Assessing Occupational Health, Safety and Environment Management Practices and Challenges at the New Headquarter Building Construction Project of Commercial Bank of Ethiopia

By

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A Research Project Submitted to Addis Ababa University School of Commerce in Partial Fulfillment of the Requirements for the Award of Master of Arts in Project Management

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Approval Page

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Approved by the Board of Examiners

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Statement of Declaration

I, the undersigned, hereby declare that the project research entitled: **"*Assessing Occupational Health, Safety and Environment Management Practices and Challenges at the New Headquarter Building Construction Project of Commercial Bank of Ethiopia*"** has been carried out by me under the guidance and supervision of Dr. Adane Atara.

I also declare that all materials and sources used for this project research have been duly acknowledged. The work had not been submitted to any educational institutions for the requirement of any award.

_____ _____

Mekonnen Seid Date

Statement of Certification

This is to certify that Mekonnen Seid has carried out this research project work on the topic entitled ***"Assessing Occupational Health, Safety and Environment Management Practices and Challenges at the New Headquarter Building Construction Project of Commercial Bank of Ethiopia"*** under my supervision.

This work is original in nature and it is sufficient for submission for the partial fulfillment for the requirements of the award of Masters of Art in Project Management.

Adane Atara (PhD)	_____	_____
Advisor	Signature	Date

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Abstract

The management of occupational health, safety and environment has become today an issue that is pertinent and crucial to all organizations across all industries especially for the construction industry. The safety and health of workers and society surrounding any project should not be taken as a luxury but rather a necessity. This case study therefore, aims to find out the current practices of occupational health, safety and environment management at the new headquarter building construction project of Commercial Bank of Ethiopia (CBE) with a view to identify key challenges and problems in implementing and practicing an effective management of occupational health, safety and environment. In pursuing this objective, a descriptive research design was used and obtained the relevant primary data through online questionnaire survey and semi structured interview. The questionnaire survey data was analyzed using SPSS software and presented in frequency and percentages. Consequently, the study result revealed that, though management of occupational health, safety and environment is well practiced by the contractor, it is practiced unsatisfactorily in the project by the client and consultant organizations. Despite the overall project health, safety and environment management practice is not satisfactory, it is found that provision and utilization of key health, safety and environment practices that complies with occupational health, safety and environment requirement were performed in the project workplace. Lack of top management commitment is the major challenges to the implementation of occupational health, safety and environment management system in the given project. Further findings of this study show that among the factors to occupational health, safety and environment hazards in the given construction project, falling objects from working platforms, hoists and scaffolds have immense contribution to occupational health, safety and environment hazards.

Key Words: ***Occupational Health, Safety and Environment Management, Construction Site, Practice and Challenges;***

Abbreviations

AAiT:	Addis Ababa Institute of Technology
APM:	Association for Project Management
CBE:	Commercial Bank of Ethiopia
CSCEC Ltd.:	China State Construction Engineering Corporation Limited
DB:	Design-Build
DBB:	Design-Bid-Build
EPA:	Environmental Protection Agency
EPHI:	Ethiopia Public Health Institute
FDRE:	Federal Democratic Republic of Ethiopia
GDP:	Gross Domestic Product
GNP:	Gross National Product
GTP:	Growth and Transformation Plan
HSE:	Health, Safety and Environment
HSPA:	Health and Safety Professionals Alliance
ILO:	International labor organization
MOLSA:	Ministry of Labor and Social Affairs
OHS:	Occupational Safety and Health
OSHA:	Occupational Safety and Health Authority
PAHO:	Pan American Health Organization
PPE:	Personal Protective equipment
SARS:	Severe Acute Respiratory Syndrome
SPSS:	Statistical Package for the Social Sciences
UNEP:	United Nations Environment Program
WB:	World Bank
WHO:	World health Organization

Other Terms:

Client= Employer = CBE = Owner

Consultant = Employer Representative = Addis Ababa Institute of Technology

Contractor = China State Construction Engineering Corporation Ltd.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter introduces the background to the study, including the challenges faced in implementing and managing occupational health, safety and environment practices at construction sites particularly at the new headquarter building construction project of Commercial Bank of Ethiopia, the need for a sound occupational health, safety and environment management system and the motivation for researching this field. The organization and project profile of Commercial Bank of Ethiopia and the project understudy are introduced briefly. The research question, objectives, significance of the study, scope and limitation of the research are also discussed. The organization of the study is included at the end of this chapter.

1.2 Background of the study

Construction industry makes significant contributions to the socio-economic development process of a nation. The significance of the industry originates mainly from the direct and indirect impact it has on all economic activities. It contributes to the national output and stimulates the growth of other sectors through a complex system of linkages. It is noted that about one-tenth of the global economy is dedicated to constructing and operating homes and offices (UNEP, 1996). UNEP further observes that the construction industry contributes to employment and creates income for the population and has multiplier effects on the economy. The construction industry utilizes large unskilled labor. Throughout the developing countries, the majority of workers in the industry are untrained. The industry is an active sector, which is currently becomes a backbone of the developing countries' economy like Ethiopia; utilizing an enormous amount of various resources and budgets and embracing vast manpower by creating a large job opportunity.

Currently a number of construction projects of high rise buildings for the purpose of headquarter, district offices and branches are executed in different major cities of the country including the one we are concerned: The new headquarter building construction project of Commercial Bank of Ethiopia. This building construction project is executed by the project office established by

the bank as a client organization; China State Construction Engineering Corporation Ltd. (CSCEC Ltd.) as a contractor organization and Addis Ababa Institute of Technology (AAiT) as a consultant organization. Like any other construction projects in the country, this building construction project of commercial bank of Ethiopia has contributed a lot for creating job opportunities as it embraces huge both skilled and unskilled manpower. However, by its very nature of the industry, this building construction project is considered to be as risky with frequent and high accidents rate and ill-health problems to workers, practitioners and end users. Moreover, it is obvious that the project organization and its functions are greatly influenced by the health, safety and environment issues and practices at the workplace.

Several construction activities are intrinsically exposed to health and safety risks such as working at height, underground, in confined spaces and close proximity to falling materials, handling load manually, handling hazardous substances, noises, dusts, using plant and equipment, fire, exposure to live cables, poor housekeeping and others (Muiruri & Mulinge, 2014).Adverse environmental impacts of construction such as soil and ground contamination, water pollution, construction and demolition waste, noise and vibration, dust, hazardous emissions and odors have been major concerns and received more and more attention in the construction industry (Zhen C. and Heng Li., 2006). Hence, it is important that any construction project organization has to be proactive in managing the safety, health and environment responsibilities and has to do with them in a systematic way. The proactive management of health, safety and environment in the project workplace helps construction project organizations prevent injuries and ill-health at workplace.

1.3 Organization and Project Profile

The Commercial Bank of Ethiopia is the leading bank in Ethiopia, established in 1942. It has now over 1250 branches stretched across the country, and is working towards becoming a world class commercial bank. Thus Commercial Bank of Ethiopia has embarked on a unique and monumental undertaking to build an iconic and state-of-the-art headquarter in Addis Ababa, Ethiopia. The 48 story is under construction by the project's contractor; China State Construction Engineering Corporation Ltd.(CSCEC Ltd.) which is procured through International Competitive

Bid (ICB). In addition, the Design Review, Supervision and Contract Administration service is procured to Addis Ababa University-Addis Ababa Institute of Technology (AAU-AAiT).

An agreement was made in April, 2015 between CBE and the well-known Chinese government owned construction company; China State Construction Engineering Corporation Ltd., to design and build the CBE new headquarter project and the bank has accepted an offer by the Contractor through the letter of acceptance in March 2015 and in April 2015 for the design, build and completion of such works and the remedying of any defects therein with. Following this contact agreement signed with the contractor, the Commercial Bank of Ethiopia in the year 2016 has awarded the Addis Ababa University; Addis Ababa Institute of Technology (AAU - AAiT) for the design review, supervision and contract administration of this CBE new headquarter.

The building assembly consists of a high-rise office tower and two low-rise building volumes. The total floor area is estimated to be 147,692m2. The office tower of more than 48 floors (4B+G+48) includes the main departments of the Bank. The low-rise buildings (4B+G+6 & 4B+G+8) are mainly conference centers, shopping center and parking garage. A large public spaces like Public Square, has been highly recommended to be included in the site.

After completion, the building is likely to be one of the highest (198 meters high) on the African continent. It will also form an important landmark and icon for the Commercial Bank, the city of Addis Ababa and Ethiopia as a nation. The head quarter building will be an impressive contribution to the dynamic skyline of Addis Ababa. The design of the building is envisaged to symbolize Ethiopia and the African Nations. In view of this, the diamond design of the tower building is rooted in the local East African Culture and has its own unique East African identity. The building is an ambitious one in that a premium international sustainability label shall be part of the project.

1.4 Problem Statement

Construction industry is an important part of the economy in many countries and often seen as a driver of economic growth especially in developing countries. Typically, construction industry contributes to 11% of gross domestic products (GDP) in most developing countries (Giang & Pheng, 2010). Regardless of its importance, construction sites have been regarded as very risky

areas where construction workers are subject to frequent fatalities and ill- health problems. In general, the sector is accident prone (ILO, 2005) and has been regarded as the most hazardous place in which to work with a high level of health and safety risks (ILO, 2005, Lingard& Rawlinson, 2005 and Smallwood et al, 2008).

While the growth and industrialization have made huge positive contributions to improvement in living standards and needs for health, educational, social and economic growth, it had brought adverse health consequences on work places. In developing countries, like Ethiopia, the current rapid economic development has brought changes in characteristics and condition of employment in various economic sectors (Takele, 2011). In Ethiopia even though there are no adequately compiled figures and reports on the intensity of occupational accidents and ill-health, according to the research reports from few data sources, the numbers of accidents occurring in work places is increasing from year to year and total economic losses, social and human crises resulting due to these accidents are enormous (MOLSA, 2016).

The construction sector in Ethiopia, with a focus mainly on housing and road infrastructures is growing very fast. Inadequate awareness of occupational hazard, limited use of PPE at the work place, and poor personal hygiene were noted to be contributing factors to excess exposures such as unsafe work environment, dust and noise (Hardeep et al, 2008). Commercial Bank of Ethiopia is striving hard to achieve its organizational vision, "to become a world-class bank by 2025" so that improves its service of excellence and competitiveness. In doing so the bank has executed different projects of constructing high-rise buildings for its headquarters, district offices and branches. The new headquarter building construction project that the researcher is concerned is contracted to international contractor that has a huge experience in construction project management.

Although, many accidents, injuries and ill-health problems in Ethiopia remain unreported, there is a great concern that existing situation is alarming. Some prior studies (by Lucy et al, 2016; Dawit, 2016; Zeru, 2014 and others) have been done in relating to occupational HSE management in Ethiopia. But from experience in the construction industry prior literatures in Ethiopia have leaved not enough documentation on HSE management of building construction. All in all it can be said that occupational HSE management is not given apriority as compared to budgeted cost, quality and scheduled time in construction project management.

The overall problems stated above related to occupational HSE management in building construction in Ethiopia and the need for effective occupational HSE management in Commercial Bank of Ethiopia aspired the researcher to conduct this case study research on occupational HSE management in the new headquarter building construction project of Commercial Bank of Ethiopia and put forwarding solution in the construction industry occupational HSE management practices.

1.5 Research Questions

Based on the problem statement that has been stated, the following research questions are developed:

- What are the current practices of occupational HSE management at the new headquarter building construction project of Commercial Bank of Ethiopia?
- What are the challenges and problems in relation to the implementation of occupational HSE management at the new headquarter building construction project of Commercial Bank of Ethiopia?
- What are the key elements of effective occupational health, safety and environment management practices within a construction project?
- What best practice guide of occupational health, safety and environment management could be used for the construction projects at Commercial Bank of Ethiopia?

1.6 Research Objective

Main Objective

The main objective of this study is to assess the current practices of occupational health, safety and environment management on the new headquarter building construction project of Commercial Bank of Ethiopia with a view to identify key challenges and problems in implementing and practicing an effective management of occupational health, safety and environment.

Specific Objectives

- Assessing the current occupational HSE management practices at the new headquarter building construction project of Commercial Bank of Ethiopia;
- Identifying the challenges and problems in relation to the implementation of occupational HSE management at the head quarter building construction project of Commercial Bank of Ethiopia;
- Identifying key elements of effective occupational health, safety and environment management practices within a construction project.
- Proposing a best practice guide for occupational health, safety and environment management for the construction projects at Commercial Bank of Ethiopia.

1.7 Significance of the study

The issue of construction workplace HSE is becoming extremely relevant. If we are failing to adhere to the principles of safety, it affects moral, legal proceeding and financially both social, psychological and economics of the society. Moreover, workers on construction workplaces are exposed to extremely high risks, since working conditions are frequently changing, various construction equipment types and mechanisms are used, and workers of various professions/professional levels are involved.

Thus, the significance of this research is to improve the management of occupational HSE standards at the construction sites by covering general HSE provisions as well as duties and responsibilities of the project client, consultant, and contractor organizations under study regarding safety measures and the minimum necessary requirements.

The importance of this research is also to provide a bench mark to develop system for managing HSE in worksites of construction companies. It will be used as a basis for establishing occupational HSE programs in order to create safe and healthier working conditions which in turn has greater contribution in reducing accidents and hazards to the workers in construction sector. Moreover, the study can also benefit researchers who would like to undertake studies aimed at assessing and identifying the practice and challenges of occupational HSE management that have great advantage in integrating HSE management programs with other project management functions like cost, quality and time.

1.8 Scope of the study

This study was a case study of occupational HSE management at the new headquarters office building construction project of Commercial Bank of Ethiopia, a huge and unique construction project for the project office of CBE as well as for the building construction industry in the country. The study only focused on occupational HSE management practices and challenges at the new headquarter building construction project of Commercial Bank of Ethiopia. The rationale behind this delimitation is that this new headquarter building construction project of Commercial Bank of Ethiopia is contracted with internationally renowned contractor in construction project management so that it is expected to gain valuable experience and knowledge transfer in the field of construction occupational HES management.

1.9 Limitation of the study

Due to the current unexpected pandemic of COVID-19, the project offices have prohibited any face to face meetings and access to construction workplace for visitors like me so that minimizing the risk of COVID-19 in the workplace. They only allowed communications by means of internet/email or telephone. Thus, the study is limited to be conducted by collecting data through online questionnaires from the target population.

1.10 Organization of the Study

This research work encompasses five distinct chapters presented as follows. Chapter one is an introduction of this study. The chapter comprises the background of the study, organization and project profile, the problem statement, the research questions, the research objectives, significance of the study, scope of the study, limitation of the study and finally organization of the study. Chapter two will comprise a review of the past and present literature on occupational HSE management of construction industry at large and specifically the building construction projects. Chapter three of the study will describe the research methodology which will consists of the research design, research approach, target population, method of data collection and instruments used, validity and reliability of data collection instruments, data analysis and presentation methods and ethical consideration. Chapter four will consists of data presentation, analysis and interpretation of findings. The final chapter, chapter five, will contain the summary, conclusions drawn from the study and recommendations forwarded.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter presents a review of related theories and related literature to the study. Construction HSE is becoming grave concern for both practitioners and researchers all over the world. This chapter provides the fundamental theories related to the concept of occupational HSE management as well as the workplace characteristics of construction industry. In addition, some safety related aspects from prior studies are discussed in this chapter to give a richer context for understanding construction occupational HSE management practices.

Borg and Gall (1993) argue that literature review is a comprehensive survey of existing research and theoretical informational about the proposed research area. It is an evaluative report of recorded information on the selected area. This chapter aims to provide a basic framework to help the reader understand the context of the research. The purpose of the review is to identify knowledge gaps, methodological weaknesses, to develop a theoretical base and refine the research problem. This chapter demonstrates the need for an approach to effective occupational HSE management methods for construction projects and illustrates the research conceptual framework as shown in figure 2.1 below.

2.2 Theoretical Review

2.2.1 The Concept of Occupational Safety and Safety Management

Regarding the concept of occupational safety, Alli (2008) gives the following definition of occupational safety: "...is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment".

