

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ADDIS ABABA INSTITUTE OF TECHNOLOGY

SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING

(Construction Technology and Management)

Assessment of Safety and Health Laws and Enforcement Practice in Ethiopian Construction Industry: A Case of Selected High-Rise Building Projects in Addis Ababa

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A Thesis Submitted to the School of Graduate Studies in Partial Fulfilment of the Requirements for the Degree of Master of Science in Civil Engineering

July 2020

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY

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MASTER'S RESEARCH APPROVAL SHEET

Assessment of Safety and Health Laws and Enforcement Practice in Ethiopian Construction Industry: A Case of Selected High-Rise Building Projects in Addis Ababa

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DECLARATION

I certify that the research work entitled, " Assessment of Safety and Health laws and Enforcement Practice in Ethiopia: A Case of Selected High-Rise Building Projects in Addis Ababa" is my original work. The work has not been presented for any degree at any other University. The material obtained from other sources has been duly acknowledged in the thesis.

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DEDICATION

For those who lost their lives and being disabled due to lack of proper Occupational Safety and Health in the Ethiopian Construction Industry.

በኢትዮጵያ የግንባታ ኢንዱስትሪ ውስጥ የሥራ ደህንነት እና ጤና በማጣት ምክንያት ህይወታቸውን ላጡ እና የአካል ጉዳተኞች ለሆኑ ሁሉ ይሁንልኝ::

ACKNOWLEDGMENTS

I would like to express my special thanks to the Almighty GOD for enabling and giving me the inner courage and strength to accomplish my educational career one step further. I would like to thank the Ethiopian Roads Authority (ERA) for giving me this scholarship. I thank the school of Civil and Environmental Engineering, Addis Ababa Institute of Technology, for the platform to study this program. I would like to take this opportunity to express my sincere appreciation to my advisor, Dr. Girmay Kahsay, for his supervision & advice throughout the research period. I would also like to express my deepest gratitude for my former instructor, Getaneh Gezahegne, a Ph.D. Candidate at the University of Alberta in Canada, for his assistant in supplying reading materials from his busy schedule.

I would like to extend my sincere appreciation to colleagues at the Ethiopian Institute of Architecture Building Construction and City Development (EiABC) for your courage and support during my study time. My sincere gratitude also goes to Engineer Bekele Jebesa, the General Manager of Ethio Infra Engineering plc, Engineer Sheferaw Alemu from Ethiopian Association of Civil Engineers (EACE) and Deputy General Manager of Rama construction PLC, Engineer Tshehay Kebebew from MUDHC, Engineer Elias Kebede & Engineer Jilalo Kemal from Addis Ababa city Administration Construction Bureau, Architect Helawie Sewnite & Engineer Fiktor Belachew of Addis Ababa City Infrastructure Coordination, Building Permit and Control Authority, and Ato Mellisie Nigatu from Addis Ababa City Fire and Emergency Prevention and Rescue Agency, Ato Asefa Gonfa from Addis Ababa Red Cross Society, Ato Alemu Wondimu from Addis Ababa city Administration Bureau of Labor and Social Affair (BOLSA) and for those stakeholders on the study projects and others for your willingness to give necessary information for this research work.

I would also like to extend my thanks to my brother Miteku Tarekegn for the support and courage during my study. Also, many individuals contributed a lot to my academic career that I 'did not mention with their names. Thank you very much, indeed, all of you. Mainly, my late mother W/ro Gebeyansh Tsige and my late father Ato Tarekegn Tilahun, even if you are not physically with me at this time, I never forget your courage and motivation in my life.

Lastly, I would like to extend my sincere gratitude to my beloved wife Maritu Yietayew, and my sweet babies, Natenael Geremew and Brook Geremew, for your patience and understanding of my absence in giving care for you, during my study and this research.

ABSTRACT

The nature of construction work is dangerous, risky, and needs attention in integrating well-being and safety management into the entire process. In Ethiopia, the state of occupational safety and health (OSH) is weak, especially in the construction industry. Compliance with OSH law is one of the significant factors for OSH improvement; unfortunately, its level is low in Ethiopia. Hence, the objective of this research was to assess the OSH law & enforcement practice in the Ethiopian construction industry by taking a case of five Financial Institution high-rise building projects in Addis Ababa. Of these, four projects were undertaken by Chinese international contractors and one by the local GC-1 contractor. Questionnaires were distributed to Project Managers, Site Engineers, Safety Engineers, and Office Engineers from the contractor side, while Resident Engineers of the consultant side & Client Representatives. Interviews were also conducted with the Foreman of the contractors. Group discussion was conducted with representatives of the organizations who have a direct and indirect stake in OSH related to the construction industry. A case study was conducted with the mentioned five projects. The data were analyzed qualitatively and quantitatively using descriptive statistics. Accordingly, the result of the study revealed that all the Chinese international contractors seem to have relatively better practices and awareness compared to the local contractor. However, they are doing below the current safety and health (SH) practice of their country. The findings of the study indicated a significant gap and discrepancies between stakeholders in the project sites in implementing of OSH law and a lack of enforcement for the implementation of the law by major stakeholders. The analysis of results from the interviews focus groups, and observations made on the project sites indicated that lack of commitment on the 'contractor's side as well as lack of follow-up and enforcement by the consultant, building officer, and labor inspector. Even though there are some limited fines enacted in the labor law, building proclamation, and building regulations on those who do not implement OSH properly in project sites, not implemented on the study project sites. It is recommended to improve the attitude and commitment of stakeholders for SH in construction projects and carry out regular undeclared visits to project sites by regulatory bodies to enforce the implementation of OSH. The regulatory body needs to design policies and strategies that ensure the implementation of OSH enforcement on construction project sites. Also, the contract agreement recommended that to include a safety budget in provisional sum on the special condition (SCC) of contract and safety audits at least once a year.

Keywords: Safety, Health, legislation, High-Rise buildings, Financial institutions.

ABBREVIATIONS

BLS	Bureau of Labor Statistics
BOLSA	Bureau of Labor and Social Affairs
ECPMI	Ethiopian Construction Project Management Institute
EEA	Ethiopian Economic Association
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GNP	Gross National Product
GTP	Growth and Transformation Plan
HDB	Housing Development Board
ILO	International Labor Organization
KD	Kuwaiti dinar
MoHURD	Ministry of Housing and Urban-Rural Development
MoLSA	Ministry of Labor and Social Affairs
MUDHC	Ministry of Urban Development Housing and Construction
NPC	National Planning Commission
NSC	National Safety Council
OSH	Occupational Safety and Health
PMI	Project Management Institute
SCC	Special Conditions of Contract
S$	Singaporean Dollar
SH	Safety and Health
TVET	Technical and Vocational Education Training

GLOSSARY

Accident: any unplanned event that results in injury or ill-health of people, or damage or loss to property, plant, materials, or the environment (Hughes & Ferrett, 2016). Also, an accident refers to a loss-producing, unintended event (Friend & Kohn, 2007).

A cross-sectional study is a type of observational research that analyzes data of variables collected at one given point in time across a sample population or a pre-defined subset (scribbr, 2020).

Closed-Ended Questions are defined as question types that ask respondents to choose from a distinct set of pre-defined responses among set multiple-choice questions (questionpro, 2020).

Cross-sectional study: involves looking at data from a population at one specific point in time. The participants in this type of study are selected based on particular variables of interest. Cross-sectional studies are observational and are known as descriptive research (Cherry, 2019)

Descriptive research design is a type of research design that aims to accurately & systematically describe a population, situation, or phenomenon. It can answer what, when, where, and how questions, but not why questions (scribbr, 2020).

Descriptive Statistics: are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire or a sample of a population. Descriptive statistics are broken down into measures of central tendency & measures of variability (spread). Measures of central tendency include the mean, median, & mode, while measures of variability include the standard deviation, variance, the minimum & maximum variables, & the kurtosis & skewness (Kenton, 2019).

Financial Institutions: Is a company engaged in the business of dealing with financial and monetary trades such as deposits, loans, investments, and currency exchange (Adam, 2019).

Hazard: a source of danger (Merriam-webster, 2020). A Hazard is anything that has the potential to cause harm, injuries, accidents, or other undesirable effects (Boyle, 2019).

Hazard Analysis: is used as the first step in a process used to assess risk. The result of a hazard analysis is the identification of the different types of hazards (Boyle, 2019).

Health: the protection of the bodies and minds of people from illness resulting from the materials, processes, or procedures used in the workplace (Hughes & Ferrett, 2016). It's an individual's mental, physical, physiological, and social conditions are within normal limits. It's usually concerned with situations that cause illness or disease (Merriam-webster, 2018b).

High Rise Buildings: buildings are having more than fifty floors of average height one above another (Thapa, et al., 2013). In Ethiopia is a building having a floor between 15 to 45 (PPA, 2015).

Incident: is an unintended event, possibly not causing a loss (Friend & Kohn, 2007).

Inferential Statistics: a type of statistics is used to reach conclusions that extend beyond the immediate data alone. For instance, inferential statistics used to make judgments of the probability that an observed difference between groups is a dependable one or one that might have happened by chance in the study (William, 2020).

Law: According to Encyclopedia Britannica (2015), safety is a discipline and profession concerned with the customs, practices, and rules of conduct of a community that is recognized as binding by the community, and enforcement of the body of rules is through a controlling authority.

Legislation: Is the exercise of the power and function of making rules (such as laws) that have the force of authority under their promulgation by an official organ of a state (Merriam-webster, 2016).

Mega High Rise Buildings: a building is having a floor of more than 45 in Ethiopia is referred to as a Mega High-rise building (PPA, 2015).

Occupational Safety and Health (OSH): is the science of the anticipation, recognition, evaluation, and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment (Alli, 2008).

Open-Ended Questions: are free-form survey questions that allow respondents to answer in open text format so that they can answer based on their complete knowledge, feeling, and understanding. It means that the response to this question is not limited to a set of options (questionpro, 2020).

Safety: As per the Merriam-webster English dictionary, safety is the condition of being safe from undergoing or causing hurt, injury, or loss (Merriam-webster, 2018a).

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CHAPTER 1 INTRODUCTION

1.1 Introduction

The construction industry is one of the world's most dangerous industrial sectors globally, accounting for 30–40% of fatal injuries (Sunindijo & Zou, 2012). For instance, in South Korea, workplace fatalities account for the highest proportion (25.30%) (Kang & Kwon, 2011). In Hong Kong, accidents at construction sites are the highest, with 47% of the fatality rate (Chan, et al., 2008). Also, construction site accidents are the first in fatalities in the US (Arnold & Itkin, 2019), the fourth-highest in Australia (SWA, 2019), and the first highest in China (CLB, 2019).

This industrial sector includes constructing, demolishing, maintaining, and renovating buildings and civil engineering works (EW, 2019). The construction industry generates a large proportion of GDP, that accounts for 8 % in the United Kingdom (UK) (Hughes & Ferrett, 2016), 17% in Japan (ILO, 1992), 13 % in Australia (Back To Basics, 2020) and 18% in Ethiopia (NPC, 2016). The construction industry is one of the largest employment sectors in the world. In the UK, it employs 10% of the workforce (Hughes & Ferrett, 2016).

In many developing countries, construction is among the fastest-growing areas of the labor market. In Ethiopia, it provides the basis for other sectors to grow by constructing the physical facilities required for the production & distribution of goods & services, which shows its effect on the economy as a whole (EEA, 2008). Also, from the total population of employment in the country, construction, quarrying, and mining take 20.10 %, from this 20.10%, the construction industry is leading in creating job opportunities (CSA, 2018).

Furthermore, this industry represents one of the riskiest, complex, and dynamic industrial environments due to its unique, dynamic, and temporary nature (Mohammadi et al., 2018). For instance, as per the ILO (2017) report, the estimated economic loss caused by work-related injuries and disease is equivalent to 4% of the 'world's gross national product. The impact of the construction industry on the economy due to accidents is estimated to be 10 to 20 times higher in developing countries than the developed ones (Khan, 2013). Following this, only 5 to 10 % and 20 to 50% of the workforce in developing & developed countries have access to some kind of SH services in their workplaces (ILO, 2017).

The fatal injury rate for the construction industry in Ethiopia is higher than the national average compared to other industrial sectors. The hazards are not restricted to those working on sites, but the general public is also exposed due to lack of proper SH practice (Lucy Feleke, et al., 2016).

