Assessment of Health and Safety in Constructing High-rise Buildings in Addis Ababa: The case of Ayat Share Company

By

Sipara Alemu

A Final Project Work Submitted to the
School of Graduate Studies of AAU, School of Commerce

Presented in Partial Fulfilment of the Requirements for
Master's of Arts Degree in Project Management

Advisor: Bahran Asrat (PhD)

Addis Ababa University, School of Commerce
Addis Ababa, Ethiopia
June, 2020

Declaration

I, Sipara Alemu, declare that this final project work entitled "Assessment of Health and Safety in Constructing High-rise Buildings in Addis Ababa, Ethiopia: the case of Ayat Share Company" represents my own work with the guidance of my advisor except where due acknowledgment is made, and it has not been previously included in any thesis, dissertation or report submitted to any university for degree, diploma or other qualification. It is conducted for the partial fulfilment of the requirement for the Degree of Master's of Arts in Project Management and submitted to School of Graduate Studies of AAU, School of Commerce.

Name: _____

Signature: _____

Date: _____

Addis Ababa University, School of Commerce

School of Graduate Studies

This is to certify that this final project work prepared by Sipara Alemu entitled "Assessment of Health and Safety in Constructing high rise buildings in Addis Ababa, Ethiopia: the case of Ayat Share Company" submitted in partial fulfilment of the requirement for the Degree of Master's of Arts in Project Management complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Advisor: _____ Signature: _____ Date:_____

Examiner: _____ Signature: _____ Date:_____

Examiner: _____ Signature: _____ Date:_____

_____

Chair of Department

Abstract

This study has assessed the current health and safety practices used in constructing high rise buildings in Addis Ababa. The study has given weight to health and safety issues which have been ignored by the construction society.

The study used descriptive design. Questionnaires were distributed to 85% of the employees of the case company. A sample of fifty employees of the case company was taken. A total of six people including the managers were interviewed to get general information about the project. The researcher had own observation to the project sites using an observation checklist.

Descriptive statistical analysis was the major technique used to analyse the data collected from the questionnaires. The data were entered to Excel and interpreted and analysed by SPSS version 20 software programme. Triangulation was used to analyse the data collected from the questionnaire, interview and researcher's own observation all together.

The researcher recommended that every real estate company should have in-house health and safety policy, appointed personnel, suitable facilities, and PPEs for all workers on the site, and should include health and safety obligations in the agreements while contracting external contractors.

Key Words

Health, Safety, Health and Safety Management, Construction, Construction Projects, High rise Building Projects

Dedication

First and foremost I would like to acknowledge my Lord and Saviour Jesus Christ for the love, protection and being my strength in all I do.

I give my heartfelt gratitude to my research Advisor Bahran Asrat (PhD), who gave me enlightening guidance from formulation of this topic until its completion. Without his patience and inspiration, this dissertation could not have been completed.

Special thanks are given to the interviewees and respondents who generously spare their time to give the valuable information I needed complete to complete the paper.

I dedicate this work to my sweet and loving mother Birhan Beyene, words are just not expressive enough for her constant love, prayer, care, encouragement and support which make me able to get such success.

I would like to thank my uncle Gashaw Beyene for pushing me towards my entrance to Graduate studies.

To my dear fiancé Samuel Adugna, sharing our life and love along our new journey is a blessing.

Contents

List of Tables

List of Figures

Acronyms

HS	-	Health and Safety
OHS	-	Occupational Health and Safety
OHSA	-	Occupational Health and Safety Administration
HSMS	-	Health and safety Management System
HSE	-	Health and Safety Executive
HSA	-	Health and Safety Authority
HSC	-	Health and Safety Commission
HSL	-	Health and Safety Laboratory
EHS	-	Healthy and Safe Environment
WHO	-	World Health Organization
ILO	-	International Labour Organization
NQA	-	National Quality Assurance
ISIC	-	International Standard Industrial Classification
MOLSA	-	Ministry of Labour and Social Affairs
MoFED	-	Ministry of Finance and Economic Development
MUDCO	-	Ministry of Urban Development housing and Construction
FES	-	Fire and Emergency Services
GDP	-	Growth Domestic Product
SPSS	-	Statistical Package for Social Sciences
PMBOK	-	Project Management Body of Knowledge
PDCA	-	Plan Do Check Act
PM	-	Project Manager
HRM	-	Human Resource Manager

CHAPTER ONE

INTRODUCTION

This chapter clarifies what the research is about, the triggering factor for the researcher to study the topic, the research questions, the research objectives, the significance of the study, the scope of the study, the potential limitations of the study, organization of the whole research paper and the definition of key terms.

1.1.Background of the Study

Health is the biggest wealth that money cannot buy and safety is in the hands of the doer of tasks. People live, learn, work, get medical treatment, play, watch movie, eat and drink in café and restaurants … etc. in a constructed buildings. And so many people are engaged in construction activities. Either people do construction activities for living or are users of it after it is completed. In all cases performing construction works in a healthy and safe manner is a concern for everyone. It is not luxury rather necessity.

Construction is the general term meaning the art and science to form objects, systems, or organizations. (Wikipedia Contributors, 2019) Construction project, sometimes just referred to as a 'project', is the organized process of constructing, renovating, refurbishing, etc. a building, structure or infrastructure. (Designingbuildings.co.uk, 2018)

Construction industry in the case of Ethiopia, although the definition adopted by the National accounts department of MoFED is the same as that of ISIC, the activities actually covered under the industry are the construction and maintenance activities of: (1) Residential buildings in urban and rural areas, (2) Non-residential buildings, i.e. factory buildings, ware houses, office buildings, garages, hotels, schools, hospitals, clinics, etc., (3) Other construction works, like roads, dams, dikes, athletic fields, electricity transmission lines, telephone and telegraph lines, etc. (MoFED, 2005 as cited in Ethiopian Economic Association, 2008) Construction industry in general is a vast and an active sector, which not only is a backbone of the world's economy but also a vital component to develop Ethiopia.

The global construction industry makes up approximately 9% of the world's gross domestic product and accounting to around 7% of the total employment worldwide

(Horta et al, 2012, as cited in Gopal, 2016) It is clear that developing countries demand the construction sector greater than the developed countries due to the need to build and improve the physical infrastructures and the built environment. In Ethiopia, the role of the industry in terms of creating employment opportunities especially in urban areas is increasing highly. According to the 2017 edition of African Economic Outlook, construction activities in Ethiopia accounted for 15.9% of GDP at current prices during the 2015/16 fiscal year. Recently construction is booming in Ethiopia, accounting for 18% of the country's GDP for the financial year 2017/18; and is the largest employer in the country, with more than two million people employed in fulltime and temporary jobs. (BBC News, 2019)

Health and safety management system (HSMS) is an approach put in place by an employer to minimize the risk of injury and illness. It involves identifying, assessing and controlling risks to workers in all workplace operations. (Government of Alberta, 2019)

Prior Studies say that construction is a very hazardous industry. The construction industry, employing the largest labour force, has accounted for about 11% of all occupational injuries and 20% deaths resulting from occupational accidents. For instance, in Addis Ababa some 23 people died in 2015 alone in construction-related activities, said the city's Fire and Emergency Services (FES). (Getachew, 2016) Most of these accidents are created due to unsafe behaviour and unsafe conditions. Hence, health and safety problem in building construction is the major and worldwide issue which needs strong consideration since it affects the life of the workmen (manpower), project time, project cost and also project quality.

The researcher selected this knowledge area because even though health and safety rules exist, they are not implemented effectively. As a result illness, injury and death are increasing in this sector at an alarming rate. Furthermore, the grievous work hazards at the construction workplace are sensed less than what they actually are. Construction Health and safety consideration has not yet been studied and evaluated as major problem in Ethiopia.

The selected area of this study was Addis Ababa due to the lot of building constructions found. The population is increasing day by day especially in the urban area. This in turn creates an increasing demand of lots of residential buildings. As a result real estate business is becoming one of the leading construction businesses these days. The tall buildings of the real-estates can accommodate many more people on a smaller land than

low-rise buildings on the same land. A high rise building can be defined as any new or existing structure over 80ft (National Fire Association, 2008 20-80 as cited in Argaw, 2017).

The Project Management body of Knowledge (PMBOK) divides projects in to five phases; which are initiation, planning, execution, monitoring and controlling and closing. (Roseke, 2017) The study addressed only the execution phase since this phase is the particular time where construction workers face the challenging, tiresome and risky works of the construction site.

The case company of this study has been constructing real estate buildings more than twenty years now and is one of the prior real estate companies in Addis Ababa. Currently, it has three project sites which are under construction.

The company has hundred construction professionals which are directly hired by the company. And it gives contracts to external grade one building contractors in order to run the site work; so the company hires only from project manager to foreman, the rest like masons, carpenters, plasterer, bar bender, daily labourers and the like are hired by the external contractors.

A total sample of fifty respondents from the company participated in the study. A total of six people (two project managers, one HRM a site engineer, a supervisor and a foreman) were interviewed about the real experiences of all the workers in the site and all workers in the site were observed using observation checklist. The collected data were organized and presented in triangulated form.

The company is chosen as it has experienced in the area and can represent the cross country construction health and safety practices as the practices are mostly similar.

This paper has recommended best practices for a healthy and safe working environment and hopefully contributed an insight for future studies.

1.2. Statement of the Problem

Many construction workers are getting ill and dying at work places in Addis Ababa high rise buildings; yet health and safety issues are not getting sufficient attention. Though many accidents remain unreported, the existing situation is a huge concern. Construction sites do not give much attention to health and safety.

The researcher argues that anyone should not face illness and even worse death while trying to earn a living because of the employer's carelessness or just focus on using the worker's labour as a ladder to profits. The poor lives of the workers and families who

expect their safe arrival for the sec of living should be put in to consideration. More over all this health and safety problems being seen especially in high rise buildings, successful project completion is all what is in the heart of the clients, government, project managers, engineers, contractors and others involved in the industry. The researcher finds concern for a building (non-living thing) rather than the human as nonsense. After all, those buildings after completion will not be occupied by nothing but human.

Health and safety management is not given priority as compared to budgeted cost, quality and scheduled time. It's true that the success of a construction project and project management depends highly on keeping the project on time and on budget. If a project fails behind schedule for any reason, costs will climb up. A number of problems can set a project back, but in a high-hazard industry like construction, accidents remain a too-frequent cause of delays and a danger to workers. (Abrahamsen and Hall, 2013) Since neglecting HS practices could be a major factor contributing to project time and cost overrun, all stake holders of a project must give it priority as to ensure the successful completion of their project. Giving value for health and safety as much as for budget and schedule contributes at most to effectiveness of the project.

Project management faces disaster due to poor health and safety management system globally. Since a project manager has a direct responsibility on the project; failing to plan, perform and monitor health and safety practices results in serious accidents. The work-related injury or illness can put the employee out of work temporarily or permanently or may put him/her to death. In addition, it affects the productivity and goodwill of the business. High turnover of employees is also expected in an unhealthy and unsafe working environment due to loss of moral of employees. In addition, failing to provide suitable working environment for employees can cause legal costs to employers.

Recent data on construction fatalities are very hard to get as the recording system is not standardized worldwide. Keeping in mind the absence of proper accident recording especially in developing countries, it is clear that estimates are drawn mostly from figures of developed countries and little information from the developing countries. According to ILO estimates, in the construction industry at least 60,000 fatal workplace accidents occur each year worldwide – or about one death every ten minutes. (Somavia, 2005) Though accidents happen in developed countries, the health and safety practices are way better than those of the developing countries mainly because of the greater

number of educated man power and health and safety costs are included in their budget like any other activities.

The different levels of health and safety awareness in sites require different ways of training and communication. Lack of knowledge towards the area, exposure to technology, information and experience limits the improvement of healthy and safe working environment in the construction sites.

Most developing countries are notable for poor health and safety practices. Consequently, despite several efforts put in place on improving the practice over the years, there seems to be a major issue about health and safety that still proliferates in developing countries especially within the construction industry (Samuel, H.et al. 2012). As a result, these countries seem to barely recognize the practice of health and safety within the construction industry as a key contributing factor to its national development. (Michael Fosu, 2018)

Earlier research findings confirmed that most construction companies in Ethiopia do not have clearly defined and developed risk policy and response plans. As a result, in most construction sites appropriate health and safety practices have not taken place so various challenges are encountered in this area.

Construction sites in Addis Ababa are and are becoming horror places. Just moving around the roads of Addis; anyone without the need of being construction professional can witness the unsafe and unhealthy conditions in construction sites. Engineers, supervisors and project managers are mostly seen with helmets on their head and wearing high visibility vests standing at the safest distance while the daily labourers with no helmets and PPEs doing the actual job on site using construction tools and materials, holding equipment and walk on the old wood scaffoldings. People might fail to obey laws but what is most terrific is to see people lose their morality and conscious.