From a health &safety point of view, it involves creating organized efforts and procedures for identifying workplace hazards and reducing accidents and exposure to harmful situations and substances. From an environmental point of view, it involves creating a systematic approach to complying with environmental regulations and protect natural environment from pollution and

destruction. On one hand, we have a "health and safety" component, that refers to predicting and minimizing the probability of hazards, that in other words means improving safety of humans. On the other hand, we have the environment, which can imply to definitions – the working environment for people, and overall community in the sense of the influence to nature and environment by company's operations (Emilija, 2018).

The employer should have overall responsibility for the protection of its workers' safety and health, and provide leadership for occupational safety and health activities in the organization. There already are model programs that improve health and decrease costs. It is not knowledge that is lacking, but penetration of those programs into a greater number of settings (PAHO, 2006). According to PAHO (2006) it is stated that the most effective strategy for managing health and safety in the health services, and for providing health care is to incorporate occupational health and safety into an institution's managerial objectives. Handling health and safety objectives in the same way as objectives dealing with finances, the services, or quality are handled will help attain a high performance standard in health and safety. It is management's responsibility to ensure that the health care facility under its responsibility establishes adequate policies and programs supplied with sufficient human and financial resources to provide a healthy and safe workplace (PAHO, 2006).

2.2.2 Occupational HSE and Related Terminologies Defined

Before a detailed discussion of health, safety and environment issues can take place, some basic occupational HSE and related terminologies definitions are required:

Health - A joint definition of occupational health endorsed by the ILO and WHO (as revised in 1995) states that: "Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the workers in an occupational environment adapted to their physiological and psychological capabilities; and, to summarize : the adaptation of work to man and of each man to his job" (WHO, 1995: 3).

Safety – the protection of people from physical injury. The borderline between health and safety is ill-defined and the two words are normally used together to indicate concern for the physical and mental well-being of the individual at the place of work. Occupational health and safety (OHS) is a multidisciplinary concept touching on issues relating to such disciplines as medicine, law, technology, economics and psychology.

Welfare – the provision of facilities to maintain the health and well-being of individuals at the workplace. Welfare facilities include washing and sanitation arrangements, the provision of drinking water, heating, lighting; accommodation for clothing, seating (when required by the work activity), eating and rest rooms. First aid arrangements are also considered as welfare facilities.

Accident – is defined as any unplanned event that results in injury or ill-health of people, or damage or loss to property, plant, materials or the environment or a loss of a business opportunity. Other authorities define an accident more narrowly by excluding events that do not involve injury or ill-health.

Environmental protection – arrangements to cover those activities in the workplace which affect the environment (in the form of flora, fauna, water, air and soil) and, possibly, the health and safety of employees and others. Such activities include waste and effluent disposal and atmospheric pollution.

Hazard and risk – a hazard is the potential of a substance, activity or process to cause harm. Hazards take many forms including, for example, chemicals, electricity and working from a ladder. A hazard can be ranked relative to other hazards or to a possible level of danger.

A risk is the likelihood of a substance, activity or process to cause harm. A risk can be reduced and the hazard can be controlled by good management. It is very important to distinguish between a hazard and a risk – the two terms are often confused and activities such as construction work are called high risk when they are high hazard. Although the hazard will continue to be high, the risks will be reduced as controls are implemented. The level of risk remaining when controls have been adopted is known as the residual risk. There should only be high residual risk where there is poor health and safety management and inadequate control measures (Hughes & Ferrett, 2007).

2.2.3 Workplace Characteristics of Construction Industry

The range of the construction industry is very broad. According to Hughes & Ferrett (2007), the most common activity is general building work which is domestic, commercial or industrial in nature. This work may be new building work, such as a building extension or, more commonly, the refurbishment, maintenance or repair of existing buildings. Larger civil engineering projects involving road and bridge building, water supply and sewage schemes and river and canal work all come within the range of construction. The work could involve hazardous operations, such as demolition or roof work, or contact with hazardous materials, such as asbestos or lead. Construction also includes the use of woodworking workshops together with woodworking machines and their associated hazards, painting and decorating and the use of heavy machinery. It will often require work to take place in confined spaces, such as excavations and underground chambers. Moreover, at any given time, there are many young people receiving training on site in the various construction trades. These trainees need supervision and structured training programs (Hughes &Ferrett, 2007).

There are three main characteristics in the construction industry that have a direct effect on construction safety (Hallowel, 2008). According to Hallowell, each characteristic will be discussed briefly:

Fragmentation: One of the unique features of the construction industry is its fragmentation. The most prevalent delivery method in the U.S has been Design-Bid-Build (DBB). In this method, the constructor is solely responsible for worker safety, and historically, designers have not addressed site safety in their design since they feel that they do not have adequate training (Gambatese, 1998). Modern delivery methods, that designers and constructors work together, could lead to better safety performance (J Hinze J.W., 1997; Hecker S., 2005). One study shows that there is a difference in project performance as well as safety performance in Design-Build (DB) and Design-Bid-Build projects, of which DB projects had higher safety and project performance (Thomas, 2002).

Dynamic Work Environment: Unlike manufacturing, construction tasks are not repeatable. Each job site has its own characteristics, and makes construction work dynamic. Construction workers do a variety of tasks and their next job could be a completely different construction

project (Elyas & Gabriel, 2017). Hallowell (2008) has compared manufacturing and construction in terms of work condition, and findings show that repetition, task predictability, and task standardization are high in manufacturing and low in construction, which could be a reason for differences in fatality rate between these two industries.

Safety Culture: The term "safety culture" first was introduced by a post-accident review meeting after the Chernobyl disaster in 1986 (Choudhry et al., 2007). Poor safety culture is recognized as a significant factor in any accident occurrence (Dester & Blockley, 1995). Researchers and organizations have defined safety culture differently, yet the bases of all are similar (Cooke &Rousseau, 1988). In addition, all identify safety culture as fundamental for organizations to manage safety aspects of operations (Glendon & Stanton, 2000).

The ill-defined conditions of construction site with numerous material-handling, transportation and storing operations which involve various equipment is considered as responsible factor for frequent occupational accidents and occupational diseases (Jean Caude, 2004). Therefore, determining the routes and areas for the passage and movement of plant and equipment; the conditions under which various materials are handled (handling and lifting equipment, working platforms, removal of waste and debris, dangerous materials); and preparing areas for the storage of various materials are vital decisions to be made for multidimensional benefits.

2.2.4 Occupational HSE Management on Construction Project Sites

One of the key components in the socio-economic development of enterprises is its workforce and the necessity for it to be healthy, productive and motivated. Occupational HSE needs to be incorporated within the management and business plan of organizations to take into account the fact that the healthy production of materials, goods and services can only be achieved if the health, safety and well-being of the working population are ensured. Putting emphasis in the management plan on the protection of the human resources and on promoting health and establishing a safety climate is certainly one way of achieving sustainability.

Construction Safety Management is a method of controlling safety policies, procedures and practices on construction sites (Wilson and Koehn, 2000). It is a dynamic process involving small or large adjustments made to site operations to achieve the desired goals without encountering unexpected "shocks" to normal business (Cheng et al., 2004). Furthermore, safety

should be embedded as a management concept into every level of a company and every part of a cross-organizational project. When considering construction safety management, "safety culture" and "safety climate" are two important aspects (Flin et al., 2000). Safety culture is preceded by an extensive body of research into organizational culture and climate; culture embodies values, beliefs and underlying assumptions, and climate is a descriptive measure that captures the workforce's opinion of the organizational environment (Gonzalez-Roma et al., 1999).

Safety management techniques must often be adjusted to meet the unique needs of the industry. Because most firms allocate limited resources for safety management, contractors are forced to carefully select from the available elements (Hallowell and Gambatese, 2009). To effectively manage construction safety, adherence to safety procedures is important when maximizing safety performance. According to Jaselskis, Anderson and Russell (1996), construction safety management techniques improved significantly following the Occupational Safety and Health Act of 1970. This act placed the responsibility for construction safety on employers and resulted in a dramatic increase in safety planning and management efforts in the construction industry.

After recognizing the importance of developing a system to manage the safety and health in work place the next step is determining the relevant occupational safety and health management system that comprises the activities designed to facilitate the coordination and collaboration of workers' and employers in the promoting and sustaining safer and healthy workplace environment for all. The concept of management regarding safety is more about the rights, roles and responsibilities in actions in hazards identification and in proper implementation of preventive measures (Alli, 2008). Occupational health, safety and environment management system is applicable to any organization that wishes to establish safe working conditions (OSHA, 2015). The management system have been defined by (ILO, 2014) as "a combination of the planning and reviewing the management, organizational arrangements, the consultative arrangements, and the specific program elements that work together in an integrated way to improve health, safety and environment performance". Mulinge, (2014) also noted that occupational HSEMS is the deliberate linking and sequencing of processes to achieve specific objectives and to create a repeatable and identifiable way of managing occupational health, safety and environment (HSE).

HSE Policy

ILO-2001 Guidelines on occupational HSE policy states that the employer, in consultation with workers and their representatives should set out in writing an occupational HSE policy, which should be:

- specific to the organization and appropriate to its size and the nature of its activities;
- concise, clearly written, dated and made effective by the signature or endorsement of the employer or the most senior accountable person in the organization;
- communicated and readily accessible to all persons at their place of work;
- reviewed for continuing suitability; and
- made available to relevant external interested parties, as appropriate;

HSE Organization and Management

ILO-2001 Guidelines state that the employer should have overall responsibility for the protection of workers' safety and health, and provide leadership for occupational HSE activities in the organization. The employer and top management should allocate responsibility, accountability and authority for the development, implementation and performance of the occupational HSE management system and the achievement of the relevant occupational HSE objectives.

Organization structures and processes should be established which:

- ensure that occupational HSE is a line-management responsibility which is known and accepted at all levels;
- define and communicate to the members of the organization the responsibility, accountability and authority of persons who identify, evaluate or control occupational HSE hazards and risks;
- provide effective supervision, as necessary, to ensure the protection of workers' safety and health;
- promote cooperation and communication among members of the organization, including workers and their representatives, to implement the elements of the organization's occupational HSE management system;

- fulfill the principles of occupational HSE management systems contained in relevant national guidelines, tailored guidelines or voluntary programs, as appropriate, to which the organization subscribes;
- provide appropriate resources to ensure that persons responsible for occupational HSE, including the safety and health committee, can perform their functions properly;

Planning and Implementation Activities of HSE

According to ILO-2001 Guidelines, the purpose of planning should be to create an occupational HSE management system that supports:

- as the minimum, compliance with national laws and regulations;
- the elements of the organization's OHSE management system; and
- continual improvement in OHSE performance;

Consistent with the occupational HSE policy and based on the initial or subsequent reviews, measurable occupational HSE objectives should be established, those are:

- specific to the organization, and appropriate to and according to its size and nature of activity;
- consistent with the relevant and applicable national laws and regulations, and the technical and business obligations of the organization with regard to occupational HSE;
- focused towards continually improving workers' occupational HSE protection to achieve the best occupational HSE performance;
- realistic and achievable;
- documented, and communicated to all relevant functions and levels of the organization; and
- periodically evaluated and if necessary updated;

Monitoring & Evaluation (Performance Measures)

ILO-2001 Guidelines on performance monitoring and measurement states that procedures to monitor measure and record occupational HSE performance on a regular basis should be developed, established and periodically reviewed. Responsibility, accountability and authority

for monitoring at different levels in the management structure should be allocated. Performance monitoring and measurement should:

- be used as a means of determining the extent to which occupational HSE policy and objectives are being implemented and risks are controlled;
- include both active and reactive monitoring, and not be based only upon work-related injury, ill health, disease and incident statistics; and
- be recorded;
- provide feedback on occupational HSE performance;
- provide information to determine whether the day-to-day arrangements for hazard and risk identification, prevention and control are in place and operating effectively; and
- provide the basis for decisions about improvement in hazard identification and risk control, and the occupational HSE management system;

Occupational HSE Management Review

According to ILO-2001 Guidelines, management reviews should:

- evaluate the overall strategy of the occupational HSE management system to determine whether it meets planned performance objectives;
- evaluate the occupational HSE management system's ability to meet the overall needs of the organization and its stakeholders, including its workers and the regulatory authorities;
- evaluate the need for changes to the occupational HSE management system, including occupational HSE policy and objectives;
- identify what action is necessary to remedy any deficiencies in a timely manner, including adaptations of other aspects of the organization's management structure and performance measurement;
- provide the feedback direction, including the determination of priorities, for meaningful planning and continual improvement;
- evaluate progress towards the organization's occupational HSE objectives and corrective action activities; and
- evaluate the effectiveness of follow-up actions from earlier management reviews;

2.3 Empirical Review

2.3.1 Effects of Poor Occupational HSE Practice in Construction Workplace

As James & Cheryl (2007) stated the human, social and economic costs of occupational accidents, injuries and related diseases and major industrial disasters have long been cause for concern at all levels from the individual workplace to the national and international. Christer (2006) also indicated that the health status of the workforce in every country has an immediate and direct impact on national and world economies. According to Thewodros (2016), despite a slow continuous improvement, occupational accidents and diseases are still too frequent and their cost in terms of human suffering and economic burden continues to be significant. Injuries related to construction work remain a serious problem worldwide.

The report of ILO, 2014 stated that it is estimated that every year there are some 125 million work related accidents, 220,000 of them fatal. Lucy(2016) stated that according to the report of ILO it is estimated about 2.2 million fatalities occur due to occupational ill-health consequences across the world every year. Referring the report of ILO, 2010, Thewodros (2016) said that 160 million new cases of occupational diseases are caused annually by exposure and dangerous conditions at the work place; 30-40% of them can be expected to lead to chronic diseases and about 10% are likely to result in permanent disability.

Kaur&Arora (2012) on their work demonstrated that any development project plan to improve the quality of life has some built-in positive and negative impacts. The development project should be planned in such a manner that it has maximum positive impacts and minimum negative impacts on the environment. According to Gangolells et al. (2011), prediction of the environmental impacts of construction in the early stages of projects, may lead to improvements in the environmental performance of construction projects and sites.

Regarding hazardous substances, Alli (2008) stated that the importance of protecting workers, the general public and the environment from materials containing hazardous substances cannot be overemphasized. Employers must therefore dispose waste containing hazardous materials, such as asbestos, in a manner that does not pose a health risk to the workers concerned, including those handling the waste material, or to the general population. Furthermore, it is up to the

competent authority and employers to take measures to prevent pollution of the general environment by dust or other pollutants released from the work site.

2.3.2 Health, Safety and Environment Laws and Regulations in Ethiopia

Institutionally, the management of occupational HSE issues is, first of all, represented by set of governmental bodies that are responsible for occupational HSE in the country. These governmental bodies work based on the ultimate state law of the country which is the Constitution of Ethiopia. The Civil Code (Proclamation # 165/1960) together with the Labor Code (Proclamation No 377/2003) is the general legal basis for health and safety rules in Ethiopia. Several articles/provisions are provided under these general laws regarding health and safety of people. According to Lucy (2016) Labor Code ensures worker-employer relations and enables workers and employers to maintain industrial peace. It strengthens and defines the powers and duties of the organ charged with the responsibility of inspecting labor administration, particularly labor conditions, occupational HSE.

Lucy (2016) also stated that one of the provisions provided under these general laws is article 92 which clearly spells out the fundamental obligations of an employer with regard to putting in place of all the necessary measures in order to ensure, workplaces are safe, healthy and free of any danger to the well-being of workers. In the same provision article 93 provides the obligations of workers pertaining to the required co-operation and putting into practice of the regulation and instruction given by the employer in order to ensure safety health and working conditions at work places. The law has clearly stipulated about occupational injuries with all other related provisions.

2.3.3 Integration of Occupational HSE with Project Management

According to APM(2000), a project management is defined as an endeavor in which human, material and financial resources are organized in a novel way to deliver a unique scope of work of given specification often within constraints of cost and time to achieve beneficial changes defined by quantitative and qualitative objectives.

