *et al.*, 2003, Chan and Chan, 2004, Swan and Khalfan, 2007). Recently, many studies have, however, included also other performance aspects, such as health and safety (Chan and Chan, 2004), environmental performance (Chan and Chan, 2004, Swan and Khalfan, 2007), customer satisfaction (Chan and Chan, 2004, Collins and Baccarini, 2004), and innovation (Harty, 2008).

2.8.1 COST MANAGEMENT PERFORMANCE WITH BUDGET

Cost is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubshait and Almohawis, 1994). Ali and Rahmat (2010) indicated that cost is not only confined to the tender sum, but the overall cost that a project incurs from inception to completion, which includes any costs arise from variations, modification during construction period and the cost arising from the legal claims, such as litigation and arbitration. Project cost is the overall cost a project incurs from inception to completion, is of major interest as it shows the resource usage in economic terms (Mthalane, et al, 2007). Cost overruns can be a source of problems for an otherwise successful project as contractors are frequently criticized for the common occurrence of cost overruns (sometimes labeled cost growth) in construction projects (Chan and Chan, 2004).

In order to win bids contractors keep their costs down and labour is a major item of cost. The winning tender is therefore likely to be the one that does not provide safety equipment, welfare facilities and a safe working environment. In this context a low price for the client is secured at the expense of the health and safety of the workforce (Wells and Hawkins, 2007). Market conditions in South Africa are such that contractors frequently find themselves in the iniquitous position that should they make the requisite allowances for health and safety, they run the risk of losing a tender or negotiations to a less committed competitor (Smallwood, 1996). Fryer (1997) says that clients may have to accept that there is a health and safety premium to pay in the cost of construction.

During research conducted in South Africa approximately 50% of project managers advocated the inclusion of a provisional sum for health and safety (Smallwood, 1996). This would ensure that all tenderers allocate an equitable amount of resources to health and safety.

2.8.2 TIMELY DELIVERY OF PROJECTS

The increasing importance of time in our globalised society has affected the construction industry in form of shortened project schedules. Project duration is simply the number of days/weeks/months from start to completion of the project (Mthalande, et al, 2007). Since time can be a critical issue for many clients, project duration is often of prime interest. However, schedule overruns may be an even more important issue.

Completing projects in a predictable manner on time (within schedule) is an important indicator of project success and the construction industry is frequently criticised for project delays (Chan and Kumaraswamy, 1997, Odeh and Battaineh, 2002, Faridi and El-

Sayegh, 2006, Swan and Khalfan, 2007). Schedule overruns (sometimes labeled time growth) are often very negative since they hinder the client to start using the end product as planned. Puspasari (2005) in his study indicated that, delay to the owner means loss of revenue through lack of production facilities and rent-able space or a dependence on present facilities. In some cases, to the contractor, delay means higher overhead costs because of longer work period, higher material costs through inflation, and due to labour cost increase.

2.8.3 QUALITY DELIVERY

In the construction industry, quality is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Parfitt and Sanvido, 1993). In other words, the emphasis of quality in construction industry is on the ability to conform to established requirements. Requirements are the established characteristics of a product, process or service as specified in the contractual agreement and a characteristic is any specification or property that defines the nature of those products, processes or services, which are determined initially by the client. In order to achieve a completed project that meets the owner's quality expectations, all parties to a project must acquire an understanding of those expectations, incorporate them into the contract price and other contract documents to the extent possible, and commit in good faith to carry them out (Ganaway, 2006).

Satisfactory time and cost performance is of little value if the project delivers inferior quality. The concept of quality is closely related to customer satisfaction, which has gradually been elevated in importance in the construction industry (Latham, 1994, Egan, 1998, Forsythe, 2007). Customer satisfaction is commonly described as a comparison

between the customer's pre-purchase expectations and their post-purchase perceptions. Hence, it involves the customer's final feelings about whether the outcome provided a satisfying or dissatisfying experience (Forsythe, 2007). Since construction industry products are highly customised and co-created during the construction process, the concept of quality regards both the final product and the process during which is created. Two main aspects of quality then emerge as identified by (Mthalande, et al, 2007). First, quality of end product has to do with the users' satisfaction with the finished construction and it is a critical success factor (Collins and Baccarini, 2004, Forsythe, 2007). It is also related to how the final product and its function meets the specification (Chan and Chan, 2004, Collins and Baccarini, 2004). The second aspect of quality is the service quality during the construction process, which reflects the client's perception of the process during which project participants interact to create the end product (Maloney, 2002, Forsythe, 2007). Poor quality project may disappoint the client as functional adequacy, construction project completion on time and within budget, life-cycle costs and operation and maintenance is not met.

2.9 CONSTRUCTION HEALTH AND SAFETY THROUGH PROCUREMENT

2.9.1 PLANNING STAGE HEALTH AND SAFETY CONSIDERATIONS

According to Wells and Hawkins (2013), many of the common health and safety problems encountered during construction and operation could be avoided if due consideration and effort were invested during the project brief and design phases.

Risks to the health and/or safety of workers and users of a facility may occur at any stage

of the project cycle. Risks that can be detected as early as the planning stage include those linked to hazards associated with the location and the site (e.g. chemical, biological, physical, radiological hazards). At the design stage, risks to health and safety may arise from the specification of materials, technology of construction, as well as considerations relating to buildability, operation and maintenance.

Wells and Hawkins (2013) have indicated that to ensure that risks are addressed at the earliest possible stage the following steps are proposed:

- An OHS risk assessment is carried out on all projects at the planning and design stage.
- The findings of the risk assessment are entered into a risk register.
- The risk register is passed to the appointed contractor and updated throughout the project.
- An OHS plan is developed to mitigate the risks with clear allocation of responsibilities.
- The OHS plan is carried through to tender and issued with the tender documentation.

It is normal on large projects (particularly when funded by donors) to require an Environmental and Social Impact Assessment (ESIA) to be carried out at the planning stage to consider the potential environmental and social risks and impacts of the project. Risks to health and safety are key aspects of social risk, so the OHS risk assessment should be a major component of the ESIA. Health and Safety risk mitigation measures then need to be incorporated into the Environmental and Social Action Plan and passed down the procurement chain in the form of clear contractual requirements to the

contractor and subcontractors (Wells and Hawkins, 2013).

From the initial inception of the project it is vital that the client develops and disseminates a clear policy for safeguarding the health and safety of the workers on their construction project(s). The policy should be widely publicised so that those on the demand side (procuring officers) and on the supply side (potential tenderers) fully understand the client's priorities (Wells and Hawkins, 2013).

A second step is, understanding the market. Before going out to tender, the client must be confident that the criteria set are realistic and can be met by the local market.

A market analysis may be required. It should cover the Occupational Health and Safety regulatory framework, the capacity of the main OHS agency and a baseline study of common OHS practices on the ground. It may be found that the capacity of consultants and contractors in the local market is insufficient to meet the standards required. This is one of the most difficult issues in developing countries where operators may have little or no understanding of health and safety risks and their mitigation. In this situation it may be necessary to set out very clear minimum standards to be met in the short term and accompany these with an intensive training programme (Wells and Hawkins, 2013).

The objective for the project(s), once defined, should be included in the subject matter of the tender – for example, “Construction of a public school/office/road built with special regard to health and safety”. In this way, health and safety becomes of part of the core objectives of the project (Wells and Hawkins, 2013).

2.9.2 SOURCING STAGE HEALTH AND SAFETY CONSIDERATIONS

The client's objectives for health and safety should be explained in the invitation to tender, with specific requirements set out in detail in the tender data and explained

verbally at pre-tender meetings (Wells and Hawkins, 2013). If failure to convince the client of their capacity to meet these requirements is to be considered as reason to reject a tender, this also should be clearly stated in the Tender data

Clients/Consultants may require contractors to submit with their tenders:

- a site specific health and safety plan (including, where appropriate, a fall protection plan)
- an outline of the procedures to be adopted to ensure that health and safety requirements are met, not only by the main contractor but also by subcontractors
- a system and format for recording and reporting accidents, incidents and near misses

So that there is no misunderstanding of what is required (and to ease the process of checking that the contractor has made adequate provision for health and safety) items that are necessary to meet the client's requirements and which can be separately priced should be listed as a prime cost item in the bill of quantities, provisional sum, or in whatever other pricing mechanism is used. Contractors are required to put a price against each of these items (Wells and Hawkins, 2013).

The kind of items that could be separately priced include:

- the preparation and updating of a site specific health and safety plan including a supervision and reporting scheme (to include subcontractors)
- provision of temporary protective works (scaffolds, hoardings)
- hiring of a qualified safety officer
- provision of safety training to workers and supervisors
- time to attend meetings of the health and safety committee
- provision of welfare facilities (water, food, housing)

- provision of personnel protective equipment
- medical examinations, first aid and emergency facilities

It is also possible (and may be considered preferable) to take the cost of meeting the client's health and safety requirements out of competition by pre-pricing the above items. This was the approach adopted in Hong Kong in 1996 under the 'Pay for Safety' scheme. The maximum payment for all safety items was set at approximately 2% of the estimated value of the contract on small projects and 1% on large projects. Items that are not delivered are not paid for (David, 2007).

Although the price paid for safety measures may seem high to some clients, in the longer term it should be off-set by lower tender prices as contractors experience savings associated with better health and safety. The main sources of savings are reduced insurance premiums, less disruption to work schedules and higher labour productivity as workers feel more secure. Benefits accruing to the financiers include lower credit risk, less likelihood of work stoppage and diminished risk to their reputation (David, 2007).

In evaluating tenders it is important to consider whether the contractor has made adequate allowance for the items included in the special section of the bill of quantities or alternative pricing mechanism. Particular attention should be paid (especially in multi-storey buildings) to the contractor's plan and financial provision for the design and construction of temporary support systems (e.g. scaffolding) (Wells and Hawkins, 2013).

World Bank rules require the contract to be offered to the 'lowest evaluated tender'. But if the contractor's provision for health and safety fails to meet the client's requirements, the tender could be rejected as invalid/non-conforming. This is likely to be more readily accepted if health and safety is included in the objectives of the project.

Where local procurement regulations permit, clients might consider reducing the priority given to price in tender evaluation and increasing that given to quality and work safety. A notable example comes from Singapore which in 2005 moved to a quality/cost (two envelope) system for evaluating contractors' tenders, with the contractor's record on health and safety included in the quality assessment of technical bids (Wells and Hawkins, 2013).

In addition, work safety measures are included in the specification for public works projects and construction firms are ruled out if their work safety record is unsatisfactory (David, 2007).

2.9.3 CONTRACT DOCUMENTATION STAGE HEALTH AND SAFETY CONSIDERATIONS

Many contracts make only vague and general reference to health and safety. For example, the Labour Act 651, 2003 as well as many other standard forms of contract developed by national public procurement authorities, contain in their general conditions a statement to the effect that the contractor must take all 'reasonable precautions' to protect the health and safety of the workers. But without clear benchmarks and definitions in the specification as to what is 'reasonable', the statement tends to be ignored. Other contracts, state in the conditions of contract that the Contractor must comply with the health and safety requirements stated in the works information (Wells and Hawkins, 2013).