The cumulative sum of all the above problems related to health and safety management in high rise building constructions and the expected expansion of high rise real estate buildings in future in Ethiopia especially in Addis Ababa aspired the researcher to conduct research on health and safety management practices in high rising real estate buildings in Addis Ababa city and recommended forwarding solutions that will help develop a culture of effective health and safety management.

1.3.Research Questions

1.3.1. General Research Question

What are the health and safety management practices used during the implementation phase of high rise real estate building projects in Addis Ababa, Ethiopia?

1.3.2. Specific Research Questions

Here are the specific research questions:

1. What are the health and safety policies and regulations used in the construction of high rise real estate buildings?
2. What are the health and safety management structures used during the construction of high rise real estate buildings?
3. Are sufficient health and safety trainings given to the employees during the construction of high rise real estate buildings?
4. Are there adequate facilities, tools and evaluation techniques of health and safety during the construction of high rise real estate buildings?

1.4. Study Objectives

1.4.1. General Objective

The general objective of this research is to assess the health and safety management practices during the implementation phase of high rise real estate building projects in Addis Ababa, Ethiopia.

1.4.2. Specific Objectives

1. To examine the current health and safety policies and regulations used in the construction of high rise real estate buildings.
2. To identify the health and safety management structures used during the construction of high rise real estate buildings.
3. To examine if sufficient health and safety trainings are given during the construction phase of high rise real estate buildings.
4. To evaluate the health and safety facilities, tools and evaluation techniques used during the construction of high rise real estate buildings.

1.5. Significance of the Study

The research tried to magnify the preciousness of the lives of all the workmen involved in the construction industry. If used properly, it will make health and safety management issue given priority in working places.

The significance of this research is that it intended to truly expose the current health and safety management practices and identify the core problem areas so as to take the appropriate measures to reduce injury and death in building construction projects.

The findings of the research can be used to create knowhow of how to protect oneself from accident, make the working environment the safest place and make the job safe to each and every construction professional involved during the construction phase.

For the sec of all injured, got ill and lost their lives at sites and for the current construction workers, the researcher aimed at contributing her best to fill some research gaps and indicated some effective health and safety management practices in the recommendation part, suitable to workers in site, which can be adapted in every high rise building projects.

The research can also be a stepping stone for other researchers who want to do more on this topic or for students who want to work their dissertation on this topic.

1.6. Scope of the Study

Occupational Health and Safety is a necessity to every work place in the globe. The researcher chose the construction industry as it is growing with an increasing demand all over the world especially in developing countries. And globally most of the injuries and fatalities occur in construction sites.

Health and safety management system is very crucial not only to the success of the project but also to sustainable national growth. Lack of health and safety practices directly affects the workers and indirectly affects their families, the society and contributes a lot to the national cost of accidents.

Given that all project stakeholders- clients, designers, PMs and contractors influence and contribute to construction health and safety, project managers, in their capacity as project leaders and co-ordinators are uniquely positioned to integrate occupational health and safety into all aspects of the design and construction processes.(J.J. Smallwood, 1999)

The construction industry is so vast that it requires narrowing the scope in to manageable area. Among other constructions like highway, rail way, dam and

irrigation, this study focused on buildings. High rise real estate building projects are chosen for being the majority of recent buildings along with the effective use of space and increasing demand for residential buildings for the rapidly increasing population. The high exposure of the workers to risk during the implementation phase made this phase the topic area.

Addis Ababa is picked because of the high speed growth of the construction industry in the city. Addis Ababa population 2020 is estimated to be 4,793,699. (World urbanization prospects, 2020) Which means there is and will be need of high rise buildings of houses for those inhabitants. And many are employed in the construction industry. Convenience to the researcher is also considered.

The research used descriptive design in order to reveal the current health and safety practices of high rise building apartments during their implementation phase in Addis Ababa. The researcher at most tried to assess the core problem areas as per the research questions because clear identification of the problem is half way to the solution.

Primary data was collected through questionnaire, interview and observation checklist. Secondary source from prior researches, books, journals ...etc. was used. The quantitative data was analysed using SPSS while qualitative analysis methods were used for the data from interview and comments.

1.7. Limitations of the Study

Unlike all the other times, this research was done during a period of worldwide pandemic CO-VID 19, which made collecting papers of questionnaires and interviewing very risky. As the virus could be transmitted through breathed air and it can stay on papers for some days.

The very short period of the preparation of the research makes it difficult to get the necessary information and analyse the data within that period.

The research tried to expose the reality practices of health and safety management within the scope area, but the lack of transparency among the people made the fact finding more tiresome above all the other challenging factors in undertaking a research.

1.8. Organization of the Study

The research report contains five chapters.

Chapter1: Introduction – this part includes the background of the study including description of the case company, the Problem Statement, the general and specific research questions, the general and specific objectives of the research, Significance,

Scope and Limitation of the study, organization of the paper, and definition of key terms.

Chapter 2: Review of Related Literature – contains the empirical review with earlier findings, about health and safety, of different researchers; theoretical review including the definitions and brief descriptions of the topic areas, and the theoretical frame work of the study. This part helps to briefly understand the terms in the study.

Chapter 3: Research Methodology – in this chapter the design of the research, the targeted population and the sample size, the data collection types and tools, data analysis techniques, and the validity and reliability test techniques are contained.

Chapter 4: Data presentation, Analysis and Interpretation – shows the data collected the analysis and interpreted results in detail.

Chapter 5: Conclusion and Recommendation – Presents the conclusion of the findings, the researcher's forwarded suggestions towards health and safety practices in high rise real-estate buildings and insight for future works.

1.9. Definition of key terms

Health and Safety Management: is the proven method of reducing risk, maintaining a culture of safety and improving productivity.

Effective Health and Safety Management: to make the environment healthy and safe; to make the job healthy and safe; and to make worker health and safety conscious.

Health: is the state of being free from illness or injury.

Safety: is the state of being safe, the condition of being protected from harm or other non-desirable outcomes.

Construction Projects: are the organized efforts to construct a building or structure.

High rise buildings: any new or existing structure over 80ft.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This Chapter includes the conceptual and empirical reviews. The conceptual review helps to widely understand the various definitions, scope, component and importance of the main issues in the topic. A brief description of each point in the topic is part of this chapter. Variables are identified and the conceptual frame work of the research is also included. The empirical part reviews previous findings regarding construction health and safety in high rise buildings from different published and unpublished sources and adds the researcher's point of view on it as today's studies build on those of yesterday's.

2.1. Theoretical Review

2.1.1. Definition of Health, Safety and Health and Safety Management

In order to understand this paper very well, the key words used in the study are well defined and the characteristic of each point is presented.

Health

The Oxford dictionary defines health as the state of being free from illness or injury. And the Merriam Webster dictionary defines health as the condition of being sound in body, mind or spirit.

In 1948, the WHO defines health as a complete physical, mental and social well-being and not merely the absence of disease or infirmity. In 1986, the WHO made further clarifications and defines it as "A resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities."

In 2009, researchers publishing in the Lancet defined health as the ability of a body to adapt to new threats and infirmities.

In the researcher's opinion, health is the complete wellbeing of a person described by proper functioning of the physical body, peace of mind and a good social interaction. Health touches every aspect of our lives. It is difficult to think of life without health.

Safety

Full form of safety is Stay Alert for Every Task You do.

The Oxford defines safety as the condition of being protected from or unlikely to cause danger, risk, or injury. It can also refer to the control of identified hazards in order to minimize risks.

Safeopedia explains Safety:

"Safety is a concept that includes all measures and practices taken to preserve the life, health, and bodily integrity of individuals. In the work place, safety is measured through a series of metrics that track the rate of near misses, injuries, illnesses, and fatalities. In order to improve these metrics, employers and safety officials must also conduct investigations following any incident to ensure that all safety protocols and measures are being followed or to implement new one if needed."

Safety is a term referring to an individual's complete understanding of the benefits of doing things the right way and the harm of performing activities in a careless, irresponsible and wrong way. 'Prevention is better than cure'- English proverb. Safety is a state in which situations causing harm can be controlled but failing to do so causes danger.

Health and Safety Management

Health and Safety Management is an organized efforts and procedures for identifying workplace hazards and reducing accidents and exposure to harmful situations and substances. (Business dictionary, 2019)

A health and safety management system is a process put in place by an employer to minimize the risk of injury and illness. (Government of Alberta, 2020) Health and Safety Management is the proven method of reducing risk, maintaining a culture of safety and improving productivity. (NQA, 2020)

Health and safety management is a key factor to the successful completion of projects. An individual must be healthy to be able to work and the working environment must be safe so that activities can be performed properly.

2.1.2. Importance of Health and Safety Management System

Health and safety management system is a crucial system in ensuring the wellbeing of every individual in a company. Construction workers are exposed to risky workplaces so the execution of HSMS in construction projects can save millions of lives of workers. In developing countries like Ethiopia where there is a high unemployment and illiterate rate, it is not easy to save a life of one educated, skilled or experienced labour. Saving the working man power is saving the lives of many others living by them.

The presence of health and safety management in a company enhances the goodwill and being safe boosts the morale of employees which in turn contributes to the success of the company. Healthy workers working in safe environment can have nothing but a quality performance. HSMS also improves the ability to continuously identify hazards and control risks in the workplace.

The high-rise real estate companies in Addis, computing to supply the house needs of the increasing population would have doubled up their speed had they had incorporated the health and safety management in to their system. Expenditure of costs during accidents and time wasted resulting in delay of works could all be minimized in healthy and safe working environment.

A responsible project manager who assures the implementation of an effective HSMS in the company will be honoured for the successful completion of projects and have an excellent reputation.

2.1.3. Scope and Components of Health and Safety Management

Health and Safety management encompasses more than just a health and safety program. It includes health and safety policies, systems, standards, and records, and involves incorporating health and safety activities and program in to other business processes. (Work Safe BC, 2020)

Occupational health and safety refers to programs, guidelines and procedures that protect the safety, welfare and health of any person engaged in work or employment. The overall goal of any health and safety program is to create the ultimate safe working environment and to reduce the risk of accidents, injuries and fatalities on the job. (Drew Mitchell, 2013)

Effective Health and Safety Management has the following components:

Policy

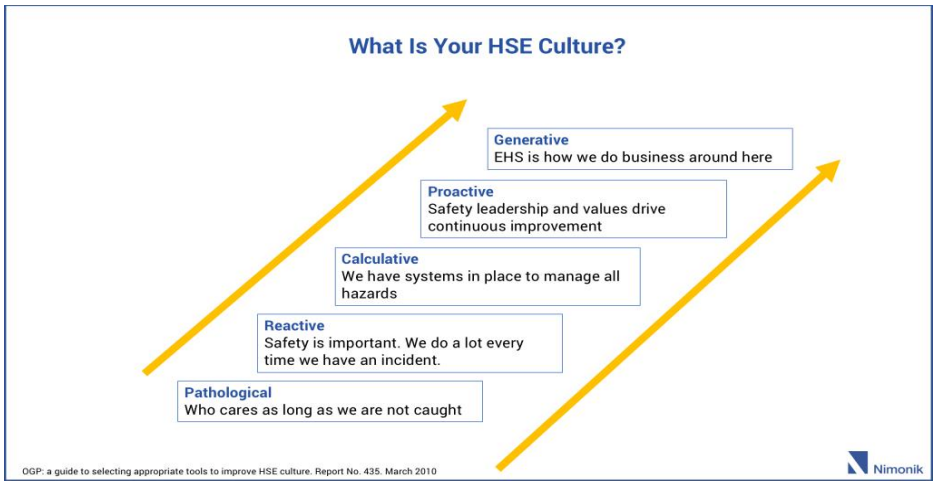
The workplace should develop a health and safety policy that meets the standard of the labour law in the country. Responsibilities to people and the working environment will be met in a way that fulfils the spirit and letter of the law. (HSA, 2020)

Management and commitment

Effective leadership and commitment enables consistent application of the health and safety policy through planning and setting goal towards achieving the policy. The management should be committed to implementing the rues looking forward to improve the health and safety culture in the workplace. The management should assure the

availability and adequacy of resources (good facilities, right tools and PPEs) provided to the workers.

Figure 2.1.3-1: HSE Culture



Source: Jonathan Brun, 2018

Health and Safety Training and Instruction

In order to have a healthy and safe working environment, everyone in the work place must play their role. Senior manager should know their role in establishing HS policies and continually plan and provide resources for HS practices. Employers must make sure all workers are trained and can perform their tasks in a healthy and safe manner. Workers should work in a healthy and safe manner as per their training.

Inspection of premises, equipment, workplaces and work practices

Reviewing the overall health and safety practices in the workplace helps to know how the health and safety practices are going on, where the exact problem is and prevent accidents and unhealthy and unsafe working practices from developing. Monitoring and review is an essential component of health and safety. Health and safety management systems work on a PDCA system; Plan, Do, Check, Act.

Figure 2.1.3-2: Health and Safety Monitoring and Reviewing

Source: (Victoria Hughes, 2018)

Identifying hazards and managing risk

Risks must be assessed, identified and risk control method should be developed as to minimize workplace hazards as much as possible and ensure the well-being of workers.