Suraji et al. (2001) stated that construction site safety is no longer a term merely associated with technical issues. Rather, emphasis is placed on how project management can help improve site

safety. Thus safety management is now integrated into project management. Joan(2010) on his work indicated that the guidelines of ILO-2001 encourage the integration of occupational health, safety and environment management system with other project management system and state that occupational HSE should be an integral part of business management. According to OSHA (2007), while integration is desirable, flexible arrangements are required depending on the size and type of operation.

Alli (2008) on his work emphasized that occupational HSE management should not be treated as a separate process, but be integrated into other workplace activities. Its various functions and procedures should be embedded in other management system and business processes in the enterprise, as well as within comparable structures in the community. For example, occupational health services in a small enterprise could be integrated with the primary health care provided within the community. This would be of benefit to workers and their families.

2.3.4 Contribution of Occupational HSE Management to Construction Industry

According to OSHA (2015), the main goal of safety and health management system is to protect the workers, and resources of the employers from workplace injuries, illness, and minimizing the suffering and financial hardship these events can cause. Takele (2011) said that organizations devote considerable resources in protecting workers safety and ensuring healthy workplaces. For both business and financial reasons, many go beyond the minimum requirements set by occupational HSE laws. Occupational HSE management system provides organizations with the framework to develop a solution to the increasing challenges facing them at the workplace today, from serious injury and illness, lost work days, increasing occupational health and safety regulations, large citations/ penalties, rising worker's compensation costs, costly medical claims, worker retention and employee satisfaction.

Assegid (2018) on his work indicated that companies with effective occupational HSE management system earn positive returns and benefits on their health and safety investment by savings operational cost through integrated occupational HSE management. Among these; less work-related accidents and ill health and associated costs; improving performance through heightened employee morale and adherence to policies and procedures; increased control of regulator issue; reinforcing a responsible and well-managed reputation with customers,

stakeholders and communities; the company receives clear demonstration of legal and regulatory compliance to regulatory authorities, customers and employees; better management of health and safety risks increased access to new customers and business partners through an improved company image. Paul-Emile BOILEAU, 2016 also said the investments in occupational HSE have thus social and economic benefits for the enterprises and recent economic studies and surveys have confirmed the benefits of a top-down approach to occupational HSE on business productivity and competitiveness. More and more, it is being recognized that occupational HSE should be seen as an investment rather than an expense and that it should be a key component of the management and business plan of the enterprises.

2.3.5 Challenges of Promoting Occupational HSE Practices in Construction Industry

According to OSHA (2015), in order to change the impacts of poor occupational accidents and ill-health/diseases promoting occupational safety and health programs in each organization should be recognized as key responsibility of the management and actions have to be implemented with full commitment of all stake holders. Thus, for organizations to prevent their production or service delivery process from accidents and risks; and make workplaces safer for their employees, it is vital to develop occupational HSE management system and implements simultaneously with other business aspects such as quality improvement, profit enhancement, increasing customer satisfaction.

Thewodros (2016) stated that the challenge for all stakeholders is to build positive developments and to sustain preventative rather than corrective efforts in a regularly changing world of work. He said in case of Ethiopia, the country is striving hard to improve its basic facilities by building schools, hospitals, housing complexes, shops, offices, highways, power plants, industries, bridges and other infrastructures. However, all these construction activities are carried out by unskilled labor forces at cheap rate. Occupational injuries and accidents among these workers are high due to illiteracy, poverty, lack of health and safety training and information on health hazards and risks at the work place.

2.3.6 COVID 19 and Occupational Health and Safety

According to the report of WHO on 2020, Corona virus Disease 2019 (COVID-19) is a respiratory disease caused by the SARS-CoV-2 virus. It was first detected in Wuhan, China, in December 2019. On 30 January 2020, the WHO Director-General declared that the current outbreak constituted a public health emergency of international concern. Depending on the severity of COVID-19's international impacts, outbreak conditions - including those rising to the level of a pandemic can affect all aspects of daily life, including work, travel, trade, tourism, food supplies, and financial markets. Also the report of ILO on the same year warned that Corona virus (COVID-19) is a highly contagious disease that can have severe effects on people, especially those who are vulnerable. The virus is likely to pass from person to person in communal areas and where it is not possible to maintain safe distances between persons. If a person is infected while working it can be passed on through families and other contacts. You can spread the virus even if you don't have symptoms. During the COVID-19 pandemic it is essential that the workforce is protected to minimize the risk of the infection spreading (ILO, 2020).

The outbreak of COVID-19 has evolved rapidly. In Ethiopia, infections are rising, with 89,860 confirmed cases as of October 19, 2020.The Federal Ministry of Health (FMOH) is leading the government response in Ethiopia to this national public health risk and FMOH along with the Ethiopian Public Health Institution (EPHI) is providing up to date information and advice about this pandemic. According to OSHA 2020, when working in the construction industry, the risk of exposure to the corona virus can be reduced with the help necessary safety precaution tips such as encouraging workers to stay home if they are sick, properly wearing masks and other PPE, maintaining social distancing, encouraging respiratory etiquette, promoting personal hygiene, using EPA – approved cleaning chemicals, cleaning and disinfecting portable jobsite toilets regularly, etc.

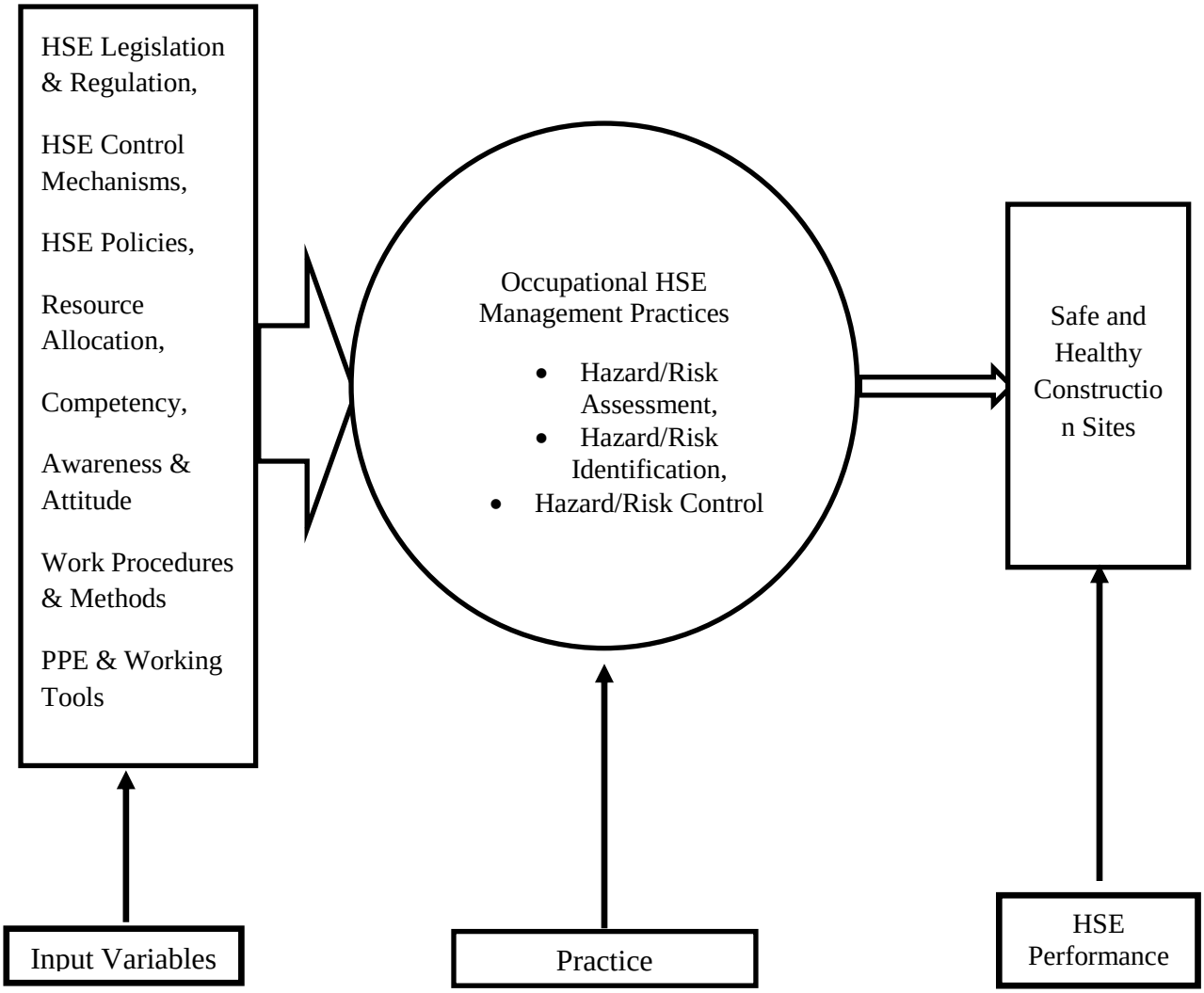

Figure 2.1: Research Conceptual Framework (Source: author's view)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter; the procedures, tools and materials used in this study for collecting, analyzing and methods of presenting the analyzed data for occupational HSE management practices for the new headquarter building construction project at Commercial Bank of Ethiopia are discussed in detail. The chapter includes the sub sections dealing with research design, research approach, target population, methods of data collection and instruments used, reliability and validity of data collection instruments, data analysis and presentation methods and finally ethical consideration required to investigate existing occupational HSE management of the new headquarter building construction project at commercial bank of Ethiopia.

3.2 Research Design

Descriptive survey design was employed in this study with the assumption that it enables the researcher to access the current practice and challenges of occupational HSE management of the new headquarter building construction project at commercial bank of Ethiopia. Because, descriptive research study type is flexible in nature and it can provide a lot of information that helps in identifying further areas of research. Besides, it uses both quantitative and qualitative data in order to find the solution to what is being studied so far. As Kothari explained, the major purpose of descriptive research is description of the state of affairs as it exists at present and also he added that descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group (Kothari, 2004). And this method identified the Practices and challenges of the study.

The study design procedure is initially an extensive literature search on existing work on occupational HSE management in the construction industry and later a survey using self-administered questionnaire approach will be conducted. Statistical techniques will then be used to analyze the information gathered.

3.3 Research Approach

As Kothari, (2004) explained the types of research approach brings to light the fact that there are two basic approaches to research, namely, quantitative and qualitative approaches. The former involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion and is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. The quantitative one is helpful in quantifying variables which is gathered through closed ended questions and interpreting statistical data. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. This aims at discovering the underlying motives and desires, using in depth interviews for the purpose. Such an approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis. Generally, the techniques of focus group interviews and depth interviews are used.

Thus, in this study, it is used both quantitative and qualitative data in order to find the solution to what is being studied so far.

3.4 Target Population

Target population refers to the total set of individuals (subjects or events) having common characteristics in which the researcher is interested. It has been known from the project coordinators that professionals involving on the project are: 25 from the client organization; 18 from the consultant organization and 30 from the contractor organization which is a total of 73 in number. The target population of this study includes building construction project professional staffs of contractor, client and consultant that are working in the new headquarter building construction project at Commercial Bank of Ethiopia.

Thus the target population of the study was 73 in number from which the data was collected. According to Kothari census inquiry needs to be emphasized that when the universe is a small one, it is no use resorting to a sample survey. Census is a complete enumeration of all items in the ‘population’. It can be presumed that in such an inquiry, when all items are covered, no element of chance is left and highest accuracy is obtained (Kothari, 2004). Thus, the Census inquiry was employed. Using Census was appropriate because the target population for this study was limited in number and manageable. In addition it enabled the highest accuracy on the finding

of the study. Therefore all of the target populations were addressed for information inquiry on the subject under study.

3.5 Method of Data Collection and Instruments Used

Questionnaire and individual interview were employed to collect data. The data was collected from primary sources through questionnaire and individual interview which enable the researcher to gain genuine information. Prior to designing questionnaire and individual interview, a pilot study was carried out consisting of a selection of prototype questionnaire and individual interview that were distributed by e-mail randomly to a selection of 4 individuals who are construction & safety experts in the field of building construction project management in order to get a feel of the work involved and get constructive criticism from all respondents. The pilot study was provided to enable the design of the potential questionnaire and individual interview, and also to enable a testing facility to see whether the questions were intelligible, easy to answer, whether they contained inapplicable or confusing statements, which could retrieve incorrect information for the benefit of the research. When the pilot questionnaire got to the stage of good feedback from the respondents, the questionnaire where then put in place, and distributed to the professionals participated on the project.

Based on the pilot study and the findings from the literature review, the final questionnaire was carefully designed by the researcher in order to assessing the practice and challenges of occupational HSE management of the new headquarter building Construction project at Commercial Bank of Ethiopia. The purpose of the questionnaire is to provide answers and meet the stated aims and objectives of the study.

In the close-ended questionnaire, the respondents were asked mostly to answer a Yes/No/Don’t Know and five-scale system (Likert scale) questions about the current practices and challenges of occupational HSE management of the new headquarter building construction project at Commercial Bank of Ethiopia. Based on all of the information that was gathered, quantitative analysis was carried out and the results are discussed in detail in the following Chapter.

Additionally a total of twelve open-ended interview questions relevant to the research objective are presented and distributed. Semi structured interview which, as Dawson, 2002 stated, is the most common type of interview in social research was used to collect data because this process allows the researcher to gain insights into others perspectives about the phenomenon under study and it is particularly useful for ascertaining respondent's thoughts, perceptions, feelings, and retrospectives account of events.

3.6 Validity and Reliability of Data Collection Instruments

Checking the validity and reliability of data collecting instruments before providing to the actual study subject is the core to assure the quality of the data (Creswell 2012). The qualitative approach is often criticized for lack of academic rigor. This is because of the qualitative nature of the data, which are based on the perceptions and subjective interpretations of the researcher. The researcher recognized this fact and designed the research to meet the aspects of quality in terms of validity and reliability, as advocated by Bryman (1989), and Yin (2003).

Reliability refers to the absence of random error, enabling subsequent researchers to arrive at the same insights if they conducted the study along the same steps again (Yin, 2003). To increase the reliability of the survey, a Yes/No/Don't Know and a five-scale system (Likert scale) questionnaire were used. The reliability in such scale is higher compared to a two - scale system (Hayes, 1992). The tendency toward consistency found in repeated measurements is referred to as reliability.

To make sure the research's reliability of the questionnaire the researcher conducted Cornbach's alpha reliability test by using SPSS version 21.00 and found **0.878**Cornbach's alpha and it is generally considered acceptable. According to Hair and others (1992) an alpha of 0.70 or greater is deemed acceptable.

Table 1 Reliability Test

Variables	**N**	**Cronbach's α coefficient**
Practices of occupational health, safety and environment management	28	0.956
Practices that comply with occupational health, safety and environment requirements on construction sites	6	0.893
Influencing factors to occupational health, safety and environment hazards	12	0.836
challenges to the implementation of health, safety and environment management on construction sites	6	0.750
OHSE legislation and regulation	6	0.900
Overall	**58**	**0.878**

3.7 Data Analysis and Presentation Methods

After the raw data were collected through online from the target population, it is organized and presented in different forms. Important numerical results are presented using tables and charts. Data that are used for qualitative analysis were presented in statement forms as part of the interpretation.

The data from the closed ended questions were coded and entered to SPSS version 21.00 so as to analyze and summarize the data descriptively and results presented in tables and charts as percentages and frequencies. The qualitative data's were gathered from general comments and interview and analyzed separately but presented in combination with the quantitative information. Generally the research methodology and design process is shown in (Fig. 3.1)

3.8 Ethical Consideration

The researcher addressed ethical considerations of confidentiality and privacy of all individual respondents. The researcher used a rigorous and conscious effort at all times to sustain this promise. Respondents participated on voluntary basis. Participants were well informed as to the purpose of the study and consented verbally. Measures were taken to ensure the respect, dignity and freedom of each individual participating and to assure confidentiality in the study. Moreover, participants were clearly informed that the information they provide would be kept confidential and would not be disclosed to anyone else including anyone in the company.

In addition, data, results, methods and procedures, and publication status were truthfully reported. No attempted used to fabricate, falsify, or misrepresent data in this study. It was tried to avoid careless errors and negligence; the research work was carefully and critically examined. Never plagiarize. It tried to honor patents, copyrights, and other forms of intellectual property. Not used unpublished data, methods, or results without permission and given proper acknowledgement or credit for all contributions to research.