1.2 The Construction Industry in Ethiopia

Ethiopia is one of the developing countries in the Horn of Africa. It is the second-most populous country in Africa, with over 115 million people with a land area of 1.12 million square kilometers (Worldometers, 2020). As an ancient country, Ethiopia has a rich history of magnificent construction activities. For instance, the obelisks of Axum, the rock-hewn churches of Lalibela, and Gondar's castles are some of the remarkable ancient construction endeavors. Also, at the beginning of modern civilization, some significant developments have been recorded. For example, the Addis Ababa-Djibouti railway line was one of the construction undertakings that successfully carried out in the early 1900s. Likewise, during the Italian occupation of the 1930s, there were construction activities mainly in the development of long trunk roads constructed to link different parts of the country. After the Italian occupation, expatriate contractors dominated most of the medium and small civil and building projects. Eventually, local construction companies owned by Ethiopian professionals were developed (Girmay Kahsay, 2003).

In Ethiopia, the construction industry is one of the major sectors where the public & private sectors have invested a considerable amount of money (R & M, 2018). During the GTP I period, the construction industry, on average, grew at 28.70% per annum, pushing its share in GDP to rise from 4% in 2009/10 to 8.5 % by 2014/15 (NPC, 2016). The percentage share of the construction sector to GDP at the constant basic price has increased from 11 % in 2015 EC to 18% by 2019 (Michael Kamya, 2019).

According to Wubishet Jekale (2004), the development of the construction industry in Ethiopia is seen in six distinct periods. The first period was pre-1968, in which international construction companies undertook almost all construction activities in the country. Then, after having some exposure from foreign contractors, small scale construction companies started to take part in the industry from 1968 up to 1982. However, after state-owned companies were established, almost all construction activities were dominated by state-owned construction firms from 1982–1987. After acquiring some experience and exposures from 1987-1991, the government allowed the separation of design and construction phases.

In 1991 the government changed the policy and allowed the private sector to participate in the industry. Since 2001 the government has introduced the concept of incorporation & capacity building from local firms' performance & capacity limitation. Thus, several private construction companies were established and participated in various construction sub-sectors. Table 1 shows a summary of the six distinct periods of the Ethiopian construction industry.

Table 1: Summary of the Ethiopian Construction Industry in Periods (Wubishet Jekale, 2004)

Period	Designation	The Feature of Each Period
Pre 1968	Foreign Company Domination	➢ International construction companies undertook almost all construction activities in the country after the Italian Occupation of 1941
1968–1982	Small Scale Construction Companies	➢ A period encouraged private sector development, which resulted in the establishment of small scale domestic construction companies in the country.
1982–1987	Parastatal Companies Domination	➢ This period was known as the parastatal company domination period since the private construction company, established earlier, had been nationalized by the government. Those state-owned construction firms undertook almost all construction activities.
1987–1991	Fragmentation of Phases	➢ During this period, design services and construction phases were introduced as a separate phase to the Ethiopian construction industry.
1991–2001	The Era For Re-Emergence of Privatization	➢ The year 1991 carried a change of policies that enabled the private sector to re-emerge. Thus, private construction companies were established in the country & started taking part in construction activities.
Since 2001	The Re-Emergence of Integration and Capacity Building	➢ The government has introduced the concept of integration and capacity building in 2001. ➢ It was realizing the performance and capacity limitation of domestic firms that begin to be involved in some projects.

However, the Chinese involvement in the construction projects through very low initial bid-prices has been displacing the local & other foreign construction firms. Chinese firms are also dominating both rural & urban road construction in Ethiopia (Alemayehu Geda & Atnafu G. Meskel, 2010).

From the new millennium onwards, the construction industry in Ethiopia is progressing considerably. Recent studies indicated that the GDP contribution of the construction industry to the country raised to 5.60%. This progress approached the country's' growth to the sub-Saharan average of 6% as of 2010. Beyond its contribution to the nation, the industry is also the 6th major contributor to the continent's infrastructure stock following South Africa, Egypt, Morocco, Algeria, and Nigeria (Zinabu Tebeje & Getachew Teka, 2015). Since then, the country has been implementing a significant number of programs, including the university capacity building program, the housing development program, & the road sector programs, and others (ERA, 2016).

1.3 Background of The Study

Buildings, as one category of civil engineering works, are categorized differently in different parts of the world; low rise, mid-rise, high rise & mega high rise. From the categories, one of the emerging types of building in different countries is the high-rise buildings. However, there is no international consensus in defining what "high rise buildings mean?" (Li, et al., 2018). For instance, in the US, the National Fire Protection Association is considered a high-rise that is higher than 75 feet (23 meters) or about seven stories (Marty, 2016).

In China, a high-rise building means a residential building of 10 floors or more, and other commercial buildings are exceeding 24 meters (8 stories), including mega-high-rise buildings (commercial buildings at least 100 meters tall) (Li et al., 2018).

Likewise, in Ethiopia, as per PPA (2015) classification, buildings are classified into four categories; Low rise buildings are those buildings having G+00 up to four floors. A building having floors between five up to fourteen are mid-rise buildings. A building having fifty up to forty-five floors is referred to as high rise buildings. Mega high rise buildings are those buildings having floor numbers forty-five & above. The construction of high-rise buildings increasing in Addis Ababa and other main cities of the country. Following the construction of high-rise buildings in Ethiopia, the industry faces many accidents and fatalities (Fasil Argaw, 2016).

Regardless of its benefits to the nation's economy, the construction industry is considered as a risky sector, as workers are exposed to injuries, disabilities, fatalities, and other health-related problems. This industry needs vital concern for the issue of OSH. Construction safety aims to ensure that the industry as a whole must not cause immediate danger to the public and workers around the construction sites (Safeopedia, 2018).

Regarding the issue of OSH, in Ethiopia, different studies have been done from different perspectives. For instance, Fasil (2016), tried to assess OSH management in high rise buildings construction. The study noted that Chinese contractors have a relatively better practice of OHS management than local grade-one contractors.

Amare (2016), also tried to assess OSH practices in Addis Ababa, focusing on the 40/60 housing projects at Bole-Ayat. The finding of the study indicated that many accidents & health problems occurred due to poor practice of OSH management. Besides, the mass building construction project coordinated by the City Government in Addis Ababa lacks applying SH management practices.

Seifedin Sermolo (2014), also studied the OSH practices of construction companies in Ethiopia. They focused on Addis Ababa and Welkite & concluded that a high number of fatalities and accidents occurred due to poor OSH management practice. Furthermore, the status of OSH management practices of construction companies covered in the study was found to be very poor in the international OSH management practice.

To minimize accidents and fatalities the management of construction companies, workers, and the community must be familiar with their country's governing laws to manage the OSH of working premises effectively. Formulating a clear end goal allows the people of any country to identify ways to reach the desired result. Thus, the laws can help develop a list of potential obstacles, discuss methods for avoiding them, and start creating a timeline for achieving goals in the legal process (Wisegeek, 2018). Accordingly, the primary objective of any OSH law is to prevent accidents with their associated consequences in terms of injury, disablement, and fatality within the working environment (Hefer, 2016).

To improve the death of construction workers and the general public at large, ILO has long tried to find the development and promotion of conventions, recommendations, and codes of practice. The Safety Provisions of Building Convention (No. 62) adopted as long ago as 1937. It was succeeded in 1988 by the Convention on SH in Construction (No. 167) & its complementary Recommendation (No. 175). A Code of Practice on SH in Construction, adopted in 1992. The Asbestos Convention (No. 162) and its complementary Recommendation (R.172), which was adopted in 1986, are also of particular importance to the construction sector. (ILO, 2016).

An essential instrument used to manage the industry needs a precise law and enforcement practice following ILO Conventions, Recommendations, and Codes of Practice in the legal system. It is in this light that this thesis was initiated to assess the current state of OSH law and enforcement practice in the Ethiopian construction industry.

1.4 Statement of The Problem

Of all construction accidents, falls are the leading cause 48% of serious injuries and 30% of fatalities (Nadhim et al., 2016). In particular, falling from height (FFH) represents more than one-third of injuries & is a leading cause of multi-serious injuries & fatalities. In 2013, FFH accounted for 36.9% of the occupational fatalities in the US, 31% in the UK, and 12% in Australia. In Ethiopia, there is no sufficient statistical information but, accidents and fatalities are increasing from time to time.

Therefore, the construction of high rise buildings needs serious attention from every party who has a stake in the construction projects.

In a study conducted by Sebsibe Tadesse & Dagnachew Isreale (2016), work-related diseases, disabilities, and fatalities are the significant challenges of the Ethiopian building construction industry, which results in absence from work & loss of productivity. For instance, in 2012, the three construction workers' tragic deaths in Addis Ababa from broken wood scaffolding on a construction site were painful news for the city residents (Elleni Araya, 2013). Also, in 2015, twenty-three people died in construction-related activities in Addis Ababa (Addis Getachew, 2016). Similarly, Samuel Bogale (2018), reported a fire that engulfed workers' dormitory at the construction of Adey Ababa Stadium also claimed the lives of seven people so far while almost a dozen were burned severely.

Furthermore, a construction worker has died after falling off from high-rise buildings near Meskel Square in Addis Ababa (Samuel Getachew, 2018). A study by the Ethiopian Construction Project Management Institute (ECPMI) indicated that 3,424 accidents happened from 2012 to 2016 in different building construction project sites in Addis Ababa (ECPMI, 2017). The report by Addis Ababa City Administration Bureau of Labor and Social Affair (BoLSA) also indicated that the death of 58 construction workers' recorded in Addis Ababa at different construction sites due to falling from scaffolding & working at height in 2018-2019 (BoLSA, 2019).

To minimize accidents and fatalities, having proper safety performance is one of the challenges of high-rise buildings than other construction types. The high-altitude operation and excavation of deep foundation pits resulted in much higher accident rates, severe injuries, and fatalities. These accidents are caused by falls, while the impact of falling objects is the major threats (Li et al., 2018).

The problem of SH affects all construction stakeholders, clients, contractors, consultants, and end-users. Therefore, this research aims to assess the current OSH law and enforcement practice in the Ethiopian construction industry in general and in selected High-Rise Building Construction Projects in Addis Ababa in particular.

1.5 Objectives of The Study

The objective of this study discussed as general and specific objective below:

1.5.1 General Objective

The general objective of this research is of safety & health law and enforcement practice in Ethiopia, a case of selected high-rise building projects in Addis Ababa.

1.5.2 Specific Objectives

The specific objectives of the study to address the general objective stated above are:

- To check the availability & ability of OSH laws in the Ethiopian construction industry;
- To check the awareness level of stakeholders on OSH laws & enforcement practices;
- To identify the gaps in the enforcement practice of OSH law;
- To evaluate the OSH clauses in the conditions of contract;

1.6 Significance of The Study

The outcome of this study contributes to the current body of knowledge by providing additional expertise and understanding of the OSH law and their enforcement in the Ethiopian context. The findings of this research also contribute by addressing construction SH legal issues to help to minimize the construction site accidents by utilizing the enforcement instruments legally in general and contractually in particular. Moreover, this study provides the basic ideas on the legal provisions and benefits of its applicability with appropriate enforcement mechanisms to the construction environment. Accordingly, it may serve as a base for the contractors to prepare training documents by aligning with the country's laws. It may also be useful for consultants to prepare guidelines while they are working on sites. Similarly, regulatory bodies may use it as an input for the preparation and revision of current legal provisions on construction safety. Furthermore, the finding of this research is a springboard for future researchers in OSH in the Ethiopian construction industry.

1.7 Organization of the Thesis

The remaining part of the thesis is organized into four chapters. The second chapter contains a review of related literature in SH in construction, OSH practices, and OSH law to the construction industry. The third chapter discusses the research design and methodological approach. Then, results, analysis, and discussion are presented in chapter four. Finally, chapter five provides the conclusions made and the recommendations forwarded.

CHAPTER 2 LITERATURE REVIEW

2.1 Causes for Construction Site Accidents

The construction industry is one of the most unsafe industries due to high incidents, injury, and fatality rates. The ILO estimates that some 2.4 million women and men worldwide submit to work-related accidents or illnesses every year; this corresponds to over 6000 deaths every day. There are around 340 million occupational accidents and 160 million victims of work-related illnesses annually in the world. Among many sectors, the construction industry contributes a considerable proportion of 17% of injuries and deaths (Balaji & Kothai, 2014).

The ILO updates these estimates at intervals, & the updates indicated an increase in work-related accidents and illness. In this regard, the construction industry has an extremely high rate of recorded accidents. Data from many developed countries indicated that construction workers are 3 to 4 times more likely than other workers to die from accidents. In the developing world, the risks related to construction work possibly 3 to 6 times greater than in the developed world. Many workers suffer & die from job-related diseases arising from past exposure to unsafe substances (ILO, 2018).