In developing countries, where there is often little understanding of the issue, standard national contracts should make reference to national health and safety regulations (World Bank, 2006). If these are not well known the main requirements should be referenced and

where possible listed in the specific conditions of contract. Where countries do not yet have legislation governing health and safety, work safety measures would need to be included in the specification as an important contract document (World Bank, 2006).

The client must be conscious of their liabilities under the law (World Bank, 2006). They must therefore include in the contract appropriate procedures to cover the liabilities, as well as to meet their own standards and the lender's requirements. Such procedures should include a 'safety management system' to promote and monitor compliance with national health and safety regulations and any other contract specific requirements, as well as a system for reporting against a set of indicators agreed for the purpose. The contract should spell out the responsibilities of the various parties on these issues (World Bank, 2006). The cost of identified measures to safeguard health and safety should be priced as specific items in the contract documents and not paid for if not delivered. The contract may also make provision for additional penalties for poor health and safety performance and/or the payment of bonuses for accident-free sites (World Bank, 2006).

2.9.4 MONITORING AND REPORTING STAGE HEALTH AND SAFETY CONSIDERATIONS

Clients can use the contract procedures to monitor health and safety contract provisions against Key Performance Indicators (KPIs) to ensure compliance and retain credibility. It is essential that monitoring and reporting systems are agreed in advance before work starts on site see, for example, Asia Development Bank, 2006.

Monitoring from within the project team is the most effective way of ensuring compliance with the H&S provisions of the contract. The reporting chain should be from

subcontractor to main contractor, to consulting engineer, to client, to financier.

Prime responsibility for managing activities and people on construction sites rests with the main contractor, who carries responsibility also for monitoring and reporting the activities of subcontractors. To help raise the profile of health and safety it is proposed that a regular slot for health and safety issues be put on the agenda of site meetings (World Bank, 2006).

A particularly useful contribution to monitoring can be expected from the workforce, so long as they are made aware of their rights and a channel is available to them to complain if the rights are not respected. One simple way of informing workers of their entitlements is to post notices on the site in local languages spelling out what these are (for example, they are entitled to a safe and healthy workplace, safe drinking water, food and accommodation etc.). The contract can require that this is done. This measure is suggested in ILO Convention 94 and was successfully adopted in a project to raise labour standards in feeder road construction in Ghana (Ladbury, 2003).

Supervising engineers are the client's representative and responsible for safe-guarding the client against health and safety risks on the project. Supervising engineer, even if not based on site, are frequent visitors and in a good position to observe site practices as well as to talk to the workers about their concerns (Ladbury, 2003).

In addition to monitoring, supervising engineers have powers to enforce the health and safety requirements of the contract. They can do this directly, for example by the exercise of 'stop-work orders' (Ladbury, 2003). Although enforcement is sometimes necessary, the provision of incentives for good performance (e.g. bonuses for accident free sites) and penalties for poor performance are more important tools for changing behaviour in the

longer term. The most effective form of penalty is a poor rating which can affect future opportunities for work (Ladbury, 2003).

2.9.5 POST PROJECT EVALUATION STAGE HEALTH AND SAFETY CONSIDERATIONS

The record of health and safety during construction should be an issue to be addressed in the final evaluation of the project. Many projects, especially those funded by donors, are currently subject to independent financial and technical audits. The technical audit is an appropriate place to report on the management of health and safety risks during construction, while the financial audit should check expenditures on health and safety measures (World Bank, 2006).

It is recommended that technical and financial audit reports contain a special section on health and safety and that this information is fed back to the relevant authorities and stakeholders in the project (World Bank, 2006).

While audits are generally conducted at the completion of a project, a case can be made for conducting technical audits at key stages during the construction process so as to uncover problems (e.g. inadequate foundations) that might be concealed by the time the project is completed. This would enable problems in the provision for health and safety, or management of health and safety, to be picked up in time to take corrective action.

2.10 CAUSES OF SITE ACCIDENTS IN CONSTRUCTION

In order to investigate the impacts of site accidents on the project performance it is essential to identify the causes of site accidents in construction sites. The main causes of accidents are:

2.10.1 CONSTRUCTION SITE FALL

Falls from above can occur from scaffolds, walkways or stairs and into shafts (from the edge of the shafts) excavations, or floor openings. This type of accident occurs because stairs were not provided with railings or scaffolds were not provided with guard rails.

2.10.2 CRANE ACCIDENTS

According to Whitman (n.d.) the creation and use of cranes have allowed humans to build structures our ancestors could have never imagined. In densely populated areas where there is nowhere else to build but up, cranes are everywhere and are relied upon to create residential and commercial buildings. Although cranes have improved along with technology over the years, crane accidents still occur that can result in injury or death.

Crane accident deaths can arise from a number of factors, including lightning, high winds, defective cranes, falls, electrocution, and other hazards associated with construction at heights. Many crane accidents can be avoided with proper training and safety procedures. During construction, the well-being of workers must be more important than other considerations (Whitman, n.d.).

2.10.3 SCAFFOLDING ACCIDENTS

The use of scaffolding is pervasive and necessary in the construction industry. Some of the most dramatic structures that have been built by humans relied on scaffolds to get the job done.

Construction workers injured in scaffold accidents connected the event with planking or supports giving way or the employee slipping or being struck by a falling object. These are circumstances that should not occur when sites follow OSHA standards. Most scaffolding accidents can be avoided through proper training and preventative measures (Whitman, n.d.).

2.10.4 RUN OVER BY OPERATING EQUIPMENT

The construction site is an extremely busy work environment. With movement by workers and vehicles, everyone has a responsibility to look out for each other's safety. Supervisors and foremen have the additional duty of promoting effective safety procedures and practices at the construction site to ensure the well-being of all employees (Whitman, n.d.).

Tragically, there are circumstances when construction workers are run-over or injured by operating equipment. Accidents such as this can occur at any worksite, but risks are increased when working on highways or near busy roads with heavy equipment. In these environments workers must be vigilant and meticulous when practicing safety standards. Any lapse in procedure could result in a preventable construction accident.

Someone being run-over by operating equipment can discuss the case with a compassionate lawyer (Whitman, n.d.).

2.10.5 ELECTRICAL ACCIDENTS ON CONSTRUCTION SITES

It is estimated by OSHA that nearly 350 construction workers die every year from electrical accidents. A few causes of these fatalities include electric shock, electrocutions, steam accidents, and power line contact. The risks of these hazards are heightened for

workers who perform their jobs on scaffolding or in cranes near overhead power lines. In addition to the aforementioned injuries one may suffer from electrical accidents, other risks include burns and falls caused by contact with electrical energy (Whitman, n.d.).

2.10.6 TRENCH COLLAPSES

The building of trenches is necessary for many construction tasks. They are present wherever buried utilities are constructed or repaired. It is absolutely imperative that appropriate safety measures are taken during the building process to ensure the safety of all workers involved.

A trench is narrow in length with its depth greater than its width. When trenches are constructed they must have safeguards in place to protect workers inside the trench from a collapse. When a trench collapses workers may easily become crushed under the weight of heavy soil from above. One cubic yard of soil weighs about as much as a mid-sized automobile, and suffocation can occur with only a couple feet of soil on top of the victim (Whitman, n.d.).

2.10.7 FIRES AND EXPLOSIONS

According to (Mithalane, et al, 2007) there are three types of fires and explosions that could probably occur on construction sites. These are small fires, large fires and blowouts. The probability is that small fires are least dangerous and blow outs being the most severe (Gloss & Wardle, 1984).

2.10.8 WELDING ACCIDENTS ON A CONSTRUCTION SITE

Welding is a hazardous activity that requires experience and a strict adherence to safety guidelines. Welding accidents can arise from welding fumes, UV light, sparks, noise, or skin injury. Due to the wide range of accidents that may occur, healing times and other circumstances are extremely dependent upon the individual (Whitman, n.d.).

Welding accidents can run the gamut of a wide variety of other serious construction-related mishaps. Welders can be exposed to gases, electricity, toxic fumes, and high temperatures that can separately or in combination pose significant health risks. It is important for safety precautions to be established and in use by welders to avoid accidents (Whitman, n.d.).

2.10.9 SLIPS AND TRIPS

Slips happen where there is too little friction or traction between the footwear and the walking surface. Common causes of slips are wet or oily surfaces, occasional spills, weather hazards, loose, unanchored rugs or mats, flooring or other walking surfaces that do not have same degree of traction in all areas. Trips happen when your foot collides (strikes, hits) an object causing you to lose the balance and, eventually fall. Common causes of tripping are obstructed view, poor lighting, clutter in your way, wrinkled carpeting, uncovered cables, bottom drawers not being closed, uneven (steps, thresholds) walking surfaces (ccohs, 2013).

2.11 EFFECTS OF SITE ACCIDENTS ON PROJECT PERFORMANCE

From a business standpoint, accidents affect the profitability of a project. Economic impacts of site accidents could have direct and indirect costs. A direct cost is defined as those costs covered by the workers compensation insurance. These may include medical costs, premiums for workers, compensation insurance, liability and property losses (Kapp et al., 2003). Indirect costs are those costs attributed to loss of productivity of the injured worker and the crew, transportation costs to the nearest medical treatment facilities and time expended to complete various forms related to the injury (Hinze & Appelgate, 1991). Literature review and interviews by Mthallane, et al, (2007) identified the effects of site accidents on the construction company as follows: damages to plant, equipment and completed work, payments for settlements of injury or death claims, Legal fees for defense against claims, costs of rescue operations and equipment, expenditures on emergency equipment, loss of function and operations income, slowdowns in operations while accident causes are determined and corrective action taken, corrective actions to prevent re-occurrence of accident, degradation of efficiency of operations because of loss of experienced and trained personnel, training costs for replacements, increased insurance costs, loss of productivity, disruptions while investigations are being carried out by the company safety department and insurers, medical payments , insurance premiums and costs of workman's compensation insurance

2.12 SUMMARY

This chapter presented key definitions relevant to the study. Presented the Significance of Construction Procurement, Construction Procurement Cycle and the significance of the

Ghanaian Construction Industry, Revealed the significance of the Ghanaian Construction industry with regards to health and safety and Highlighted Construction project performance in terms of cost, quality and timely delivery, Construction Health and Safety through procurement, Causes of accidents on construction sites and the effects of site accidents on project performance.

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CHAPTER THREE

RESEARCH METHOD AND DESIGN

3.1 INTRODUCTION

This chapter seeks to identify the study area, define the target population, discuss the design of the Questionnaire, identify the method of Distribution and Collection of the Data, and identify the Data Analysis method. It concludes by identifying the anticipated challenges and suggesting steps to moderate their collective effect on the credibility of the study.