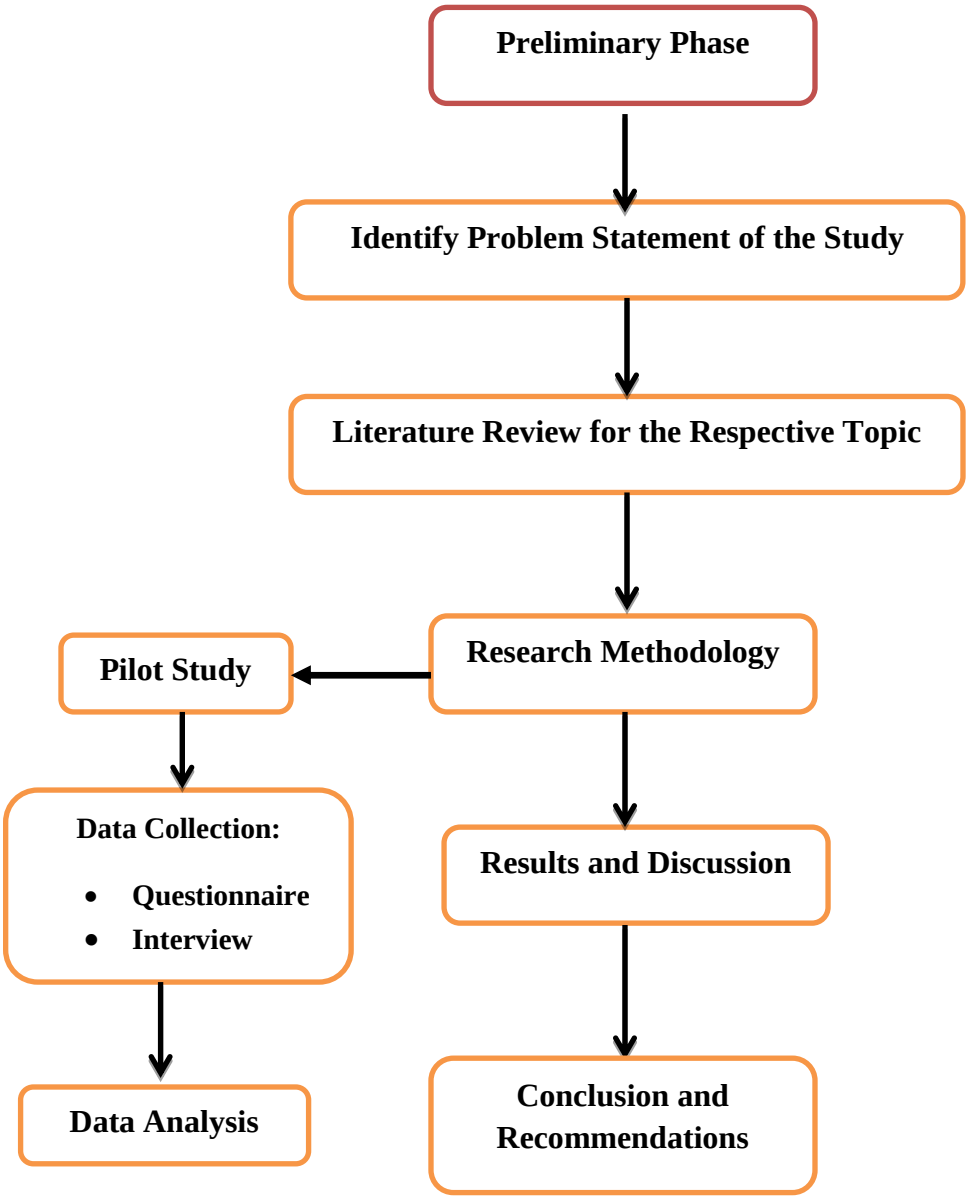

Figure 3.1 Research Methodology and Design Process

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter focuses on the data analysis and presentation ways based on the data collected through questionnaire and interview. First, the research response rate was computed and presented, secondly the information about organization type and position of respondents were presented, and finally the findings on four key objective areas of the study were presented and interpreted using frequency, mean and SD tables and bar graphs. The researcher therefore has described the results of quantitative research with the help of these frequency, mean & SD tables and bar graphs. The interpretations and discussions were presented on the basis of the findings and supported by related literatures and information from different documents. Broadly, the close-ended questionnaire grouped into 7 separate sections:

- Sec. 1 - Organization Type & Position of Respondent
- Sec. 2 - Occupational HSE Management System Issues
- Sec. 3 - Key practices that comply with Occupational HSE requirements on construction site
- Sec. 4 - Factors to Occupational HSE hazards on construction workplace
- Sec. 5 - Challenges to implementation of Occupational HSE programs on construction site
- Sec. 6 - Occupational HSE Legislation and Directives
- Sec. 7 - Covid-19 and Construction Workplace Safety

To enhance the research, qualitative research was followed and to acquire information in detail online interview was conducted. The researcher asked 12 questions from each interviewee. No particular scale was used in the questionnaire. The survey questionnaire and interview questions are given in appendix of this thesis report.

4.2 Response Rate

Among the total of 73 questionnaires distributed to professionals participated in CBE headquarter building construction project, 61 questionnaires were appropriately filled and returned which gives 83.56% return rate which is assumed to be suitable for further analysis.

4.3 Organization Type & Position of Respondent

The information about organization type and position of respondent was the first section of the questionnaire and consists of three questions. These include respondent's job title (position); organization type and type of the project they involved. The main purpose of the organization type and position of respondent analysis in this research is to describe the characteristics of the respondents so that the analysis could be more meaningful for readers.

Among the 61(100%) respondents, 23(37.70%) are from client/owner organization, 20(32.79%) are from contractor organizations, 17(27.87%) are from consultant organization and the rest 1(1.64%) are from others. This shows majority of the respondents are from client and contractor organizations and it is because much of the professionals participated in the project are them. Also 57(93.4%) of the respondents are involved in new projects, 3(4.9%) of respondents are involved in maintenance and only the rest 1(1.6%) of respondents are involved in others. This implies that most respondents are involved in new projects.

4.4 Occupational HSE Management System Issues Survey and Results

The survey results to the 28 questions regarding different activities in practicing occupational HSE management are summarized below. Occupational HSE policy, occupational HSE organizing/managing, occupational HSE planning and implementation, occupational HSE performance monitoring and measurement and occupational HSE performance review are included in this section.

4.4.1 Occupational HSE Policy

Measures for the prevention and control of occupational hazards in the workplace should be based upon a clear, implementable and well-defined policy at the level of the enterprise (Alli, 2008). This occupational safety and health policy represents the foundation from which

occupational HSE goals and objectives, performance measures and other system components are developed (Alli, 2008).

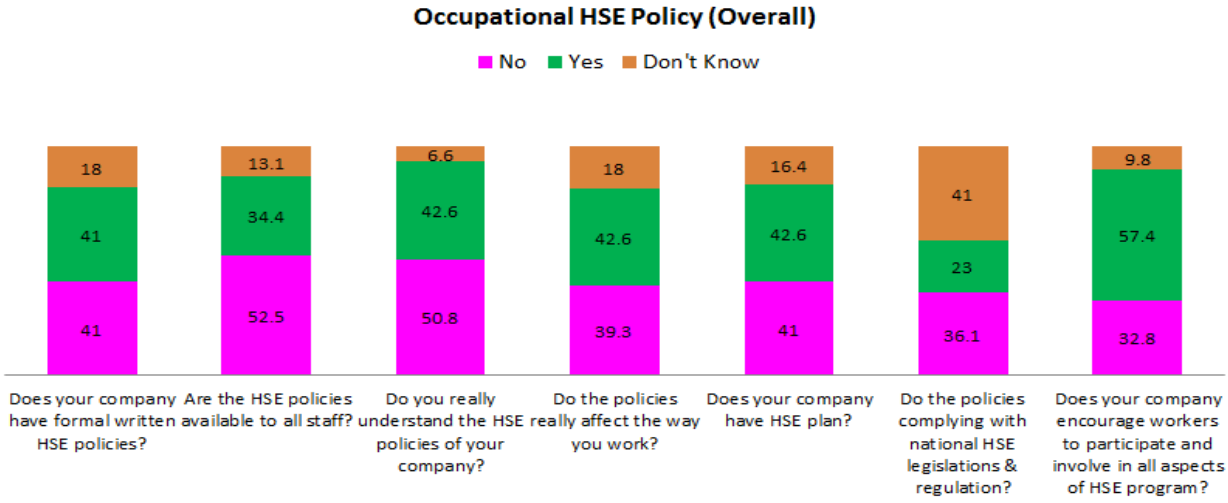

Figure 4.2 Occupational HSE Policies (Overall)

From the survey results and analysis regarding activities on occupational health, safety and environment policy, as shown on figure 4.2 and table 2, it can be understood that only the contractor organization has developed very well a formal written occupational HSE policies that were complying with national HSE legislations & regulation and these policies were made available to all staffs. It is also noted that these policies were really understood by almost all staffs of the contractor and they all have realized the benefits of these policies. Moreover, it is indicated that only the contractor organization has developed a detailed occupational HSE plan in their organization. Also it is noted that only the contractor organization was encouraging workers to participate and involve in all aspects of occupational HSE program.

Generally table 3 shows the mean and SD values regarding the responses on occupation HSE policy on the given project. The overall mean value of the client (0.609) and consultant (0.589) organizations indicated that these two project organizations have not well developed clear, implementable and well-defined occupational HSE policy. While the overall mean value regarding the response by contractor organization about occupational HSE policies, 1.071 indicated that contractor organization has well developed a clear, implementable and well-defined occupational HSE policy for the given project.

4.4.2 Occupational HSE Organizing/Managing

The policy sets the direction for health and safety within the enterprise and forms the written intentions of the principals or directors of the business (Hughes, P. &Ferrett, E., 2007). The organization needs to be clearly communicated and people need to know what they are responsible for in the day-to-day operations (Hughes, P. &Ferrett, E., 2007). Thus, like all management functions, any organization has to be committed in organizing and managing its occupational HSE within the organization. This section includes questions about the status in organizing and managing occupational HSE in the given construction project.

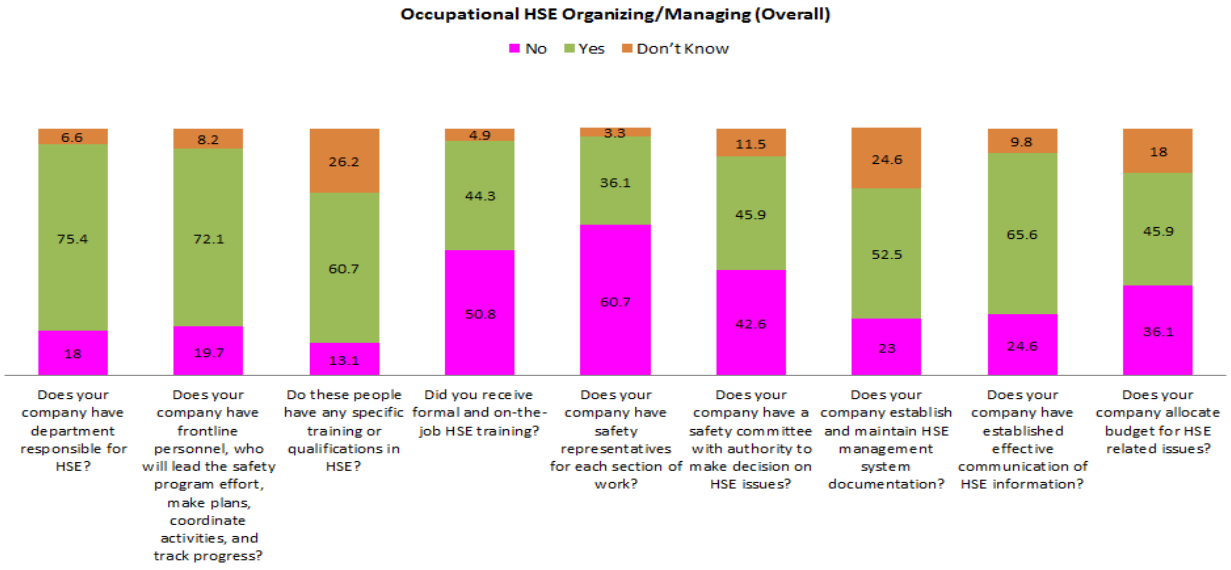

Figure 4.3 Occupational HSE organizing/managing (overall)

From the survey results and analysis for the questions regarding occupational HSE organizing/managing, as shown on figure 4.3 and table 2, it can be understood that only the consultant and contractor organizations had a department responsible for managing occupational HSE in their project and they both had frontline HSE personnel, who will lead the safety program effort, make plans, coordinate activities, and track progress in their project. It is also indicated that frontline HSE personnel from the consultant and contractor organizations had specific training or qualifications in HSE. Regarding formal and on-the-job HSE training for employees in the project, most of the respondents from the contractor organization took formal and on-the-job HSE training while only half of respondents from the consultant organization took the training. It is also noted that only the consultant and contractor organizations have

established and maintained occupational HSE management system documentation as well as effective communication of HSE information in their project. However, it is surprised that only the contractor organization had a safety committee with authority to make decision on HSE issues and had allocated the required budget for HSE related issues.

Generally table 3 shows the mean and SD values regarding the responses on occupation HSE organizing/managing on the given project. The overall mean value of the client (0.652) and consultant (0.771) organizations indicated that they have not well committed in organizing and managing their occupationalHSE within the project even though the consultant organization is better than the client organization. As indicated from the overall mean value regarding the response of the contractor organization which is 0.994 and close to 1, the contractor organization has well committed in organizing and managing its occupational HSE within the project.

4.4.3 Occupational HSE Planning and Implementation

Planning is vital for the implementation of occupational HSE policies. Adequate control of risks can only be achieved through coordinated action by all members of the organization. An effective planning system for health, safety and environment requires organizations to establish and operate anHSE management system which controls risks, reacts to changing demands and sustains a positive health and safety culture. If workplace precautions, risk control systems and management arrangements are well designed and recognize existing business practice and human capabilities and fallibilities, they will be easier to implement (HSG65, 2008).

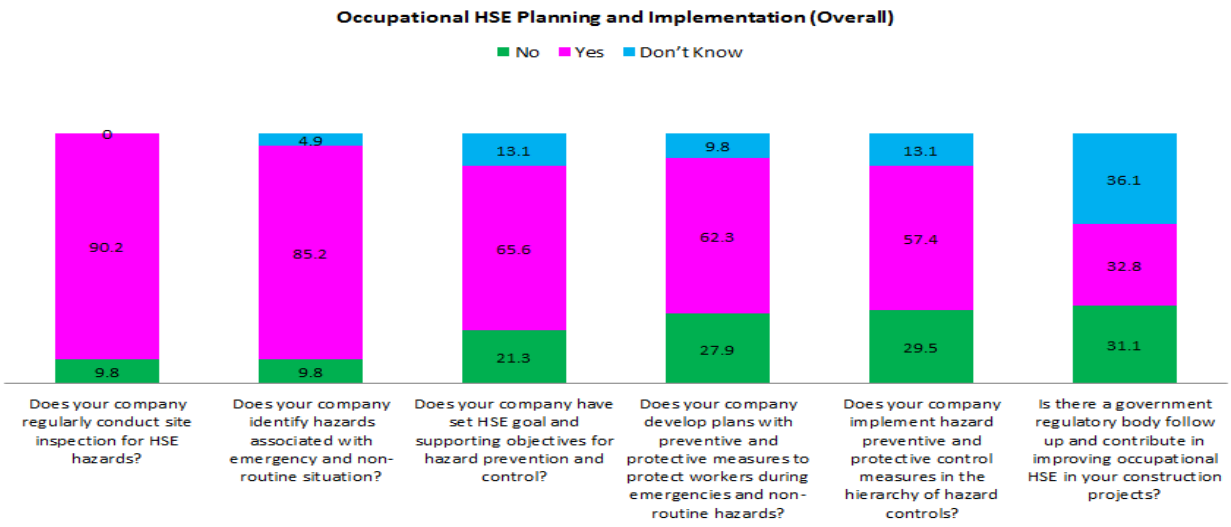

Figure 4.4 Occupational HSE planning and implementation (overall)

From the survey results and anlysis regarding occupational HSE planning and implementation, as shown on figure 4.4 and table 2, it can be understood that eventhough all the three organizations had regularly conducted site inspection for HSE hazards in the project, only the consultant and contractor organizations were fully committed to identify HSE hazards associated with emergency and non-routine situation in their project and they have both set HSE goal and supporting objectives for HSE hazard prevention and control in their project. Also it is indicated that only consultant and contractor organizations have developed plans with preventive and protective measures to protect workers during emergencies and non-routine hazards in their project and they have both implemented hazard preventive and protective control measures in the hierarchy of hazard controls in their project. However, it is noted that none of the three organizations have responded that there were government regulatory body follow up and contribution in improving occupational HSE.