According to Hughes & Ferrett (2016), the construction industry has a world reputation for its quality while it remains one of the most dangerous from OSH's point of view. In 2004/05, the fatal injury rate (per100,000 workers) was 3.4, compared to other industry averages of 0.8. In 2006/07, there was a 28% increase in fatalities in the industry, which accounted for 32% of all recordable fatal injuries. Safety failures affect not only the employees but also the organization as a whole. They can result in pervasive low morale and increases in costs. Reese & Eidson (2006) concur that construction accidents are very high compared to other industries due to the unique, complex, & dynamic nature of the industry. Also, this industry has multiple features & activities compared with other industries that contribute to an increased probability of occurring accidents & fatalities.

2.1.1 Accident Causation Theories

Avoiding accidents is difficult in the absence of an understanding of the causes of accidents. Many attempts have been made to develop a prediction theory of accident causation. However, so far, none has been universally accepted (ILO, 2011). Also, to understand the causes of accidents and subsequent injuries, different researchers have attempted to develop different theories about the causes of accidents (Cooney, 2016). To grasp the basics of laws and enforcement practices understanding accident causation are important. In this study, some of the accident causation theories presented as follows:

2.1.1.1 The Domino Theory

Heinrich (1931), cited in ILO (2011), developed the domino theory where 88% of all accidents are caused by "unsafe acts of people," 10% by "unsafe actions," and 2% by "acts of God." He proposed a "five-factor accident sequence" Each factor would actuate the next step in the manner of toppling dominoes lined up in a row. The sequence of accident factors is ancestry and social environment; Worker fault; unsafe act together with mechanical and physical hazard; accident and damage; or injury (ILO, 2011).

In the same way that removing a single domino in the row would interrupt the sequence of toppling, Heinrich suggested that removal of one of the factors would prevent the accident and resultant injury, with the vital domino to be removed from the sequence being number 3.

The domino model is widely seen today as too simplistic to be a useful tool for understanding the causal factors of accidents because:

- It leads to an excessively simple view of the contribution of human performance to accidents, & a focus on training & procedural compliance (including "behavior-based safety" programs), rather than on system design, workload, and incentives.
- It adopts a purely linear & mechanical model of causality, which is incorrect in complex systems where accidents are generally caused by many interacting and irregular factors.

2.1.1.2 Multiple Causation Theory

The multiple causation theory is an outgrowth of the domino theory. According to Taylor & Hegney (2004), it postulates that for a single accident, there may be many contributory factors, causes, and sub-causes and that certain combinations of these give rise to accidents. In this theory, the contributory factors can be grouped into the following two categories:

- **Behavioral:** This category includes factors about the worker, such as improper attitude, lack of knowledge, lack of skills, and inadequate physical and mental condition.
- **Environmental**: This category includes improper guarding of other hazardous work elements & degradation of equipment through use & unsafe procedures.

Furthermore, improper attitudes in the work-places are traditional bad habits that are considered as prevalent, even work accidents are considered as a risk & fate that they have to accept. Lack of OSH

training, as well as improper work culture, developed among the workers, is the cause of improper awareness to apply OSH while working in the construction sites (Chandra, et al., 2017).

2.1.1.3 The Pure Chance Theory

According to the pure chance theory, every given set of workers has an equal chance of being involved in an accident. It further implies that there is no single evident pattern of events that leads to an accident. In this theory, all accidents are treated as corresponding to Heinrich's acts of God. It held that there exist no interventions to prevent them (ILO, 2011).

2.1.1.4 Biased Liability Theory

Biased liability theory is based on the view that once a worker is involved in an accident, the chances of the same worker becoming involved in future accidents are either increased or decreased compared to the rest of the workers. This theory contributes very little, if anything at all, towards developing preventive actions for avoiding accidents (ILO, 2011).

2.1.1.5 Accident Proneness Theory

Accident proneness theory maintains that there is a subset of workers who are more liable to be involved in accidents within a given set of workers. This theory is not generally accepted. Suppose this theory is supported by any empirical evidence at all. In that case, it is felt that it probably accounts for only a deficient proportion of accidents without any statistical significance (ILO, 2011).

2.1.1.6 The Energy Transfer Theory

Accidents are the result of the unintended release of energy in the system that causes damage or injury. To protect workers from accidents the most main thing is identifying the type of Energy they used in the workplace (abisonline, 2017). The types of energy needed in the work-place may be:

- Electrical Energy in the form of Motors and Extension Cords
- Chemical Energy in the form of Gasoline, Paint Thinner, and Propane
- Stored Potential Energy in the form of Water behind a dam
- Thermal Energy in the form of Open Flame and Radiant Heater
- Radiant Energy in the form of X-Ray Machine
- Kinetic Energy in the form of Truck moving down the road

Accidents in the work-place caused by energy transfer can be Prevent by:

- Identifying The Energy in The System
- Respecting The Energy in The System
- Control The Energy in The System

Those who accept the energy transfer theory put forward the claim that a worker incurs injury or equipment suffers damage through a change of energy, and that for every change of energy there is a source, a path, and a receiver. This theory is useful for determining injury causation and evaluating energy hazards and control methodology.

According to ILO (2011), report strategies can be developed which are preventive, limiting, or upgrading to the energy transfer by:

- Control of energy transfer at the source can be achieved by; Eliminate the source, Changes made to the design or specification of elements of the work station & Preventive maintenance.
- The path of energy transfer can be modified by The enclosure of the path, Installation of barriers, Installation of absorbers & The positioning of isolators.
- The receiver of energy transfer can be assisted by adopting the next measures: Limitation of exposure & Use of PPE

2.1.2 Structure of Accidents

The belief that accidents are caused and can prevent makes it imperative for us to study those factors which are likely to favor the occurrence of accidents. By studying such factors, the root causes of accidents can be isolated. The necessary steps can be taken to prevent the recurrence of accidents. These root causes of accidents can be grouped as "immediate" and "contributing." The immediate causes are unsafe acts of the worker and unsafe working conditions. The contributing causes could be management-related factors, the environment, and the worker's physical and mental condition. A combination of causes must converge to result in an accident (ILO, 2011).

The figure below shows the structure of accidents, including the details of immediate causes, contributing causes, types of accidents, and results of accidents. This structure is not exhaustive by any means. However, an understanding of the "cause and effect" relation of the accident-causing factors required before the continuous improvement of safety processes are assuming.

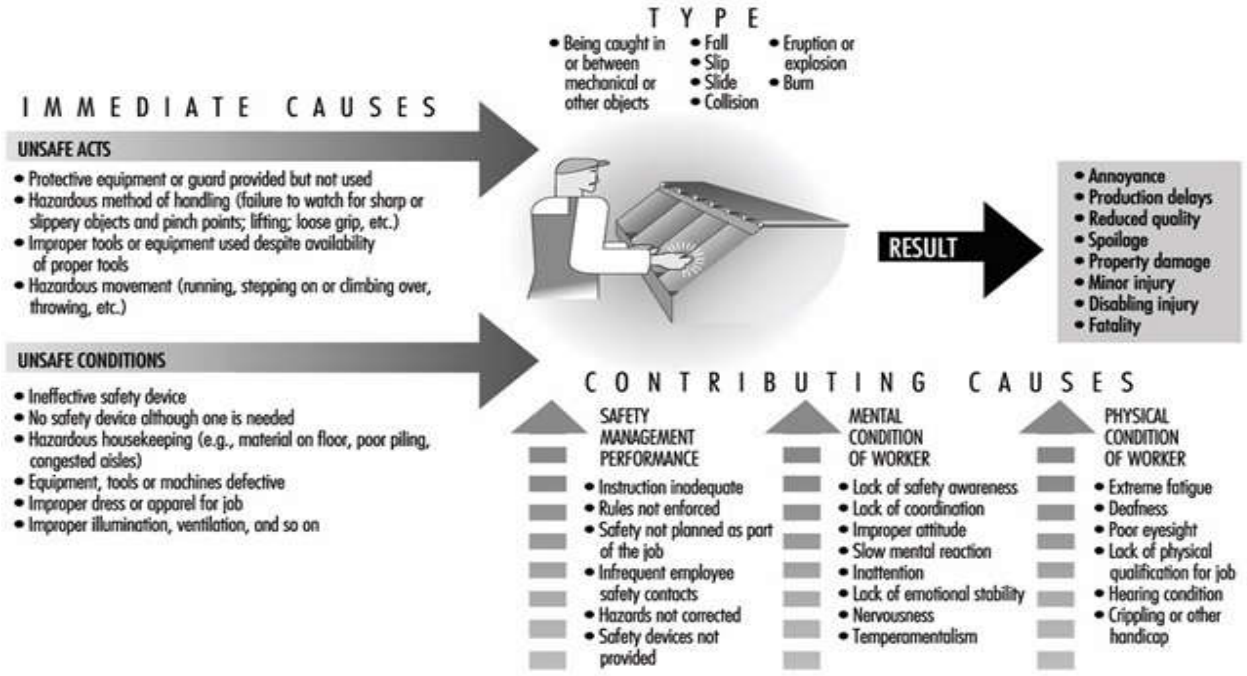


Figure 1: Structure of Accidents (ILO, 2011)

As we have seen in Figure 1, contributing causes for accidents are stated under safety management performance, if safety planning does not get due attention in a company to minimize accidents in the work-place, it may cause accidents. In the same scenario, safety planning must be considered one element for the company's well-being, such as cost, quality, and time as performance indicators.

2.2 Role of Stakeholders in Construction SH

A stakeholder, as defined by the Project Management Institute (PMI, 2016), is any person, group, or organization that can be positively or negatively impacted by or cause an impact on the actions or activities in the workplace. Charles et al. (2007) also suggested that to enhance the construction SH performance, the collaboration between those involved in the concept, design, construction planning, construction work, maintenance, demolition, and others is essential.

2.2.1 Role of Government in Construction SH

Governments are significant employers, policymakers, and regulators and have a leadership role in preventing work-related death, injury, and disease through promoting, legislating, and enforcing SH requirements. The starting points for the government's activities are policy outcomes. Governments also can help promote better SH by setting requirements for the projects to include a range of safety

measures, such as specifying the safety budget, building design, and set standards for specific construction materials (SWA, 2019).

Furthermore, Government roles can range from non-regulatory interventions, such as distribution and communication of information, to establishing monitoring requirements through the declaration and enforcement of standards and guidelines (Levy, et al., 2017).

2.2.2 Role of Client in Construction SH

The client is an organization, or individual, who commissions the activities necessary to implement and complete a project to satisfy its or his needs and then enters into a contract with the commissioned parties (Donkoh & Aboagye-Nimo, 2016), Lingard H. & Rowlinson (2005) also said that construction clients tend to have a more significant initiative in managing OSH in the projects they sponsor. For example, if construction clients were inviting tenders specified how prospective contractors should allocate OSH costs in their bids, all tenderers would be forced to allocate the price of OSH into their bids. The costs allocated to OSH could then be easily identified & compared, and performance measured and paid for it. This would enable clients to eliminate immoral contractors to try to cut corners that influence OSH practices.

Accordingly, the client is responsible for checking the competence of all the appointees & their resources. They must make sure that the facilities for all of the workers are suitable for their welfare. They must allow sufficient resources and time for each stage in the project and not rush any projects. They must also provide information to the contractors before the construction (HSA, 2009).

2.2.3 Role of Consultant in Construction SH

The consultant (designers) are those who have a trade or a business that involves preparing designs for construction work. This includes preparing drawings, design details, specifications, bills of quantities, and the specification of articles and substances, as well as all the detailed analysis, calculations, and preparatory work or arranging for their employees or other people under their control to prepare designs relating to a structure or part of a structure (Famakin, et al., 2012). Designers' are responsible during the construction phase by supervising the project under the condition of contract and during the construction phase of a project. They need to consider the SH of those who maintain, repair, clean, refurbish, and eventually remove or demolish all or part of a structure and the SH of users of work-places.

Consultants are responsible for making sure that there are no risks or hazards during a building design stage. After that is doing, they must provide information on all the other risks that there could still be, which could not be prevented entirely. The consultant must make sure that the client is aware of their roles & duties during the design stage & the construction phase of the whole process. They must also provide information for the SH file and also keep the file updated.

2.2.4 Role of Contractor in Construction SH

A contractor may be a person or group of persons or companies with a formal contract to undertake the construction. The contractor may be responsible for supplying labor and material and providing and overseeing staff if needed (PMI, 2008). According to Lingard and Rowlinson (2005), construction contractors have traditionally borne the responsibility for OSH. Their site-based project managers and site staff are responsible for the day-to-day management of OSH. They have to ensure that employees comply with the SH site regulations.

2.2.5 Role of Employee in Construction SH

Workers have SH responsibilities on-site, as they are the most likely to be involved in an accident. They also have duties to SH. The workers must be competent and know what they are doing at all times. They must report any apparent risks that they see in a site so that accidents can be avoided (UKEssays, 2018).