Joint Health and Safety Committee and Representatives

Joint health and safety committee and representatives help in co-ordinating all workers to jointly talk over about health and safety issues, bring ideas, identify problems causing injuries and accidents and bring on solutions. They also assist in developing and implementing HS management system.

2.1.4. Health and Safety in Construction

Health and safety at construction sites deals with both physical and psychological well-being of workers on construction sites and other persons whose health is likely to be adversely affected by construction activities. It is of primary concern to employers, employees, governments and project participants. (Muiruri and Mulinge, 2014)

In the researcher's opinion Health and Safety of workers must be given number one priority in construction sites. The lives of the people engaged in construction activities must be valued than the buildings, which is very far from the current situation. The value given to them and the workplace being safe and healthy brings them peace and stability of mind which in turn increases productivity and success of the project.

Construction sites are high risk working environments. Employees are expected to work at great heights with heavy machinery and potentially dangerous building materials. It's crucial that health and safety regulations are closely followed to reduce the chance of injury and protect the lives of workers. (Monica Sikora, 2016)

2.1.5. History of Health and Safety Management

Prior to 1970, the regulation of work place health and safety was a very different landscape. Back then, it fell under the purview of the Department of Labour but did not have a central focus, which meant that workers were the ones to suffer the consequences. In the United States, occupational health and safety truly begin in 1970, with passing of the Occupational Safety and Health (OSH) Act. The goal of this law was simple: to improve safer working conditions for all workers, regardless of their job or industry. (EHS Insight Resources, 2019)

Health and Safety Act was first introduced by Secretary of state for Employment, Michael Foot on 22 March, 1974. And the commencement was from 1October, 1974. The territorial extent were England and Wales, Scotland, Northern Ireland and offshore. (Wikipedia)

The Health and Safety Commission (HSC) was formed when the Health and Safety at work etc. Act 1974 received Royal Assent on 31 July 1974. The Health and Safety Executive (HSE) was formed on 1 January 1975 under the leadership of its first Director, John Locke. HSE's remit was to undertake the requirements of the Health and Safety Commission and to enforce health and safety legislation in all workplaces, except those regulated by Local Authorities. The Health and Safety Laboratory (HSL) celebrated its centenary this year. HSL is a leading scientific health and safety research organisation specialising in work-related activities. (Timeline- HSE)

In developing Countries only about 10% of workers have access to occupational health services. Globally, efforts to improve workplace conditions were implemented as early as 1954, but it was only in 1979 that the World Health Organization and the International Labour Organization intensified their efforts. Notably, Resolution WHA32.14 on the Comprehensive Workers' Health Programme further developed Occupational health, and Resolution WHA33.31 encouraged countries to integrate occupational health and safety into primary health care services and to cover underserved populations. More recently, in 1996, the Global strategy on occupational health for all was developed by WHO collaborating centres. (Regional Committee for Africa, 54 (2004))

Ethiopia took the initiatives to protect workers in the country by adopting OSH regulations as early as the 1920's. Ethiopia has had a regulation on Occupational Safety and Health (OSH) since the 1940's.The Ethiopian Labour Standard Proclamation was made possible in 1964.This was updated in 2006 with the view to suiting the provisions

of the Ethiopian Constitution in reference to labour protection. The Ministry of Labour and Social Affairs (MOLSA) is the state organ that regulates workers' safety and health in work places, both private and state owned. MOLSA and its regional networks have an organizational structure lined to the periphery. Ethiopia is one among the many countries from around the world that have adopted ILO Convention No 155 of 1981 in 1991 which resulted in two major regulations: Labour Proclamation No. 377/2003 and Labour Proclamation No. 515/2007 on public civil servants. The national level policy on Occupational Safety and Health (OSH) has recently been developed and approved (July 2014) by the Central government. (Kumie et al., 2016)

Occupational Health and Safety has come a long way in world history. There once was a time when workplaces did not have any health and safety standards. Now health and safety are being practiced indifferent levels in different countries though not to the desired level. The important thing to remember is that OHS has evolved and will continue to evolve over time so all workplaces must be made ready to keep up.

ILO and WHO

The International Labour Organization was created in 1919 by Part XIII of the Versailles Peace Treaty ending World War I. In 1946, after the demise of the League of Nations, the ILO became the first specialized agency associated with the United Nations. (ILO, 2020) The ILO is a United Nations agency whose mandate is to advance social and economic justice through setting international labour standards. It is headquartered in Geneva, Switzerland. The ILO is subsequently a major contributor to international labour law. In 2019, the organization convened the Global Commission on the Future of Work, whose report made ten recommendations for governments to meet the challenges of the 21st century labour environment; these include a universal labour guarantee, social protection from birth to old age and an entitlement to lifelong learning. (Wikipedia)

The World Health Organization (WHO) is a specialized agency of the United Nations that is concerned with international public health. It was established on 7 April 1948, and is headquartered in Geneva, Switzerland. (Target Health Blog, 2018).WHO's main functions can be summed up as follows: to act as a directing and coordinating authority on international health work, to ensure valid and productive technical cooperation, and to promote research. (Encyclopaedia)

2.2. Review of Empirical Studies

2.2.1. Legal Aspect of Health and Safety Management

Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) requires: Employers manage and conduct their work activities in such a manner as to ensure the safety, health and welfare of employees that a risk assessment is carried out by the employer or person in control of the place of work. (HSA, 2020)

The Labour proclamation No 377/06

Unlike many countries, in Ethiopia there is one comprehensive labour law that is operating in order to address all aspects of ensuring labour relation to be governed with basic fundamental rights and obligation focusing on industrial peace in all work places. The law is also formulated in order to guarantee and maintain all fundamentals rights at work and to define the powers and duties of the organ charged with enforcing of the implementation of the ideals of the law which is tantamount to the labour inspectorates. The law applies to all employer employee relationship or undertaking that employs one or more persons. (Seblework, 2006)

Ethiopia has been a member state of the ILO since 1923 and has ratified 21 conventions; those related to the topic are presented below.

Table 2.2.1 – 1: List of Conventions of HS Ratified by Ethiopia

No	Convention	Date of Rat.
1	Weekly Rest (Industry) Convention, 1921 (No. 14)	28 – 01 – 1991
2	Forced Labour Convention, 1930 (No. 29)	2 – 09 – 2003
3	Employment Service Convention, 1948 (No. 88)	4 – 06 – 1963
4	Weekly Rest (Commerce and Offices) Convention, 1957 (No. 106)	28 – 01 – 1999
5	Discrimination(Employment and Occupation), Convention 1958 (No. 111)	11 – 06 – 1966
6	Minimum Age Convention, 1973 (No. 138)	27 – 05 – 1999
7	Occupational Safety and Health Convention, 1981 (No. 155)	
8	Workers with family responsibilities Convention, 1981 (No. 156)	28 – 01 – 1991
9	Vocational Rehabilitation and Employment (Disabled persons) Convention, 1983 (No. 159)	28 – 01 – 1991
10	Worst Forms of Child Labour Convention, 1999 (No. 182)	2 – 09 – 2003

Source: ILOLEX, 31 – 03 – 2009

2.2.2. Health and Safety Management in Ethiopian Construction

Globally, 85% of the workers in the country do not have access to occupational health services. In developing countries, only about 5% of those in the work force have access to some kind of OSH services. Ethiopia is in a transition period from agriculture-based economy to the industrial-led one. There is therefore a need for the country to build infrastructure that meets acceptable standards needed to protect workers and the environment, with the focus on the industrial sector. The United Nations Assembly urged a Universal Access to all workers, including the informal sector by 2017. Ethiopia is expected to meet this international commitment. Developing countries shoulder a burden of losing up to 10% of their GDP because of work related injuries and diseases. Ethiopia seems to find herself in a good position in terms of having OSH laws based on the convention mentioned earlier. But the implementations of the provisions of regulations remain unsolved. This is partly due to the poor understanding of the laws by employers or investors which they care more about the profits than the expenses required for the provision of OSH Services. The limitations in training capacity of OSH inspectors in terms of using measurement based hazard evaluation, access to hazard measuring equipment, knowledge and skill of using the equipment, exposure of measurement technology and absence of trained human resource is a point of concern. (Kumie et al., 2016)

Table 2.2.2-1: Occupational Accidents by Regions

Region	Fatality rate (per 100,000 workers)	Accident rate (per 100,000 workers)
EME [1]	4.2	3240
FSE [2]	12.9	9864
OIA [3]	21.5	16434
SSA [4]	21.0	16012
LAC [5]	17.2	13192
MEC [6]	18.6	14218
Singapore	9.8	7452
South Africa	19.2	14626

[1]Established Market Economics, [2]Former Socialistic Economies, [3]Other Asia and Islands (excluding China and India), [4] Sub-Saharan Africa (Including South Africa), [5]Latin America and the Caribbean, and [6] Middle Eastern Crescent

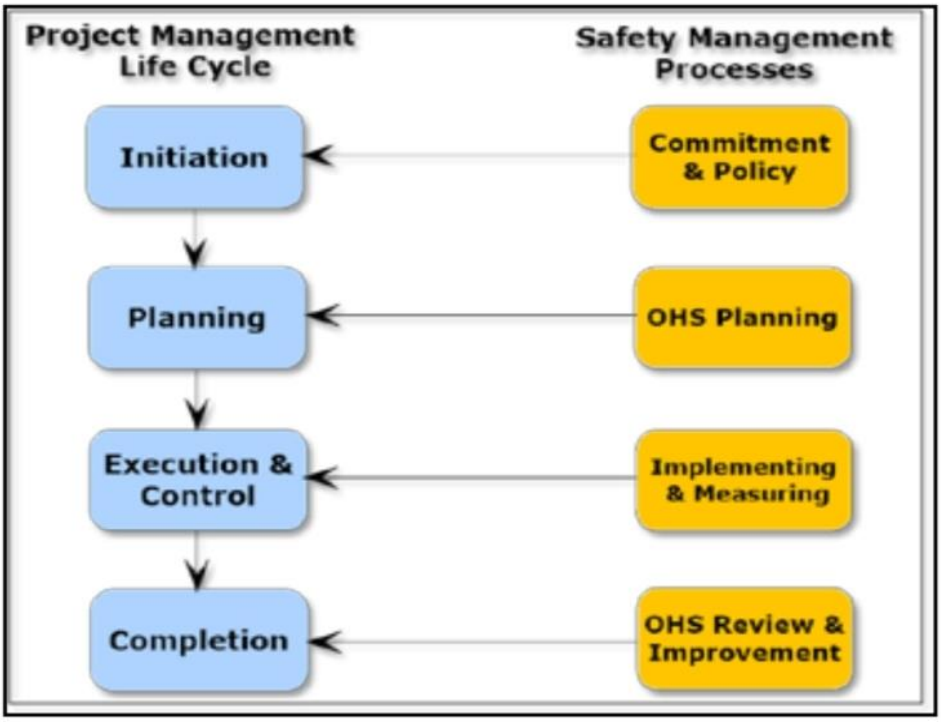
Source: (Hamalainen et al., 2006 as cited in TEO, THEO and FENG, 2018)

2.2.3. Integration of Health and Safety Management into Project Management

The main targets of project management are cost, schedule (time) and quality (performance). Project managers strive to manage and meet the requirements of a project and deliver its objectives. The main reasons of using project managers are the successful completion of a project and satisfaction of the stakeholders. Sometimes this involvement of managers, to complete on time, on budget and with the desired quality, leads to accidents, serious injury, pain and even death. The very nature of construction projects by itself is exposed to risky activities. This indicates the need for high integration of Health and Safety Management Practices with Project Management.

Though Health and Safety is the responsibility of all departments in a construction project, it should be highly integrated with the project management so that the H & S practices can be equally managed as those of the project parameters; time, cost and quality. As the overall responsibility of a project lies on the project manager and takes the lead role in every process from initiation to completion, the PM is supposed to give priority to health and safety issues in each and every phases of a project. Successful completion of a project should comprise workers' healthy and safe completion of their duties. Hence Health and Safety Management processes should be contained in the project management phases.

Figure 2.2.3-1: A Proposal Model to integrate Health and Safety Management into Project Management



Source: (TorkyAlthaqafi and Dr. Barry Elssy, 2015)

2.3. Conceptual Framework of the Study

Health and safety management is very important as it is integral to the overall success of any organization.

In-house HS policy protects the wellbeing of the employees and all that are affected by the workplace directly or indirectly.

A well-structured HS management, who takes the responsibility of the execution of the policy, monitor and evaluate HS performance drives the success of the project.

Evaluation techniques are useful to inspect the safety and health practices of the workplace. Health and safety trainings should be given as per the different levels of knowledge and attitude of employees to enable them to carry out their tasks in a healthy and safe manner.

CHAPTER THREE

RESEARCH METHODOLOGIES

This chapter clearly shows the design of the research, the description of the study variables, the study area and target population, data collection source, type, instrument, data analysis technique and software and how the reliability and validity analysis is undertaken.