3.2 AREA OF STUDY

The Ghana Education Service in an effort to create a conducive environment for teaching and learning in schools across the country is complemented by the Ghana Education Trust Fund (GETFund) to provide educational infrastructures for basic and second cycle schools in the country. The GETFund website provides that 215 of these educational infrastructures for basic and second cycle schools have been completed in the Brong Ahafo Region and from observation are still under construction. The 215 projects which were initiated and completed between 2009 and 2012 were made up of 54 Emergency Intervention Projects (EIPs) in Senior High Schools (SHS) and 161 Classroom Blocks in Basic Schools to address the problem of Schools Under Trees (SUT) in the Region. The EIPs are in the form of Classroom Blocks, Dormitories, Science Laboratories, Assembly and Dining Halls. These were provided to deal with the emergencies that came up as a result of the four years SHS programme implemented by the then Government. This

information as cited on the Mordern Ghana website was made known at a Brong Ahafo Regional Policy fair in Sunyani.

Information available at the official website of GETFund also indicated that the SUTs and EIPs cut across all the Twenty-Seven (27) Municipal and District Assemblies of the Brong Ahafo Region.

3.3 POPULATION

Web Finance (2014) defines a population as a group of individuals or items that share one or more characteristics from which data can be gathered and analyzed.

The population of this study is made up of all the Heads of Procurement Entities in all the Twenty-Seven (27) Municipal and District Assemblies in the Brong Ahafo Region of Ghana. The Twenty Seven Municipal and District Assemblies in the Brong Ahafo Region are listed in the table below.

**Table 3.1: No. of Procurement Entities in the Municipal and District Assemblies
in the BrongAhafo Region**

No.	Municipal / District Assembly	No. of Procurement Entities
1.	Asunafo North Municipal	1
2	Asunafo South District	1
3	Asutifi District	1
4	Asutifi South	1
5	Atebubu Amantin	1
6	Banda District	1
7	Berekum Municipal	1
8	Dormaa East	1
9	Dormaa West	1
10	Dormaa Municipal	1
11	Jaman North District	1
12	Jaman South District	1
13	Kintampo Municipal	1
14	Kintampo South District	1
15	Nkoranza North District	1
16	Nkoranza South Municipal	1
17	Pru District	1
18	Sene East District	1
19	Sene West District	1
20	Sunyani Municipal	1
21	Sunyani West District	1
22	Tain District	1
23	Tano North District	1
24	Tano South District	1
25	Techiman Municipal	1
26	Techiman North District	1
27	Wenchi Municipal	1
	TOTAL	27

Source: www.ghanadistricts.com

3.4 SAMPLING

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, it can be

defined as a set of respondents (people) selected from a larger population for the purpose of a survey. Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population (Mugo, 2002). Sampling allows a researcher to draw conclusions about populations from samples.

The population size of Twenty-Seven (27) Head of Entities, notwithstanding the constraints of time was considered manageable for which reason sampling was not needed for the study.

3.5 DATA COLLECTION METHODS

In order to achieve the aim of the study, the questionnaire was structured and consisted of close ended questions to gather information from procurement entities in Municipal / District assemblies in the Brong Ahafo Region of Ghana.

Glasgow (2005) identified that closed-ended questions provide a set of answers from which the respondent must choose. Close-ended questionnaire was used in data collection because of the ease in administration and analysis of the data.

3.6 DESIGN OF QUESTIONNAIRE

The questionnaire comprised of four sections; Section A solicited information on the respondent's profile and or their background; Section B solicited information on the profile of the procuring entities in the Assemblies. Section C required the respondents' to indicate the forms in which health and safety considerations take during tendering in their respective Assemblies. Section D sought to identify the types of health and safety issues

or accidents that may have occurred on their project sites and how they affected project performance in terms of cost, quality and timely delivery.

3.7 THE DISTRIBUTION AND COLLECTION OF DATA

Data collection is a term used to describe the process of preparing and collecting data with the purpose of obtaining information to keep on record, to make decisions about important issues and to pass information on to others. In this research self-addressed envelopes with stamps and copies of the questionnaire were posted to the heads of the Procurement Entities of the Twenty-Seven (27) Assemblies of the Brong Ahafo Region and later posted back. Addresses of the Heads of entities were obtained from the official website of Ghana Districts.

3.8 CHALLENGES IN DATA COLLECTION

It was anticipated that some respondents may perceive the data collection exercise as a test of their academic prowess and may therefore refer to manuals and some may lie for fear of reprisals. In order to mitigating the effect of the challenge based on the credibility of the research findings, some independent observations were made to supplement the data collected through the questionnaire.

3.9 DATA ANALYSIS

Quantitative analytical tools were used to analyse the results. Quantitative approaches are known to be specific and result oriented. All sections of the questionnaire were analysed using percentages. Importance Index (I.I) of determining of significance of factors was

adopted in Section C and D to determine the impact of health and safety project performance.

3.10 SUMMARY

This chapter identified the study area, defined the target population, discussed the design of the Questionnaire, identified the method of Distribution and Collection of the Data and identified the Data Analysis method. It also identified the anticipated challenges and suggested steps to moderate the collective effect on the credibility of the study.



CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 INTRODUCTION

The purpose of this study was to find out the extent to which health and safety issues are considered by public entities during the sourcing stage of the public procurement process using analytical tools. This chapter presents the results and interpretation of the study. Quantitative analytical tools were used to analyse the results. All sections of the questionnaire were analysed using percentages. Importance Index (I.I) of determining of significance of factors was adopted in Section C and D to determine the items Procuring Entities require of tenderers to price and the effect of health and safety on project performance.

A total of Twenty-Seven (27) questionnaires were administered to the Heads of Entities of all the Municipal and District Assemblies in the Brong Ahafo Region. Twenty-One (21) responses were received, Two (2) of the questionnaires received were not responsive and excluded in the analysis resulting in a response rate of 70.37%.

Table 4.1: Distribution and Data Collection

Questionnaire issued	No. of Responses	No. of Responses responsive	Response rate
27	21	19	70.37%

4.2 DATA PRESENTATION AND ANALYSIS

4.2.1 RESPONDENT'S PROFILE / BACKGROUND INFORMATION

The questionnaires were administered to Heads of procurement entities in the Municipal and District Assemblies undertaking the Schools Under Trees and Emergency Interventions Programme in the Brong Ahafo Region of Ghana. It was considered necessary to identify the professional qualification of the respondents in order to assess how their qualifications and expertise translate in the discharge of their procurement duties. Figure 4.1 below highlights the experience of the respondents.

In addition to the qualification of the respondents, it was considered important to determine the length of time they had been involved in procurement related activities. It is a widely accepted view that officers gain more experience in the field as their length of service extends. Figure 4.1 illustrates the qualifications of the respondents, number of years working with the entity and how often they are involved in pre-contract works procurement activities.

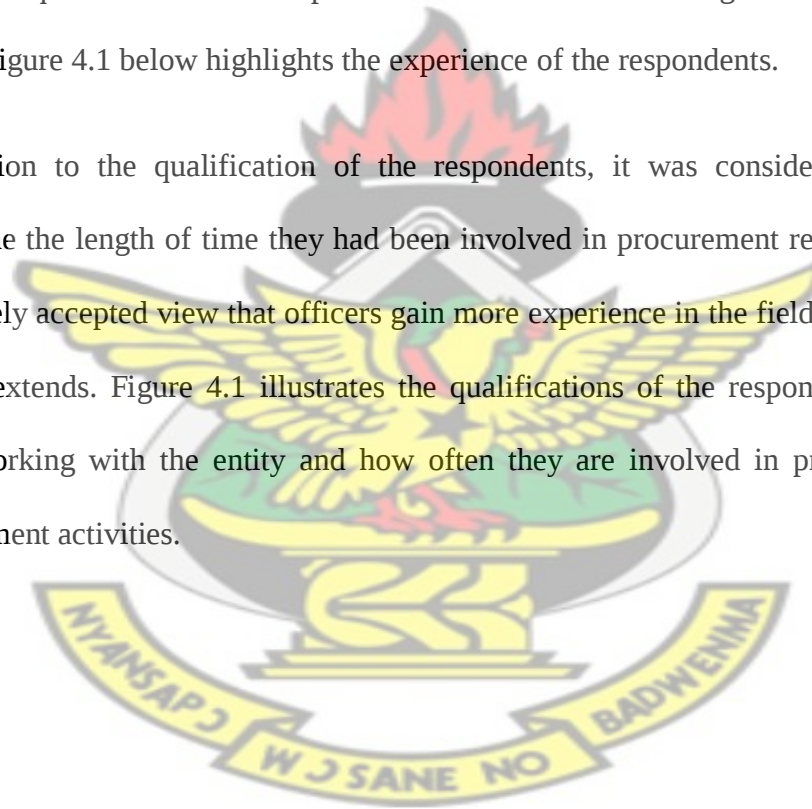
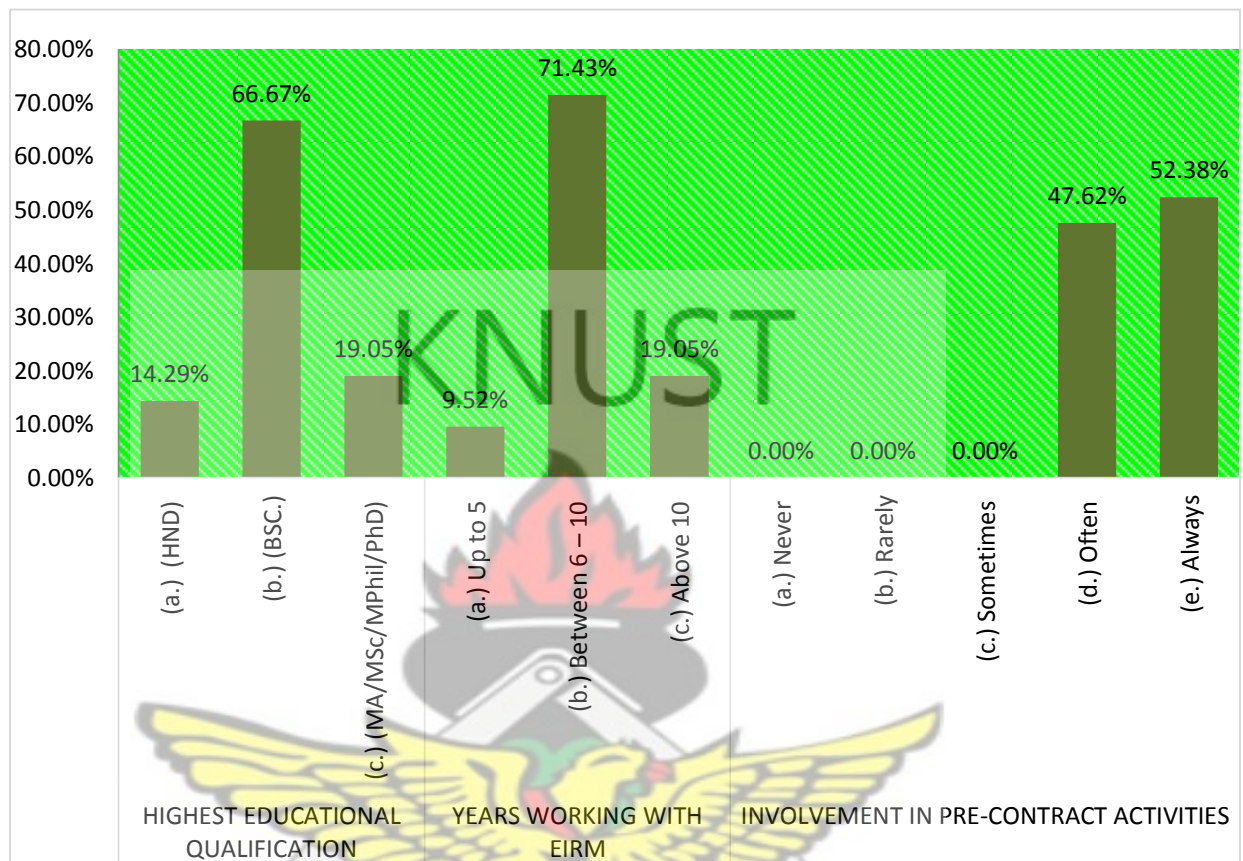