Furthermore, workers expected caring safety and the safety of anyone who might be affected by what they do or fails to do. Having appropriate safety in workers implies a right to adequate knowledge, and a right to stop work in the case of imminent danger to SH. To take care of their SH, workers need to understand occupational risks and dangers. Therefore, they should be adequately informed of hazards and adequately trained to carry out their tasks safely. To make progress in OSH within enterprises, workers & their representatives have to unite with employers. This idea is also emphasized by Alli (2008), as the protection of life and health at work is a vital worker's right.

2.3 The Importance of SH in the Construction Industry

The OSH hazards faced by construction workers are higher in developing countries than the developed ones. Sebsibe Tadesse and Dagnachew Isreal (2016), confirmed that accidents and fatalities are more prevalent among workers in the construction industry than in other occupational groups in developing countries. The risk of fatality in the construction industry is five times higher than in manufacturing. In comparison, the risk of a significant injury is two and a half times higher

(Nawi et al., 2016). According to ECPMI (2017), construction crews and project teams' safety is a top challenge on construction projects. It should be a priority at all levels of the organization. Safety behavior, ownership, and incident reduction must be closely monitored & controlled throughout the project with the help of several resources, including human resources, safety officers, and other corporate compliance agents.

Subsequently, a safety consulting company in Canada stated that the importance of safety needs commitment to safety by the management, in turn, creating a high safety culture where everyone 'wants' to be safe, workers want to work in a safe environment. If the firm keeps the workers' safety in their working premises, absenteeism drops when effective safety programs are introduced. Also, work premises kept to higher standards for safety, cleanliness, and housekeeping. A safe work environment produces satisfied employees; everyone wants to go home safe each day, and worker compensation insurance claims decrease (WCS, 2018).

SH in construction is particularly important than other industries because it is prone to hazardous situations and can be dangerous at times. In the UK, for example, on a report of 2010/11, the construction industry accounts for 27% of fatal injuries to employees and 9% of major reported injuries (HSE, 2011). The challenges of safety in construction sites still need due attention. Regarding SH's importance in the construction industry, the parties involved in the project anticipated to think through their working place benefit from moral, economic, reputation, and legal perspectives as follows:

2.3.1 Moral Benefit of SH at Workplace

Keeping the working place free from accidents and fatalities arise from moral reasons. The moral reason is all about the moral duty that every person obliged to others. It is not morally acceptable that when people go to work, they show danger, resulting in pains, suffering, injuries, and ill-health. Workers expect to work in a safe environment and return to families and friends at the end of their working time. When a worker kills, injured, or suffers any terrible injury by any accident, he is not the only one to suffer. His family, dependents, friends, and colleagues pass through a massive impact. So it is a must for workers to be provided with a reasonable standard of care to prevent them from such sufferings (Zafar, 2018).

In a similar view, the moral reasoning stated by Boyle (2019) as most people would agree that whatever risks they choose to take themselves, it is unacceptable to put other people at risk, mainly when doing this without their knowledge or consent. Many of the decisions taken by managers and

SH professionals influence the risks to which other people are exposed. Therefore, they have an ethical and moral duty to make sure that these risks are unacceptable. Also, there is an expectation on the part of society in general that organizations take reasonable care to ensure that the people and activities they manage do not harm other people or their property. This kind of working area norm is called the duty of care for workers.

Duty of care is the moral duty on the way to other humans working with a given firm or is working on the premises of a firm. Nevertheless, someone gets injured by a mistake that can be understood. However, if there is any case of negligence and someone got hurt, or there is any kind of loss occurred for a person or business; in that case, the act might require proper investigation and action. Furthermore, the procedure and liability for breach of a duty of care depend on the policies and laws at the time (FST, 2017).

Practicing the duty of care has different naming in a different country. In Scotland, this area of the law is said to be Delict, while in England, Wales, and Northern Ireland, it is called the law of Tort. Delict and Tort differ from the law of contract. Contracts generally specify the duties of each of the parties and the remedy. Upon entering into a contract, the parties obtain specific rights and certain duties. In Delict or Tort, these duties exist through the nature of the parties' relationship regardless of the contractual obligations, in both jurisdictions, Delict, and tort attempt to strike a balance between the individual's wrongful conduct and compensating the victim for his loss (FST, 2017).

2.3.2 Economic Benefits of SH at Workplace

Construction site accidents and ill health result in various direct and indirect costs. Some of the costs can be insured, and most cannot. It is vital to manage SH in working places (Zafar, 2018). Poor SH records can increase costs due to low morale and increased staff turnover. Similarly, it increased insurance premiums and, in extreme cases, make insurance hard to obtain (Boyle, 2019).

Furthermore, Occupational accidents generate high costs to employers, place a burden on healthcare providers, and potentially have a detrimental effect on the long-term health and socio-economic status of injured workers. At a company level, it could lose money, workers, clients, productivity, vendors, respect, and potentially the entire business (Gittleman, et al., 2010). Similarly, workers' Compensation Insurance covers work-place injuries and illnesses. There could be more costs to pay if the company is negligent. These costs include clean-up & repair, claims management, accident investigation, litigation, and new employees' hiring and training. The company can avoid it if it realizes the importance of having the SH platform and implementing it into its structure (Weakley,

2019). From the above, the construction industry accidents increase the cost of the projects, and it hinders the profit of a company.

2.3.3 Reputation Benefits of SH at Workplace

Making working place safe from occupational accidents benefit any company that has to pre-qualify to work. A lower rate of accidents gives a better grade with the clients. A company's most valuable asset (its workers) is protected. A well-managed and maintained safety program gets a worker to work with it. Safety programs create an environment where safety signs of progress are considered, encouraged, and fulfilled. In turn, workers feel like they are part of the safety solution. Safe work environments enhance the goodwill of a company. It enables a company to win and retain business customers. Clients want to work with safe companies having lesser downtime due to incidents. Safety reduces business costs & disruption and gives societal acceptance (WCS, 2018).

In building goodwill for the companies, the social expectations that demand from employers to provide a safe place of work, safe plant and equipment, safe systems of work, competent workers, and a high standard of training and supervision are vital (Zafar, 2018). On top of this, poor health and safety records can result in customers using alternative products or services. They can discourage investment in and lending to the organization by the shareholders (Boyle, 2019).

2.3.4 Legal Benefit of SH at Workplace

Laws are made to protect human rights. As a result, concerning work, it compels the employer to do what he morally should do to take reasonable care of employees. Legal reasons are prepared based on the national laws and international standards to avoid preventive, corrective, and compensatory damages as a result of prosecution before the court. It also set the boundaries and governs the rules for the conduct of business. Failure to achieve minimum standards set by laws can lead to enforcement actions and prosecution before the court (Zafar, 2018).

Furthermore, Weakley (2019), in the work-place SH regulations are vital to keeping the well-being of the employees and the employer. Many hazards are present in today's work environments, and the employer has to keep their employees safe from these hazards. Violating or not have SH procedures in the work-place can have a tremendous impact on any business. In supporting this idea improving safety in construction projects has been achieved through different approaches, one of which is the application of work-place safety policies. It is necessary to develop safety rules and apply them strictly in the organization's day-to-day activity (Razali & MS, 2017).

2.4 OSH Laws and Enforcement Practice Across the Globe

According to Fasil Argaw (2016), developing countries have poor SH records compared to the developed world, which may be attributable to low use of technology, labor-intensive methods, and low workforce participation in health and safety issues. The construction sites in developing countries are ten times more dangerous than in industrialized countries. Moreover, Ofori (2018) explained that the construction processes in developing countries share similar characteristics in terms of the adoption of technology, construction methods, cultural environments, and regulations. These aspects of the industry in developing countries make the management of construction projects, including health and safety problematic tasks.

To manage the construction industry successfully, the law governing OHS, in many developing countries, is significantly limited compared to the developed countries (Enshassi, et al., 2008). For instance, many developing countries have safety legislation. However, the regulatory authority is weak and even non-existent in most cases. On the other hand, the controlling situation in the developed countries is in line with the OSH as an integral part of the regulatory framework.

Construction safety regulations are the backbone for successful construction safety management in many countries. It is challenging to manage the industry at all levels without appropriate legal provisions and enforcement practice. Thus, assessing and examining the current status of OHS practices of selected countries is presented for comparison with the Ethiopian construction legal provisions and enforcement practice. Therefore, some countries are selected from every continent purposefully to assess their experience and to take their best practices.

2.4.1 European Experience

To get the best practices of European countries, the United Kingdom & France selected as follows:

2.4.1.1 United Kingdom (UK)

Construction is one of the major industries in the UK, accounts for 8% of its GDP. It employs 10% of the working population and has an annual turnover of over £250 billion. According to HSE (2010), the industry saw an 11.5% drop in output, followed by a slow return to growth over the preceding few years. However, the construction industry still represents 8.3% of the UK economy, and over 300,000 construction enterprises are hiring more than 2.5 million workers (HSE, 2010).

In the UK, the first law of SH is the HSW Act 1974; this act sets out general duties that employers follow or rely upon in dealing with employees and members of the public (HSE, 2010). The general

duties under the Health and Safety Act 1974 rely mainly on the principle of "so far it is reasonably practicable." This part of the law compels employers to assess likely risks in the work-place that could harm the SH of employees and third parties and take sensible measures to tackle them (HSE, 2016). However, a review of SH prosecutions in the UK construction industry shows that wrongdoings under the HSW Act accounted for 46% of all HSE prosecution cases between 2010 and 2015. Similarly, the HSW Act also accounted for £8,954,043 out of £11,625,312 total fines imposed on organizations for breaching the regulation in the same year (Fidderman, 2015).

Similarly, SH regulations in the UK were prepared in the 1970s. However, the recent SH sentencing guidelines of 2016 appear to focus on penalties & safety regulations. The new sentencing guidelines depend mainly on offense grouping that specifies a range of penalties based on SH offender's financial abilities. Apart from the new regulation, other SH rules in the UK centered on the participation & duty of stakeholders about the work-related duty of care (Arewa, et al., 2018).

Moreover, an organization condemned a breach of SH law and maybe penalizing. Fines and claims for compensation are additional costs of the companies failing to manage risk. So, managing SH and expected risks based on the country's law benefit the company from the financial drain and unnecessary costs (Boyle, 2019).

2.4.1.2 France

According to ILO (2015), in France, the primary law on OSH is available in Part IV of the Labor Code entitled "Health and Safety at Work" completed by specific and technical decrees placed at the end of the Code. Other parts of the Code supplement SH at work legislation. The French Labour Ministry often produces circulars to provide guidelines on the application of the law. The employer shall take all necessary measures to ensure safety and protect workers' physical and mental health. The Labour Code also incorporates transpositions of European Union legislation.

According to Li & Poon (2013), the French system of Worker compensation was established in 1898 for workers in the private sector. It is based on the principle that the employer is assumed to be strictly liable for accidents at work. Therefore, they have to pay monetary compensation to the victim. It recognizes serious medical incidents and suicides on sites. Social protection includes health insurance, and worker's compensation covers different population sections such as the company, private or public sector, or work. In the private sector, there is a mandatory requirement for the employer to report any work-place accident to the victim's social insurance fund. The fund determines if the accident is work-related. In the public sector, the victim supervisor has to send a

report of the accident. Besides, a departmental committee for the accident-related to work received the report for further action. In the case of fatal accidents, the reward includes a pension paid to the victim's beneficiaries (Briere, et al., 2010).

At present, most health and work compensation funds have digitalized the details of accidents' claims, determinations about liability, and compensation. However, there are some problems with the French workers' compensation system. First, most of the self-employed workers are not protected by their social insurance again, the work-place and commuting accidents. Second, some work-related health problems are under-reported and not reported by a variety of factors. Also, the reports may not include in-group pressure (e.g., the company adopts a "zero accident" plan at the company) and individual factors (e.g., fear of losing one's job). Finally, each of the social insurance funds functions alone. Data may be inconsistent as there is no point of centralization (Briere et al., 2010).

2.4.2. Experience of The Americas

To get the best practices of American countries, Brazil & the United States selected for this study:

2.4.2.1 Brazil

In Brazil, the awareness of work-place accidents grew in the early years of the 20th century. Several state-level initiatives during the first two decades of the century addressed the problem of workplace accidents. A national regulating work-place safety condition (Law No. 37 was 24) promulgated in 1919 & updated in 1934. During the decades of rapid industrialization that followed World War II, the number of reported accidents and their economic problem increased dramatically. The national government took action in 1968 by issuing Ordinance 32, which defined SH initiatives' requirements at the work-place level (Frumkin & Camara, 1992).