3.1. Research Design

The research used a mixed of qualitative and quantitative approach. Thus, it is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research. (Creswell & Plano Clark, 2007)

The research design was descriptive in order to provide an accurate presentation of the existing situation of health and safety practices in high rise real-estate building projects in Addis Ababa and addressed the high level of ignorance towards the topic area.

The study is a cross sectional research as the researcher observed the sites at one point in time due to the small period of time to conduct the research. Survey design was used to gather information via questionnaire and interview. Generally flexible, appropriate, efficient and economical design was used.

3.2. Description of Study Area and Target Population

The study area, Addis Ababa is the capital city of Ethiopia that is located at 8°7''northern latitude and 38°45'' eastern longitude with an average altitude of 2400 above mean sea level. The high rise real-estate buildings in Addis Ababa can represent all the others in Ethiopia because the practices are similar across the country. The convenience to the researcher is also considered.

Though construction firms in Ethiopia must be registered and licensed by the Ministry of Urban Development housing and construction (MUDCO) in order to undertake any construction work in Ethiopia and the Ministry has placed the basic human and equipment requirements to attain different licenses with different grades and only when these conditions are fulfilled the firms will be qualified and be allowed to participate in the industry, the exact number of current high rise real estate building projects in Addis Ababa which are currently under construction was impossible to get. Due to this and

other factors, one best well experienced company, with three active projects under-construction, that can perfectly represent almost all real estates, was selected.

The company has more than 20 years of experience in building real estates. Currently, it has three active projects under construction (implementation phase).The company hires construction professionals (PMs, Supervisors, Site & Office Engineers, and Foremen) and gives contract to outside contractors that hire masons, carpenters, bar benders and daily labourers. Based on the information gathered from the case company of the research, it has 100 employees under those three projects. Questionnaires were distributed to the employees of the company; the site and all daily labourers were observed by the researcher using the prepared observation checklist and few people on site and office were interviewed.

3.3. Sampling Technique and sample size

The study used non-probability convenience sampling method where by samples were selected from the target population on the basis of their accessibility to the researcher. The selection process was held after explaining to managers about: their rights to participate in the study, procedures, benefits and purpose of the study to allow for questionnaires.

3.3.1. Sampling size

The sample size determination is based on Taro Yamane Method; The Taro Yamane method was formulated by Tara Yamane in 1967 to determine the sample size from a given population.

$n= N/ (1+N (e)^{2})$

Where:

n - Signifies the sample size

N - Signifies the population under study

e - Signifies the margin error = (0.05)

In this case, N = 100 (total employees of the company in the three projects)

$n = 100/ (1 + 100 (0.05)^{2}) = 80$ (confidence level of 95%)

This is an optimum sample which fulfills the requirements of representativeness, efficiency, reliability and flexibility.

3.4. Data Collection – sources and tools

3.4.1. Data Collection Sources

Both primary and secondary sources were used. Primary sources were gathered from the self-observations, interviews and questionnaires. Secondary sources were gathered from different published and unpublished related works.

3.4.2. Data Collection Tools

Questionnaire

The survey questionnaire was used to achieve the answers for the research questions, i.e. what are the health and safety policies and regulations used in the construction of high rise real estate buildings?, What are the health and safety management structures used during the construction of high rise real estate buildings?, Are sufficient health and safety management trainings given to the employees during the construction of high rise real estate buildings? And are there adequate facilities, tools and evaluation techniques of health and safety during the construction of high rise real estate buildings?

A survey questionnaire was sent to 85 respondents. For those who have internet access, it was sent via e-mail in order to avoid contact with paper due to the current worldwide pandemic. For the rest of the respondents' questionnaire papers were given. The survey questionnaire was used to gain insight into the conditions of the project sites and it pointed out the different factors which affect the performance of health and safety practices in high rise building construction projects. The main focus being to assess the health and safety practices in the selected high rise real-estate company which reflects the practices of almost all real-estate companies because the practices are more or less similar across the country.

The questionnaire is composed four parts. The first part of the questionnaire gives the general information about the respondents and was analyzed with averages, figures and percent. The second part contains questions about the current Health and Safety practice in the projects. The respondents answered in a 'YES' or 'NO' form and if their answer was NO, there are lists of reasons to be selected from or add a reason. The third part requests the respondent's opinion towards construction health and safety programme in Construction. The fourth and final part contains major areas to be considered during construction of high rise real estate buildings including the frequency of causes of injuries and the factors that affect Health and Safety performance in high rise building construction projects and analyzed with figures.

Interview

Interviews give supplementary information which is often of great value in interpreting results, about the respondent's personal characteristics, views and environment. Interview was conducted to some selected employees of the case company in order to get more information in greater depth. Two project managers, one human resource manager, one supervisor, one site engineer and one foreman were interviewed.

Observation Checklist

Direct observation was used on the construction sites using checklist to directly observe and document the workplace practices, identified hazards, management, site organization, work practices, facilities, equipment and tools being used. The background of the researcher being in the construction field has helped to easily understand the critical issues in the construction health and safety. The research paper included the researcher's own observation of the selected case projects and experience to enrich the study with the required data.

3.5. Description of Study Variables

These are the different factors that are considered to be relevant to the health and safety practices in constructing high rise real-estate buildings.

- Policies and Regulations: the company should follow health and safety policies stated in the local government law and develop written in-house that will help protect the health and safety of employees and visitors.
- Management structure: health and safety manager should be appointed. The management should give health and safety first priority in the workplace.
- Training: there should be orientation to new employees and periodical training to all workers in a site to create awareness about health and safety and remind them of protecting one self and each other while at work.

  Knowledge and attitude: a site contains different people with different levels of education, understanding, experience and views; keeping that in mind continuous effort is required so as to increase their knowledge of health and safety practices. They cannot take care more than they know so all employees must be equipped with knowledge of keeping themselves and others safe from danger while performing each and every activity in the work place. And a medium should be created for them to share their understandings and experiences with each other.

- Facilities and tools: Though trainings are given and knowledge is enhanced, health and safety practices cannot take place in the absence of facilities and tools.

  Evaluation technique: workplace should be checked whether tasks are being performed in a safe and healthy manner, facilities and PPEs are being used properly and health and safety rules are followed in order to develop the culture of healthy and safe practices.

3.6. Data Analysis –techniques, software

This research used descriptive statistical analysis technique to analyse the data collected from the questionnaires. The data was entered to Excel and interpreted and analysed by SPSS version 20 software programme. The questionnaires gathered from the different construction professionals in the company were analysed using descriptive tools to answer the health and safety policies and regulations used in the construction of high rise real estate buildings, the health and safety management structures used during the construction of high rise real estate buildings, whether sufficient health and safety management trainings are given to the employees during the construction of high rise real estate buildings or not and whether there are adequate facilities, tools and evaluation techniques of health and safety during the construction of high rise real estate buildings.

The data from interview and comments were analysed using qualitative data analysis techniques separately but presented in combination with the quantitative information. This one is heavily dependent on the researcher's analytic and integrative skills and personal knowledge of the social context where the data is collected. Ethnographic and Constant comparative methods were used to analyze the qualitative data.

Ethnographic is studying people or situations within their own environment through the use of methods such as participant observation face to face interviewing.

Constant comparative method is a process in which any newly collected data is compared with previous data that was collected in one or more earlier studies.

3.7. Reliability and Validity Analysis

The extent to which results are consistent over time indicates the reliability of a research. To keep the consistency of this study, the researcher has reviewed literatures, articles and previous researches and cross checked the findings of this study with it. The Cronbach's Alpha test was used to assure the reliability of the results of the questionnaire with Likert Scales. The acceptable limit of Cronbach's Alpha is a result

greater than 0.7. All the results were greater than 0.7 as shown below in the figure which assures their reliability.

Validity determines whether the measuring instrument truly measures what it was intended to measure or how truthful the research results are. Before distributing the questionnaires and performing the interviews, the advisor of the researcher approved it and other few selected construction professionals commented on it. To measure the validity of the results, the researcher considered the theory and the measuring instrument used.

Table 3.7 – 1 Cronbach's Alpha Test

	Reliability Statistics		
Questionnaire No.	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
(Part 3) 3.1	.730	.771	7
(Part 3) 3.2	.990	.991	15
(Part 4) 4.1	.960	.964	10
(Part 4) 4.2	.988	.992	20

3.8. Ethical Consideration

According to Kumar and Kandasamy (2012) ethical considerations in research work includes the following: and all were considered during the study.

- Right to choose: whether or not to participate in the study.
- Right to safety: from psychological damage like stress during the interview.
- Right to be informed: what is involved, how long it will take, and what will be done with the data.
- Right to privacy: control of information and unwanted communication.
- Confidentiality**: i**ndividual respondents should never be identified and their privacy and rights must be reserved.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter presents the triangulation of the data collected through the questionnaires, interviews and the observation check list. It includes the analysis and interpretation of the data which helps to reach to conclusion and forward recommendations towards health and safety practices for high rise buildings in general and real estate companies in particular.

4.1. General Information of the Respondents

This section briefly shows the descriptions of the construction professionals participated in the study. A total number of 85 questionnaires were distributed but only 50 questionnaires were collected. Based on the collected number of respondents the margin of error was calculated using margin of error calculator and resulted in 9.85%; which is acceptable for social science studies. The number of the questions in the questionnaire was not small in order to get full information on the current health and safety practices but was easy to answer. Due to time constraint, unwillingness of some of the employees, absence of incentive to the respondent (which motivates some people) and other factors, it was difficult to gather all the distributed questionnaires.

Table 4.1 – 1: Response rate among Sampled Population

Population in Number	Sample Size	Questionnaires Distributed(in no)	Questionnaires Collected (in no.)	Return Rate in %
100	80	85	50	58.8%

Gender of Respondents

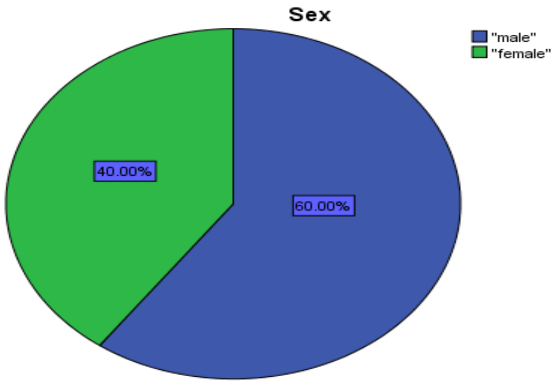


Figure 4.1 – 1: Gender of Respondents

As shown in the figure above there were 40% female and 60% male respondents. It is clear that unlike some years back in Ethiopia, these days there is almost equal participation of both genders in the construction firm.

The Education Status of the Respondents

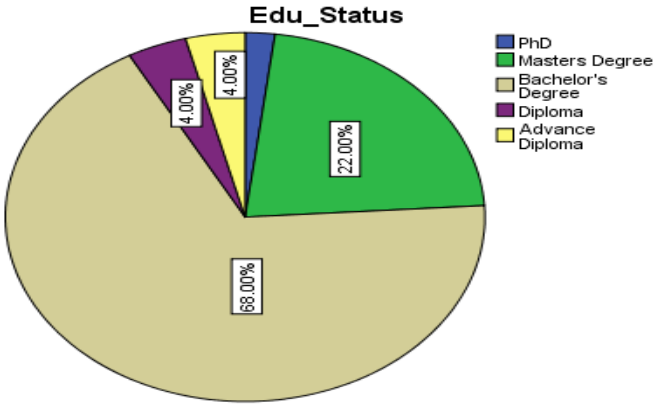


Figure 4.1 – 2: Education Status of Respondents

As shown in the figure above, 68% of the respondents were Bachelor's Degree holders, 22% were Master's Degree holders, 4% were Advanced Diploma holders, 4% were Diploma holders and 2% which was only one person with PhD holder. It can be seen that the construction industry has space for every education levels. Though not participated in the questionnaire, since the company give contract to contractors to hire these professionals, most daily labourers, masons, carpenters, bar benders etc. have educational level lower than diploma.

Job title of the Respondents

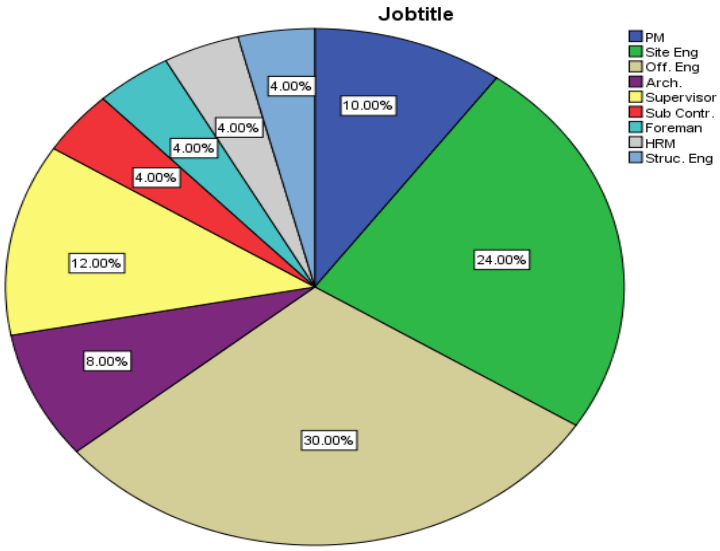


Figure 4.1 – 3: Job Title of Respondents

Out of the respondents 30% were office engineers, 24% were site engineers, 12% were supervisors, 10% were PMs, 8% were architects, and structural engineers, HRMs, sub-contractors and foremen each were 4%. The researcher believes health and safety is the responsibility of all professions which participate in the project one way or another and tried to include all as much as possible.