Figure 4.1: Experience of Respondents



From the figure above, 66.67% had at least a Bachelors Degree, 71.43% of the respondents had been working with their respective assemblies for up to ten (10) years and 52.38% of the respondents were frequently involved in pre-contract works procurement activities.

The findings of Figure 4.1, therefore indicates that a significant number of the respondents (71.43%) have worked for extensive periods in Pre-Contract Procurement roles in and can therefore reliably provide information on how their Entities make Health and Safety considerations during the sourcing stages of works procurement, in their respective Assemblies.

4.2.2 FAMILIARITY OF RESPONDENTS TO REGULATIONS WHICH GOVERN SPECIFIC AREAS IN CONSTRUCTION

Table 4.2 indicates the extent to which respondents are familiar with some under listed regulations governing specific areas in construction.

Table 4.2: Respondents' familiarity with regulations

Regulations	Rating				
	Not Familiar %	Quite Familiar %	Average %	Familiar %	Very Familiar %
Public Procurement Act, 2003, (Act 663)	0.00	15.79	0.00	15.79	68.42
The Labour Act, 2003, (Act 651)	26.32	5.26	5.26	31.58	31.58
Factories, Offices and Shops Act, 1970, (Act 328)	68.42	15.79	0.00	0.00	15.79
The Workmen's Compensation, 1987, (PNDCL 187)	52.63	15.79	0.00	15.79	15.79
The Insurance Act, 2006 (Act 724)	31.58	31.58	0.00	15.79	21.05

From the above table, 68.42% of the respondents rated the Public Procurement Act, 2003, (Act 663) of Ghana as a legislation they were familiar with. The next best known legislation was the Labour Act, 2003, (Act 651) with 31.58%.

68.42%, 52.63% and 31.58% of the respondents also rated the Factories, Offices and Shops Act, 1970, (Act 328), The Workmen's Compensation, 1987, (PNDCL 187) Act

and The Insurance Act, 2006 (Act 724) respectively as regulations they were not very familiar with.

The findings of Table 4.2 therefore reveals that some of the Respondents had little or no Knowledge of the above listed Legislations that ought to inform the identification and setting of the Evaluation criteria to ensure that the best Contractor capable of achieving value for money within the safest conditions is selected.

4.2.3 ACTIVITIES INVOLVED IN DURING THE PRE-CONTRACT STAGE OF WORKS PROCUREMENT

This section sought to reveal the extent of involvement of the various respondents with activities under the pre-contract stage of works procurement.

Table 4.3 Involvement with activities under the pre-contract stage of works procurement

Activities	Rating				
	Never %	Rarely %	Average %	Often %	Always %
Planning	15.79	15.79	0.00	0.00	68.42
Tender document preparation	0.00	0.00	0.00	31.58	68.42
Tender evaluation	0.00	0.00	0.00	15.79	84.21
Average rating	5.26	5.26	0.00	15.79	73.68

Table 4.3 above indicates that 89.47% (15.79% + 73.68%) of the respondents were involved in the pre-contract stage of works procurement. From the table, Tender Documents Preparation and Tender Evaluations were activities the respondents were mostly involved in. That is all of respondents, 100% (31.58%+68.42%) were involved in

Tender Document preparation and the same percentage of respondents, 100% (15.79%+84.21%) were involved in Tender Evaluations. 68.42% of the respondents involve themselves with procurement planning activities.

It can therefore be inferred from the table above that a considerable number of the Respondents have been involved in a variety of Pre-Contract Procurement Activities and can therefore provide information representative of the procurement procedures in their respective Assemblies.

4.2.4 PROFILE OF ORGANISATION

4.2.4.1 ACTIVITIES OF THE MUNICIPAL / DISTRICT ASSEMBLIES

Table 4.4 Frequency of respondents' involvement with procurement activities

Tender Document Preparation of Entity	No. of Respondents	Percentage of Respondents
Once every five projects	0	0.00%
Twice every five projects	0	0.00%
Thrice every five projects	0	0.00%
Four times every five projects	2	10.53%
Every project	17	89.47%
TOTAL	19	100.00%

From tables 4.3 above, it can be identified that the Assemblies have been preparing Tender Documents for almost every construction project they have to undertake.

It means further that competitive bidding which requires Procurement Entities to set Evaluation Criteria based on which the most suitable Contractor is selected, is the most commonly used method of procurement in their respective Assemblies. The respondents

can therefore provide reliable information on the considerations made in the setting of their Evaluation Criteria.

4.2.4.2 ENTITY'S CONSIDERATION OF THE APPLICATION OF THE PROVISIONS IN REGULATIONS IN THE PREPARATION OF TENDER DOCUMENTS

Table 4.5 below highlights how effectively the procurement entities of the Assemblies ensure compliance with some listed regulations governing works procurement. From the table below, higher percentages are identified with higher levels of compliance and vice versa.

Table 4.5: Entity's application of some regulations governing specific areas in construction

Regulations	Rating				
	Not Effectively %	Quite Effectively %	Average %	Effectively %	Very Effectively %
Public Procurement Act, 2003, (Act 663)	0.00	0.00	0.00	15.79	84.21
The Labour Act, 2003, (Act 651)	15.77	15.79	15.79	21.05	31.58
Factories, Offices and Shops Act, 1970, (Act 328)	68.42	15.79	15.79	0.00	0.00
The Workmen's Compensation, 1987, (PNDCL 187)	52.63	15.79	15.79	15.79	0.00
The Insurance Act, 2006 (Act 724)	36.84	15.79	0.00	31.58	15.79

From the above table, 84.21% of the Respondents rated the Public Procurement Act, 2003, (Act 663) as a legislation their entities “very effectively” consider in Tender Document preparation. The Labour Act, 2003, (Act 651), represented by 31.55% responses is the next best regulation whose requirements are considered by procuring entities in their tender document preparation.

The Factories, Offices and Shops Act, 1970, (Act 328), the Workmen’s Compensation Law, 1987, (PNDCL 187) and the Insurance Act, 2006 (Act 724) had ratings of 68.42%, 52.63% and 36.84% respectively representing regulation whose requirements are not effectively considered by procuring entities in their tender document preparation.

It is identified that the percentage Heads of Entities who are familiar with the Public Procurement Act and the Labour Act as identified in table 4.2 are almost the same as the percentage of Procurement Entities who “very effectively” consider these legislations in tender document preparation in table 4.5.

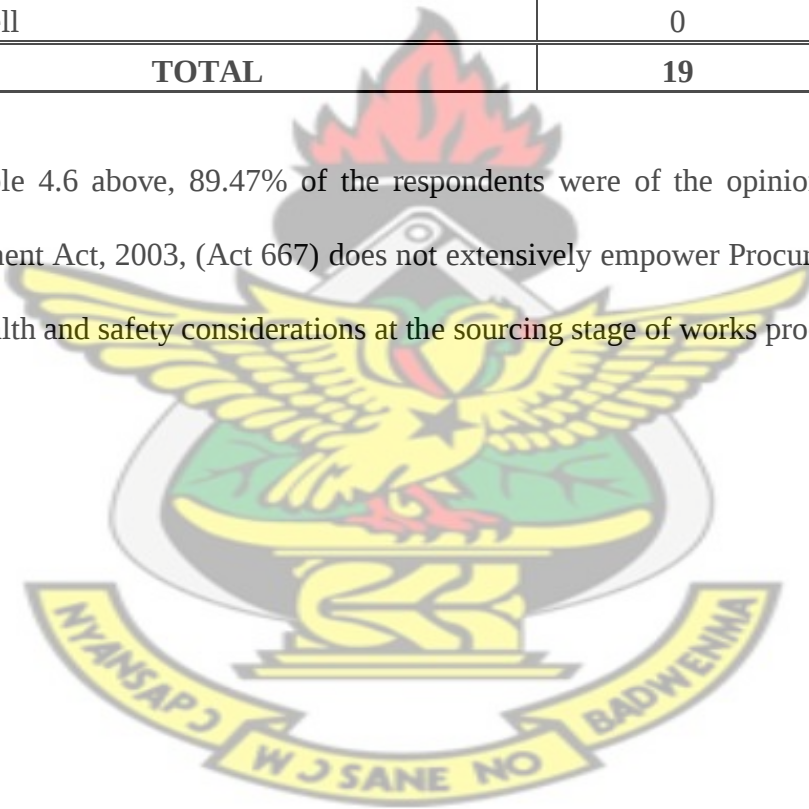
4.2.4.3 OPINION OF RESPONDENT

The opinion of respondents was sought on, how well Public Procurement Act, 2003, (Act 663) empowers procurement entities to make Health and Safety considerations at the sourcing stage of works procurement. Table 4.6 highlights the findings.

Table 4.6 - Respondents' opinion on the Public Procurement Act, 2003, (Act 663)

PUBLIC PROCUREMENT ACT, 2003, (ACT 663) EMPOWERING PROCUREMENT ENTITIES TO MAKE HEALTH AND SAFETY CONSIDERATIONS AT THE SOURCING STAGE OF WORKS PROCUREMENT	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Not well	2	10.53%
Quite well	17	89.47%
Averagely	0	0.00%
Well	0	0.00%
Very well	0	0.00%
TOTAL	19	100.00%

From table 4.6 above, 89.47% of the respondents were of the opinion that the Public Procurement Act, 2003, (Act 667) does not extensively empower Procurement Entities to make health and safety considerations at the sourcing stage of works procurement.