The primary law covering SH prevention in the Construction Industry is the Regulatory Standard NR-18; it is a legal document. It provides several guidelines to ensure the right working environment & safe working conditions in construction sites. It was established by Decree 3214 of 1978. This regulatory standard is the most important tool that focuses on measures for the prevention of accidents. It requires that all kinds of construction projects, regardless of the size of the construction site, follow the established rules. It is also necessary that all construction projects be expected to implement the Environmental Risk Prevention Program. The regulatory standard in Brazil is the initial reference to risk prevention in all construction sites provided by NR-9. Also, the Program for

Medical Control of OSH aims to preserve and guarantee the workers' collective health. The NR-35, with working at heights and the safety requirements to do so (Gomes, et al., 2016).

Most OSH functions working in the Ministry of Labor. However, with the re-organization of the health sector in 1988 into the Unified Health System (Sistema Unico de Sauide, or SUS), some responsibility was shifted from the Ministry of Labor to SUS. The new constitution empowers SUS to protect worker health (Article 205, Sections 2, &7). The OSH Service Delivery Ordinance 32 of 1968, updated in 1983, requires companies to establish an Internal Committee for the Prevention of Accidents. In case of an occupational injury or disease, the Committee offers substantial benefits above ordinary medical coverage. These include medical costs, full wage replacement, compensatory payments for loss of function, rehabilitation costs, and death benefits. The employer is required to report it to the Ministry of Labor (Instituto Nacional de Seguridade Social (INSS)) within 24 hours when an occupational injury or illness occurs. The employer is informing about the injury to the Ministry of Labor. This information must be notified within 24 hours and described the injury. The report automatically triggers the workers' compensation scheme, expected to pays for medical care. The employer continues to pay full wages for the first 15 days of lost time. If a company fails to report an injury or illness, claiming that it is not occupational, then a worker may take the case to the labor court (Frumkin & Camara, 1992).

2.4.2.2 United States of America (USA)

In 1970, the United States Government created the Occupational Safety and Health Administration (OSHA), a national public health agency dedicated to the fundamental proposition that no worker should choose between their life and their job. Passed with mutual support, the creation of OSHA was a historical moment of cooperative national reform. The OSHA law clarifies that the right to a safe work-place is a fundamental human right (OSHA, 2018).

According to National Safety Council (NSC) 2006 cited in Hallowell (2012) in the past 40 years, the fatality rate in construction has declined by more than 40% due to the seriousness of OSHA acts. Nevertheless, as per the Bureau of Labor Statistics (BLS) in the report, the fatality and injury rate in construction remains five times higher than the all-industry average. This unbalanced injury-and-illness rate has been attributed, in part, to the complex, dynamic, and transient nature of construction projects (Hallowell, 2012).

Implemented at the end of May 2008, the "Safety4Site" program in the USA designed to reduce injuries and workers' exposure to OSH hazards. This program aims to enforce on-site safety

management & encourages practitioners to report any violation regulated by OSHA, such as riding on equipment not designed for multiple passengers, improperly using a stepladder, working within 10 feet from power lines. This program enhances safety awareness, safety attitude and culture progress and accountability of the general contractors' employees, all hired subcontractors, and materials suppliers of all levels while achieving positive and keen changes in safety attitude and behavior. Violation can be reported by management staff, peer workers, or a representative when workers violate the rules for the first time. Workers who violate quickly are removed from the job site for one day after the violation is reported. They must return to the job site the next morning to lead the huddle meeting (a team meeting gathering together) on the "Safety4Site" non-negotiable violation. Individual review of the "Safety4Site" program and discussion carried out between the management staff and the workers who have committed the violation. They require to sign the commitment letter for the program and be allowed to work again. The huddle meeting enhances two-way communication & worker involvement. In the case of second-time violation, the general contractors (GC) employees are separated from the GC for 30 days without pay or benefits but are eligible for rehiring.

However, if they work for subcontractors, they are dismissed from all the GC's projects for one year. For subcontractors with a higher violation record, the contract is mandated to have a plan of action for change as well as a full-time safety educated person on the project at no extra cost to the owner or the GC. The breach of contract leads to the close of the contract (Chen & Jin, 2013).

2.4.3 Australian Experience

The Australian construction industry has a multiplier effect on the economy with other industries (ABS, 2018). The Federal Safety Commissioner promotes OSH to building work by disseminating information, monitoring, and promoting compliance with the Building Code. The Commissioner engage personnel with suitable experience and qualifications as his consultants.

The Building and Construction Industry Improvement Act 2005 states clearly the construction safety measure requirement in Australia. Each of the states in Australia has some unique and designed regulations according to their specific needs. For example, the OSH Act was introduced in Victoria in 1985. It focuses on the various stakeholder needs to prevent work-related illnesses, injuries, and deaths. It also provides mechanisms for consultation between employees and employers on health and safety issues (Lin & Mills, 2001).

Australian OSH statutes stipulate that there must be work-place committees & employee health and safety agents in medium to large companies. The New South Wales risk assessment regulation in 2001 entails explicit consultation requirements and is the most critical source of worker involvement in construction safety (Saksvik & M., 2003)

2.4.4 Asian Experience

To get the best practices of Asian countries, China, Singapore & Kuwait selected for this study:

2.4.4.1 China

According to the National Bureau of Statistics of China (2016), the construction industry in China is one of the leading industries. It is a vital basis for the development of public infrastructure. In 2011–2012, the construction industry contributing 7.51 % to the GDP. & it's an increase of 15.17 % over the previous year. By the end of 2012, there were 75,280 Construction companies in China. These industries employed a considerable amount of 42.7 million people. As in many countries, safety has always been a significant concern in the Chinese construction industry. Despite widespread recognition of the importance of safety, employees in the construction industry have long faced risky conditions in the work-place. In 2010, the construction industry's accident rate was the highest among all industries in China (Wang, et al., 2010).

According to Li & Poon (2013), the leading authority in China's construction safety is the Ministry of Housing and Urban-Rural Development (MoHURD) at the central government level. Under the leadership of MoHURD, the Bureau of Construction Quality and Safety Supervision is established at each province, municipality, and autonomous administrative region to manage safety-related construction issues.

The "Administrative Regulations on the Work Safety of Construction Projects" Declaration No. 393 of the State Council of the People's Republic of China came into force as of January 2004. It introduces a remarkable change in the SH requirements on construction. For instance, it regulates the contractor, owner, supervisor, designer, and relevant stakeholders' safety responsibilities. Any organization which fails to comply with the laws leads to a penalty. In another scenario, the ''Regulation on Work Safety Licenses'', Declaration No. 397 of the State Council of the People's Republic of China came into force in February 2004. Work Safety licenses regulation includes:

- The contractor to establish and improve the safety system at work;
- Safety training provided to the employees;

- Improve work safety system and provide professional safety staffs;
- Pay insurance premiums for the employees and buy employment injury insurance;
- Supervise, identify and evaluate significant hazards at work,
- The employer & contractor have to raise the outlay on work safety (Zou & Sunindijo, 2015).

The "Management Methods on Documents of Production Safety" states the scope for site safety inspections, encourages construction practitioners to take photographs as proof of unsafe production, and submits safety information online. Besides, four emergency program was launched from 2003 to 2005: The Emergency Plan on Production Safety, Fire Protection, Acute Occupational Disease, & Acute Occupational Poisoning. These programs help the managerial staff and the employees to act quickly in an emergency state to reduce the chance of accidents. Similarly, it stated the prevention-oriented approach as the fundamental principle of safety management in construction projects (Zou & Sunindijo, 2015).

2.4.4.2 Singapore

Building Operations and Works of Engineering Construction (BOWEC) Regulations 1994 laid substantial grounds for construction safety practices in Singapore. The BOWEC Regulations list 13 major elements that constitute proper construction safety management on sites. The 13 elements include safety policy, working practice, promotion, training, group meetings, incident investigation and analysis, in-house rules and regulations, control of contractors, safety inspection, maintenance regime, hazard analysis, harmful materials, and emergency readiness (Pheng, 2000).

Besides, Singapore's regulations instruct that contractors must include safety budgets and measures in their tenders. As many of the accidents related to cranes (for instance, 63 accidents in 1997, 42 in the first half of 1998). The new Factories (Operation of Cranes) Regulations replaced the 1993 regulation on 1 March 1999. The new regulations state that all mobile and tower crane operators must register with the Ministry of Industrial Safety and renew it every two years. The law also stipulates different legal requirements according to the scale of the projects. The first and foremost one is contractors' projects worth at least S$ (Singaporean Dollar) 5 million must hire a full-time safety supervisor for safety promotion and supervision of safety work. Contractors' projects worth at least S $ 10 million have to implement a safety management system covering such areas as hazard analysis, safety policy, house safety rules, safety inspections, safety work practices, and machinery and equipment maintenance. The last one is that contractors' projects worth S $ 30 million have to

hire an independent external auditor to audit the safety management system on a half-yearly basis (Ofori & Debrah, 2001).

According to Li & Poon (2013), in managing the construction projects, workers of different countries, citizens were quite ordinary on sites in Singapore. The differences in labor's traditions & cultures affect human relations, and work habits cause difficulty in communications, which gives rise to safety problems on-site.

Since April 1993, all foreign country construction workers in Singapore have to attend a half-day Construction Safety Orientation Course, including the SH legal frameworks before the issue of a work permit (it changed to a full day since November 1997) high accident rates on-site. The course was conducted in different languages with the help of video presentations. It covers primary safety hazards & accident case studies that aim to introduce the hazards on construction sites, develop a positive safety attitude, the importance of good housekeeping and safe excavation, and hands-on sessions on the proper use of personal protective equipment. In line with this starting from 1998, all project managers of contracts with S$10 million or above have to complete a 30-hour safety course (Ofori & Debrah, 2001).

According to Ofori & Debrah (2001), the Singaporeans Housing Development Bureau (HDB), has set up a Safety Unit in its Structural Engineering Department since 1976 to reduce accident frequency rates on its sites. It has hired full-time site safety supervisors to oversee safety arrangements on-site, prepare a safety program, issue inspection schedules, conduct safety meetings, and document the safety records for several years. After a close follow-up and supervision by this office accident and fatalities dramatically decreased from 7.18 per million person-hours worked to 0.66 in the ten years 1982–1992. This dramatic change was observed in the construction industry by intensive mechanisms taken by the workers of HDB.

In Singapore, the HDB promoting safety awareness among workers, contractors, supervisory staff, regular safety meetings, safety orientation courses on-site as compulsory, providing safety measures to ensure a safe working environment are essential tools in promoting SH in the construction industry. Also, employing safety supervisors to ensure that safety is everyone's duty and practicing proactive management, and the last one is Safety Unit conduct checks to prevent accidents.

2.4.4.3 Kuwait

In Kuwait, construction site safety & accident reporting supervised by two different government authorities: the Administration of Safety (AOS) at the Kuwait Municipality, which deals with construction safety procedures in sites, and the Workers Affairs Department (WAD) at the Ministry of Social Affairs and Labor (MSAL) (Al-Tabtabai, 2002).

Accordingly, MSAL, construction workers make up nearly 9.90% of the total labor force for the years 2001 to 2007. This labor force consists of foreign nationals, and has minimal education; some workers barely read and write. They also lack the training necessary to perform complicated construction tasks in Kuwait (Al Humaidi & Tan, 2010).

Through, to start a new job site, the contractor is required to contact the Safety Department of the Kuwait Municipality and submit necessary documents. The department provides safety information about the proposed job. A safety representative conducts a site visit to ensure safe places for storage, temporary site offices, and services. Safety posters with significant instructions given to the contractor and hanged at the job site. In addition to safety interaction procedures and accident prevention methods for each activity related to the proposed job. The Safety Department hires safety engineers and inspectors to conduct daily site inspections at construction projects. Inspections include safety procedures and equipment provided by the company and site cleaning and proper disposal of construction materials. Kuwait Municipality safety inspectors use a printed form of the safety checklist, which contains major possible safety violations. Firms who commit a violation penalized by either a warning ticket or a penalty ticket based on the type of violation. The penalties for each violation range from 1 KD $3.27 to a few thousand (Karim, et al., 2002).

The percentage of accidents in the Kuwait construction industry is far higher than in all other industries. Besides, the amount of accident compensation ranges between US$360 and US$720 for each of the affected workers. In 2005, a new law was declared. It bans workers from mid-day to late hours of the day from June to August to prevent dehydration due to hot weather. According to the law, injuries suffered by workers during regular working hours are classified into injuries, permanent disabilities, & deaths. In cases of injury, the worker compensated as per the number of days needed for recovery recommended by medical examination. In cases of permanent disability, the worker compensated for the percentage of disability determined by the medical board (percent disability multiplied by salary multiplied by 2000 days). In the event of death, the worker aided in full pay for 1500 days' salary (Al Humaidi & Tan, 2010).