The Total Work Experience of the Respondent sand Their Stay in the Company

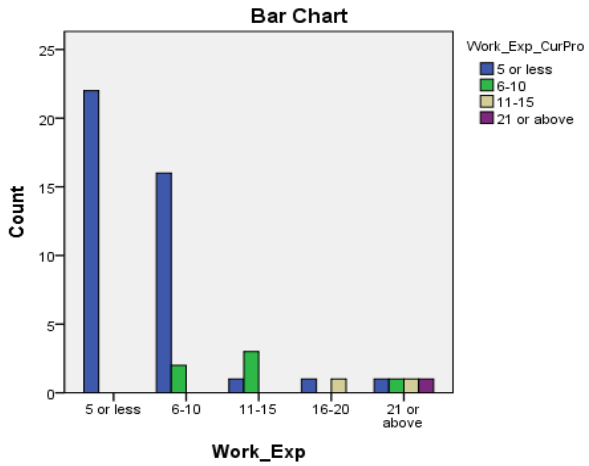


Figure 4.1 – 4: The Total Work Experience of the Respondents' and Their Stay in the Company

The figure above shows the work experience of the respondents' and their stay in the company. Most of them had 5 years or less and 6 – 10 years of experiences, there were also respondents with 11 – 15 years and above. Those with 10 years and above helped in explaining the situations in the construction industry but 5 years or less is enough to know the current practices in the company which can represent all high rise real estate buildings since the practices are more or less similar. Thus the experiences of the respondents' imply they can forward valuable information as required by the study.

4.2. Current Health and Safety Practices in High rise Buildings

4.2.1. Health and Safety Policy

Companies should have written HS policies and regulations that comply with the OHS policies and rules of the country. Healthy and safe working environment must be provided for employees and the company must be committed to the goal of maintaining it, looking for a continuous improvement.

All employees and visitors must perform their actions and duties in a safe and healthful manner, and are accountable for the health and safety of themselves and their co-

workers. If necessary, disciplinary actions should be taken on those who fail to abide in the company's health and safety policy.

During observation of the projects, the researcher did not see visible health and safety rules and warning signs posted.

During the interview, both the Senior PM and the HRM with more than 20 years' and 15 years' experience respectively said that there is no well-organized written OHS policy in most construction companies and if there is in few companies, the implementation is very poor; but that they do have written policy here in this company but there is no budget allocated for the implementation and that they are working on it.

Respondents in the questionnaire were asked if there is in house OHS policy and implementation and if they answered no, they were asked why. Since the employees do not see the HS practices being applied in their workplaces, all answered no and chose their reasons from the list of reasons provided to them. Only three respondents chose the choice 'other' and give their own reasons. One of them said that he has no idea why, it seems like he could not get enough reasons for this. The second one said that it is because of lack of commitment by top managers; and the third one said that responsible HS department is not available.

Table 4.2.1 – 1: Respondents' Opinion about the Company's HS Policy and Implementation

	Frequency	Per cent	Valid Per cent
Lack of Awareness by all Parties	10	20	20
No control by Government Body	19	38	38
Ignorance	23	46	46
Other	3	6	6

Respondents have chosen more than one choice.

46% of the respondents agreed the main reason of the absence of HS policy and implementation is because of ignorance. The duty of the legislation of HS policy lies on the top managers who are aware of the importance of HS practices but are ignorant. One can naturally prefer and know the value a healthy and safe working environment unless it is out of ignorance that one does not follow the HS rules. 38% of the respondents believed that it is because of lack of control by the government body that HS practices are not practiced. Of course the government should inspect and enforce health and safety practices in every company and use punishment for disobedience and reward system for obedience of the law. Only 10% of the respondents said it is lack of

awareness by all parties. Hence, it can be concluded that absence of HS policy and implementation is mainly out of ignorance.

As mentioned earlier, the senior PM and the HRM said that they have HS policies that comply with the HS rules of the Ethiopian Labour Law but they do not have the budget for implementation. The empirical studies showed; the labour law in Ethiopia is also formulated in order to guarantee and maintain all fundamentals rights at work and to define the powers and duties of the organ charged with enforcing of the implementation of the ideals of the law which is tantamount to the labour inspectorates. (Seblework, 2006) Had the government had strict enforcement and inspection, the company owners would have allocated budget for the HS policy.

The conceptual review showed that one of the components of an effective health and safety management is health and safety policy and commitment to consistently look forward to it. In the absence of HS policy and execution especially in implementation phase of buildings, without doubt there is high presence of increased cost of accident, time overrun, loss of productivity and most of all the life of every employee is at risk.

4.2.2. Health and Safety Management Structure

In order to have an effective Health and Safety Management System, there should be appointment of Health and Safety Manager. Managers should form joint HS committee to work cooperatively in taking all the steps which reduce workplace hazards as low as possible. Managers together with supervisors are responsible for the health and safety of all workers under their supervision.

As the conceptual review pointed, monitoring and review is an essential component of health and safety management system. The management is supposed to monitor HS performance, ensure adequacy of HS budget and plan project HS and act accordingly.

The researcher did not observe any HS office and HS personnel during her visit in all the current three project sites of the company which were under construction.

During the interview, all interviewees told the researcher that there is no HS Manager which means there is no particular designated person (manager) who is responsible for the pre-mentioned management duties. The senior project manager said that they have general supervision of each project site twice a week but not in particular for the HS performance. Only if they find critical issue during the supervision, they automatically try to give it a solution. And about ensuring the adequacy of HS budget, there is no allocated HS budget in the first place. Respondents were asked what they think the

reason is and to forward their suggested HS expense in % out of the total construction cost.

Table 4.2.2 – 1: Respondents' Opinion towards the company's HS Management Structure

	Frequency	Per cent	Valid Per cent
Lack of Awareness by all Parties	14	28	28
No control by Government Body	31	62	62
Ignorance	23	46	46
Budget Constraint	22	44	44
Absence of Obligation in the Contract Agreement	23	46	46
Upper level Management and Commitment Problem	45	90	90

Respondents have chosen more than one choice.

The respondents were supposed to choose their reasons from list of choices in the questionnaire; of which 90% chose the 'upper level Management and Commitment Problem', 62% chose 'No control by the Government body', 46% chose 'Ignorance', 46% chose 'Budget Constraint', 28% chose 'Lack of Awareness', 22% chose 'Absence of Obligation in Contract Agreements'.

It can be concluded that the main reason of lack of HS manager was identified to be the upper level management and commitment problem. The company and top managers in the company must hire HS Manager who manages every HS issues. The second most chosen reason was the lack of government control; the government must enforce appointment of HS Manager since that will help in prohibiting lots of workplace damages and injuries. The third most chosen reasons were ignorance and budget constraint. Ignorance should be removed and morality and consciousness should take place in the minds of every one as health and safety is the responsibility of all. Whether there is an enforcing and punishing body or not; obeying laws and keeping oneself and others safe is very important. When contracting to outside contractors HS issues are not even considered in the contract agreements. 46% of the respondents think there is a budget constraint too; but as per the interview and literature reviews; it is not about budget constraint but the absence of strict enforcement by the government and the less attention given for HS by the company owners.

Table 4.2.2 – 2: Respondents' Suggested HS Expense

Job Title * Suggested HS Expense Cross tabulation

Count						
Job title	Suggested HS Expense in % of the total construction cost					Total
	< 0.5	0.6-1	1.1-2	2.1-3	> 3.1	
PM	1	1	1	1	1	5
Site Engineer	2	4	4	2	0	12
Office Engineer	2	4	7	2	0	15
Architect	2	0	1	1	0	4
Supervisor	2	2	1	1	0	6
Sub-Contractor	0	0	1	1	0	2
Foreman	0	0	1	0	1	2
HRM	0	0	0	2	0	2
Str. Engineer	0	1	0	1	0	2
Total	9	12	16	11	2	50

Different scholars suggest different OHS cost to developing countries like Ethiopia, the findings of this research and the researcher from own experience suggested 1.1 – 2% of the total construction cost.

4.2.3. Health and Safety Training

New employees must be trained prior to starting their job and regular training and instruction must be provided to for workers to make sure that appropriate work practices are followed, and to promote their use. These trainings offered must not be either only to say there is training in this company or to meet the numerous policies and regulations, but also as a construction company to encourage health and safety practices and be an exemplary model throughout the construction community. Awareness should be created constantly through HS meetings, written brochures and orientations.

Currently, there is a worldwide pandemic COVID-19; though many business sectors have decreased works, all construction firms are actively engaged in work. This implies construction workers are highly exposed to such and other kinds of transmitted diseases; so they need to be constantly trained how to protect themselves and others.

Many women participate in construction works these days, especially there are women daily labourers that come from countryside looking for better lives in the city and others who want to go to Arab countries as house-maids and till they finish their processes to go, they engage in construction activities to get some money to support their lives. Unless such women are trained well, they are highly exposed to HIV AIDS and other diseases and they are not aware of how to protect themselves.

During the interview, the PM told to the researcher that there is a training once a year in every project. In the researcher's point of view this once a year training has no relevance because people really forget and should be constantly remind plus new employees can join at some time between the years.

Respondents were asked if there are trainings for new employees, workers and whether there are written brochures to aware them about HS practices, all answered no and gave their reasons.

Table 4.2.3 – 1: Respondents' Opinion towards the Company's HS Training

	Frequency	Per cent	Valid Per cent
Lack of Awareness by all Parties	12	24	24
No control by Government Body	19	38	38
Ignorance	26	52	52
Budget Constraint	32	64	64
Upper level Management and Commitment Problem	18	36	36

Respondents have chosen more than one choice.

64% chose the 'budget constraint', 52% chose 'ignorance', 38% chose 'no control by the government', 36% chose 'upper level management and commitment problem' and 24% chose 'lack of awareness by all parties' as their reasons. Since the researcher has noted that there is no budget allocated for HS during the interview with the managers, the most chosen reason by the respondents which is budget constraint is the main reason. Even if one of the managers like the HRM wants to plan HS trainings, it cannot be performed without allocated budget. The ignorance of company owners towards

workers HS is a big challenge that the government should work on by regular inspection and penalty for failing to obey the Ethiopian OHS policies.

The findings of this study agreed with this the fore mentioned limitations in training capacity of OSH inspectors in terms of using measurement based hazard evaluation, access to hazard measuring equipment, knowledge and skill of using the equipment, exposure of measurement technology and absence of trained human resource is a point of concern. (Kumie et al., 2016)

4.2.4. Health and Safety Resources: Facilities, Tools and Evaluation technique

Employers are obliged to create a healthy and safe working environment to their employees. And workers have all the right to refuse working in unhealthy and risky environment. But this is not the case for developing countries like Ethiopia where jobs are really hard to get and getting the job might be the ultimate goal of many people including construction professionals. Healthy and safe working environment includes good welfare facilities like showers, canteens, rest-rooms, provision of PPEs, the right tools, equipment and plants to execute jobs and periodical review of applications of those provided facilities, tools, equipment and PPE. PPE is the final line of defence between the worker and the occupational hazard, failing to use it causes damage and injury.

During the researcher's own observation of the project sites, she has seen the construction activities being performed with the right tools, equipment and plants but has not seen workers with PPEs. She has also observed rest-room (not clean) but not canteens and good shower.

During the interview the project manager said that the layout of the site considers HS aspects as in constructing temporary structures like site offices and access roads and that PPEs are provided for some their employees like the PMs, supervisors, site engineers and foremen but those employees who are provided are not seen using it daily mainly because of ignorance and absence of strict evaluation as everyone focuses on the job being done only. He said that there is supervision of the sites but not the HS aspects.

The Construction industry in Ethiopia in general needs lots of jobs to be done on industrial hygiene. Industrial Hygiene is the science of anticipation, recognition, evaluation, control, and prevention of health and safety hazards in the workplace that may cause injury, illness, or affect the well-being of workers and the community. (UVA, 2020)

Table 4.2.4 – 1: Respondents' Opinion towards the Company's HS Facilities, Tools and Evaluation Technique

	Frequency	Per cent	Valid Per cent
Lack of Awareness by all Parties	16	32	32
No control by Government Body	45	90	90
Ignorance	38	76	76
Budget Constraint	9	18	18
Absence of Obligation in the Contract Agreement	33	66	66
Upper level Management and Commitment Problem	1	2	2
No Skilled Person	24	48	48
No Standard Practice	26	52	52

Respondents have chosen more than one choice.