Generally table 3 shows the mean and SD values regarding the responses on occupation HSE planning and implementation activities on the given project. The overall mean value of the client (0.762) organization indicated that it has not well developedan effective occupational HSE planning and implementation system within the project. As indicated from the overall mean valuesby the consultant (0.923) and contractor (1.067) organizations, as the values are close to 1, they have well developed an effective occupational HSE planning and implementation system within the project.

4.4.4 Occupational HSE Performance Monitoring & Measurement

Occupational HSE performance monitoring & measurement is vital to maintain and improve health, safety and environment performance. There are two ways to generate information on performance: active systems which monitor the achievement of plans and the extent of compliance with standards and reactive systems which monitor accidents, ill health and incidents (HSG65, 2008).

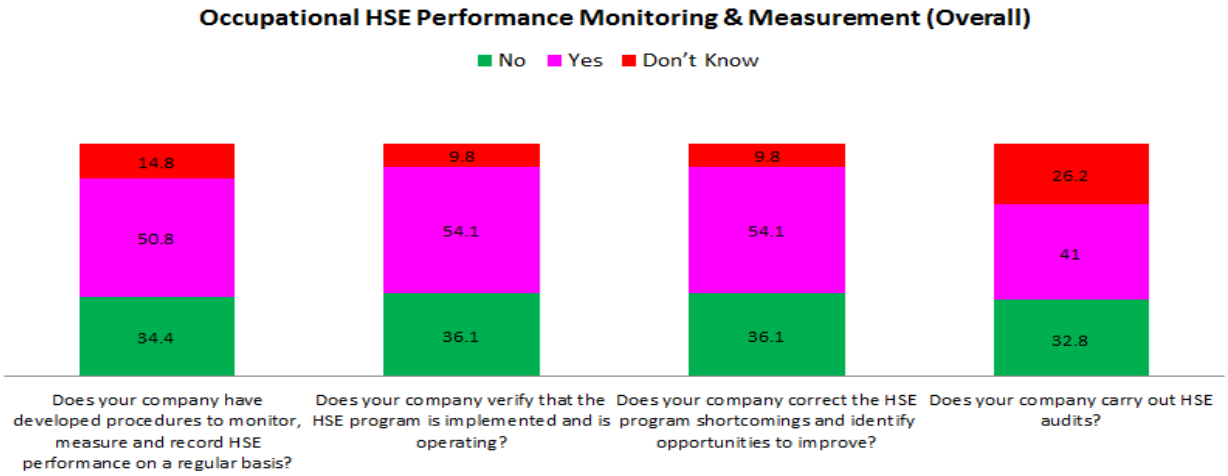

Figure 4.5 Occupational HSE performance monitoring & measurement (overall)

From the survey results and analysis regarding occupational HSE performance monitoring & measurement, as shown on figure 4.5 and table 2, it is found that even though both the consultant and contractor organizations have developed procedures to monitor, measure and record occupational HSE performance on a regular basis; have verified that the HSE program is implemented and is working and have corrected the HSE program shortcomings and identified opportunities to improve in their project, it is indicated that only the contractor organization has carried out HSE audits in the project.

Generally table 3 shows the mean and SD values regarding the responses on occupationalHSE performance monitoring & measurement activities on the given project. As indicated from the overall mean values regarding the responses on occupationalHSEperformance monitoring & measurement activities by the consultant (0.883) and contractor (1.075) organizations, as the values close to 1, they have well performed the necessary occupationalHSE performance

monitoring & measurement activities to maintain and improve health and safety performance within the project.

4.4.5 Occupational HSE Performance Review

Organizations can maintain and improve their ability to manage occupation HSE risks by learning from experience through the use of occupationalHSE performance reviews (HSG65, 2008).

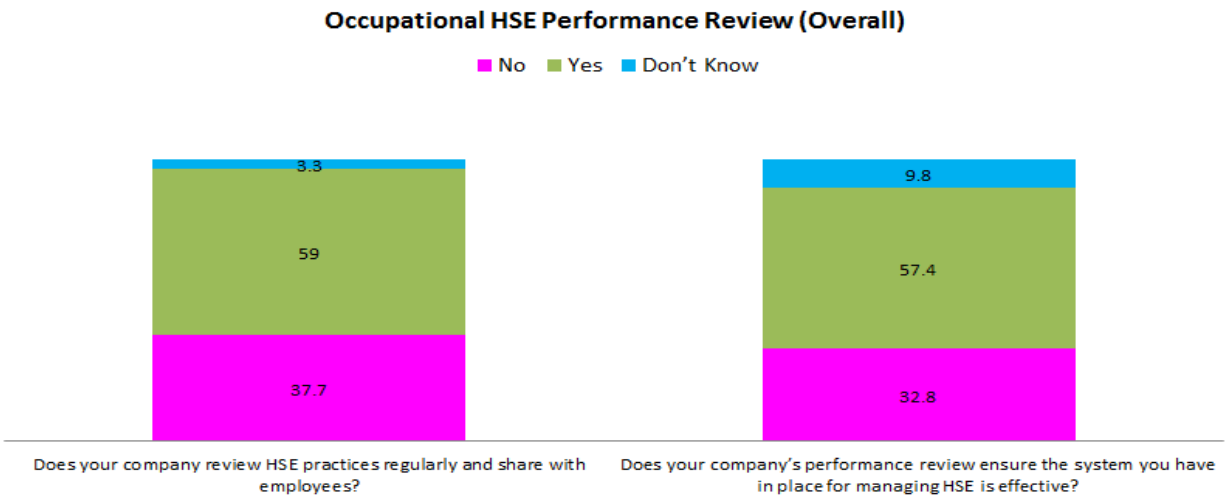

Figure 4.6 Occupational HSE performance review (overall)

From the survey results and analysis regarding occupational HSE performance review, as shown on figure 4.6 and table 2, it is found that only the contractor organizations have well reviewed HSE practices regularly and share with employees in their project. And it is also indicated that only the contractor organizations' performance review ensured that the system they had in place for managing HSE is effective in their project.

Generally table 3 shows the mean and SD values regarding the responses on occupationalHSEperformancereviewactivities on the given project. As indicated from the overall mean values regarding the responses on occupationalHSE performance review activities by the consultant (0.765) and contractor (0.925) organizations, as the values are close to 1, they have better performed occupational HSE performance reviewactivitieswithin the project. Moreover, it is indicated that the contractor organization was better than the consultant organization in performing occupationalHSE performance review activities within the project.As per the

interview conducted, it was indicated that the current occupational HSE management status in the client & consultant organizations is not more than unsystematic site inspection and have not yet implemented HSE management in the given project. However the contractor organization has practiced proper occupational HSE management.

4.5 Key practices that comply with occupational HSE requirements on the construction site

The survey results to the 6 questions regarding key practices that comply with occupationalHSE requirements are summarized in figure 4.7 and table 4. Provision of required personal protective equipment (PPE), provision of first-aid kits with sufficient elements in it, provision of health and safety warning signs, provision of walling for danger zones, provision of proper construction waste disposal system and provision of fire prevention and firefighting procedures are included in this section as key practices that comply with occupationalHSE requirements on the construction site.

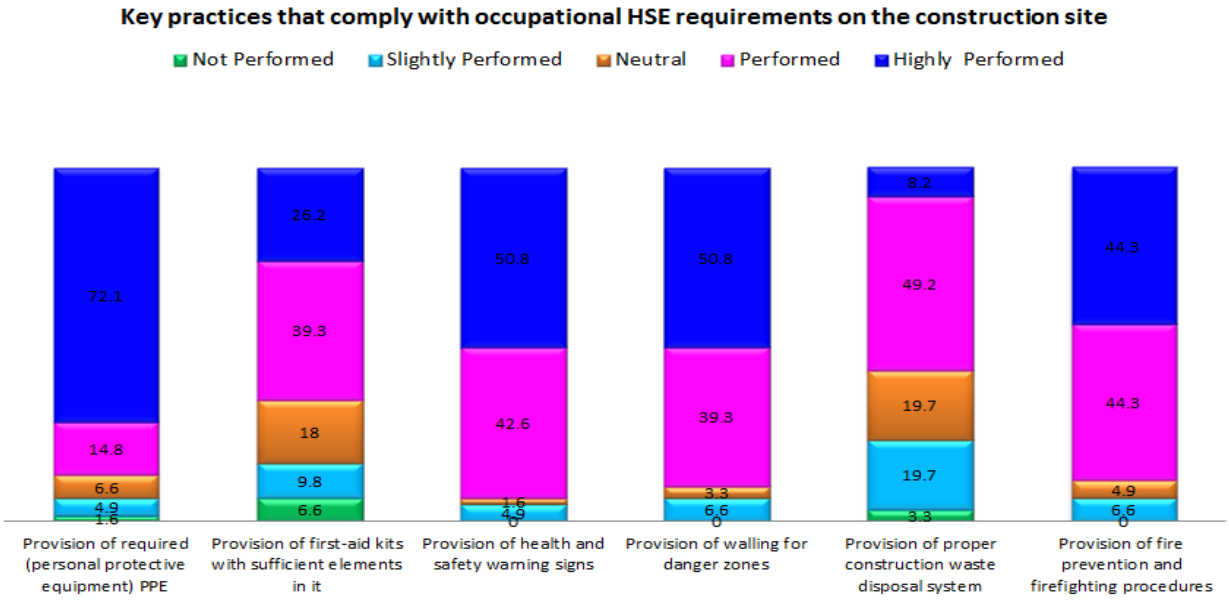

Figure 4.7 Key practices that comply with occupational HSE requirements on the construction site

From the responses as shown in table 4 and figure 4.7, it can be understood that in the project workplace the provision and practice of personal protective equipment, the provision and availability of health and safety warning signs, the provision and availability of walling or

protection for danger zones and the provision and availability of fire prevention and firefighting procedures are highly performed. Also as can be seen from their response, the provision and availability of first-aid kits with sufficient elements in it and the provision and practice of proper construction waste disposal system are well performed in their project workplace.

In summery table 7, regarding the responses on key practices that comply with occupational HSE requirements, shows that the mean values of four out of six key practices are greater than 4.0. This means that these are the four practices performed and highly performed in the given project. Provision of required personal protective equipment (PPE); provision of health and safety warning signs; provision of walling for danger zones; and provision of fire prevention and firefighting procedures are the four major practices that comply with occupational HSE requirements mostly performed within the project.

4.6 Factors to Occupational HSE Hazards

The survey results to the 12 questions about HSE hazard factors are summarized in figure 4.8 and table 5 below. Thequestionnaires consists of twelve key HSE hazard factors on the construction site and asks the respondents to indicate the level of contribution of these hazard factors on their construction site.

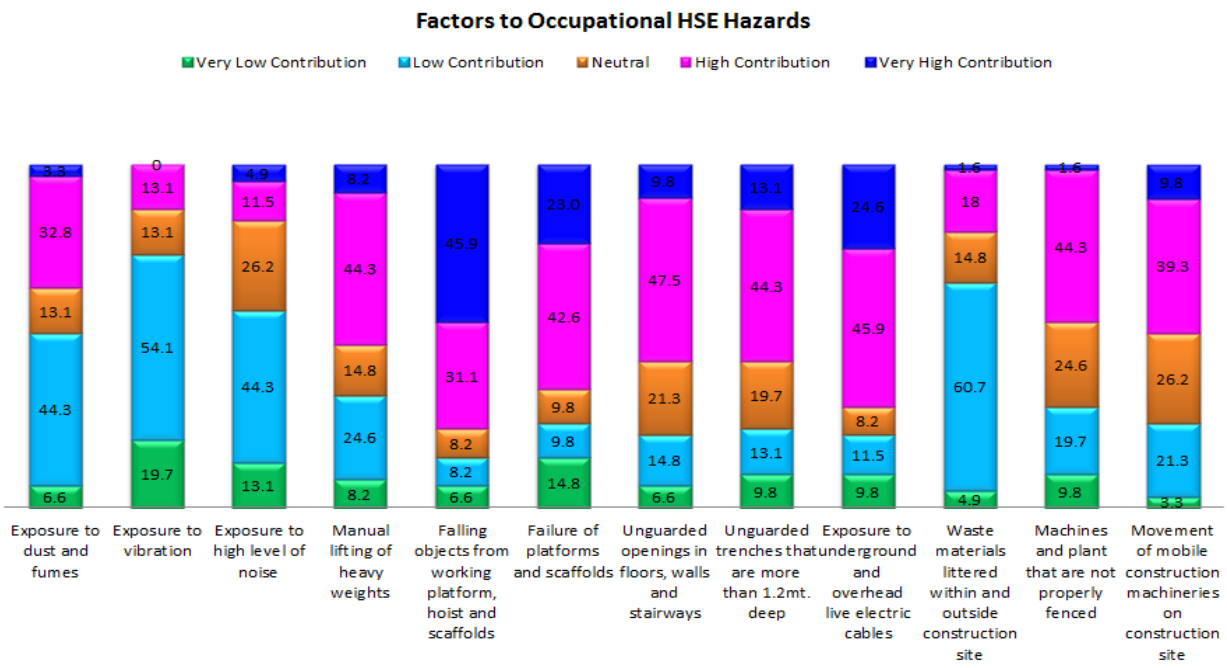

Figure 4.8 Factors to occupational HSE hazards

From the responses as shown in the table 5 and figure 4.8, it can be understood that falling objects from working platform, hoist and scaffolds is highly contributing to occupational HSE hazards in the construction project. While exposure to high level of noise, waste materials littered within and outside construction site and exposure to vibration are the least contributing factors to occupational HSE hazards in the construction project.

In summery table 7 shows that the mean values of one factor among the twelve contributing factors to occupation HSE hazard are greater than 4.0. Falling objects from working platform, hoist and scaffolds is one of the most contributing factors to occupation HSE hazards in the given construction project. Exposure to vibration; waste materials littered within and outside construction site; exposure to high level of noise; and exposure to dust and fumes are the four contributing factors with mean values less than 3.0 and have less contribution to occupational HSE hazards in the project. According to the interview, it was also observed that among the major factors to occupational HSE hazards falling objects from height, unguarded danger zones and live electric cables are found the most mentioned factors.

4.7 Challenges to the implementation of HSE programs on construction sites

The survey results to the 6 questions about challenges to the implementation of HSE programs are summarized in figure 4.9 & table 6 below. Lack of top management commitment, high cost of implementation, lack of legal enforcement procedures, lack of awareness and negligence, lack of coordination with government, and none inclusiveness of policies and regulationsareincluded in this section as key challenges to the implementation of HSE programs on construction sites. The questionnaire asks the respondents which of these key challenges is the most influential in their construction sites.