2.4.6 African Experience

To get the best practices of African countries, South Africa, Ghana & Kenya selected for this study:

2.4.6.1 South Africa

In South Africa, the construction industry accounts for around 8% of total formal employment and around 17% of total informal employment. It is also the third most dangerous sector for workers after the transportation and fishing industries (Okonkwo, 2019).

In South Africa, the Occupational Health and Safety Act (OHSA) is the top OSH law. The primary aim of OSHA in South Africa provides SH at work and the SH of persons in connection with the use of plant and machinery (ILO, 2013). According to the Compensation for Occupational Injuries and Diseases Act (COIDA) (1993), COID is a government body that compensates workers injured at work or who have contracted a disease (schedule 3 of COID Act) at work. Since August 2014, the reporting system to COID changed to an online system. The authority and governance for OHS in South Africa are shared mainly by three government departments: the departments of Labor (DOL), Departments of Mineral Resources (DMR), and Departments of Health (DOH). The Department of Labor is responsible for OSH inspection and enforcement in commerce and industry apart from mining & energy production, where the Department of Mineral Resources is responsible (BE, 2017).

The main statutory law on SH in the jurisdiction of the Department of Labor is Act No. 85 of 1993: Occupational Health and Safety Act, as amended by the OHSA Amendment Act, No. 181 of 1993. Regulations to the OHS Act include the General Administrative Regulations, 2003, Certificate of Competency Regulations, 1990, Construction Regulations, 2014, Diving Regulations 2009, Driven Machinery Regulations, 1988, Environmental Regulations for Work-places, 1987, General Machinery regulations, 1988, General Safety Regulations, 1986, Noise-induced hearing loss regulations, 2003, and Pressure Equipment Regulations, 2004.

Similarly, Rothmann & Pienaar (2014), the OSH Act of 1993 determines that an employer must establish & maintain a safe and safe work environment without risk to the health of employees. The employer is responsible for the provision of SH in the work-place, including the costs of hazard identification, control, and the provision of a medical examination program where applicable. The compensation law COIDA provide for medical insurance for the treatment of work-related diseases and injuries for workers. The health services for the industry procure from the private sector through employer-funded medical aid schemes (insurance) (NHA, 2003).

South Africa possess the foundational legislative frameworks and organization of OSH. However, OSH access and application of the legislative frameworks for workers remains significantly constrained. In line with this, the significant gap is the shortage of skilled and trained human capital, particularly in OSH. Organizing short courses and training on OSH would be priceless in advancing the cause of OSH (Moyo et al., 2015).

2.4.6.2 Ghana

In Ghana, the construction industry contributes to 3.12% of the total GDP. The industry is dominated by small local companies, with few of them hire more than two hundred and fifty employees. Large firms that hire more than two hundred and fifty employees are mainly foreign firms and are rare. Similar to other developing countries, Ghana's construction safety performance was reduced. It has a higher accident rate than many other industries (Khani, et al., 2008).

In Ghana, a law on SH (including ILO conventions) was approved by the parliament. In line with this, SH clauses in conditions of contract form part of the legal framework of the Ghanaian OSH management system. Statutes, common law, ILO Conventions provide the basis to enforce SH measures on sites. The statutes used to manage the SH include the factories, office & shops act 1970, the labor act 2003, and the workman's compensation act 1987 (Khani, et al., 2008).

To manage the authorized provisions properly, the government established five ministries responsible for OSH in Ghana: Occupational Health Service Unit, the Environmental Protection Agency, the Labor Department, the Factory Inspectorate Department, and the Attorney General's Department. Among them, the Labor Department and Factory Inspectorate Department are the two major government departments responsible for safety, health, and workers' welfare. They are under the Ministry of Manpower Development and Employment (Li & Poon, 2013).

According to Khani et al. (2008), in Ghana's legal frameworks, the Factory Inspectorate Department has the right to enforce work-place SH standards. It helps ensure that all the work-places attain the minimum requirements of SH prescribed by the Factories, Offices, and Shops Act (Act number 328). Apart from site inspections, the department proactively promotes work-place SH through seminars and workshops, provides OSH information, conducts work-place surveys, and registers factories (including construction sites). The labor department administers the Workmen's Compensation Act (1987) and the Labor Act (2003). But, these two departments face logistical & human resource constraints, which have adversely affected their operational efficiency.

Similarly, Khani & Braimah (2014), the safety regulations that are managed poorly by government departments & compliance with safety law are low. There is poor coordination of the activities of the many institutions responsible for implementing SH standards. The level of compliance with relevant SH law is undesirable & remarkable improvements in this regard are necessary. Also, there is no specific SH regulation for the construction industry of Ghana. Also, problems of compliance with the law are evident from the brief safety provisions in contract clauses.

2.4.6.3 Kenya

In Kenya, the construction sector plays a significant role in the country's economic development through its contribution to GDP 7% & creation of employment, and production of capital facilities and assets required for production in other sectors. Despite its importance, the construction industry is considered risky with frequent and high accident rates and ill-health problems to workers, practitioners, & end-use (Muiruri & Mulinge, 2014).

To protect workers' safety in the construction industry, OHS is managed under the Ministry of Labor and Human Resource Development. This office is authorized with the responsibility of the SH of workers. Also, it undertakes systematic inspections and audits of work-places.

Similarly, this office, creates awareness to citizens and other people on matters of OSH, mainly through training, approving architectural plans of buildings intended for use in work-places and processing compensation claims for employees injured in accidents or who have contracted diseases in the course of employment in line with the work injury benefits Act 2007.

In Kenya, the SH and welfare of workers are the OSHA, which was enacted in 2007. This act was enacted to provide for the SH & welfare of workers and all persons lawfully present at work-places and to provide for the establishment of the National Council for OSH & connected purposes. The purpose of this act is to secure the safety, health & welfare of persons at work; and protect persons other than persons at work against safety and health risks.

Furthermore, this act applies to all work-places where any person is at work, whether temporarily or permanently. So, the act and its provisions apply to the construction industry since the construction site is regarded as a factory. The act provides for duties of both employer & the employees in ensuring the safety, health, and welfare at work. The act requires every occupier to establish the SH committee at the work-place under regulations. The SH audit of his work-place was carried out at least once every twelve months by the SH advisor. In Kenya, OSHA provides for the law & the

enforcement mechanisms on SH matters in the construction industry. SH officers expected to inspect the sites to ensure the act's provisions are adhered to by all parties.

For quick reference the best practices of the above-mentioned countries are summarized in the following table:

Table 2: Summary of Construction Safety Measures in different Countries

Country	Safety Measures
UK	➢ SH regulations in the UK centered on the input & responsibility of stakeholders
	➢ The recent SH sentencing guidelines 2016 appear to focus on penalties
	➢ The penalties are serious and make a significant difference in the country.
France	➢ There is a mandatory requirement for the employer to report any work-place accident to the victim's social insurance fund.
	➢ The employer is assumed to be strictly liable for accidents at work; therefore, they have to pay monetary compensation to the victim.
Brazil	➢ OSH service delivery ordinance requires companies to establish an internal committee for the prevention of accidents.
	➢ Reliable reporting & compensation system established, The employer expected to pay full wages
USA	➢ The OSHA law makes the right to a safe work-place is a basic human right,
	➢ The ‘‘Safety4Site’’ program is designed to reduce injuries & workers’ exposure to OSHA Hazards & aimed to enforce on-site safety management & encourage practitioners to report any violation & enhance safety awareness
	➢ Workers who are working in unsafe conditions & showed unsafe acts discharged from the site
	➢ They have serious laws on the use of subcontractors; if they failed to apply SH regulations, the contract will be terminated.
Australia	➢ The Federal Safety Commissioner promotes OSH concerning building work, disseminating information, monitoring & promoting compliance with the Code.
	➢ Act 2005 states clearly the construction safety measure requirement
	➢ The OSHA is introduced in all states in good condition; every state in Australia has some laws which are unique & designed according to their specific needs.
	➢ There must be work-place committees & employee SH agents in medium
	➢ Workers involved in the consultation of SH

Country	Safety Measures
China	➢ The "Administrative Regulations on the Work Safety of Construction regulates the safety duties of the relevant stakeholders.
	➢ The SH regulation in China includes the contractor to establish and improve the safety system at work
	➢ Safety training is provided to the employees, provide professional safety management staff, pay insurance premiums for the employees & buy employment injury insurance
	➢ Any organization which fails to comply with the laws leads to a penalty.
	➢ According to law, supervise, identify & evaluate significant hazards at work, work safety state giving to the regulations & compile the emergency program.
Singapore	➢ Mobile and tower crane operators must register with the Department of Industrial Safety of the Ministry and renew every two years.
	➢ All foreign country workers attend a one-day Construction Safety Orientation training, training course provided in different languages including the SH legal frameworks before the issue of a work permit.
	➢ Contractors' projects worth S$5 million - 30 S$ million must to: • hire a full-time safety supervisor for safety promotion & supervision • to implement a safety management system covering hazard analysis, safety policy, in house safety rules & safety inspections. • hire an independent external auditor to audit on a half-yearly basis.
	➢ HDB has set up a Safety Unit in its Structural Engineering Department, hired full-time site safety supervisors to oversee safety status on-site.
Kuwait	➢ The general provisions of Kuwaiti labor law state that officials have the right to inspect, supervise, execute, & implement laws of labor safety rights.
	➢ In Kuwait financial compensation scheme for victim workers on site
	➢ On-site safety standards specified in the conditions of the contract, to which the project parties agree.
South Africa	➢ The Department of Labor is responsible for OSH inspection and enforcement.
	➢ The employer is responsible for the provision of SH in the work-place
	➢ The compensation law provides for medical insurance for the treatment of work-related diseases & injuries for workers.
	➢ An employer must establish & maintain a work environment that is safe and without risk to the safety and health of employees.

Country	Safety Measures
Ghana	➢ The parliament approves law on SH (including ILO conventions).
	➢ SH clauses in conditions of contract form part of the legal framework of the Ghanaian OSH management system.
	➢ To manage the authorized provisions properly, the government established five ministries responsible for OSH.
	➢ The legal frameworks of Ghana, the Factory Inspectorate Department, has the right to enforce workplace safety and health standards.
Kenya	➢ The SH & welfare of workers are the OSHA, which was enacted in 2007. The act was enacted to provide for the SH & welfare of workers & all persons lawfully present at work-places.
	➢ The act requires every occupier to establish the SH committee at the work-place under regulations & safety, and the health audit of his work-place was carried out at least once every twelve months by the SH advisor
	➢ OSHA provides for the law and the enforcement mechanisms on SH matters in the construction industry.

2.5 OSH in the Ethiopian Construction Industry

Construction is a sector with particular hazards, like work at heights, work with power tools, more than one trade, and more than one employer working on a single site with a lack of coordination. Studies revealed that various factors are mainly associated with a work-related injury. In Ethiopia, statistical information regarding construction injuries is rare, & minimal attempts have been made to investigate the frequency and associated factors. The bad news of construction site accidents in Ethiopia is a day to day happening (Sebsibe & Dagnachew 2016; ECPMI, 2017).

Similarly, in Ethiopia, the working conditions of construction sites for the workers are found to be very poor. It is mainly due to improper employment relationships and a lack of safety measures. Many workers are exposed to different kinds of work-related accidents. The majority of injured workers did not receive compensation. Also, most of the employees on construction sites in Ethiopia have done their work without PPE (Gojjam Limineh, 2018).

In building construction, most of the causes of an accident is falling from height (FFH). FFH occurs very frequently in the accident history of Ethiopia. As a result of FFH, injuries, and deaths that happened to the laborers who fall from a height, especially upper body parts, are exposed to injuries (Selam Kassahun, 2017). The main reasons for accidents in Ethiopia are FFH, working without PPE, trench collapse, or defective or misused equipment, struck by an object. Lastly, electric shock is also

a severe problem in Ethiopia. Further, inadequate site supervision is the main reason for accident occurrence in Ethiopia (Lucy Feleke, et al., 2016).

Seifedin (2014) stated that as construction in developing countries is more labor-intensive than in the developed world, without a major difference between large & small contractors, unsafe conditions exist in many sites in Ethiopia. Due to this, workers are subjected to numerous hazards. There are no training programs, safety agendas in meetings, & orientations for the new staff in many sites. So, employees are forced to learn from their own bad experiences.

Similarly, there is also a lack of medical facilities & substandard sanitation. This industry faces a critical challenge for SH (R & M, 2018). Besides the rapid growth of construction in Ethiopia, the frequency of work-related injuries & accidents is critical for the industry (ECPMI, 2017).

2.6 Safety and Health Laws and Enforcement Practice in Ethiopia

The issue of leading SH at work on a legal basis in Ethiopia dates back to the 1940s when the first legal instrument Proclamation No. 58/1945 promulgated. The origin of this law was a result of the advent of development that took place in the country. The country's law framed on the fundamental principles underlined by the notable ILO conventions on labor inspection.