90% chose 'no control by the government', 76% chose 'ignorance', 66% chose 'budget constraint', 52% chose 'no standard practice', 48% chose ' no skilled person' etc. As shown in the table. The fact that there is no strict government control is the main reason. Since people are afraid of punishments; they would perform better in that case. Ignorance is second most chosen reason which is not only by the employers, but also during the interview the PM said that the employees are also as ignorant as not using PPEs even after providing them. Third most chosen reason is budget constraint; of course the senior PM has told the researcher that there is no budget allocated for HS. The fact that there is no standard practice makes it difficult for implementation. Absence of HS personnel and HS obligation in the contract agreement while contracting outside contractors, were also the other reasons.

4.2.5. Responsibility of Accidents during Construction

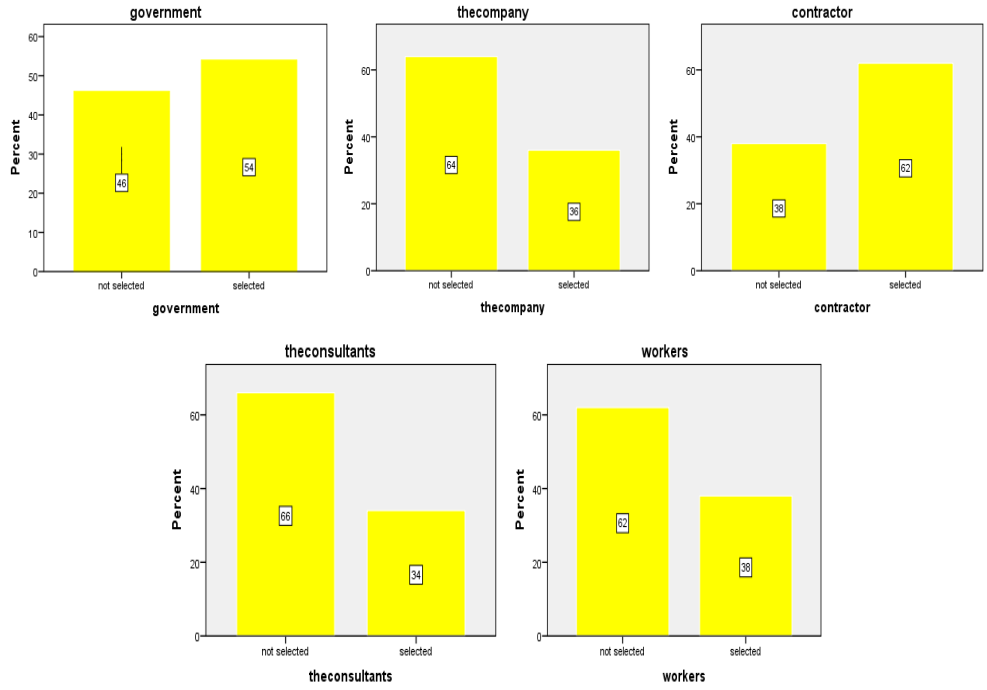


Figure 4.2.5 – 1: Respondents' Opinion of Responsible Body for Construction Accidents

Health and Safety is the responsibility of all stake holders in the construction industry. Each and every one of them might have roles to play but every individual is responsible for the health and safety of oneself.

Accident and Fatal Reporting

During the interview, the researcher noted that when accidents happen on site, the foreman reports the accident to the available engineer in the office and the management will take care of the situation. It will be reported to insurance within seventy two hours (two days) and costs are handled by insurance. If death situation occurs compensation fee will be paid to the injured family of the worker and the body will be sent to the families.

Answers from the interview showed that there is First Aid Kit on the site but no First Aider, there used to be a nurse but now the first aid is handled by the foremen. Two deaths (one fallen from scaffolding and the other when trying to swim in the excavated hole which was filled up by water) and one paralysis (fallen from height while carelessly taking to a co-worker on the ground) were of the worst accidents during the past three years as the researcher found out from the interview questions.

Accident and fatal reporting is a major issue which must be handled by a health officer, and helps a lot in risk assessment, risk prevention and control, hazard identification, safety plan and for researchers' future works.

4.3. Respondents' Opinion towards Construction Health and Safety Program in Construction Related Disciplines

Construction health and safety is the responsibility of all construction professionals. Construction Health and Safety Program must be included in every construction related disciplines.

Table 4.3 – 1: Frequency and Percentage of Respondents' Opinion towards inclusion of HS Program in Construction related Disciplines

	Likert Scale											
	Very Important		Important		Neutral		Not really Important		Un important		Total	
	F	%	F	%	F	%	F	%	F	F	F	%
PM	45	90	5	10	0	0	0	0	0	0	50	100
Architect	15	30	21	42	7	14	6	12	1	2	50	100
Civil Eng.	44	88	6	12	0	0	0	0	0	0	50	100
Structural Eng.	39	78	9	18	1	2	1	2	0	0	50	100
Quantity Survey	17	34	20	40	10	20	3	6	0	0	50	100
Building Survey	16	32	27	54	7	14	0	0	0	0	50	100
Safety Officer	45	90	5	10	0	0	0	0	0	0	50	100

Table 4.3 – 2: Mean and Standard Deviation of Table 4.3 – 1

	1	2	3	4	5	6	7
Mean	1.10	2.14	1.12	1.28	1.98	1.82	1.10
SD	0.303	1.050	0.328	0.607	0.892	0.661	0.303

The mean and standard deviations are ordered according to the listed disciplines in the above table respectively.

The following subject areas must be addressed in the construction/ construction management programme. Respondents' were asked if they have been included.

Table 4.3 – 3: Frequency and Percentage of Respondents' Answer in whether the listed Subject areas are addressed in the Construction/ Construction Management Program

	Likert Scale											
	Strongly Agree		Agree		Neutral		Dis agree		Strongly Disagree		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Requirement Legal	16	32	26	52	3	6	1	2	4	8	50	100
Responsibility HS	14	28	9	18	1	2	13	26	13	26	50	100
HS Policy	13	26	15	30	4	8	11	22	7	14	50	100
Safety Plan	10	20	20	40	4	8	10	20	6	12	50	100
Risk Analysis	13	26	13	26	3	6	16	32	5	10	50	100
HS Program	7	14	9	18	4	8	20	40	10	20	50	100
HS Inspection	6	12	9	18	5	10	23	46	7	14	50	100
HS Training	6	12	9	18	4	8	23	46	8	16	50	100
Constructability	3	6	8	16	9	18	25	50	5	10	50	100
Personal Protection	9	18	11	22	11	22	14	28	10	10	50	100
Injury Report	6	12	3	6	9	18	22	44	10	20	50	100
HS Promotion	4	8	3	6	6	12	20	40	17	34	50	100
Procurement system Influence	2	4	4	8	11	22	18	36	15	30	50	100
In-house HS rules	6	12	10	20	11	22	11	22	12	24	50	100
House Keeping	1	2	7	14	16	32	14	28	12	24	50	100

Table 4.3 – 4: Mean and Standard Deviation of Table 4.3 – 3

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mean	2.02	3.04	2.68	2.64	2.74	3.34	3.32	3.36
SD	1.097	1.628	1.435	1.336	1.411	1.364	1.269	1.290
	9	**10**	**11**	**12**	**13**	**14**	**15**	
Mean	3.42	2.90	3.54	3.86	3.80	3.26	3.58	

SD	1.071	1.282	1.232	1.195	1.088	1.352	1.071	

The mean and standard deviations are ordered according to the listed disciplines in the above table respectively.

4.4. Major Health &Safety areas to be considered during construction of high rise building construction projects

Frequency of Causes of Injuries in Construction Sites

Construction industry in general is very hazardous industry. Each and every activity must be performed in healthful and safe manner, failing to do so causes fatal and non-fatal accidents, and ill-health problems.

During the interview, all interviewees said that every activity in the construction site needs to be carried out in a careful safe manner.

Table 4.4 – 1: Frequency and Percentage of Respondents Opinion towards the Frequency of Causes of Injuries

	Likert Scale									
	High		Medium		Low		Exceptional		Total	
	F	%	F	%	F	%	F	%	F	%
Falling	27	54	21	42	2	4	0	0	50	100
Stairways and ladders	27	54	17	34	5	10	1	2	50	100
Scaffolding	47	94	2	4	1	2	0	0	50	100
Excavation	47	94	3	6	0	0	0	0	50	100
Electricity	10	20	29	58	6	12	5	10	50	100
Construction Hoists, Cranes	15	30	20	40	12	24	3	6	50	100
Hazardous Substance	13	26	16	32	15	30	6	12	50	100
Noise	22	44	18	36	8	16	2	4	50	100
Tools & Machinery	10	20	26	52	11	22	3	6	50	100

Fire	3	6	17	34	18	36	12	24	50	100

Table 4.4 – 2: Mean and Standard Deviation of Table 4.4 – 1

	1	**2**	**3**	**4**	**5**
Mean	1.50	1.60	1.08	1.06	2.12
SD	0.580	0.756	0.340	0.240	0.849
	6	**7**	**8**	**9**	**10**
Mean	2.06	2.28	1.80	2.14	2.78
SD	0.890	0.991	0.857	0.808	0.887

The mean and standard deviations are ordered according to the listed causes in the above table respectively.

Falling from scaffoldings and heights, stairways and ladders and excavated places were the most selected danger areas; but all in all construction sites are the riskiest places which needs the most careful, healthy and safe working practices.

Factors which affect health and safety performance of high rise building construction projects

There are different factors with different degree of impact affecting health and safety performance of high rise real estate buildings. Respondents were asked to identify the degree of impacts of the different factors.

Table 4.4 – 3: Frequency and Percentage of Respondents' Opinion towards the Degree of impact of the different factors affecting HS performance in Construction

	Likert Scale											
	Very High		High		Average		Low		Very low		Total	
	F	%	F	%	F	%	F	Per.	F	%	F	%
Design Complexity	9	18	5	10	17	34	12	24	7	14	50	100
Type of Owner	28	56	13	26	6	12	2	4	1	2	50	100
Weather Condition	5	10	23	46	16	32	5	10	1	2	50	100
Project Cost	11	22	23	46	10	20	4	8	2	4	50	100
Project Duration	11	22	14	28	18	36	5	10	2	4	50	100
HS in Contracts	28	56	16	32	5	10	1	2	0	0	50	100
HS Policy	31	62	18	36	1	2	0	0	0	0	50	100

Accident Report	28	56	14	28	5	10	2	4	1	2	50	100
Fire Control	17	34	18	36	10	20	2	4	3	6	50	100
Risk Assessment	27	54	15	30	6	12	1	2	1	2	50	100
HS Training	31	62	17	34	1	2	1	2	0	0	50	100
PPEs	33	66	15	30	1	2	1	2	0	0	50	100
Emergency Planning	30	60	18	36	1	2	1	2	0	0	50	100
HS Inspection	29	58	19	38	1	2	1	2	0	0	50	100
HS Meeting	26	52	21	42	1	2	2	4	0	0	50	100
First Aid Provision	30	60	19	38	1	2	0	0	0	0	50	100
Safety Signs	29	58	16	32	4	8	1	2	0	0	50	100
Work Environment	33	66	13	26	4	8	0	0	0	0	50	100
Reward & Punishment	14	28	28	56	4	8	3	6	1	2	50	100
Role of Gov't & Engineering Societies	36	72	12	24	1	2	1	2	0	0	50	100

Table 4.4 – 4: Mean and Standard deviation of Table 4.4 – 3

	1	2	3	4	5	6	7	8	9	10
Mean	3.06	1.70	2.48	2.26	2.46	1.58	1.40	1.68	2.12	1.68
SD	1.284	0.974	0.886	1.026	1.073	0.758	0.535	0.957	1.118	0.913
	11	12	13	14	15	16	17	18	19	20
Mean	1.44	1.40	1.46	1.48	1.58	1.42	1.54	1.42	1.98	1.34
SD	0.644	0.639	0.646	0646	0.731	0.538	0.734	0.642	0.892	0.626

The mean and standard deviations are ordered according to the listed factors in the above table respectively.

The role of government and engineering society, work environment, HS policy, HS inspection, HS training, contractual specification of HS, risk assessment, emergency plan, provision of PPEs, accident report, first aid and aider and owner's attitude were identified as the major factors affecting the health and safety performance of construction sites.

4.5. Inferential Analysis

Inferential analysis was done between the four major factors identified as reasons for the four research questions. From the literature reviews and survey results the inter-relationship among the reasons can be clearly seen; ignorance, no control by the government body, budget constraint and upper level management and commitment problem.

Table 4.5 – 1: Inferential Analysis – 1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.444	1	.444	1.980	0.000
	Residual	10.776	48	.224		
	Total	11.220	49			

a. Dependent Variable: budget constraint

b. Predictors: (Constant), upper level management and commitment problem

Thus it can be seen that there is a direct proportionality relationship among two of the major reasons; the upper level management and commitment problem and budget constraints. The fact that the upper management do not allocate budget for health and safety management in a company can result in poor health and safety practices which leads to workplace hazards.