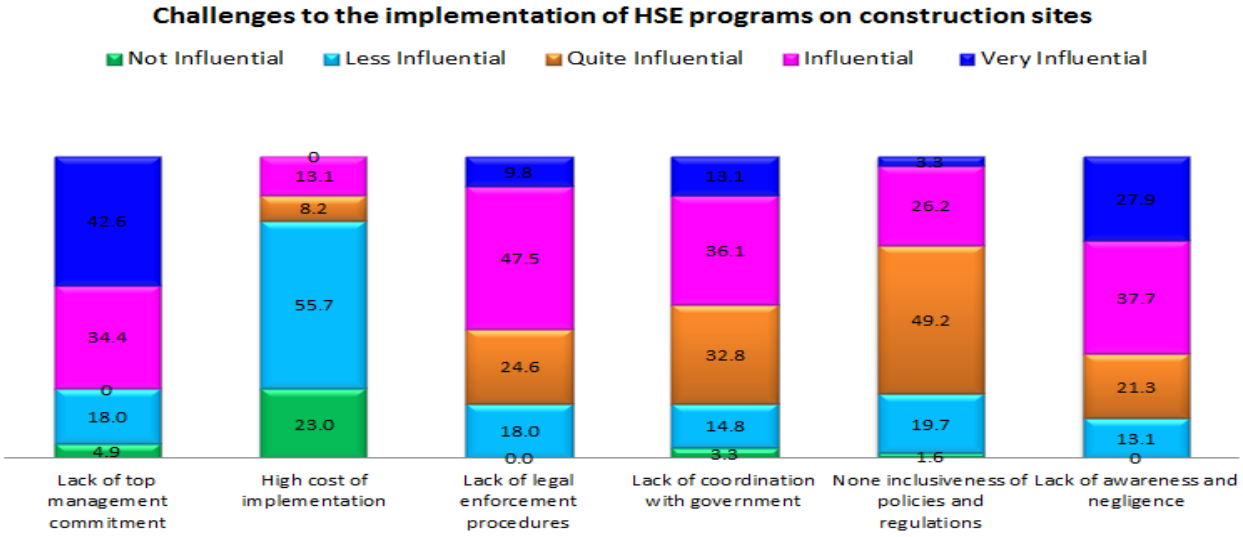

Figure 4.9 Challenges to the implementation of HSE programs on construction sites

From the responses as shown in the figure 4.9 and table 6, it can be seen that lack of top management commitment is the highest influential while high cost of implementation is least influential to the implementation of occupational HSE management program in the given construction project of CBE headquarter building.

In general table 7 shows the mean values regarding the influencing challenges to the implementation of occupational HSE programs on the construction sites. The mean values of the five out of six key influencing challenges to the implementation of occupational HSE programs are greater than 3.0. This means that these are the five major challenges influencing the implementation of occupational HSE programs in the given project. Out of which lack of top management commitment is the most influential challenge to the implementation of occupational

HSE programs in the project. It is also indicated that high cost of implementation is found to be the least influencing challenges to the implementation of occupational HSE programs in the project. According to the interview, it was also observed that lacking commitment in occupational HSE management issues by especially top management and lacking awareness about the importance of workplace HSE by most workers are found to be the major challenges to the implementation of HSE programs in the project.

4.8 OHSE Legislation and Regulation

Appropriate legislation and regulations, together with adequate means of enforcement, are key policy instruments for the protection of workers. They form a basis for efforts to improve working conditions and the working environment (Alli, 2008).

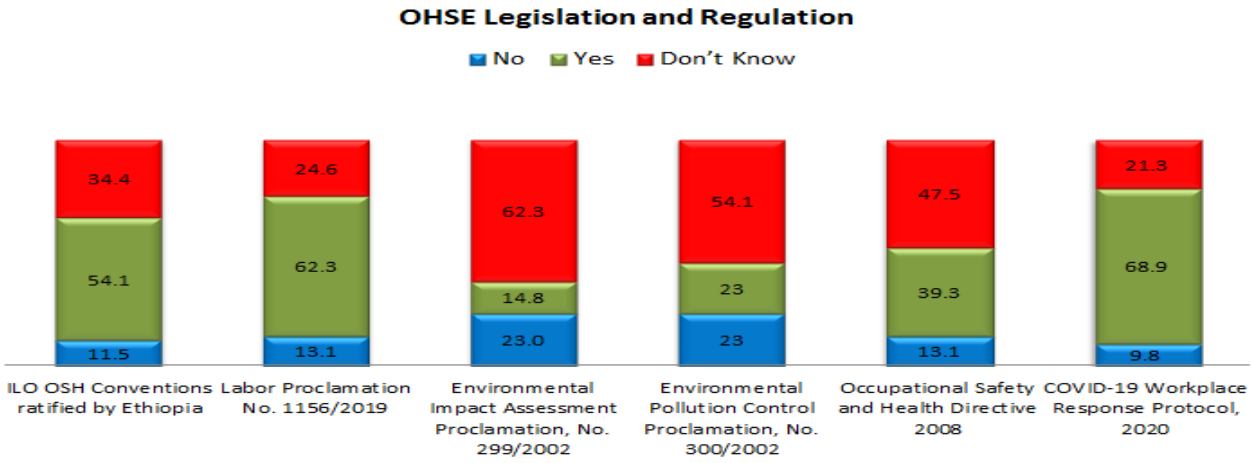

Figure 4.10 Occupational HSE legislation and regulation

From the survey data collected regarding occupational HSE legislation and regulation in Ethiopia, as illustrated in the figure 4.10 and table 8, most respondents indicated that they were aware of that only Labor Proclamation No. 1156/2019 and COVID-19 Workplace Response Protocol, 2020 affected their company.

It could be summarized from survey data, indicated on table 4.10, that two out of the six key occupational HSE legislation and regulations have been known to positively affect most the occupational HSE of the project. Labor Proclamation No. 1156/2019 and COVID-19 Workplace Response Protocol, 2020 are the two OHSE legislation and regulations that scored mean values close to 1.0.

4.9 COVID - 19 and Workplace Health and Safety

The survey results to the 8 questions regarding safety precaution measures to create a covid-19 safer working environment at the project are summarized in figure 4.11& table 9below. It is the last section of the questionnaire and consists of eight key preventive measures to create a covid-19 safer working environment for the workers in the construction site. The questionnaire asks the respondent that how does their company, with respect to these preventive measures, creates a covid-19 safer working environment for the workers.

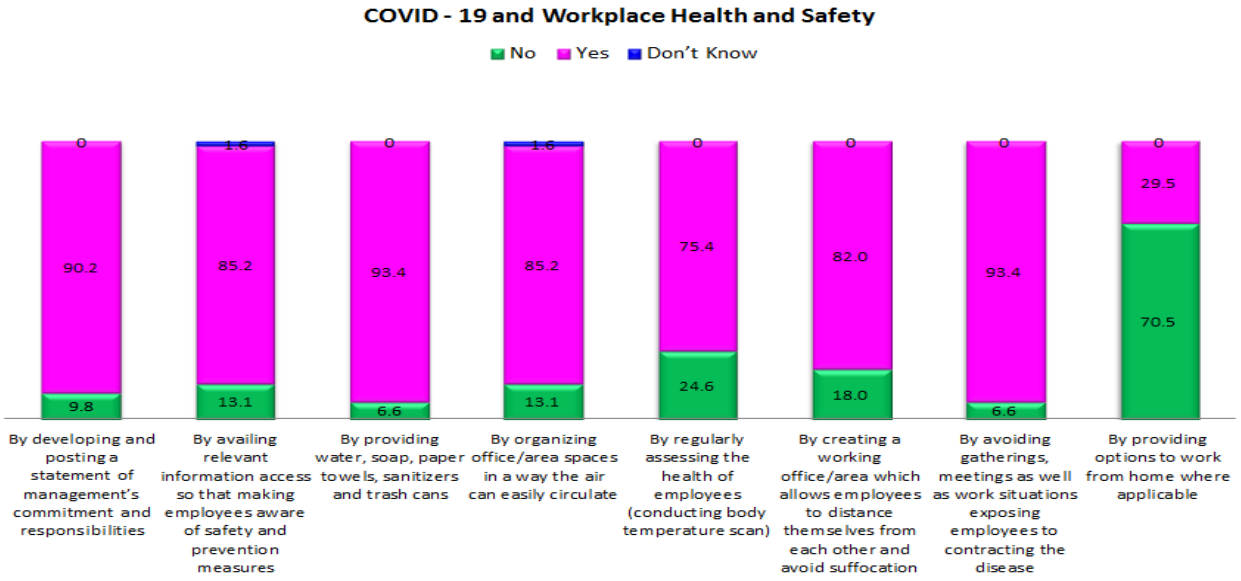

Figure 4.11 COVID-19 & workplace health and safety precautions

From the survey data collected regarding safety precaution measures to create a covid-19 safer working environment at the project, as illustrated in the figure 4.11 and table 9, most of the listed preventive measures to create a covid-19 safer working environment for the workers in the construction site except the one which is providing options to work from home where applicable have been well practiced in the project workplace.

In general table 4.10 depicts that three out of the eight key COVID-19 & workplace health and safety precautions were most performed to create a covid-19 safer working environment for the workers in the construction site. Among the eight precautions, providing options to work from home where applicable was the least performed COVID-19 & workplace health and safety precaution that scored mean values close to 0.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter is the final part of the study. First, important findings are summarized from the previous chapter. Then, based on the summary of findings conclusions are inferred. Finally, recommendations have been provided as per the findings of the study to improve occupational health, safety and environment management practices of the new headquarter building construction project at commercial bank of Ethiopia and similar projects in the construction industry.

5.2. Summary of Key Findings

From the survey, the following major findings have been outlined. This has been done according to the objectives of the study. The general objective of the study was to assess the current practices of occupational health, safety and environment management on the new headquarter building construction project of Commercial Bank of Ethiopia with a view to identify key challenges and problems in implementing and practicing an effective management of occupational health, safety and environment.

It can be summarized that although it is the main actor of the project, the client/owner organization has failed to commit in implementing and practicing occupational health, safety and environment management for the given project. Top managements leadership commitment of the client was poor in health, safety and environment issues. Even the client project office did not have any department responsible for organizing, planning, implementing, evaluating and reviewing occupational health, safety and environment of the given project. In the case of the consultant organization, even though it has a safety and environment department with a single frontline safety inspector officer and practicing some activities of health, safety and environment planning, implementation and performance evaluations, the consultant organization has also failed to commit in properly implementing and practicing occupational health, safety and environment management at this project. Generally it can be said that only the contractor

organization has definitely implemented and practiced the management of occupational health, safety and environment at the given project.

According to the data collected from all respondents, it is found that among the listed health, safety and environmentpractices that comply with occupationalhealth, safety and environment requirements on construction site, provision of required personal protective equipment (PPE), provision of health and safety warning signs, provision of walling for danger zones and provision of fire prevention and firefighting procedures are the required practices which are highly performed in the given construction project. Generally health, safety and environment practices that comply with occupationalhealth, safety and environment requirements on construction sites have been done well in the project workplace.

Falling objects from working platform, hoist and scaffolds were found to be the most contributing factor to occupationalhealth, safety and environment hazards in the given project according to the data collected from respondents. Exposure to dust and fumes; exposure to vibration and high level of noise; and construction waste materials littered within and outside construction site were the only contributing factors which had low contribution to occupationalhealth, safety and environment hazards in the project workplace.

Lack of top management commitment was found to be very influential and challengingin the implementation of occupationalhealth, safety and environment management programs in this project, according to the data collected from respondents. Next to lack of top management commitment, lack of legal enforcement procedures, lack of coordination with government and lack of awareness and negligence were found to be influential and challenging to the implementation of occupationalhealth, safety and environmentmanagement programs in the project. Among the listed six challenges to the implementation of occupationalhealth, safety and environment management programs, high cost of implementation was found to be less influential.

From the data collected related to occupationalhealth, safety and environmentlegislation and regulation that affect the project's safety and environment, it is found that ILO OSH conventions ratified by Ethiopia, Labor Proclamation No. 1156/2019 and COVID-19 workplace response protocol, 2020 were the three health, safety and environment legislation and regulations that

most of the respondents aware of that affected their company. According to the responses about the remaining three occupational legislation and regulations: Occupational Safety and Health Directive, 2008, Environmental Impact Assessment Proclamation, No. 299/2002 and Environmental Pollution Control Proclamation, No. 300/2002, most of the respondents don't know whether they aware of that these legislation and regulations affected their company or not. Hence it can be indicated that there was awareness gap in required health, safety and environment legislations and regulations in the project.

It is evident that today COVID-19 pandemic has transformed the way we work. Thus regarding the data collected from respondents about the way how their company created a covid-19 safer working environment for the workers, it is found that most of the respondents have indicated positive responses for all the given and listed health and safety precautions for COVID-19 disease in the project workplace except the last onewhich is providing options to work from home where applicable. The organizations of this project didn't provide options for their workers to work from home where applicable, as indicated by most of the respondents.

5.3. Conclusions

The study sought to assessthe current occupationalhealth, safety and environment management practices atthe new headquarter building construction project of commercial bank of Ethiopiaand then propose best practices of occupational health, safety and environment management. The findings of this study confirmed that the current occupationalhealth, safety and environment management practices of the project office in the client and consultant organization are poor. Occupationalhealth, safety and environment management programs are well practiced by the contractor organization in the given project. It is also found that provision and utilization of personal protective equipment (PPE) was a key practice that complies with occupationalhealth, safety and environment requirement which was highly performed in the project workplace.

At this challenging time of COVID-19 pandemic for the construction workforce, it is found that despite some challenges that some of the construction workers contracted the disease, the project has done great jobs in creating a COVID -19 safer working environment for the workers by providing necessary precaution measures for the diseases except in providing options to work from home where applicable.

From the study, it is concluded that lack of top management commitment to occupationalhealth, safety and environment management and lack of awareness and negligence about workplace health, safety and environment management are the major challenges to the implementation of occupationalhealth, safety and environment management system in the given project. It is also found that among the factors to occupationalhealth, safety and environment hazards in the given construction project, falling objects from working platforms, hoists and scaffolds, failure of platforms & scaffolds and exposure to underground and overhead live electric cables hadhuge contribution to occupationalhealth, safety and environment hazards.

5.4. Recommendations

The client and consultant organizations, taking in to consideration its organizational context and the needs of workers and other stakeholders, should establish occupationalhealth, safety and environment management system in which the general scope of occupationalhealth, safety and environment management for the construction project is clearly defined.

Organizational health, safety and environment policy is a major driver for better safety performance in construction projects. Thus leadership, especially top management, should accept responsibility for occupationalhealth, safety and environment by establishing a formal written occupationalhealth, safety and environment policy for their project organization. The client organization should also establish department responsible for occupationalhealth, safety and environment and assign responsibility and authority for occupationalhealth, safety and environment. Besides to these both the client and consultant organizations should develop a detailed written health, safety and environment programs for achieving better safety performance in the project.Using formal and on-the-job trainings, the client organization should raise awareness of occupationalhealth, safety and environment duties in the construction project and verify competency of occupationalhealth, safety and environment personnel. The organization should also encourage workers participation and involvement in all aspects of health, safety and environment program in the project. By studying and identifying occupational hazards, risks and opportunities of the construction project, the client organization should formulate required occupationalhealth, safety and environment objectives and develop plans to achieve them.The client organization should also provide necessary resources for managing occupationalhealth, safety and environment like budget for occupationalhealth, safety and environment related

issues. Moreover, the organization should established effective communication of occupationalhealth, safety and environment information and should maintain occupationalhealth, safety and environment management system documentation.

After implementing the required occupationalhealth, safety and environment management system in the project, the client and consultant organizations should monitor, measure, analyze and record occupationalhealth, safety and environment management performance on a regular basis and thus verify that the implemented occupationalhealth, safety and environment management system is working. The organizations should also review occupationalhealth, safety and environment management practices regularly and share with employees and should also conduct periodic occupationalhealth, safety and environmentinternal audit in the project.

Thus, based on the results from the interviews and questionnaires, the required occupational health, safety and environment management framework consisting of five key elements as shown in Figure 5.1 above is suggested for the project office of Commercial Bank of Ethiopia. These key elements of applicability are:

HSE Leadership: Critical to the success of effective occupational health, safety and environment management is leadership and commitment from top management. The expectation on leaders within the organization is to become champions of the health, safety and environment management system and provide the necessary resources to protect employees from occupational hazards. Thus top managements of Commercial Bank of Ethiopia have to be committed in establishing a clear, defined and implementable health, safety and environment policy, strategies, objectives and plans to achieve them. The organization should also ensure a clear health, safety and environment roles, responsibilities and authorities as well as employee's consultation and participation.