4.2.5 APPLICATION OF HEALTH AND SAFETY CONSIDERATIONS DURING THE SOURCING STAGE OF WORKS PROCUREMENT

4.2.5.1 FORMS IN WHICH HEALTH AND SAFETY CONSIDERATIONS TAKE

Table 4.7 Form of Health and Safety Consideration

FORM OF HEALTH AND SAFETY CONSIDERATION	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Explanation of objectives for health and safety in the pre-contract stage of works procurement	0	0.00%
An indication in the Instructions to Tenderers (Tender Data Sheet), the Health and Safety Documents contractors must submit with their tenders	0	0.00%
Pricing health and safety requirement under the preliminary section of the Bill of Quantities	16	84.21%
None	3	15.79%
Total	19	100.00%

From table 4.7, the procurement entities do not make any explanation of the objectives for health and safety in the pre-contract stage of works procurement nor do they make any indication in the Tender Data, the Health and Safety Documents contractors / tenderers must submit with their tenders.

84.21% of Procurement Entities in the Municipal / District Assemblies require tenderers to Price health and safety requirements under the preliminary section of the Bill of Quantities and 15.79% of the respondents do not make any of the above considerations.

4.2.5.2 FORMS IN WHICH HEALTH AND SAFETY CONSIDERATIONS ARE APPLIED

Table 4.8 details what items the Procurement Entities require of Tenderers to price under the preliminary section of the Bill of Quantities as identified in table 4.8.

Table 4.8: Application of health and safety consideration

ITEM	Rating				
	Disagree %	Quite Agree %	Averagely %	Agree %	Strongly Agree %
The preparation and updating of a site specific health and safety plan including a supervision and reporting scheme (to include subcontractors)	63.16	21.05	0.00	0.00	15.79
Provision of safe construction equipment (scaffolds, hoardings)	0.00	15.79	0.00	31.58	52.63
Provision of safety training to workers and supervisors	15.79	36.84	0.00	15.79	31.58
Provision of welfare facilities (water, food, housing)	15.79	31.58	5.26	31.58	15.79
Provision of health and safety gear (helmet, boot, etc.)	15.79	15.79	0.00	21.05	47.37
Medical examinations, first aid and emergency facilities	15.79	15.79	0.00	26.32	42.11

According to Adnan et al (2007), analysing data on ordinal scale (e.g. Likert scale 1-5) involves the application of Importance Indices. In this section the Importance Indices (I.I) of determining significance of items was adopted to rank the items the Procurement Entities require of Tenderers to price under the preliminary section of the Bill of

Quantities. The Importance Indices is computed as in (Adnan et al 2007): Importance Index is given by

$$\frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{5(n_1 + n_2 + n_3 + n_4 + n_5)} \times 100$$

Where: n1 – number of respondents who answered “Disagree”;

n2 – number of respondents who answered “Quite disagree”;

n3 – number of respondents who answered “Average”;

n4 – number of respondents who answered “Agree”;

n5 – number of respondents who answered “Strongly agree”

It is worthwhile to note that the nearer the value of importance index of the identified factor is to unity (1) or 100%, the more significant the items are and the most it is required of tenderers to price.

Here, respondents were to rate on a scale of “Disagree” to “Strongly disagree” as a way of determining which item the Procurement Entities required most of tenderers to be priced in the Preliminaries Section of Bill of Quantities. Tables 4.7 shows the percentage of the responses and table 4.13 also shows the rankings of items the procurement entities require of tenderers to price.

Table 4.9: Results of Importance Indices showing the application of health and safety consideration

ITEM	Weighting Factors										$\sum(ni)$	I. Index	Rank
	1	n	2	n	3	n	4	n	5	N			
The preparation and updating of a site specific health and safety plan including a supervision and reporting scheme (to include subcontractors)	12	12	4	8	0	0	0	0	3	15	35	36.84	6th
Provision of safe construction equipment (scaffolds, hoardings)	0	0	3	6	0	0	6	24	10	50	80	84.21	1st
Provision of safety training to workers and supervisors	3	3	7	14	0	0	3	12	6	30	59	62.10	4th
Provision of welfare facilities (water, food, housing)	3	3	6	12	1	3	6	24	3	15	57	60.00	5th
Provision of health and safety gear (helmet, boot, etc.)	3	3	3	6	0	0	4	16	9	45	70	73.68	2nd
First aid facilities	3	3	3	6	0	0	5	20	8	40	69	72.63	3rd

From table 4.8, it was identified that the form in which the procurement entities make health and safety consideration at the sourcing stage was by requesting from tenderers to

price health and safety requirements under the preliminary sections of the Bill of Quantities.

Table 4.8 indicates that the items the procuring entities mostly require of tenderers to price are the provision of safe construction equipment (scaffolds, hoardings, etc.), the Provision of health and safety gear (helmet, boot, etc.) and the provision of first aid facilities. These items that the Procuring Entities require of tenderers to price may have stemmed from the percentage of Heads of Entities who are familiar with the Labour Act as identified in table 4.2 and have indicated in table 4.5 that their Procuring entities consider the Labour Act in their tender document preparation. The Labour Act provides a general obligation for every employer to supply and maintain the health and safety of workplaces.

4.2.6 EVALUATION CRITERIA MOSTLY USED IN CONTRACTOR SELECTION

Table 4.10 below illustrates the evaluation criteria mostly prescribed by the procurement entities in contractor selection. Respondents were required to indicate the frequency of usage of some tabulated evaluation criteria.

Table 4.10: Evaluation Criteria mostly used in contractor selection

Item	Rating				
	Never %	Rarely %	Averagely %	Often %	Always %
Annual volume of construction works of tenderer	0.00	0.00	0.00	15.79	84.21
Experience of tenderer as prime contractor in the construction in nature and complexity equivalent to the Works	0.00	0.00	0.00	0.00	100.00
Proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment	0.00	0.00	0.00	36.84	63.16
Staff holding of tenderer	0.00	0.00	0.00	0.00	100.00
Liquid assets and/or credit facilities of tenderer	0.00	0.00	0.00	16.36	83.64
Details of how safety is communicated and coordinated	47.37	52.63	0.00	0.00	0.00
Evidence of relevant safety training for staff	47.37	52.63	0.00	0.00	0.00
Experience of safety officer proposed for a project	63.16	15.79	0.00	0.00	21.05
An outline of the procedures to be adopted to ensure that health and safety requirements are met, not only by the main contractor but also by subcontractors	63.16	36.84	0.00	0.00	0.00
A system and format for recording and reporting accidents, incidents and near misses	63.16	36.84	0.00	0.00	0.00

From the table above, respondents rated the following as the most frequently prescribed evaluation criteria in contractor selection; Experience of tenderer as prime contractor in works of similar nature and complexity equivalent to the Works (100%), Staff holding of tenderer (100%), Liquid assets and/or credit facilities of tenderer (83.64%), Annual volume of construction works of tenderer (84.21%) and Ownership or Proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment (63.16%). This falls

in line with the provisions in the instructions to tenderers in the Standard Tender Document issued by the Public Procurement Board.

The respondents also rated the following as evaluation criteria they rarely use in contractor selection; Experience of safety officer proposed for a project, An outline of the procedures to be adopted to ensure that health and safety requirements are met; not only by the main contractor but also by subcontractors; A system and format for recording and reporting accidents, incidents and near misses; Details of how safety is communicated and coordinated, Evidence of relevant safety training for staff (Wells and Hawkins, 2007).

It is therefore not surprising that greater percentage of the respondents represented by 89.47% was of the opinion that the Public Procurement Act, 2003, (Act 667) does not extensively empower Procurement Entities to make health and safety considerations at the sourcing stage of works procurement.

The Act may not specifically indicate that Procuring Entities should always consider Health and Safety in their contractor selection criteria but it does give the entities the liberty of indicating what they determine should inform the contractor selection to suit the particular project requirements.

4.2.7 EFFECT OF HEALTH AND SAFETY CONSIDERATIONS ON PROJECT PERFORMANCE

This section seeks to identify the health and safety issues that occur on the project sites and how they affect project performance in terms of cost, time and quality.

4.2.7.1 HEALTH AND SAFETY ISSUES THAT MAY HAVE OCCURRED ON YOUR PROJECT SITE

Table 4.11 below presents the Health and Safety issues / Accidents recorded on the Project Sites of the Assemblies in the Brong Ahafo Region under the GETfund Project Scheme.

Table 4.11: Health and Safety issues / accidents

Item	Rating				
	Never %	Rarely %	Averagely %	Often %	Always %
Construction site falls (roof related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects)	0.00	31.58	31.58	0.00	36.84
Crane accidents	21.05	47.37	31.58	0.00	0.00
Scaffolding accidents (Defective Scaffolding, Improperly Assembled Scaffolding)	0.00	0.00	68.42	31.58	0.00
Workers being run-over by operating equipment	52.63	31.58	15.79	0.00	0.00
Electrical accidents	15.79	36.84	47.37	0.00	0.00
Trench collapses	15.79	31.58	31.58	21.05	0.00
Fires and explosions	84.21	15.79	0.00	0.00	0.00
Welding accidents	36.84	31.58	15.79	15.79	0.00
Slips and trips	0.00	0.00	52.63	47.37	0.00
Food poisoning	15.79	21.05	0.00	31.58	31.58
Transport of contaminants to workers home	0.00	15.79	15.79	36.84	31.58

From table 4.10, it can be identified that the health and safety issues that often occur at the project sites are Slips and trips, representing 47.37% of the responses; 36.84% of respondents indicated that workers often transport contaminants to homes and 31.58%

also responded that Scaffolding accidents (Defective Scaffolding, Improperly Assembled Scaffolding) and Food poisoning often occur; Trench collapses and Welding accidents represented by 21.05% and 15.79% respectively also often occur. Construction site falls (roof related falls, crane falls, scaffolding falls, falls resulting from holes in flooring, and falling objects) represented by 36.84% responses always occurs.

Among the health and safety issues that rarely occur are Crane accidents, Fires and explosions and Welding accidents.



4.2.7.2 EFFECT OF HEALTH AND SAFETY ISSUES ON PROJECT PERFORMANCE

Table 4.12: Respondents response to how health and safety issues occur on project sites and how they affect project performance

	Item	Rating				
		Not seriously %	Quite seriously %	Averagely %	Seriously %	Very seriously %
	Damages to plant, equipment and completed work	15.79	31.58	0.00	15.79	36.84
	Payments for settlements of injury or death claims	15.79	31.58	0.00	15.79	36.84
	Legal fees for defense against claims	31.58	15.79	15.79	15.79	21.05
	Costs of rescue operations and equipment	31.58	0.00	15.79	31.58	21.05
	Expenditures on emergency equipment	15.79	31.58	0.00	0.00	36.84
	Loss of function and operations income	15.79	0.00	31.58	21.05	31.58
	Slowdowns in operations while accident causes are determined and corrective action taken	15.79	0.00	0.00	0.00	84.21
	Corrective actions to prevent re-occurrence of accident	15.79	15.79	0.00	15.79	52.63
	Degradation of efficiency of operations because of loss of experienced and trained personnel	15.79	0.00	15.79	52.63	15.79
	Increased insurance costs	15.79	52.63	15.79	15.79	0.00
	Training costs for replacements	31.58	15.79	15.79	21.05	15.79
	Loss of productivity	15.79	15.79	15.79	0.00	52.63
	Disruptions while investigations are being carried out by the company safety department and insurers	15.79	15.79	0.00	15.79	52.63
	Medical payments	15.79	15.79	0.00	36.84	31.58
	Insurance premiums	15.79	52.63	15.79	15.79	0.00
	Costs of workman's compensation insurance	21.05	15.79	0.00	31.58	31.58

Importance Index is adopted here also to rank the effect of health and safety on project performance.