Table 4.5 – 2: Inferential Analysis – 2

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.142	1	.142	.760	0.000
	Residual	8.978	48	.187		
	Total	9.120	49			

a. Dependent Variable: ignorance

b. Predictors: (Constant), no control by government body

Hence, it can be concluded the relationship explained in the data interpretation part and in the literature review between control by government body and ignorance exists. Even if there is an existence of ignorance towards health and safety practices in a company, strict control by the government can surely avoid it.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary of Major Findings

The findings showed the absence of health and safety practices in constructing high rise real-estate buildings in Addis Ababa. The major problems pointed out being the absence of health and safety management system, health and safety policy implementation, appointed health and safety personnel, health and safety awareness creating mechanism, good welfare facilities, provision of PPEs and evaluation techniques in companies.

The case company represents the health and safety practices in high rise real-estates of Addis. It is one of the senior construction companies and has more than twenty years of experience in building real-estates.

The company have written in-house policies that comply with the Ethiopian labour law. But the policy is not implemented. The majority of the respondents agreed the main reason of the absence of HS policy and implementation is because of ignorance and second because of lack of control by the government.

There was no specifically appointed health and safety manager. Almost all respondents pointed to upper level management and commitment Problem as the main reason. Next to that absence of control by the government body was specified as the reason. Some other given reasons were ignorance and budget constraint.

Results from the interview showed that there is no budget allocated for HS management. Training of health and safety is given once a year in every project. It fulfils the company's plan of once in a year HS training but it does not help in developing a healthy and safe culture. Most of the respondents reasoned that it is because of budget constraint. Some respondents agreed on ignorance while others responded the absence of control by the government, upper level management and commitment problem, and lack of awareness by all parties as their reasons.

The right tools and equipment are available in the company to perform the construction activities with quality but good welfare facilities and PPEs are not available to the workers in the site. The result of the surveys showed the main reason for this is the absence of control by the government; secondly it is ignorance, and thirdly budget constraint. The absence of standard practice and skilled person were also some of the reasons.

Total supervision of each project sites is conducted twice a week but mostly focus on the work being done not on the workers. This is identified to be because of the top managers' attention towards the work only.

Furthermore, the importance of inclusion of Health and safety program in construction related fields was studied. The frequencies of causes of injuries were identified with injuries around scaffoldings and excavated holes being the most frequent followed by falling from height and stairways and ladders, then noise, construction equipment, tools and machinery, electricity and last fire.

In addition factors affecting the performance of health and safety of high rise real-estate buildings were identified. The result implied that the implementation of all components of a health and safety management system, the role of government and engineering society and the type of owner highly affects the HS practices in projects.

5.2. Conclusion

The global construction sector is infamous for high levels of injuries, accidents and fatalities, and poor health and well-being of its workforce. While this record appears in both developed and developing countries, the situation is worse in developing countries, where major spending on infrastructure development is expected. There is an urgent need to improve construction health and safety in developing countries. (Patrick Manu et.al, 2020)

From the findings of the research, it can be surely generalized that the health and safety practices in high rise real estate buildings in Addis Ababa are very far from health and safety management systems. It can be said that health and safety practice is found only in the written conventions of the country. Occupational health and safety policies and standards might have been ratified many decades ago; the saddest truth is they have not passed the lines they have been written on.

Construction workers are front liners in the construction industry. They are the first hand victims of poor health and safety practices. The day to day construction activities are carried out by these construction workers. And yet attention is given for the work and work only unless worst accidents happen which in that case insurances handle the situation.

Construction professionals like site and office engineers, project managers, supervisors... etc. invests a minimum of five years of their lives on taking the construction programmes. And to get a good job, they spent minimum of three or more

years in gaining experience with compromised salaries. And later on, they work on such sites which have no concern for their safety and health which demoralizes the educated.

Construction workers like masons, carpenters, bar benders ...etc. take longer years to develop the skills. Most daily labourers also come a long way to find jobs but it takes few minutes to lose lives. It is not uncommon to see daily labourers climbing very weak and old wood scaffoldings like a monkey, transporting goods and themselves up and down with old lifts, and eating and resting in a place full of dust and dirt.

Proper tools and equipment might be seen in the sites of the projects but a person using PPEs is not a usual seen in the sites. Surprisingly the most important thing for the owners is whether the project is on budget and on schedule.

The situation does not only hurt the workers but also does hurt many others directly or indirectly. Families of the workers, the owner, the client, the contractor, the construction company, the construction industry, the city and the country all are victims of the ignorance towards construction health and safety. The responsibility of developing a healthy and safe culture is not left to anyone rather to each and every one involved in the industry.

In general in Addis Ababa high rise real estate buildings, it is very difficult to say such a standard practice of health and safety practice is applied in all projects. There is no uniform way of interpreting and applying the health and safety laws.

Government inspections of construction project sites are low levelled. And penalties of failure to comply with the health and safety rules are insignificant. It is very good, important and appreciated that there are health and safety policies and standards that comply with ILO as a country; but it is very bad, useless and depreciated that the regulatory bodies lack strict enforcement of those laws.

5.3. Recommendation

In light of the findings of this research, suggestions on construction health and safety practices have been forwarded.

To the Construction Company:

- Construction companies should have written in-house health and safety policies and regulations that comply with the country's labour law in order to decrease workplace hazards.

- Companies must include contractual specifications of health and safety management system in the contract agreement when contracting external contractors.
- There should be an organized HS management structure for proper implementation of health and safety practices.
- There needs to be an appointed HS officer who can be responsible for the implementation and monitoring of HS practices because other managers can be busy managing the construction activities.
- Periodical HS trainings must be held to constantly aware workers to work in a safe and healthful manner and reminding them of the consequences of failing to do so.
- Good HS facilities should be provided to workers to create good working environment and boost their morals which in turn enhances the productivity of the company.
- PPEs should be provided to all workers to help protect them from injury.

To Construction Workers:

- PMs as leaders of projects must assure the implementation of HS practices in projects which are under their management.
- Workers themselves should primarily be responsible for their well-being.
- Workers must obey the HS policy and protect each other at workplaces.

To the government:

- Regulatory bodies should enforce OHS policies in the construction industry.
- There should be periodic and sudden inspection of project sites.
- Reward and punishment system must be used to discipline construction companies.

References

Abrahamsen, A. and Hall, G. (2013) For a Successful Project, Put Safety First. [online]www.ehstoday.com.Availableat:https://www.ehstoday.com/safety/article/21916148/for-a-successful-project-put-safety-first.

Argaw, F., (2017). Assessment of Construction Safety and Health Management in High Rise Building in Addis Ababa MA Thesis

BBC News (2019). Challenges facing Ethiopia's construction industry. Available at: https://www.bbc.com/.../challenges-facing-ethiopia-s-construction-industry.

Creswell & Plano Clark (2007). Research Design

Designingbuildings.co.uk. (2018) Construction project - Designing Buildings Wiki. [online]Availableat: https://www.designingbuildings.co.uk/wiki/Construction_project.

Drew Mitchell (2013). what is Health and Safety and what does it mean for me?

EHS Insight Resources (2019)

Ethiopian Economic Association (2008): The current state of the Construction Industry.

Ethiopia Labour Inspection Audit, 2009 – ILO

Marczyk, G., DeMatteo, D. and Festinger, D. Essentials of Research Design and Methodology

Getachew, A. (2016). Construction in Addis Ababa takes deadly toll. [online] Available at: https://www.aa.com.tr/en/world/construction-in...

Gopal, T.G.S.R. and Dr. K. Murali (2016). Secondary Data Analysis on Factors Affecting Labour Productivity in Construction. International Journal of Scientific and Research Publications, 6(5).

Government of Alberta (2019). Partnerships in Injury Reduction. [online] Alberta.ca. Available at: https://www.alberta.ca/partnerships-injury-reduction.aspx [Accessed 12 Apr. 2019].

Mersha, H., Tiku, S. and Dube, L. (2017). Prevalence of Occupational Injuries and Associated Factors among Construction Workers in Addis Ababa, Ethiopia. Journal of Public Health and Epidemiology: Vol. 9(1), p. 1-8.

ITE Build & Interiors. Ethiopia's Construction Industry: Transforming a Nation; a Market Insights Report

Beaton, J. (2014-2015). Occupational Health and Safety Officer. Version II. ST.FRANCIS XAVIER UNIVERSITY

J.J. Smallwood (1999). The Role of Health and Safety in Project Management

Adams, J., Hafiz T.A. Khan, Raeside, R. and White, D. (2007). Research Methods for Graduate Business and Social Science Students

Kai Chen Goh, Hui Hwang Goh, MohdFaizal Omar, TienChoonToh and Abdullah AsuhaimiMohdZin (2016). Accidents Preventive Practice for High-Rise Construction. MATEC Web of Conferences 47, 04004. Owned by the authors, published by EDP Sciences, DOI:10.1051/matecconf/20164704004

Kumar and Kandasamy (2012). Ethical considerations in research work

kumie, A., Amera, T., Berhane, K., Samet, J., Hundal, N., G/Michael, F. and Gilliland, F. (2016). (Occupational Health and Safety in Ethiopia: A review of situational Analysis and Needs Assessment

Lucy Fekele, Prof. Emer T. Quezon, Yolente C. Macarubbo (2016). Evaluation of Health and Safety Practice in Building Construction: A Case Study in Addis Ababa; International Journal of Scientific & Engineering Research, Volume 7, Issue 10

Sikora, M. (2016). Health and Safety in Construction

Muiruri, G. and Mulinge, C. (2014). Health and Safety Management on Construction Projects in Kenya

NQA (2020). Occupational Health and Safety Management

Regional Committee for Africa, 54 (2004). Occupational Health and Safety in the African Region: Situation Analysis and Perspective Report of the Regional Director. WHO; Regional Office for Africa

Roseke, B. (2017). The PMBOK's Five Project Phases. [online] Project Engineer. Available at: https://projectengineer.net/the-pmboks-five-project-phases [Accessed 6 Jun. 2020].

Safeopedia

Schaefer, F, and Oya, C. (2019). Employment patterns and conditions in construction and manufacturing in Ethiopia: a comparative analysis of the road building and light manufacturing sectors. IDCEA Research Report, SOAS, University of London

Seblework, D. (2006). OCCUPATIONAL SAFETY AND HEALTH PROFILE FOR ETHIOPIA. MINISTRY OF LABOUR AND SOCIAL AFFAIRS.

S.H.KHAHRO, T.H.ALI, M.A.H.TALPUR, M.A.AKHUND, F.H.SIDDIQUE (2016). Occupational Health Problems in Construction Industry: A Case Study. Department of EM, CoE.Prince Sultan University, Kingdom of Saudi Arabia. Received 14th March, 2016 and Revised 28th September, 2016. Sindh Univ. Res. Jour. (Sci. Ser.) Vol. 48 (4) 737-740

Somavia, J. (2005). Facts on Safety at Work. [online] International Facts on Safety at work Organization. Available at: https://www.ilo.org/wcmsp5/groups/public/---dg...

Tadesse and Israel Journal of Occupational Medicine and Toxicology (2016). Occupational Injuries among Building construction workers in Addis Ababa, Ethiopia

Target Health Blog (2018). History of the World Health Organization

TEO, E.A.L., THEO, H. and FENG, Y. (2018). CONSTRUCTION HEALTH AND SAFETY PERFORMANCE IN DEVELOPING AND DEVELOPED COUNTRIES: A PARALLEL STUDY IN SOUTH AFRICA AND SINGAPORE.

Thewodros Bekele Tolera (2016). Occupational Hazards in Construction industry: case studies from Housing and Construction Workers at Addis Ababa, Ethiopia. [tolera *, vol.4 (iss.9)] International Journal of Research Granthaalayah: A knowledge Repository

Timeline- HSE

Torky Althaqafi, Dr Barry Elssy (2015). International Journal of Research in Management and Business Studies. Integrating Occupational Health and Safety Systems into a Project Management System

University of Virginia (2020). Facilities Management

VenumadhavYemul, MilindDarade (2014). Occupational Safety and Health in Construction Industry for High Rise Building. IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 10

Work Safe BC (2020)

World Economic Forum (2016). Shaping the Future of Construction: A Break in Mind set and Technology. Prepared in collaboration with The Boston Consulting Group

www.businessdictionary.com. (n.d.).

Yu ting Fung (2005). A study of safety and health education in construction and construction management programmes at tertiary level. University of Hong Kong

Annex 1: Time and Budget Schedule

Time Schedule

S/ No	Activities	Duration in Months(M)				
		M1(Feb)	M2(Mar)	M3(Apr)	M4(May)	M5(Jun)
1	Submitting Concept note					
2	Finalizing the proposal					
3	Finalizing the review of the related literature					
4	Development of the research instrument					
5	Data Collection					
6	Analysing the collected data and Research Report Writing					
7	Submission of Draft Report					
8	Submission of Final Report					
9	Presentation					

Budget Schedule

S/ No	Activities	Unit of Measure	Unit Cost/Rate	Quantity	Total Cost (in Birr)
1	Stationery Materials	Pcs/packages	Overall		400.00
2	Transportation		Overall		1200.00
3	Secretarial Service		Overall		400.00
4	Sub Total				2000.00
5	Contingency (10%)				200.00
Grand Total					2200.00

Annex 2: Questionnaire

Part One (Information about the respondent, company)

Direction: Please indicate your answer by ticking [√] or filling up or comment, as appropriate.