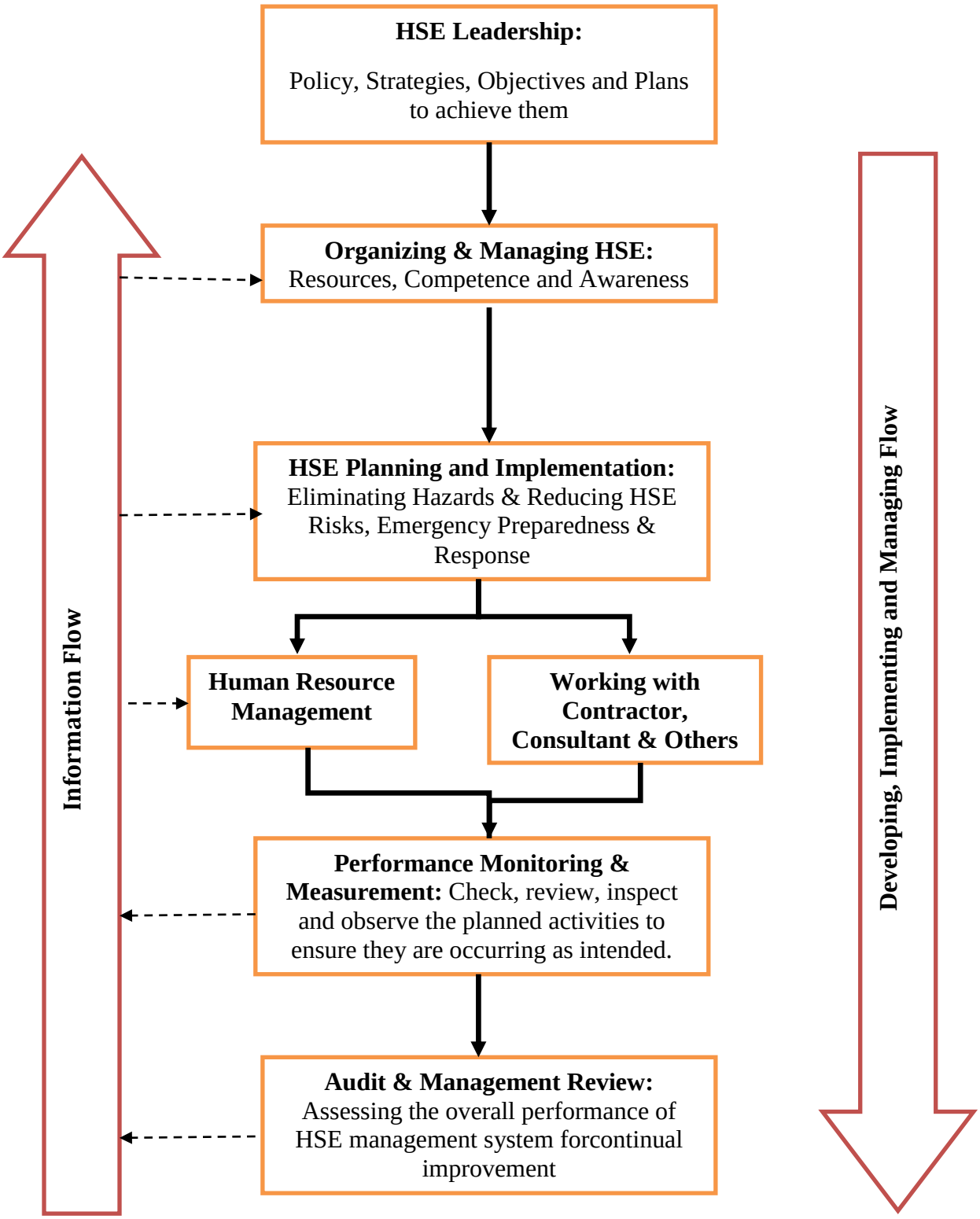

Figure 4.12 Framework for the proposed best practice guide to occupational HSE management

Organizing and Managing HSE: For effective management of occupational health, safety and environment, it is required to have full support of resources from the organization top management. Resources will be required to fulfill the requirements identified during the planning stages of occupational HSE management to maintain continuous improvement. Also the organizations to effectively and efficiently working, they must have competent employees. Competence can include consideration for:

- Capability to fulfill the task based on defined job roles and clear understanding of the required occupational health, safety and environment aspects
- Awareness of hazards associated with the environment and construction work processes
- Legal requirements
- Individual capabilities including experience, language skills, literacy and diversity

Awareness of the requirements of the occupational HSE management is critical to both internal and external employees of the organizations. There must be a clear understanding of the organization's HSE Policy including the requirement for individuals to protect themselves and others from exposure to hazards. More over the organizations have to establish and maintain HSE management documentation and an effective communication of HSE information.

Planning and Implementation: Once leadership is committed by setting HSE policy, strategies and objectives and also the required HSE organizing processes within the organization have been defined, the CBE project office organization needs to plan and control each HSE management process within the management of occupational health, safety and environment. Planning for unexpected events is also vital for any organizational discipline. Thus within the management of health, safety and environment of the CBE project office organization, it is necessary to put control measures in place to mitigate for these potential unexpected events.

Performance monitoring and measurement: Performance evaluation is a constructive process that aims to improve an organization's health, safety and environment operation. This process should help achieve and support organizational health, safety and environment strategy and goals. Thus, the CBE project organization should check, review, inspect and observe its planned health, safety and environment management activities to ensure they are occurring as intended. Monitoring generally indicates processes that can check whether something is occurring as intended or planned.

Audit and Management Review: An HSE audit is a systematic method to check organizational processes and requirements of health, safety and environment within an organization or project, as well as those detailed in the national and international HSE standard. This will ensure the processes in place are effective and the procedures are being adhered to. The internal HSE audit program within CBE project organization will aid the organization to achieve its occupational health, safety and environment objectives and targets. Management Review is also an essential element of an effective occupational health and safety and environment management system. The CBE as an organization should conduct HSE management review ether semiannually or annually. The aim of the management review is for CBE top management to assess the performance of the management system to ensure it has been effective and suitable for the needs of the organization, ultimately preventing injury or harm to employees.

5.5.Future Research Direction

In this study it is attempted to assess the current practices of occupational health, safety and environment management on the new headquarter building construction project of Commercial Bank of Ethiopia with a view to identify key challenges and problems in implementation and practicing. However, this study never touch every aspect of the given construction project and some of the following areas in occupational HSE aspect are indicated as if additional studies were conducted they could come up with better understanding on the issue. These are

- Assessing the project owner/client commitment in implementing and practicing occupational health, safety and environment management on construction projects in Ethiopia
- The impact of top management leadership in implementation of occupational health safety and environment management in local contractor construction projects
- The difference in occupational health safety and environment management practice between local and foreign contactor working in local projects

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APPENDIX

APPENDIX A

Cover Letter

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

Department of Project Management

Dear Sir/Madam

I am doing my thesis in Addis Ababa University School of Commerce Department of Project management for the fulfillment of MBA degree on the tile "Assessing the Practice and Challenges of Occupational Health, Safety and Environment (HSE) Management on Building Construction Projects at CBE: The Case of New Headquarter Building Construction Project".

The objective of the study is to assess occupational health, safety and environment management practices and challenges at the new head quarter building construction project of Commercial Bank of Ethiopia. I hope you will take a few minutes to complete this questionnaire online which I have e-mailed over to you. If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me on +251912217764 or at mekonnen2016seid@gmail.com

I look forward to your prompt response.

MekonnenSeid

APPENDIX B

Main Questionnaire

SECTION 1 - Organization Type & Position of Respondent

1. Please specify what most represents your organization

   Client/Owner [ ] Contractor [ ] Consultant [ ] Others [ ]

2. Which project/s does your company involved in?

   New Project [ ] Maintenance [ ] Others [ ]

3. What is your job title (position) in the company? _____

SECTION 2 - OHSE Management Practices

1. Occupational HSE Policies	Yes	No	Don't Know
Does your company have formal written HSE policies?			
Are the HSE policies available to all staff?			
Do you really understand the HSE policies of your company?			
Do the policies really affect the way you work?			
Do the policies complying with national HSE legislations & regulation?			
Does your company have occupational HSE plan?			
Does your company encourage workers to participate and involve in all aspects of HSE program?			
2. Occupational HSE Organizing/Managing	**Yes**	**No**	**Don't Know**
Does your company have department responsible for HSE?			
Does your company have frontline personnel, who will lead the safety program effort, make plans, coordinate activities, and track progress?			
Do these people have any specific training or qualifications in HSE?			
Did you receive formal and on-the-job HSE training?			
Does your company have safety representatives for each section of work?			
Does your company have a safety committee with authority to make decision on HSE issues?			
Does your company establish and maintain HSE management system documentation?			
Does your company have established effective communication of HSE information?			
Does your company allocate budget for HSE related issues?			
3. Occupational HSE Planning and Implementation	**Yes**	**No**	**Don't Know**
Does your company regularly conduct site inspection for HSE hazards?			
Does your company identify hazards associated with emergency and non-			

routine situation?			
Does your company have set HSE goal and supporting objectives for hazard prevention and control?			
Does your company develop plans with preventive and protective measures to protect workers during emergencies and non-routine hazards?			
Does your company implement hazard preventive and protective control measures in the hierarchy of hazard controls?			
Is there a government regulatory body follow up and contribute in improving occupational HSE in your construction projects?			
4. Occupational HSE Performance Monitoring and Measurement	**Yes**	**No**	**Don't Know**
Does your company have developed procedures to monitor, measure and record occupational HSE performance on a regular basis?			
Does your company verify that the HSE program is implemented and is operating?			
Does your company correct the HSE program shortcomings and identify opportunities to improve?			
Does your company carry out HSE audits?			
5. Occupational HSE Performance Review	**Yes**	**No**	**Don't Know**
Does your company review HSE practices regularly and share with employees?			
Does your company's performance review ensure the system you have in place for managing HSE is effective?			

SECTION 3 - Practices that comply with occupational HSE requirements on construction sites

Which of these practices are performed most on your company?	**Not performed**	**Slightly performed**	**Neutral**	**Performed**	**Highly performed**
Provision of required personal protective equipment					
Provision of first-aid kits with sufficient elements in it					

Provision of health and safety warning signs					
Provision of walling for danger zones					
Provision of proper construction waste disposal system					
Provision of fire prevention and firefighting procedures					

SECTION 4 - Factors to Occupational HSE Hazards

Indicate the level of contribution of the following factors to HSE hazards on your construction sites	**Very low contribution**	**Low contribution**	**Neutral**	**High contribution**	**Very high contribution**
Exposure to dust and fumes					
Exposure to vibration					
Exposure to high level of noise					
Manual lifting of heavy weights					
Falling objects from working platform, hoist and scaffolds					
Failure of platforms and scaffolds					
Unguarded openings in floors, walls and stairways					
Unguarded trenches that are more than 1.2mt. deep					
Exposure to underground and overhead live cables					
Waste materials littered within &outside project site					
Machines and plant that are not					

properly fenced					
Movement of mobile construction machineries on construction site.					

SECTION 5 - Below are challenges to the implementation of HSE programs on construction sites

Which challenges are the most influential in your company?	**Not influential**	**Less influential**	**Quite influential**	**Influential**	**Very Influential**
Lack of awareness and negligence					
Lack of top management commitment					
High cost of implementation					
Lack of legal enforcement procedures					
Lack of coordination with government					
None inclusiveness of policies and regulations					

SECTION 6 - OHSE Legislation and Regulation

Do the following health, safety and environment legislations are you aware of that affect your company?	**Yes**	**No.**	**Don't Know**
Labor Proclamation No. 1156/2019			
Occupational Safety and Health Directive 2008			
International Labor Organization (ILO) OSH Conventions ratified by Ethiopia			
COVID-19 Workplace Response Protocol, 2020			
Environmental Impact Assessment Proclamation, No. 299/2002			
Environmental Pollution Control Proclamation, No. 300/2002			

SECTION 7 - COVID - 19 and Workplace Health and Safety

How does your company create a covid-19 safer working environment	**Yes**	**No**	**Don't**

for the workers?			**Know**
By developing and posting a statement of management's commitment and responsibilities			
By availing relevant information access so that making employees aware of safety and prevention measures.			
By providing water, soap, paper towels, sanitizers and trash cans			
By organizing office/area spaces in a way the air can easily circulate			
By regularly assessing the health of employees (body temperature scanning)			
By creating a working office/area which allows employees to distance themselves from each other and avoid suffocation.			
By avoiding gatherings, meetings as well as work situations exposing employees to contracting the disease;			
By providing options to work from home where applicable			

APPENDIX C

Interview Questions

1. How many years experience you have working in the construction industry? _____
2. How long have you been working for the company? _____
3. Are you involved with health, safety andenvironment decisions/matters and in what capacity? _____
4. Do you have occupational HSE management system in your company? _____
5. What do you think of the current occupational HSE management status in your company? _____
6. What are the main challenges you are facing on managing occupational HSE management system? _____
7. What are your comments on improving Occupational HSE management system of your company? _____
8. In your view what are the critical success factor of the implementation? What factors influence the implementation? _____
9. Based on your knowledge what do you think is the main cause of accidents in the construction industry? _____
10. Can you mention major construction hazards that affect the safety and health of the construction workforce? _____
11. Have you ever been visited by HSE enforcing government officer for safety, health and environment inspection? _____
12. Are current and relevant occupational H&Srules and regulations for covid-19 pandemic readily available at your work sites? _____

Thank You!

APPENDIX D

Survey Results of questionnaires

Table 2Occupational HSE management practices (Frequency % Percentage)

Major Occupational HSE Activities		Organization Type	No		Yes		Don't Know	
			F	%	F	%	F	%
Policy	Does your company have formal written HSE policies?	Client	15	65.2	1	4.3	7	30.4
		Consultant	10	58.8	3	17.6	4	23.5
		Contractor	0	0	20	100	0	0
	Are the HSE policies available to all staff?	Client	17	73.9	0	0	6	26.1
		Consultant	13	76.5	3	17.6	1	5.9
		Contractor	1	5	18	90	1	5
	Do you really understand the HSE policies of your company?	Client	15	65.2	4	17.4	4	17.4
		Consultant	14	82.4	3	17.6	0	0
		Contractor	1	5	19	95	0	0
	Do the policies really affect the way you work?	Client	17	73.9	3	13	3	13
		Consultant	7	41.2	3	17.6	7	41.2
		Contractor	0	0	19	95	1	5
	Does your company have HSE plan?	Client	14	60.9	2	8.7	7	30.4
		Consultant	11	64.7	5	29.4	1	5.9
		Contractor	0	0	18	90	2	10
	Do the policies complying with national HSE legislations & regulation?	Client	14	60.9	0	0	9	39.1
		Consultant	8	47.1	0	0	9	52.9
		Contractor	0	0	13	65	7	35
	Does your company encourage workers to participate and involve in all aspects of HSE program?	Client	12	52.2	6	26.1	5	21.7
		Consultant	8	47.1	9	52.9	0	0
		Contractor	0	0	19	95	1	5
Organizing/Managing	Does your company have department responsible for HSE?	Client	11	47.8	8	34.8	4	17.4
		Consultant	0	0	17	100	0	0
		Contractor	0	0	20	100	0	0
	Does your company have frontline personnel, who will lead the safety program effort, make plans, coordinate activities, and track progress?	Client	12	52.2	6	26.1	5	21.7
		Consultant	0	0	17	100	0	0
		Contractor	0	0	20	100	0	0
	Do these people have any specific training or qualifications in HSE?	Client	7	30.4	4	17.4	12	52.2
		Consultant	1	5.9	14	82.4	2	11.8
		Contractor	0	0	19	95	1	5
	Did you receive formal and on-the-job HSE training?	Client	20	87	0	0	3	13
		Consultant	9	52.9	8	47.1	0	0
		Contractor	1	5	19	95	0	0
	Does your company have safety representatives for each section of	Client	17	73.9	5	21.7	1	4.3
		Consultant	12	70.6	4	23.5	1	5.9