: Importance Index is given by

$$\frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{5(n_1 + n_2 + n_3 + n_4 + n_5)} \times 100$$

Where: n1 – number of respondents who answered “not seriously”;

n2 – number of respondents who answered “quite seriously”;

n3– number of respondents who answered “averagely”;

n4 – number of respondents who answered “seriously”;

n5 – number of respondents who answered “very seriously”

It is worthwhile to note that the nearer the value of importance index is to unity (1) or 100%, the more significant it is and the greater its effect on project performance.

Here, respondents were given some ratings on a scale of “not seriously” to “very seriously” to rate as a way of determining the effect of health and safety issues or accidents on project performance. Tables 4.11 shows the percentage of the responses and table 4.13 also shows the rankings of how health and safety issues seriously affected project performance.

Table 4.13: Results of Importance Indices showing the ranking of ways the health and safety issues seriously affected project performance

ITEM	1	n	2	n	3	n	4	n	5	n	$\sum(ni)$	I. Index	Rank
Damages to plant, equipment and completed work	3	3	6	12	0	0	3	12	7	35	62	65.26%	6th
Payments for settlements of injury or death claims	3	3	6	12	0	0	3	12	7	35	62	65.26%	6th
Legal fees for defense against claims	6	6	3	6	3	9	3	12	4	20	53	55.79%	8th
Costs of rescue operations and equipment	6	6	0	0	3	9	6	24	4	20	59	62.11%	7th
Expenditures on emergency equipment	6	6	6	12	0	0	0	0	7	35	53	55.79%	8th
Loss of function and operations income	3	3	0	0	6	18	4	16	6	30	67	70.53%	4th
Slowdowns in operations while accident causes are determined and corrective action taken	3	3	0	0	0	0	0	0	16	80	83	87.37%	1st
Corrective actions to prevent re-occurrence of accident	3	3	3	6	0	0	3	12	10	50	71	74.74%	2nd
Degradation of efficiency of operations because of loss of experienced and trained personnel	3	3	0	0	3	9	10	40	3	15	67	70.53%	4th
Increased insurance costs	3	3	10	20	3	9	3	12	0	0	44	46.32%	10th
Training costs for replacements	6	6	3	6	3	9	4	16	3	15	52	54.74%	9th
Loss of productivity	3	3	3	6	3	9	0	0	10	50	68	71.58%	3rd
Disruptions while investigations are being carried out by the company safety department and insurers	3	3	3	6	0	0	3	12	10	50	71	74.74%	2nd
Medical payments	3	3	3	6		0	7	28	6	30	67	70.53%	4th
Insurance premiums	3	3	10	20	3	9	3	12	0	0	44	46.32%	10th
Costs of workman's compensation insurance	4	4	3	6	0	0	6	24	6	30	64	67.37%	5th

Table 4.14: Ranking of ways the health and safety issues seriously affected project performance

ITEM	RANK
Slowdowns in operations while accident causes are determined	1st
Corrective actions to prevent re-occurrence of accident	2nd
Disruptions while investigations are being carried out	3rd
Degradation of efficiency of operations because of loss of experienced personnel	4th
Medical payments	4th
Costs of workman's compensation	5th
Damages to plant, equipment and completed work	6th
Payments for settlements of injury or death claims	6th
Costs of rescue operations and equipment	7th
Legal fees for defense against claims	8th
Expenditures on emergency equipment	8th
Training costs for replacements	9th
Increased insurance costs	10th

Table 4.14 above highlights the effects of the health and safety issues identified in table 4.10 as occurring on the project sites. The effects have been ranked from the 'most serious' (1) to 'least serious' (10).

4.2.7.3 DETERMINATION OF HOW ACCIDENTS AFFECTED PROJECT PERFORMANCE IN TERMS OF COST, TIME AND QUALITY DELIVERY

This section sought to determine how the accidents affected project performance in terms of cost, quality and timely delivery. The average response rates of each of the accident effects were first calculated then the effects of the accident in terms of cost, time and quality delivery was also determined. The averages of the way the accident affected cost,

time or quality delivery were then summed together and divided by their frequency. This resulted in the average response rates of how the accidents impacted cost, time and quality delivery.

Table 4.15: How the various effects of accidents affect Project Performance in relation to Cost, Time and Quality Delivery

Effects of Accidents	Rank	Average Rating %	Cost	Quality	Time
Slowdowns in operations while accident causes are determined and corrective action taken	1st	87.37	Increase		Delay
Corrective actions to prevent re-occurrence of accident	2nd	74.74	Increase		Delay
Disruptions while investigations are being carried out by the company	2nd	74.74			Delay
Loss of productivity	3rd	71.58			Delay
Degradation of efficiency of operations because of loss of experienced and trained personnel	4th	70.53		Reduce	
Medical payments	4th	70.53	Increase	Reduce	
Costs of workman's compensation insurance	5th	67.37	Increase		
Damages to plant, equipment and completed work	6th	65.26	Increase		Delay
Payments for settlements of injury or death claims	6th	65.26	Increase		
Costs of rescue operations and equipment	7th	62.11	Increase		
Legal fees for defense against claims	8th	55.79	Increase		
Expenditures on emergency equipment	8th	55.79	Increase		
Training costs for replacements	9th	54.74	Increase		
Insurance premiums	10th	46.32	Increase		

4.2.7.3.1 Slowdowns in operations while accident causes are determined

This ranks first in table 4.14 as the most serious effect of accidents on the project sites. If activities slow down on a construction site more than the expected output per day, there is delay which could cause an increase in project cost.

Investigating the root cause of an accident is mostly done to prevent similar accidents in future. From table 4.10 above, it has been identified that scaffold accidents is one of the accidents that occurred on the construction sites and the injury may have been as a result of the construction workers falling off the scaffolds or the scaffolds collapsing and falling on them. Scaffolding is a temporary framing used in construction and building remodeling. Scaffolding accident injuries may be caused by improper installation, improper use of scaffold, defective materials, or objects falling off of scaffolding. The process of determining the cause of such accidents after its occurrence could delay the construction process and add to the cost of the project.

4.2.7.3.2 Corrective actions to prevent re-occurrence of accident

Corrective actions to prevent re-occurrence of accident have also been ranked as the second (2nd) most serious effect of accidents on the project sites. This would increase cost and delay project delivery.

The goal of corrective actions is to remove the root cause and prevent a problem from ever happening again. Corrective actions are directed to an event that happened in the past. When the right corrective actions are taken all root causes of the problem should be eliminated. For instance, if the root cause of food poisoning which was identified in table

4.10 above to have occurred on the project sites is as a result of workers getting drunk and consuming contaminated food, a corrective action may be to include them in a treatment program and their working privileges revoked or limited. This would then increase cost and delay progress. Again, if the root cause of the falls were attributable to bad formwork construction, the solution would be for it to be repaired. In this regard, corrective actions will slow down the works in the effort to redo the works and consequently add to the cost of construction.

4.2.7.2.3 Disruptions while investigations are being carried out

Having been ranked as the third (3rd) most serious effect of accidents on the project sites, this will delay construction period.

Disruptions are events that disturb the construction programme. Interferences with the flow of work in the project are common disruptions (Howick, Ackermann, Eden and Williams, 2009), Howicket al (2009) pointed out that many disruptions to complex projects are planned for at the bidding stage because they may be expected to unfold during the project (Howick et al, 2009).

Construction accidents can also cause significant disruption in the life of construction accident victims and their families. When an accident occurs, other employees may have to assist the victim and or carry out works like accident investigation, accident reporting, mitigating/preventing further damages, cleaning up the mess, and so on, thereby delaying time.

4.2.7.3.4 Degradation of efficiency of operations because of loss of experienced personnel

This is the loss due to inefficiency of the injured worker after resuming work. This reduces quality of construction work and progress.

4.2.7.2.5 Medical payments

- When a person is injured, the challenge of paying bills can be financially devastating. For this reason, workers are mostly assisted by the construction company. The contractor could decide to pay a nominal amount of money for the victim/employee as expenses for treatment in the hospitals. The payment of medical bill therefore adds to cost of project, thereby increasing cost of project.

Medical payments are cost to the contractor. When this cost becomes quite too much for the contractor, there is the likelihood of the contractor compromising on the quality of construction materials and methods implying that project quality is reduced.

4.2.7.2.6 Costs of rescue operations

- According to (Farlex, 2014) a rescue operation is a planned activity involving many people performing various actions to free others from danger such as fires, floods or confinement. From table 4.13, cost of rescue operations least affects project performance. This is in conformity with table 4.10 which identifies Fires and explosions as rarely occurring on the project sites.

4.2.7.3.7 Legal fees for defense against claims

– These are fees paid for legal service of defending the employer against a workers’ claim of having been affected by health and safety issues occurring on project site. In the instances where a worker raises a claim against the contractor, cost is incurred on legal fees against such claims. From table

4.13, payment of legal fees for defense against claims also least affects project performance. This then implies that workers mostly do not raise legal claims against employers thereby least affecting the project performance.

4.2.7.3.8 Expenditures on emergency equipment – An emergency according to Reverso, (2014) is an unexpected and difficult or dangerous situation, especially an accident, which happens suddenly and which requires quick action to deal with it. Emergency equipment are those intended for use in an emergency. Expenditures on emergency equipment is one of the factors also rated as least affecting project performance.

4.2.7.3.9 Training costs for replacement –Training has been identified as one of the most important elements of any injury and illness prevention program. It allows employees to learn their job properly, brings new ideas into the workplace, reinforces existing ideas and practices, and puts program into action. Training costs for replacement being ranked as least affecting project performance indicates that safety training programmes are mostly not organized for workers. The Factories, Offices and Shops Act, 1970, (Act 328) provides that that “No person shall be employed at any machine or in any process liable to cause bodily injury, unless he has received sufficient training in work at the machine or in the process, or is under adequate supervision by a person who has a thorough knowledge and experience of the machine or process”.