1.1. Respondent's Personal Information

1. Sex Male [ ] Female [ ]
2. Age 20-30 [ ] 30-40[ ] 40-50[ ] Above 50[ ]
3. Job title Architect [ ] Site Engineer [ ] Office Engineer[ ]
   Supervisor [ ] Project Manager [ ] Sub Contractor [ ]
   Other: Please Specify_____
4. Education status Diploma [ ] Advance Diploma [ ]
   Bachelor's Degree [ ] Master's Degree [ ]
   PhD [ ] other: Please Specify_____
5. Work Experience
   0- 5 years [ ] 5-10 years [ ] 10- 15 years [ ]
   15-20 years [ ] above 20 years [ ] other: Please Specify_____
6. Work Experience in this current project
   0- 5 years [ ] 5-10 years [ ] 10- 15 years [ ]
   15-20 years [ ] above 20 years [ ] other: Please Specify_____
7. Employment Pattern
   Permanent [ ] Temporary/ Contract [ ]

1.2. Company Information

1. Classification of your firm in construction business
   Governmental [ ] Private [ ] Other: Please Specify_____

Part 2 (Health and Safety System in the Project)

2.1. Do your construction projects/sites have a Health and Safety Manager? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Absence of obligation in the contract agreement

C. Ignorance

D. There is no controlling and enforcement by the government

E. Other: Please Specify _____

2.2. Do Managers actively monitor the Health &Safety performance of their projects and workers through reports? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. Upper level management and commitment problem

D. Other: Please Specify _____

2.3. Do Managers ensure that the Health & Safety Budget is adequate? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. Upper level management and commitment problem

D. Other: Please Specify _____

2.4. Do your construction firm have a written in house Health & Safety rules & regulations and implementation for all workers reflecting management concerns for safety and health? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. No control and enforcement by the government

C. Ignorance

D. Other: Please Specify _____

2.5. Do your project have a site-specific Health &Safety plan? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Absence of obligation in the contract agreement

C. Ignorance

D. There is no controlling and enforcement by the government

E. Other: Please Specify _____

2.6. Are there any safety orientation and training provided to new employees in your company?

A. Yes B. No

If yes please describe the training materials used? _____

2.7. Is there a regular health and safety training programme for workers? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. No budget for Health & Safety

C. Upper level management and involvement problem

D. There is no enforcement law

E. Other: Please Specify _____

2.8. Does the Layout of the site consider Health & Safety aspects? (During constructing site offices, access roads, temporary structures while constructing the project) If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industry

B. There is no controlling and enforcement law in the contract agreement

C. No skilled person

D. Ignorance by all parties

E. Other: Please Specify _____

2.9. Do Constructability of project is reviewed periodically or frequently in Health &Safety aspect? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. No contractual obligation in the contract

C. There is no controlling and enforcement law in the contract agreement

D. Not standard practice

E. No skilled person

2.10. Does your firm prepare written brochure or orientation those aware workers about the preventive measures to reduce risk? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraint

C. No company Health & Safety policy in the firm

D. Ignorance

2.11. Is there adequate first aid and first aider(s) on your construction projects/sites? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Ignorance

2.12. Do your firm provide personal protective equipment (PPE)? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Other: Please Specify _____

2.13. Do your firm provide right tools, equipment and plant to execute construction? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Other: Please Specify _____

2.14. Do your firm provide good welfare facilities such as showers, canteens, toilets? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Ignorance

2.15. Do Proper supervision by staff trained in Health & Safety carried out on your project? If your answer is no, what do you think is the reason?

A. Lack of awareness by all parties in the industries

B. Budget constraint

C. There is no enforcement law

D. No trained person

2.16. Are all injuries, fatalities filled & reported to the concerned body? If your answer is no, what do you think is the reason?

A. Rarely done by the consultant

B. Lack of awareness by all parties in the industries

C. Upper level management and involvement problem

D. There is no regulatory body enforce to report

E. Other: Please Specify _____

2.17. In your opinion, who should be responsible for industrial accident during construction on site?

A. Workers

B. Government

C. Contractors

D. Owners' Consultant

E. The Company

2.18. Is there a governmental organization follow up and contribute in improving safety in the Construction projects?

A. Yes

B. No

C. If yes, who is it and how does it work?

2.19. What is your suggested expense in safety management in the terms of contract cost in construction projects?

A. Less than 0.5%

B. 0.5-1%

C. 1-2%

D. 2-3%

E. Morethan3%

Part 3 (Respondent's opinion towards construction health and safety programme in Construction)

3.1. Please indicate the degree of importance of the inclusion of construction health and safety programme in the construction/construction management programme to various construction related disciplines.

Discipline	Very Important	Important	Neutral	Not really Important	Unimportant
1. Project manager	□	□	□	□	□
2. Architects	□	□	□	□	□
3. Civil engineers	□	□	□	□	□
4. Structural engineers	□	□	□	□	□
5. Quantity surveyors	□	□	□	□	□
6. Building surveyors	□	□	□	□	□
7. Safety Officers	□	□	□	□	□

3.2. Do you think the following subject areas are addressed in the construction/construction management programme?

Subject area	strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1. Legal requirements And liabilities	□	□	□	□	□
2. Health and Safety	□	□	□	□	□

Responsibility

3. Health and Safety Policy □ □ □ □ □
4. Hazard identification /Safety plan □ □ □ □ □
5. Risk analysis and Method Statements □ □ □ □ □
6. HS programs (health And safety meetings, permits to work) □ □ □ □ □
7. Health and Safety inspection □ □ □ □ □
8. Health and Safety Education and training □ □ □ □ □
9. Constructability □ □ □ □ □
10. Personal Protection □ □ □ □ □
11. Injury/damage report And Investigation □ □ □ □ □
12. Health and Safety Promotion □ □ □ □ □
13. Influence of Procurement System □ □ □ □ □
14. In-house safety rules □ □ □ □ □
15. Housekeeping □ □ □ □ □

Part 4 (The Major Health and Safety areas to be considered during construction of high rise building construction projects)

4.1. Frequency of causes of Injuries in construction sites Please Mark " " on the space provided

No	Description	Frequency of injuries and fatalities			
		High	Medium	Low	Exceptional
1	Falling (Objects falling from a height)				
2	Stairways and ladders				

3	Scaffolding (Falling from scaffolding during construction)				
4	Excavations (Slides, collapse, not shored protection…etc.)				
5	Electricity (Electric power Accidents)				
6	Construction Hoists &Elevators and Cranes & Derrick				
7	Hazardous substances				
8	Noise				
9	Tools and Machinery (Drilling, Grinding, Bending machine…etc.)				
10	Fire（from electric, fuel, chemical etc.）				

4.2. Factors that affect safety and health performance in the construction industry

Please Mark " " on the space provided

No	Description	Degree of impact				
		Very high	high	average	Low	Very low
1	Complexity of the Design					
2	Type of Owner/attitude of owner/					
3	Weather Condition					
4	Project Cost					
5	Project Duration					
6	Contractual Specification of Safety health					
7	Safety and Health Policy					
8	Accidents / Incidents / Near Miss Report					
9	Fire prevention and control					
10	Risk Assessment					
11	Safety and Health Training					

12	Personal Protective Equipment (PPE)					
13	Emergency Planning and Procedures					
14	Safety and Health Inspection					
15	Safety and Health Management Meeting					
16	First-Aid Provision					
17	Safety Signals, Signs and Barricades (Incentives)					
18	Work environment					
19	Reward and Punishment System					
20	Role of Government and Engineering Societies					

Annex 3: Interview **(The first nine questions will be only for top managers)**

1. Contractor Category General[ ] Building [ ]
2. Contractor Grade 1 [ ] 2 [ ] 3 [ ] 4 [ ]
3. Current Status of the project
4. What is the total experience of your company in construction?
5. What is the total number of employees?
6. What is the total Project Construction Cost (in ETB Millions)?
7. How much is the Health and safety prevention expenditure in % from the total cost?
8. How much is the Health and safety accident expenditure in % from the total cost?
9. How much is the number of accidents in the years (2009-2011E.C)?
10. What are the health and safety practices you use on this site?
11. Have you ever take a health and safety training in this site? How Often?
12. What kind of illness and injury has happened in this site during your stay? What were the main causes?
13. In which area of the work do usually health and safety problem arose?
14. What was the worst accident you remember on this site?
15. What kind of tools and facilities are there for health and safety management system?
16. How often does the supervisor or site manager check your health and safety practices on your daily activities?
17. What are the health and safety tools and practices you personally use on site?
18. Can you mention some of the Ethiopian Construction Health and Safety Rules, Regulations and Standards that you know?

Annex 4: Site Observation Checklist

No	Statements	Yes	No	Remark
1	Health and Safety Practice Evaluator(daily basis)			
2	Visible Health and Safety Rules Posted			
3	Availability of PPEs and Provision			
4	Safe place to eat, rest and wash			
5	Safe steel scaffolding			
6	Holes and edges are covered, marked			
7	Warning Signs			
8	Availability of alarm in case of emergency			
9	Availability of fire extinguisher			
10	Shoring is made to the sides after excavation			
11	Safety net around the scaffolding			
12	First Aid Kit and health personnel on the site			
13	Accidents and Incidents Registering diary book			
14	Health and Safety Management Structure			
15	Well organized and protected site			

Annex 5: Item-Total Statistics for the Questionnaires' Part 3 and 4

For Part 3 – 3.1

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
HS in PM	9.44	7.272	.395	.329	.721
HS in Architects	8.40	4.041	.679	.575	.638
HS in Civil Eng.	9.42	6.738	.682	.675	.686
HS in Str. Eng.	9.26	6.400	.403	.346	.708
HS in Quantity Surveyor	8.56	4.904	.584	.528	.662
HS in Building Surveyor	8.72	6.369	.361	.408	.718
HS in Safety Officer	9.44	7.313	.369	.394	.724

For Part 3 – 3.2

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Legal requirement	45.48	293.969	.802	.	.991
HS Responsibility	44.46	272.376	.936	.	.990
HS Policy	44.82	278.600	.933	.	.989
Safety Plan	44.86	282.572	.912	.	.990
Risk Analysis	44.76	279.084	.939	.	.989
HS Programs	44.16	279.566	.963	.	.989
HS Inspection	44.18	282.926	.956	.	.989
HS Training	44.14	282.368	.953	.	.989
Constructability	44.08	290.198	.932	.	.989
Personal Protection	44.60	281.959	.970	.	.989
Injury Report Investigation	43.96	284.896	.936	.	.989
HS Promotion	43.64	287.174	.907	.	.990

Influence Procurement System	43.70	289.439	.938	.	.989
In-house HS Rules	44.24	279.533	.973	.	.989
House Keeping	43.92	289.708	.947	.	.989

For Part 4 – 4.1

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Falling	16.92	35.912	.869	.919	.955
Stairways and ladders	16.82	33.742	.908	.943	.952
Scaffolding	17.34	39.780	.557	.903	.966
Excavations	17.36	40.439	.588	.897	.967
Electricity	16.30	32.827	.899	.927	.953
Constr. Equipment	16.36	32.072	.935	.922	.951
Hazardous Sub.	16.14	31.102	.924	.921	.952
Noise	16.62	32.485	.928	.904	.951
Tools, Machinery	16.28	33.063	.922	.939	.952
Fire	15.64	32.643	.874	.873	.954

For Part 4 – 4.2

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Design complexity	32.42	197.391	.857	.	.989
Owner type	33.78	202.379	.961	.	.987
Weather Condition	33.00	205.469	.933	.	.987
Project Cost	33.22	201.604	.937	.	.987
Project Duration	33.02	201.000	.914	.	.988
Contractual specification of HS	33.90	208.418	.958	.	.987
HS Policy	34.08	215.504	.904	.	.988
Accident Rep	33.80	202.816	.962	.	.987

Fire Prevention Control	33.36	199.256	.933	.	.988
Risk Assessment	33.80	204.082	.960	.	.987
HS Training	34.04	212.080	.932	.	.988
PPEs	34.08	212.524	.915	.	.988
Emergency Plan	34.02	211.979	.935	.	.988
HS Inspection	34.00	211.959	.935	.	.988
HS Management meeting	33.90	210.010	.917	.	.988
First Aid Provision	34.06	215.404	.904	.	.988
Safety Signs	33.94	209.119	.956	.	.987
Work Environment	34.06	212.507	.911	.	.988
Reward and Punishment system	33.50	206.459	.886	.	.988
Role of Government and Engineering Society	34.14	213.551	.875	.	.988