Further, a comprehensive law on OSH management was substituted in 1964, i.e., Proclamation 232/1964. In Ethiopia, all laws are adopted from most European countries, especially France and the UK (Dawit Seblework, 2006).

OSH law in Ethiopia was enacted at different times. It is better to start a review of the country's different legal documents as follows:

2.6.1 The FDRE Constitution

In any country of the world, governments need laws to manage the people of their country. Managers and politicians see the law as a means to attain their economic, cultural, political, and social policies and a tool for development and fostering regulatory behavior in the society.

According to Hefer (2014), the law governs all parts of humans' lives in any given society, and it is of utmost usefulness that the viewers understand it to foster compliance & effectiveness. In Ethiopia, the supreme law basis is the constitution promulgated by Proclamation No. 1/1995. This law has several articles on matters of conducive work in general & of SH & environment in particular.

As stated in Article nine, the supreme law of the country is the constitution. In this article, any law customary practice or a decision of an organ of state or a public official that breaches this constitution

shall be of no effect. All international agreements endorsed by Ethiopia are an integral part of the law of the land, including all the ILO convention endorsed by the country. Also, Article thirteen highlights that the citizens' fundamental human rights and freedom shall be interpreted in a manner conforming to the principles of the Universal Declaration of Human Rights.

Article forty-two of the FDRE Constitution spells out that the rights of labor to form associations to improve their conditions of employment and economic well-being. The right includes the right to form trade unions and other associations to bargain collectively with employers or other organizations that affect their interests. Similarly, the constitution provides this article that workers have the right to reasonable limitation of working hours, rest, leisure, periodic leaves with pay, remuneration for public holidays, and a healthy & safe work environment.

Article forty-four of the constitution declares environmental rights and says that all persons have the right to a clean and healthy environment. About economic points, Article 89 (8) states that the government shall endeavor to protect and promote the health, welfare & living standards of the working population of the country. Article 92 (1) States, the government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment.

Fulfilling SH's issue is one of the basics of international human rights in which Ethiopia is accepted as a UN member country via ILO. The basic concepts of SH of other developed & developing countries' experiences included in the Ethiopian constitution. This constitution is used as a foundation for the country's laws concerning OSH for responsible governmental authorities.

2.6.2 The Ethiopian Civil Code

The Civil Code of Ethiopia has promulgated during the time of Emperor Haile Selassie-I, the last king of the country, on May 5, 1960, by proclamation 165 of 1960. This code stipulated the responsibilities and duties of the employer about SH.

Article 2548 of the civil code stated the employer's responsibility as "the employer should take necessary measures as are required by the special circumstances of the work to safeguard the life, physical integrity, health and moral standing of the employee. Also, the employer shall, in particular, arrange the premises and keep up the equipment in his undertaking with this object in view, under the general practice and technical requirements for the working condition." Similarly, Article 2549 of the code clearly stated about accidents arising from work; in this condition, the employer shall be liable for accidents which the employee suffers from his work.

Articles 2550 and 2551 clearly stated the responsibility of the employer during the time of an accident on workers as; the employer shall be liable for accidents which the employee suffers arising from activities which he performs in the interests of the undertaking, notwithstanding that the employer has not ordered these activities.

- Keeping the private rights of the country's citizens is the primary duty of every government while in their working area or other places.

2.6.3 The Ethiopian Labor Law

Ethiopian Ministry of Labor and Social Affairs (MoLSA)has coordinated the nation's labor and social affairs and implemented programs thereof (Chilot, 2019). MoLSA prepared and endorsed different laws for the protection and well-being of the country's workers. One of the laws prepared by the ministry and endorsed by a higher constitutional entity is Labor law of the nation. Currently, Labor Proclamation No. 1156/2019 is the principal national law on labor issues & functional as of the 5th day of September 2019.

Proclamation No. 1156/2019 covers all establishments with one or more workers. It addresses a wide range of issues such as employment relations and contracts, obligations of employers and workers, wages and working time, working conditions and occupational safety and health, occupational injuries, labor disputes, and conciliation. It also sets out provisions for the labor inspection service, giving inspectors wide-ranging duties and enforcement powers and prohibiting obstruction of inspectors in performing their duties & other necessary issues concerning workers' rights, duties & benefits.

Under article 12, 5 & 6 of labor law 1156/2019, the employer and worker's obligation is clearly stated as the employer is responsible for taking all the necessary OSH measures. Similarly, abiding standards & directives given by the appropriate authorities in respect of these measures are obliged to cover the cost of medical examination of the worker whenever required by law or the appropriate authority. Likewise, in article 13, number 5 & 6, the duty of workers stated.

Article 92 stated that the fundamental obligations of an employer about putting in place all the necessary measures to ensure, workplaces are safe, healthy, and free from any danger to the well-being of workers. In the same article, the employer is obliged to take, in particular, the subsequent measures to safeguard the SH of the workers. Also, comply with the work-related SH requirements provided for in the Proclamation, take appropriate steps to ensure that workers are adequately instructed and notified concerning the hazards of their respective works, and assign safety officers,

and establish an OSH committee, provide workers with PPE, clothing, and other materials and instruct them of their use, register employment accidents and occupational diseases and report the same to the labor inspection service, arrange, according to the nature of the work, at his own expense for the medical examination of newly employed workers and those workers engaged in hazardous work, as may be necessary except for HIV/AIDS unless and otherwise, the country has an obligation of an international treaty to do so, ensure that the workplace and premises of the undertaking do not pose threats to the SH of workers, take appropriate precautions to ensure that all the processes of work in the undertaking shall not be a source or cause of physical, chemical, biological, ergonomic and psychological hazards to the SH of the workers and finally implement the instructions given by the Competent Authority under this Proclamation.

In article 93, the law provides the obligations of workers about the required cooperation and putting in to practice the Regulation and instruction given by the employer to ensure safe health and working conditions at workplaces. The primary obligation set by the law for workers to take by:

- To cooperate in the formulation of work rules to safeguard the worker's health and safety,
- To inform forthwith to the employer of any defect related to the appliances used and incidents of injury to the health and safety of workers that he is aware of in the undertaking;
- Report to the employer any situation, which he/she may have a reason, to believe could present a hazard and which he/she cannot avoid on his/her own or any accident or injury to health which arises in the course or in connecting with work,
- To make proper use of all safety devices & other appliances furnished for the protection of the SH of others,
- To obey all the SH instructions issued by the employer or by competent authorities,

In the same law, specified that no worker might inhibit with remove, displace, damage, or destroy any safety devices or other appliances furnished for his/her protection or the protection of others and may not hinders any method or process adopted with a view to abating work-related hazard. This law has specified about occupational injuries in its Articles 95-112 as follows:

- The provisions start by defining working injury, accident, and occupational diseases.
- The law also specifies that an employer shall be liable for all working injuries on workers except those caused intentionally by workers in case of non-obedience to safety orders, non-observance of accident avoidance rule & injuries caused by being intoxicated.

This law also defined the type of impairment as, Temporary, Permanent partial impairment, Permanent total impairment & Death, or fatal injury.

The degree of permanent impairment and temporary partial impairment fixed under the assessment table prescribed by directives issued by the MoLSA. Besides, the provision states that a competent medical board shall use the assessment table, to determine the extent of the degree of disablement as far as possible within twelve months from the date of injury.

Per the provision of Articles 104-106**,** details of special obligations, types of benefits, and duration of benefits liability are put on the employer. It also stated that the injured worker's medical benefits should be withdrawn following the Medical Board's decision.

Articles 107-110 have also clearly put that the cash benefit that the worker ought to provide, i.e., periodic payment during temporary impairment, impairment person, or privilege compensation in case of permanent impairment and survivors' pension to satisfy or compensation to dependent where the worker dies. The law has also clearly indicated that the maximum compensation upon the death of the worker due to a fatal accident is to be five-times his annual salaries. In this case, the employer's liability can be managed by a pension scheme for state-owned enterprises or insurance schemes arranged by enterprises for private-owned enterprises. An employer shall pay a lump sum of damage compensation to workers who are neither covered by pension law or insurance scheme.

Articles 177-179 has spelled out that labor Inspection Services, powers, and duties of labor inspectors & Measures to be taken by labor inspections.

Article 185 stated about the administrative measures on those who breach the provisions of article 19 of this Proclamation will fines from Birr 5,000 up to Birr 10,000 if the violation is for the first time, from Birr 10,000 up to Birr 15,000 if it committed for the second time & from Birr 15,000 up to Birr 30,000 it is committed for the third time. Whereas if the act committed more than three times may result in the closure of the undertaking.

Inspectors are appointed by MoLSA and BoLSA to follow the activities of organization SH with the labor law. Only 530 labor inspectors were assigned by MoLSA for Ethiopia & 135 labor inspectors for Addis Ababa city.

Furthermore, following labor inspection services are expected to be conducted in working places to follow the applicability of the Proclamation in every aspect. As mentioned in the law, the offices have only 530 inspectors in MOLSA and 135 in BOLSA. Accordingly, as per the report, BOLSA in 2016-2019 2790, 2843 & 3260 labor inspection was conducted in industries in Addis Ababa. Out of, this only 8% conducted in construction sites, especially in city Administration housing projects.

In this proclamation article 92 stated that the fundamental obligations of an employer about putting in place of all the necessary measures to ensure, workplaces are safe, healthy, and free from any danger to the well-being of workers. However, the researcher observed that the responsible body does not follow the mentioned issue in the selected site for this study.

Correspondingly, this Proclamation endorsed recently & came up with an amendment of fines stated on Article 184 of the 377/2003 proclamation by article 185 (c) from 5,000.00 up to 30,000.00 ETB.

2.6.4 National OSH Policy and Strategy

The Council of Ministers of the Federal Democratic Republic of Ethiopia (FDRE), at its 69th regular session of July 18, 2014, discussed and made amendments to the national occupational SH policy and strategy prepared by the MoLSA. The Council has decided that the policy implemented thereon. The policy approved legitimate protection addresses and guided the implementation of preventive measures to create a safe and healthy working environment in Ethiopia.

This policy guide to developing & implementing effective SH measures at workplaces to identify implementation gaps & propose the parallel remedial actions, to adequately address emerging SH problems associated with industrial development and technology transfer (MoLSA, 2014).

Furthermore, this policy provided basic principles about the prevention and protection of the workplace from occupational accidents and injuries.

Similarly, the policy endorsed the protection of communities residing around industries from environmental pollutants & industrial wastes to ensure and sustain their developmental contribution. To safeguard their social and economic benefits, including the provision of quality products and services as the policy attaches due to the above-stated issues, industrial products, and services are expected to be environmentally friendly & ascertain fundamental rights at work.

This policy is a national tool for OSH services at workplaces. Based on this, sectoral policies & execution programs shall be formulated & implemented accordingly. Also, workplaces & enterprises expected to develop SH policy or programs with similar operation strategies to be fallen from their sectorial policy frameworks to implement at task levels (MoLSA, 2014).

- The preparation of this policy and strategy is an activity that appreciated the ministry, to guiding instrument for the industry.

- The policy aims to address and guide the implementation of preventive measures to create a safe and healthy working environment in Ethiopia to develop and implement effective SH measures at workplaces. However, that lack of commitment was observed in Addis Ababa.

2.6.5 Ministry of Labor and Social Affairs (MoLSA) OSH Directive

The MoLSA issued the OSH Directive based on the power vested in it under Article 98(3),102(1), 170(1) (a-c) of Proclamation No 377/2003 has. This directive covers a wide-ranging SH application, covering all employment sectors but with specific provisions for the manufacturing and construction sectors. Without prejudice to the Labor Proclamation, this directive lays down the general duties of employers and the duties and rights of workers, and the need for specific organizational measures such as SH policy and arrangements, and personal protective equipment. It also specifies measures for controlling a wide range of risks, such as chemicals, noise, radiation, machinery, working at heights, boilers, and lifting equipment. There are also specific provisions for the recording and notifying of occupational accidents and diseases.

Even though the issue of SH has got due attention and MoLSA prepared and endorsed this directive to make a quiet working atmosphere in the working area to OSH, this directive does not address by the labor inspector and building officer in the construction projects selected for this study.

2.6.6 Ethiopian Building Proclamation

The FDRE Proclamation No.691/2005 and Ethiopian Building Proclamation No. 624/2009 ratified on May 24, 2011. This Proclamation addressed fundamental issues about the building construction process and the necessary precautions to get due attention and the expected appropriate measures. Safety issues covered in the building proclamation discussed below.