Table 4.16: Rate at which accidents increased project cost

Effects of Accidents Increasing Cost	Average Rating %
Slowdowns in operations while accident causes are determined	87.37
Corrective actions to prevent re-occurrence of accident	74.74
Medical payments	70.53
Costs of workman's compensation insurance	67.37
Damages to plant, equipment and completed work	65.26
Payments for settlements of injury or death claims	65.26
Costs of rescue operations and equipment	62.11
Legal fees for defense against claims	55.79
Expenditures on emergency equipment	55.79
Training costs for replacements	54.74
Insurance premiums	46.32
Total Effect (%)	705.28%
Total Effect (No.)	11
Average Effect (%)	64.12%

Table 4.17 Rate at which accidents reduced quality of project

Effects of Accidents reducing Quality	Average Rating %
Degradation of efficiency of operations because of loss of experienced and trained personnel	70.53
Medical payments	70.53
Total Effect (%)	141.06%
Total Effect (No.)	2
Average Effect (%)	70.53%

Table 4.18 Rate at which accidents delayed project duration

Effects of Accidents Delaying Project Duration	Average Rating %
Slowdowns in operations while accident causes are determined and corrective action taken	87.37
Corrective actions to prevent re-occurrence of accident	74.74
Disruptions while investigations are being carried out by the company	74.74
Loss of productivity	71.58
Damages to plant, equipment and completed work	65.26
Total Effect (%)	373.69%
Total Effect (No.)	5
Average Effect (%)	74.74%

It is therefore identified from table 4.15 to table 4.18 that cost, quality and timely delivery of the School Under Trees (SUTs) and Emergency Intervention Projects (EIPs) have been affected by health and safety issues or accidents that have been identified in table 4.10.

4.3 SUMMARY OF FINDINGS

Most of the Heads of Entities;

- Had a First Degree, been working with their respective assemblies for a considerable number of years, were frequently involved in pre-contract works procurement.
- Were familiar with the Public Procurement Act, 2003, (Act 663) and the Labour Act, 2003, (Act 651) but were not familiar with the Factories, Offices and Shops Act, 1970, (Act 328), The Workmen's Compensation, 1987, (PNDCL 187) and The Insurance Act, 2006 (Act 724).
- Were of the opinion that the Public Procurement Act, 2003, (Act 667) does not extensively empower procurement entities to make health and safety considerations at the sourcing stage of works procurement.

Most of the Procurement Entities;

- Prepared Tender Documents for almost every construction project they had to undertake
- Effectively considered in their Tender Document preparation legislations best known to them.
- Required of tenderers to Price health and safety requirements under the preliminary section of the Bill of Quantities. The items the procuring entities mostly require of tenderers to price are the provision of safe construction

equipment, the provision of health and safety gear and the provision of first aid facilities. They neither make any explanation of the objectives for health and safety in the pre-contract stage of works procurement nor do they make any indication in the Tender Data, the Health and Safety Documents contractors / tenderers must submit with their tenders.

- Rarely set evaluation criteria on Health and Safety.
- The projects experienced some health and safety issues / accidents which could have an effect on project performance in terms of cost, quality and timely delivery.

4.7 OBSERVATIONS MADE DURING THE STUDY PERIOD

Having anticipated that respondents may perceive the exercise as a test of their academic prowess with the likelihood of them referring to academic manuals in answering the questionnaire, the following field observations were made during the study period to supplement the findings of the data analysed.

1. Some of the Heads of the Procurement Entities within the Municipal and District Assemblies lacked the required expertise in the procurement procedures. As a result, the responsibility of procuring the works Contractors were outsourced to the Works Consultants. The lack of involvement by the Entities in the Procurement processes resulted in the duplication of Evaluation Criteria in all projects managed by the same consultants, without due regard to setting Project

Specific Evaluation Criteria to deal with Health and Safety Issues specific to Projects and sites

2. Some of the Heads of entities were not adequately knowledgeable with provisions in the Procurement Act. This as a result affected their ability to critique the Tender Documents prepared by their Consultants and raise concerns where Health and Safety provisions were non-existent.
3. Appointments of some Heads of Entities to the Municipal and District Assemblies were usually partisan. This affected project delivery focus because of Change in Governments. It was also identified that the Officers charged with the responsibility of Procurement under such circumstances were usually not knowledgeable in the procurement procedures.
4. Some of the projects were identified with cost overruns, low quality performances and delayed project delivery dates. Some of this was as a result of adversarial relationships arising between Contractors and the Assemblies/Clients in regard to who to takes responsibility for Accidents and other Health and Safety Issues on site.
5. Some of the procurement entities mostly secured low price tenders within ensuring that the Works, the Health and the Safety of the work force are duly insured by reputable Insurance Companies.
6. In the few circumstances where Health and Safety criteria were set, Tenderers were mostly not rejected on the basis of a Tenderer failing to meet Health and Safety Requirements. More importance was placed on criteria such as Works of Similar nature, Key Personnel, Equipment Holding Capacity and Financial

Capacity at the expense of the submission of a comprehensive Health and safety Plan and other safety requirements

4.8 SUMMARY

This chapter has presented results and discussions of the data collected. It also revealed the findings and observations made in determining the extent to which health and safety issues are considered by public entities during the sourcing stage of the public procurement process.



CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The aim of the study was to find out the extent to which health and safety issues are considered by public entities during the sourcing stage of the public procurement process. This chapter summarises the major findings, identifies the achievement of the objectives, presents the conclusion of the study and makes recommendations for improving health and safety considerations at the sourcing stage of works procurement.

5.2 MAJOR FINDINGS

Lack of the required Level of Education

From analysis and observations made most of the Procurement Entity Heads, represented by 66.67% in figure 1 do not have the required level of education in the procurement field.

Lack of Knowledge in the Public Procurement Act and Other Health and Safety Legislations.

Some of the Heads of Entities from observation were not very knowledgeable with the Public Procurement Act and Health and Safety legislations.

Pricing of Health and Safety Requirements in Preliminaries and General Item

Most of the Procurement Entities (84.21%) only required of Contractors to competitively price health and safety items in the preliminary section of the Bill of Quantities at Tender stage.

Less Importance Attached to Health and Safety Requirements as Evaluation Criteria

Most of the Procurement Entities rarely set evaluation criteria on Health and Safety in the Tender Data

Effect of Health and Safety on Project Performance

Most of the projects experienced some health and safety issues / accidents which had an effect on project performance in terms of cost, quality and timely delivery.

5.3 ACHIEVEMENT OF THE RESEARCH AIM AND OBJECTIVES

The fulfillment of each of the two research objectives is set out in the following subsections.

5.3.1 FULFILMENT OF THE FIRST OBJECTIVE

To identify how Health and Safety considerations are applied by public entities at the sourcing stage of procurement process.

The first objective of the research was to identify how Health and Safety considerations are applied by procurement entities in the Municipal and District Assemblies in the Brong Ahafo Region during the sourcing stage of the procurement process.

The findings of the data collected and analysed revealed that Procurement Entities only required of contractors to price some few health and safety items under the Preliminary Section of the Bill of Materials during the Tender stage. Some of the items included the provision of safe construction equipment (scaffolds, hoardings, etc.), the Provision of health and safety gear (helmet, boot, etc.) and the provision of first aid facilities.

5.3.2 FULFILMENT OF THE SECOND OBJECTIVE

The second objective of the research was to identify the effect of considering health and safety at the sourcing stage of works procurement on project performance (in terms of cost, quality and timely delivery).

The findings of data analysed and observations made also revealed that 64.12% of the School Under Trees and Emergency Intervention Project sites in the Brong Ahafo Region experienced Cost Increases. The quality of works on 70.53% of the project sites were compromised while 74.74% experience project delays.

From the Data gathered and analyzed, the Cost Increases mostly occurred as a result of Slowdowns in operations while accident causes were determined, Taking corrective actions to prevent re-occurrence of accident, Paying Medical Bills etc.

Quality was compromised mainly as a result of Degradation of efficiency of operations because of loss of experienced and trained personnel.

Project Delays also were as a result of accidents causing Slowdowns and Disruptions operations while causes are determined.

In conclusion though most of the procuring entities performed quite well in considering health and safety at the sourcing stage of works procurement, there is certainly more that could be done.

5.4 RECOMMENDATIONS

In the light of the foregoing conclusionon regarding health and safety consideration during the sourcing stage of works procurement by procuring entities in the Municipal and District Assemblies in the Brong Ahafo Region, the following recommendations have been made.

1. Heads of Entities and Procurement Officers within the assemblies should be trained to enlighten them on health and safety and procurement. Heads of Entities' qualification in the procurement field should be considered before being appointed. It is vital for the heads of entities to understand the costs of poor or non-existent health and safety consideration such as lost working days and compensation payments.

2. Appointment of the Heads of Entities should also be non partisan. Political interference in the activities of procurement in the Municipal and District assemblies should be avoided.
3. Procurement Entities when sourcing for contractors to undertake the construction of works should also make an effort to set health and safety criteria in the Tender Data Sheet, the Health and Safety Documents contractors must submit with their tenders. The items may include Details of how safety should be communicated and coordinated, Evidence of relevant safety training for staff, Experience of safety officer proposed for a project, An outline of the procedures to be adopted to ensure that health and safety requirements are met, not only by the main contractor but also by subcontractors and a system and format for recording and reporting accidents, incidents and near misses. Failure to convince the procuring entities of their capacity to meet these requirements should be considered as reason to reject a tender which should be clearly stated in the Tender data.
4. Procurement Entities must ensure Contractors provide and make use of the Health and Safety Items required at the sourcing stage of the procurement process.

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APPENDIX

Questionnaire for Respondents

Dear Respondent,

The researcher is a student of Kwame Nkrumah University of Science and Technology, College of Architectural and Planning, Department of Building Technology-Ghana. As part of completion requirements for the award of MSc. Procurement Management the student is undertaking a research by using your Institution as case study on the topic:

**“HEALTH AND SAFETY AT THE SOURCING STAGE OF PUBLIC WORKS
PROCUREMENT: A CASE OF PROCUREMENT ENTITIES IN THE BRONG
AHAFO REGION OF GHANA”**

The research has been designed purely for academic purposes. The information given will be accorded the greatest degree of confidentiality.

Instructions: Tick ✓ **and or provide answers as appropriate.**

SECTION A: RESPONDENT'S PROFILE / BACKGROUND INFORMATION

1. Please indicate your highest educational qualification

- a. ☐ Higher National Diploma (HND)
- b. ☐ Bachelors Degree (including honors)
- c. ☐ Postgraduate (MA/MSc/MPhil/PhD)
- d. Other (please specify).....

2. How long have you been working with your Municipal / District Assembly?

- a. ☐ Up to 5 years
- b. ☐ Between 6 – 10 years
- c. ☐ Above 10 years

3. How involved are you in the pre-contract works procurement activities in your entity?

- a. ☐ Never
- b. ☐ Rarely
- c. ☐ Sometimes
- d. ☐ Often
- e. ☐ Always

4. The following are a list of regulations which govern specific areas in construction. Please indicate the extent to which you are familiar with them. Please rank as (1) Not familiar, (2) Quite familiar (3) Average, (4) Familiar, (5) Very familiar, by ticking the appropriate box.