	work?	Contractor	7	35	13	65	0	0
	Does your company have a safety committee with authority to make decision on HSE issues?	Client	17	73.9	0	0	6	26.1
		Consultant	9	52.9	8	47.1	0	0
		Contractor	0	0	19	95	1	5
	Does your company establish and maintain HSE management system documentation?	Client	12	52.2	4	17.4	7	30.4
		Consultant	2	11.8	12	70.6	3	17.6
		Contractor	0	0	16	80	4	20
	Does your company have established effective communication of HSE information?	Client	12	52.2	7	30.4	4	17.4
		Consultant	3	17.6	13	76.5	1	5.9
		Contractor	0	0	20	100	0	0
	Does your company allocate budget for HSE related issues?	Client	13	56.5	3	13	7	30.4
		Consultant	9	52.9	5	29.4	3	17.6
		Contractor	0	0	19	95	1	5
Planning and Implementation	Does your company regularly conduct site inspection for HSE hazards?	Client	6	65.2	1	4.3	7	17.4
		Consultant	0	58.8	3	17.6	4	0
		Contractor	0	0	20	100	0	0
	Does your company identify hazards associated with emergency and non-routine situation?	Client	6	73.9	0	0	6	21.7
		Consultant	0	76.5	3	17.6	1	0
		Contractor	0	5	18	90	1	0
	Does your company have set HSE goal and supporting objectives for hazard prevention and control?	Client	10	65.2	4	17.4	4	52.2
		Consultant	3	82.4	3	17.6	0	11.8
		Contractor	0	5	19	95	0	5
	Does your company develop plans with preventive and protective measures to protect workers during emergencies and non-routine hazards?	Client	12	73.9	3	13	3	13
		Consultant	5	41.2	3	17.6	7	0
		Contractor	0	0	19	95	1	0
	Does your company implement hazard preventive and protective control measures in the hierarchy of hazard controls?	Client	13	60.9	2	8.7	7	4.3
		Consultant	5	64.7	5	29.4	1	5.9
		Contractor	0	0	18	90	2	0
	Is there a government regulatory body follow up and contribute in improving occupational HSE in your construction projects?	Client	10	60.9	0	0	9	26.1
		Consultant	3	47.1	0	0	9	0
		Contractor	5	0	13	65	7	5
Performance Monitoring & Measurement	Does your company have developed procedures to monitor, measure and record HSE performance on a regular basis?	Client	18	78.3	1	4.3	4	17.4
		Consultant	2	11.8	12	70.6	3	17.6
		Contractor	1	5	17	85	2	10
	Does your company verify that the HSE program is implemented and is operating?	Client	15	65.2	5	21.7	3	13
		Consultant	6	35.3	10	58.8	1	5.9
		Contractor	1	5	17	85	2	10
	Does your company correct the HSE program shortcomings and identify opportunities to improve?	Client	16	69.6	4	17.4	3	13
		Consultant	5	29.4	11	64.7	1	5.9
		Contractor	1	5	17	85	2	10
	Does your company carry out HSE	Client	15	65.2	1	4.3	7	30.4

	audits?	Consultant	5	29.4	7	41.2	5	29.4
		Contractor	0	0	17	85	3	15
Performance Review	Does your company review HSE practices regularly and share with employees?	Client	14	60.9	8	34.8	1	4.3
		Consultant	6	35.3	10	58.8	1	5.9
		Contractor	3	15	17	85	0	0
	Does your company's performance review ensure the system you have in place for managing HSE is effective?	Client	14	60.9	6	26.1	3	13
		Consultant	5	29.4	10	58.8	2	11.8
		Contractor	1	5	18	90	1	5

Source: Own survey, 2020

Table 3 Occupational HSE management practices (Mean and SD)

Major Occupational HSE Activities		**Client**		**Consultant**		**Contractor**	
		Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
Policy	Does your company have formal written HSE policies?	0.650	0.935	0.650	0.862	1.000	0.000
	Are the HSE policies available to all staff?	0.520	0.898	0.290	0.588	1.000	0.324
	Do you really understand the HSE policies of your company?	0.520	0.790	0.180	0.393	0.950	0.224
	Do the policies really affect the way you work?	0.390	0.722	1.000	0.935	1.050	0.224
	Does your company have HSE plan?	0.700	0.926	0.410	0.618	1.100	0.308
	Do the policies complying with national HSE legislations & regulation?	0.780	0.998	1.060	1.029	1.350	0.489
	Does your company encourage workers to participate and involve in all aspects of HSE program?	0.700	0.822	0.530	0.514	1.050	0.224
Overall		**0.609**	**0.870**	**0.589**	**0.706**	**1.071**	**0.256**
Organizing/Managing	Does your company have department responsible for HSE?	0.700	0.765	1.000	0.000	1.000	0.000
	Does your company have frontline personnel, who will lead the safety program effort, make plans, coordinate activities, and track progress?	0.700	0.822	1.000	0.000	1.000	0.000
	Do these people have any specific training or qualifications in HSE?	1.220	0.902	1.060	0.429	1.050	0.224
	Did you receive formal and on-the-job HSE training?	0.260	0.689	0.470	0.514	0.950	0.224
	Does your company have safety representatives for each section of	0.300	0.559	0.350	0.606	0.650	0.489

	work?						
	Does your company have a safety committee with authority to make decision on HSE issues?	0.520	0.898	0.470	0.514	1.050	0.224
	Does your company establish and maintain HSE management system documentation?	0.780	0.902	1.060	0.556	1.200	0.410
	Does your company have established effective communication of HSE information?	0.650	0.775	0.880	0.485	1.000	0.000
	Does your company allocate budget for HSE related issues?	0.740	0.915	0.650	0.786	1.050	0.224
	Overall	**0.652**	**0.803**	**0.771**	**0.432**	**0.994**	**0.199**
Planning and Implementation	Does your company regularly conduct site inspection for HSE hazards?	0.740	0.449	1.000	0.000	1.000	0.000
	Does your company identify hazards associated with emergency and non-routine situation?	0.830	0.576	1.000	0.000	1.050	0.224
	Does your company have set HSE goal and supporting objectives for hazard prevention and control?	0.740	0.752	0.940	0.556	1.050	0.224
	Does your company develop plans with preventive and protective measures to protect workers during emergencies and non-routine hazards?	0.650	0.775	0.710	0.470	1.100	0.308
	Does your company implement hazard preventive and protective control measures in the hierarchy of hazard controls?	0.650	0.832	0.710	0.470	1.100	0.308
	Is there a government regulatory body follow up and contribute in improving occupational HSE in your construction projects?	0.960	0.928	1.180	0.728	1.100	0.788
	Overall	**0.762**	**0.719**	**0.923**	**0.371**	**1.067**	**0.309**
Performance Monitoring & Measurement	Does your company have developed procedures to monitor, measure and record HSE performance on a regular basis?	0.390	0.783	1.060	0.556	1.050	0.394
	Does your company verify that the HSE program is implemented and is operating?	0.480	0.730	0.710	0.588	1.050	0.394
	Does your company correct the HSE program shortcomings and identify opportunities to improve?	0.430	0.728	0.760	0.562	1.050	0.394
	Does your company carry out HSE audits?	0.650	0.935	1.000	0.791	1.150	0.366

	Overall	**0.488**	**0.794**	**0.883**	**0.624**	**1.075**	**0.387**
Performance Review	Does your company review HSE practices regularly and share with employees?	0.430	0.590	0.710	0.588	0.850	0.366
	Does your company's performance review ensure the system you have in place for managing HSE is effective?	0.520	0.730	0.820	0.636	1.000	0.324
	Overall	**0.475**	**0.660**	**0.765**	**0.612**	**0.925**	**0.345**

Source: Own survey, 2020

Table 4 Key practices that comply with Occupational HSE requirements (Frequency & %age)

Which of these practices are performed most on your company?	**Not Performed**		**Slightly Performed**		**Neutral**		**Performed**		**Highly Performed**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Provision of required personal protective equipment (PPE)	1	1.6	3	4.9	4	6.6	9	14.8	44	72.1
Provision of first-aid kits with sufficient elements in it	4	6.6	6	9.8	11	18	24	39.3	16	26.2
Provision of health and safety warning signs	0	0	3	4.9	1	1.6	26	42.6	31	50.8
Provision of walling for danger zones	0	0	4	6.6	2	3.3	24	39.3	31	50.8
Provision of proper construction waste disposal system	2	3.3	12	19.7	12	19.7	30	49.2	5	8.2
Provision of fire prevention and firefighting procedures	0	0	4	6.6	3	4.9	27	44.3	27	44.3

Source: Own survey, 2020

Table 5 Factors to occupational HSE hazards (Frequency & %age)

Which of these practices are performed most on your company?	**Very Low Contribution**		**Low Contribution**		**Neutral**		**High Contribution**		**Very High Contribution**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Exposure to dust and fumes	4	6.6	27	44.3	8	13.1	20	32.8	2	3.3
Exposure to vibration	12	19.7	33	54.1	8	13.1	8	13.1	0	0
Exposure to high level of noise	8	13.1	27	44.3	16	26.2	7	11.5	3	4.9

Manual lifting of heavy weights	5	8.2	15	24.6	9	14.8	27	44.3	5	8.2
Falling objects from working platform, hoist and scaffolds	4	6.6	5	8.2	5	8.2	19	31.1	28	45.9
Failure of platforms and scaffolds	9	14.8	6	9.8	6	9.8	26	42.6	14	23.0
Unguarded openings in floors, walls and stairways	4	6.6	9	14.8	13	21.3	29	47.5	6	9.8
Unguarded trenches that are more than 1.2mt. deep	6	9.8	8	13.1	12	19.7	27	44.3	8	13.1
Exposure to underground & overhead live electric cables	6	9.8	7	11.5	5	8.2	28	45.9	15	24.6
Waste materials littered within and outside construction site	3	4.9	37	60.7	9	14.8	11	18	1	1.6
Machines and plant that are not properly fenced	6	9.8	12	19.7	15	24.6	27	44.3	1	1.6
Movement of mobile construction machineries on construction site	2	3.3	13	21.3	16	26.2	24	39.3	6	9.8

Source: Own survey, 2020

Table 6 Challenges to the implementation of HSE management practice (Frequency & %age)

Which of these practices are performed most on your company?	**Not Influential**		**Less Influential**		**Quite Influential**		**Influential**		**Very Influential**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Lack of top management commitment	3	4.9	11	18.0	0	0	21	34.4	26	42.6
High cost of implementation	14	23.0	34	55.7	5	8.2	8	13.1	0	0
Lack of legal enforcement procedures	0	0.0	11	18.0	15	24.6	29	47.5	6	9.8
Lack of coordination with government	2	3.3	9	14.8	20	32.8	22	36.1	8	13.1
None inclusiveness of policies and regulations	1	1.6	12	19.7	30	49.2	16	26.2	2	3.3
Lack of awareness and	0	0	8	13.1	13	21.3	23	37.7	17	27.9

negligence										

Source: Own survey, 2020

Table 7 Survey results of (Mean, SD and Ranking)

Which of these practices are performed most on your company?	**Mean**	**Std. Deviation**	**Ranking**
Provision of required personal protective equipment (PPE)	4.510	0.942	1
Provision of health and safety warning signs	4.390	0.759	2
Provision of walling for danger zones	4.340	0.834	3
Provision of fire prevention and firefighting procedures	4.260	0.835	4
Provision of first-aid kits with sufficient elements in it	3.690	1.162	5
Provision of proper construction waste disposal system	3.390	1.005	6
Overall	**4.097**	**0.923**	
Which of these practices are performed most on your company?	**Mean**	**Std. Deviation**	**Ranking**
Falling objects from working platform, hoist and scaffolds	4.016	1.218	1
Exposure to underground and overhead live electric cables	3.639	1.252	2
Failure of platforms and scaffolds	3.492	1.349	3
Unguarded openings in floors, walls and stairways	3.393	1.069	4
Unguarded trenches that are more than 1.2mt. deep	3.377	1.171	5
Movement of mobile construction machineries on construction site	3.311	1.025	6
Manual lifting of heavy weights	3.197	1.152	7
Machines and plant that are not properly fenced	3.082	1.053	8
Exposure to dust and fumes	2.820	1.073	9
Exposure to high level of noise	2.508	1.027	10
Waste materials littered within and outside construction site	2.508	0.906	11
Exposure to vibration	2.197	.910	12
Overall	**3.128**	**1.100**	
Which of these practices are performed most on your company?	**Mean**	**Std. Deviation**	**Ranking**
Lack of top management commitment	3.918	1.269	1
Lack of awareness and negligence	3.803	0.997	2
Lack of legal enforcement procedures	3.492	0.906	3
Lack of coordination with government	3.410	1.006	4
None inclusiveness of policies and regulations	3.098	0.810	5
High cost of implementation	2.115	0.915	6
Overall	**3.306**	**0.984**	

Source: Own survey, 2020

Table 8 Occupational HSE legislation and regulation (Frequency & %age)

Which of these practices are performed most on your company?	**No**		**Yes**		**Don't Know**	
	F	**%**	**F**	**%**	**F**	**%**

ILO OSH Conventions ratified by Ethiopia	7	11.5	33	54.1	21	34.4
Labor Proclamation No. 1156/2019	8	13.1	38	62.3	15	24.6
Environmental Impact Assessment Proclamation, No. 299/2002	14	23.0	9	14.8	38	62.3
Environmental Pollution Control Proclamation, No. 300/2002	14	23	14	23	33	54.1
Occupational Safety and Health Directive 2008	8	13.1	24	39.3	29	47.5
COVID-19 Workplace Response Protocol, 2020	6	9.8	42	68.9	13	21.3

Source: Own survey, 2020

Table 9 COVID-19 & workplace health and safety precautions (Frequency & %age)

How does your company create a covid-19 safer working environment for the workers?	**No**		**Yes**		**Don't Know**	
	F	**%**	**F**	**%**	**F**	**%**
By developing and posting a statement of management's commitment and responsibilities	6	9.8	55	90.2	0	0
By availing relevant information access so that making employees aware of safety and prevention measures	8	13.1	52	85.2	1	1.6
By providing water, soap, paper towels, sanitizers and trash cans	4	6.6	57	93.4	0	0
By organizing office/area spaces in a way the air can easily circulate	8	13.1	52	85.2	1	1.6
By regularly assessing the health of employees (conducting body temperature scan)	15	24.6	46	75.4	0	0
By creating a working office/area which allows employees to distance themselves from each other and avoid suffocation	11	18.0	50	82.0	0	0
By avoiding gatherings, meetings as well as work situations exposing employees to contracting the disease	4	6.6	57	93.4	0	0
By providing options to work from home where applicable	43	70.5	18	29.5	0	0

Source: Own survey, 2020

Table 10 Occupational HSE legislation and regulation and COVID-19 & workplace HSE precautions (Mean & SD)

Do the following health, safety and environment legislations are you aware of that affect your company?		**Mean**	**Std. Deviation**
HSE legislation & regulation	Environmental Impact Assessment Proclamation, No. 299/2002	1.393	0.842
	Occupational Safety and Health Directive 2008	1.344	0.704
	Environmental Pollution Control Proclamation, No. 300/2002	1.311	0.827
	ILO OSH Conventions ratified by Ethiopia	1.230	0.643
	Labor Proclamation No. 1156/2019	1.115	0.608

	COVID-19 Workplace Response Protocol, 2020	1.115	0.551
	Overall	**1.251**	**0.696**
How does your company create a covid-19 safer working environment for the workers?		**Mean**	**Std. Deviation**
COVID-19 & workplace HSE precautions	By providing water, soap, paper towels, sanitizers and trash cans	0.934	0.250
	By avoiding gatherings, meetings as well as work situations exposing employees to contracting the disease	0.934	0.250
	By developing and posting a statement of management's commitment and responsibilities	0.902	0.300
	By availing relevant information access so that making employees aware of safety and prevention measures	0.885	0.370
	By organizing office/area spaces in a way the air can easily circulate	0.885	0.370
	By creating a working office/area which allows employees to distance themselves from each other and avoid suffocation	0.820	0.388
	By regularly assessing the health of employees (conducting body temperature scan)	0.754	0.434
	By providing options to work from home where applicable	0.295	0.460
	Overall	**0.801**	**0.353**

Source: Own survey, 2020