No.	Procurement Activities	Rating				
		1	2	3	4	5
a.	Public Procurement Act, 2003, (Act 663)					
b.	The Labour Act, 2003, (Act 651)					
c.	Factories, Offices and Shops Act, 1970, (Act 328)					
d.	The Workmen's Compensation, 1987, (PNDCL 187)					
e.	The Insurance Act, 2006 (Act 724)					

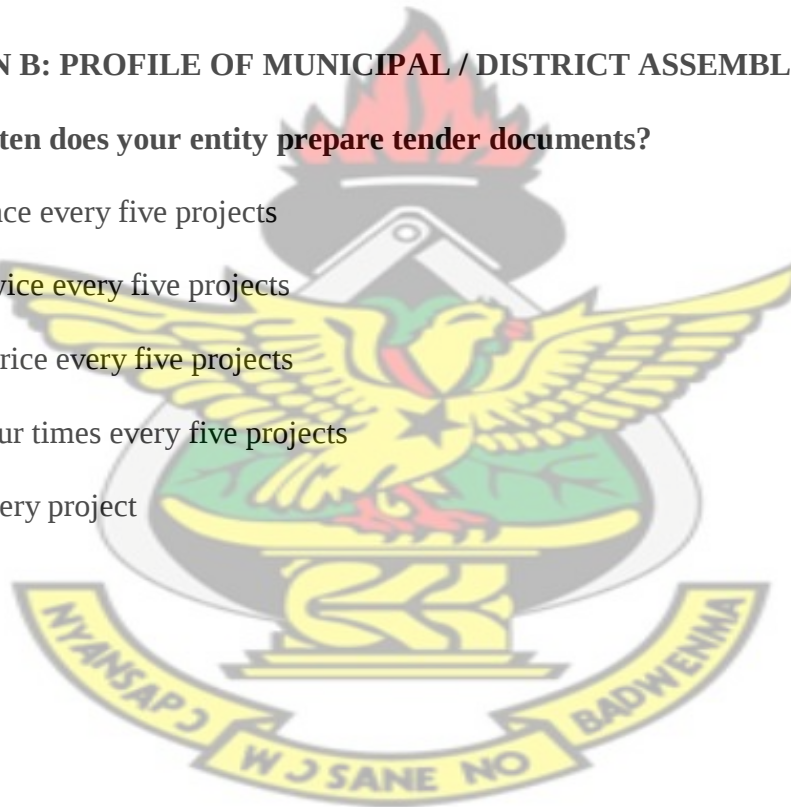
5. Which of the following activities are you involved in most during the pre-contract stage of your works procurement? Please rank as (1) Never, (2) Rarely, (3) Average, (4) Often, (5) Always, by ticking the appropriate box

No.	Activities	Rating				
		1	2	3	4	5
a.	Planning					
b.	Tender document preparation					
c.	Tender evaluation					

SECTION B: PROFILE OF MUNICIPAL / DISTRICT ASSEMBLY

6. How often does your entity prepare tender documents?

- a. ☐ Once every five projects
- b. ☐ Twice every five projects
- c. ☐ Thrice every five projects
- d. ☐ Four times every five projects
- e. ☐ Every project



7. **How effectively does your entity consider the application of the provisions in the following regulations which govern specific areas in construction in the preparation of tender documents? Please rank as (1) Not effectively, (2) Quite effectively, (3) Average, (4) Effectively, (5) Very effectively, by ticking the appropriate box.**

No.	Procurement Activities	Rating				
		1	2	3	4	5
a.	Public Procurement Act, 2003, (Act 663)					
b.	The Labour Act, 2003, (Act 651)					
c.	Factories, Offices and Shops Act, 1970, (Act 328)					
d.	The Workmen's Compensation, 1987, (PNDCL 187)					
e.	The Insurance Act, 2006 (Act 724)					

8. **In your opinion, how well does the Public Procurement Act, 2003, (Act 663) empower procurement entities to make Health and Safety considerations at the sourcing stage of works procurement?**

- a. ☐ Not well
- b. ☐ Quiet well
- c. ☐ Averagely
- d. ☐ Well
- e. ☐ Very well

**SECTION C: FORMS IN WHICH HEALTH AND SAFETY CONSIDERATIONS
ARE APPLIED DURING THE SOURCING STAGE OF WORKS
PROCUREMENT**

9. Which of the following forms do your health and safety considerations take at the sourcing stage of your procurement process? Please tick where appropriate

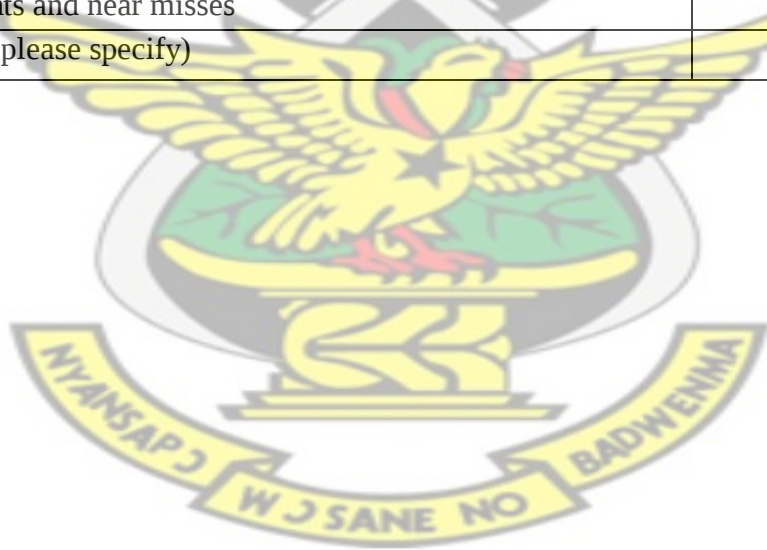
- a. ☐ Explanation of objectives for health and safety in the pre-contract stage of works procurement
- b. ☐ An indication in the Instructions to Tenderers (Tender Data Sheet), the Health and Safety Documents contractors must submit with their tenders
- c. ☐ Pricing health and safety requirement under the preliminary section of the Bill of Quantities
- d. Other (please specify).....

10. If (10a) is a form of Health and Safety consideration at the sourcing stage, how are these explanations made? Please rank as (1) Disagree (2) Quite agree (3) Averagely (4) Agree (5) Strongly Agree, by ticking the appropriate box

No.	Mode of Explanations	Rating				
		1	2	3	4	5
i.	Only in the invitation to tender					
ii.	In the invitation to tender, with specific requirements set out in detail in the tender data					
iii.	Verbally at pre-tender meetings					
iv.	Other (please specify)					

11. If (10b) is a form of Health and Safety consideration at the sourcing stage, which of these post qualification documents do you require contractors to submit with their tenders? Please rank as (1) Disagree (2) Quite agree (3) Averagely (4) Agree (5) Strongly Agree, by ticking the appropriate box

No.	Document	Rating				
		1	2	3	4	5
a.	Details of how safety is communicated and coordinated					
b.	Evidence of relevant safety training for staff					
c.	Experience of safety officer proposed for a project					
d.	An outline of the procedures to be adopted to ensure that health and safety requirements are met, not only by the main contractor but also by subcontractors					
e.	A system and format for recording and reporting accidents, incidents and near misses					
f.	Other (please specify)					



12. If (10c) is a form of consideration, which of the following preliminary work items do you require of tenderers to be priced? Please rank as (1) Disagree (2) Quite agree (3) Averagely (4) Agree (5) Strongly Agree, by ticking the appropriate box

No.	Item	Rating				
		1	2	3	4	5
i.	The preparation and updating of a site specific health and safety plan including a supervision and reporting scheme (to include subcontractors)					
ii.	Provision of safe construction equipment (scaffolds, hoardings)					
iii.	Provision of safety training to workers and supervisors					
iv.	Provision of welfare facilities (water, food, housing)					
v.	Provision of health and safety gear (helmet, boot, etc.)					
vi.	Medical examinations, first aid and emergency facilities					
vii.	Other (please state)					



13. As an entity, which of the following evaluation criteria do you mostly use in contractor selection? Please rank as (1) Never, (2) Rarely, (3) Averagely, (4) Often, (5) Always, by ticking the appropriate box.

No.	Item	Rating				
		1	2	3	4	5
a.	Annual volume of construction works of tenderer					
b.	Experience of tenderer as prime contractor in the construction in nature and complexity equivalent to the Works					
c.	Proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment					
d.	Staff holding of tenderer					
e.	Liquid assets and/or credit facilities of tenderer					
f.	Details of how safety is communicated and coordinated					
g.	Evidence of relevant safety training for staff					
h.	Experience of safety officer proposed for a project					
i.	An outline of the procedures to be adopted to ensure that health and safety requirements are met, not only by the main contractor but also by subcontractors					
j.	A system and format for recording and reporting accidents, incidents and near misses					
k.	Other (please specify)					

SECTION D: EFFECT OF HEALTH AND SAFETY CONSIDERATIONS ON PROJECT PERFORMANCE

14. The following are a list of types of health and safety issues that may have occurred on your project site. Please indicate how often these occurred on your project site. Please rank as (1) Never, (2) Rarely, (3) Averagely, (4) Often, (5) Always, by ticking the appropriate box.

No.	Item	Rating				
		1	2	3	4	5
a.	Construction site falls (roof related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects)					
b.	Crane accidents					
c.	Scaffolding accidents (Defective Scaffolding, Improperly Assembled Scaffolding)					
d.	Workers being run-over by operating equipment					
e.	Electrical accidents					
f.	Trench collapses					
g.	Fires and explosions					
h.	Welding accidents					
i.	Slips and trips					
j.	Food poisoning					
k.	Transport of contaminants to workers home					
l.	Other, please specify					

15. If any of the health and safety issues indicated in 17 above occurred, under which of the following ways did it seriously affect project performance? Please rank (1) Not seriously, (2) Quite seriously, (3) Averagely, (4) Seriously, (5) Very seriously, by ticking the appropriate box

No.	Item	Rating				
		1	2	3	4	5
a.	Damages to plant and equipment					
b.	Payments for settlements of injury or death claims					
c.	Legal fees for defense against claims					
d.	Costs of rescue operations and equipment					
e.	Expenditures on emergency equipment					
f.	Loss of function and operations income					
g.	Slowdowns in operations while accident causes are determined					
h.	Corrective actions to prevent re-occurrence of accident					
i.	Degradation of efficiency of operations because of loss of experienced and trained personnel					
j.	Increased insurance costs					
k.	Training costs for replacements					
l.	Loss of productivity					
m.	Disruptions while investigations are being carried out by the company safety department and insurers					
n.	Medical payments					
o.	Insurance premiums					
p.	Costs of workman's compensation insurance					