Article eleven correctly spelled out about Building Officers as “Every urban administration or designated organ shall appoint a building officer, with the required educational and professional qualifications to enforce, on its behalf, the provisions of this Proclamation and other laws." Similarly, this article says a building officer is empowered to order the inspection of exempted buildings erected before the effective date of this Proclamation and order the demolition or rectification of such buildings if public safety is at risk.

Article 18 occupancy permits on buildings addressed as a building officer may provide occupancy permits for the partially completed building provided safety ensured. The issue of safely design building indicated in article thirty as any building or components thereof shall be designed according

to acceptable building design codes to ensure safety, comfort, & free services. Suppose any building was designed & constructed to ensure safety for people, other constructions, & properties.

Similarly, the safety concern is clearly stated as; the municipal administration may devise plans to administer the safety requirement during construction**.**

Article 53 number 2-d stated that any owner of a building who constructs or causes the construction of his building in any other manner, which endangers public safety, is punishable with imprisonment from five years to ten years and a fine from birr twenty thousand to fifty thousand.

As stated in the Proclamation, the Building Officers expected to inspect the day to day activities, including the SH issues of the projects. However, the building officer visited the projects in some interval time. They do not give due attention to the SH concerns on the site. The officer asked the contractors personnel on the site about the applicability of some PPEs like helmets and building cover during construction. However, the issue of SH in the project's needs follow up in every aspect.

2.6.7 Ethiopian Building Code of Standards

The Ministry of Urban Development, Housing, And Construction (MOUDHC) prepared the Ethiopian Building Code of Standards. This code is the official English language version of "Occupational Health and Safety-EBCS-14: 2014." The code contains 13 sections about the basic concepts and procedures to be followed while working on any construction site.

This code, as mentioned in its preamble, is prepared in the highest level of standards adopted from the developed world's best practice to make the construction sites an excellent and convenient workplace, but applicable in the projects selected for this study.

2.6.8 Ethiopian Building Regulation

The Council of Ministers issues this Regulation according to Article 5 of the Definitions of Powers and duties of the Executive organ of the FDRE Proclamation No. 691/2005 and Ethiopian Building Proclamation No. 624/2009. Regulation clarified about the safety precautions on part five of article 29. To prevent any danger, the owner of the building shall take the following measures:

a) Cover the construction site with acceptable materials;
b) Protect utility lines in the ground from being damaged during excavation;
c) Ensure the well-being of the traffic flow around the site;
d) Prevent the exposure of inflammable construction materials to fire;

e) Provide safety wears for site employees and visitors;
f) Take precautionary measures to avoid danger on the life of human being and property which may be caused by the misuse of chemical products for construction purpose; and
g) Employ appropriate mechanisms that protect any mote of dust, smoke, ray, and other similar elements from causing nuisance and pollution to the area.

In line with this, the Regulation endorsed the fine, and penalties which were expected to apply to the contractor failed to do so in part eight, Article 44 number 11.

2.6.9 Ethiopian Building Directive

The Ministry of Urban Development and Construction (MoUDC), under the powers and duties conferred on it by the definition of powers and duties of the Executive Organs of the FDRE Proclamation No. 691/2010 prepared and endorsed Building Directive No. 5/2003 based on Ethiopian Building Proclamation No. 624/2009 for the most straightforward understanding and application of the Proclamation as well as other codes and standards of the country in national level with similar and consistent way. This directive gives due attention to the protection of workers, the pedestrian, and others near the sites.

In articles 42-45, the directive spells out SH's issue to protect the workers, the community around the project, and guests who need to visit the site.

2.6.10 Building Regulation of Addis Ababa city Administration

To manage the demand of stakeholders due to the current development of Addis Ababa city, the city Administration Construction Bureau prepared and endorsed Building Regulation based on the Ethiopian Building Proclamation No. 624/2009. This Regulation is prepared in five sections. This Regulation endorsed the issue of SH in different parts. The issues endorsed as follows:

- In part two, article eleven, point seven stated the duty of the building official's duties to work on the protection and fulfillment of the building Proclamations, regulations & directives. In the construction work, one of the expected duties by the stakeholders in the issue of SH, hence it is one of the building officer duty.
- Also, article 40, stated the follow-up & inspection of construction addressed well. Upon this article, the contractor & consultant ordered to fulfill insurance based on the capacity of the project for contractors ‘Contractors All Risk’ & consultant ‘Professional Indemnity.’

- Furthermore, in table 22.1 of the Regulation stated the penalties on those who may not fulfill SH's issue, in which the building category B ETB 3,000.00 and on Building Category C ETB 5,000.00. In the same way, the issue of insurance for different categories of the building the contractor expected to buy from ETB 500,000.00 up to ETB 2,000,000.00 from recognized insurance firm in the country.
- Part four clauses 32- 44 of the Regulation, the safety precautions to be taken into consideration during the building construction period stated adequately.

2.6.11 Ethiopian Construction Industry Development Policy

The Ethiopian construction industry's development increased from time to time in a remarkable condition (MoFD, 2010) & (NPC, 2016). The growth of the industry needs appropriate stakeholders' satisfaction. A well-organized construction policy is crucial for the industry to fulfill the industry stakeholders (Wubeshet Jekalle, 2004).

Also, in Ethiopia, the construction industry's situation is currently considered support to other sectors, and its organizational arrangement is distributed accordingly. Also, its importance to growth is acknowledged through other sectors. This division did not only sight of its integration as a whole but also the views of each sector as a support element that undermined the construction industry growth & its contribution (MoUDHC, 2013).

To foster the industry's capacity, the Ethiopian Construction Industry Council has been established with the mandate to modernize the construction sector. The establishment of the Council was officially declared following the successful completion of a two-day founding conference held here in Addis Ababa in December 2017. The Council is said to play a pivotal role in identifying shortcomings in the industry through studies and proposing alternative solutions. Formulate ideas that would help the practical implementation of policies, programs, laws, and strategic issues geared towards modernizing the sector. Appropriate government organs, presidents of regional states, Mayors of the City Administrations of Addis Ababa and Dire Dawa, representatives of the private sector are members of the Council (CEAA, 2018). This policy gives direction to:

- Ensure & enhance the role of the construction industry to the development of Ethiopia in general;
- Create a conducive environment and suitable regulatory framework for all stakeholders and their capacity development involved in the construction industry in particular;
- Enable to show the problem of managing the construction industry in a fragmented and divide into discrete sections or categories nature and its effect at large in a way to devise a mechanism to remedy such problems.

To fulfill the construction industry's demand, the government established the Construction Works Regulatory Authority by Proclamation 1097/2018. As a newly established authority, this office does not go furtherly to address national demand.

- To make the policy workable, the executive committee members of the Council, Government Organs, Presidents of Regional States, Mayors of the City Administrations of Addis Ababa & Dire Dawa & Representatives of the Private Sectors expected to work correctly. Still, they do not start work, as mentioned in the policy.
- Endorsing policy and establishing a regulatory authority is not sufficient to minimize the fatalities and accidents in construction sites and other working places. It needs strong commitment from higher officials of the government to give due attention to OSH.

2.6.12 Conditions of Contract on SH in The Construction Industry

A construction contract agreement is a document that sets a date and specifies which parties are going to participate in the construction process. The contract agreement signs between the owner of the project & the contractor or supplier providing the requested services & contain several sections of clauses defining the scope, terms, & conditions of such agreement. Also, in a contract agreement, there are different sections used to execute the works in a conducive manner. One of the critical concerns in the construction works is the OSH issue of the sites. OSH concerns stated in the Contract section include Construction conditions & responsibilities & Contract laws (Rodriguez, 2019).

Similarly, Faustmann (2017), explained that construction contracts comprise an agreement, general conditions, drawings, specifications, and other documents. In line with this, the general conditions of Contract define each contracting party's duties and privileges, and the rules by which they are to meet obligations and perform the work they agreed upon and provide the legal framework for the construction contract and promote fairness among all contracting parties. When referenced in other owner and contractor sub-agreements, they maintain vital order and consistency.

In Ethiopia, binding construction agreements by construction conditions of contracts is a well-known practice in the industry. This practice started with different formats and conditions for local as well as projects undertaken by international companies. In the local construction, the contracting agreements started a few years back by Building and Transport Construction Design Authority (BaTCODA) 1987, Ministry of Urban Development, Housing, and Construction- Standard Conditions of Contract for Construction of Civil Works Projects (MUDHC 1994), PPA 2006, and PPA 2011. For projects undertaken by international companies, they agreed by Fédération Internationale

des Ingénieurs-Conseils (FIDIC) Conditions of Contract practiced in the country. For this study, the researcher selects PPA 2011 & FIDIC 1999 Silver book OSH clauses because they are widely known & practiced in Ethiopian construction projects. The selected projects agreed on these contracts.

2.6.12.1 Construction SH in PPA Conditions of Contract

In the FDRE, an essential legal act regulating questions related to the public procurement procedures, including those that refer to the auditing of procurement procedures, is endorsed by the Ethiopian Federal Government Procurement & Property Administration Proclamation No 649/2009.

In this contractual document, several articles presented the issue of SH to protect the workers' life. Some of them are listed below:

Clause 1.2 in the Schedule of rates, the provision, and care of all staff, labor, payment, accommodation, transport, fares & other requirements including First Aid, welfare, and safety requirements are clearly stated as other necessary conditions for the activities to be done on the site. Regarding safety payments, clause 2 of the contract agreement spelled out that; the Contractor shall pay due regard to the safety of his workers; Where appropriate, the Contractor shall pay particular attention to the safety of operators and all persons in the vicinity of fuel transfer or storage operations. A prohibition on smoking must be enforced when close to flammable liquids. All equipment and vehicles shall be in excellent and safe working conditions. Besides, the contractor shall take full responsibility for the adequacy, stability, and safety of all procedures and methods of construction under the Contract stated in clause 34.2 of this condition of the Contract.

The issue of insurance stated adequately in clause 40.2 that, the contractor shall take out insurance covering his liability concerning industrial accidents and civil liabilities to any person employed by him on the works, to the Public Body, and any employee of that authority, arising from the execution of the works. Such liability shall be unlimited in the case of personal injuries. SH is appropriately stated in Clause 45 of this condition of Contract as; "the Contractor shall have the right to ban access to the Site to any person not involved in the act of the contract, except for persons legal by the Engineer or the Public Body to protect from unexpected harm.". The contractor shall ensure the safety on sites during the whole period of execution and shall be responsible for taking the necessary steps in the interests of his employees, agents of the Public Body, and third parties to prevent any loss or accident that may result from carrying out the works. In another part of look at the same clause, the Contractor shall take all essential steps, on his responsibility and at his expense, to ensure that existing structures & installations are protected, preserved, & maintained.

For the circumstance of formal notice required clause 45.4 stated as, during the implementation of the tasks, urgent measures are necessary to obviate any risk of accident or damage or to ensure security following an accident or damage, the Engineer shall give formal notice to the Contractor to do what is necessary. In a similar token with this, the Contractor's staff shall follow a system of accident recording by the Contractor's own accident reporting procedures.

All notifiable accidents shall immediately be brought to the attention of the Engineer. The Contractors shall initiate to cooperate in all preventive measures against fire or any other hazards. They are also expected to notify the Public Body of any change in the Contractor's working practices.

For quick reference the main clauses of the above-mentioned condition of contract are summarized in the following table:

Table 3: Summary of articles and concepts of SH in PPA Condition of Contract

Clause	Description	Responsible
1.2 (h)	➢ Care of all staff & labor & payment, accommodation, transport, fares, & other requirements, including First Aid, welfare, & safety	Contractor
2	➢ The safety of operators and all persons in the vicinity of fuel transfer or storage operations attention taking by,	Contractor
34.2	➢ It gives responsibility for the adequacy, stability, and safety of all operations and construction methods under the Contract.	Contractor
40.2	➢ Insurance covering liability about industrial accidents	Contractor
45.1	➢ Control on access to the site to any person not involved in the project	Contractor
45.2	➢ Ensure the safety on sites during the whole period of execution and shall be responsible for taking the necessary steps for preventing any loss or accident, which may result from carrying out the works.	Contractor
45.3	➢ Take all essential steps, on his duty & at his expense, to ensure that existing structures & installations are protected & maintained.	Contractor
45.4	➢ If urgent measures are necessary to obviate any risk of accident or damage or to ensure security following an accident or damage	Engineer
45.5	➢ Maintain accident recording and reporting	Contractor
45.8	➢ Provide such first aid facilities	Contractor
52.2	➢ Design of particular temporary works	Employer

2.6.12.2 Construction SH in FIDIC Conditions of Contract

The country was injected to boost its growth of different consultants and contracts coming to work with the Ethiopian government. Most of the responsible governmental and private bodies signing with international construction firms bind their interest & beliefs & duty from them by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) condition of contact. It is the French-language acronym for which means the international federation of consulting engineers (Udom, 2014).

It was started in 1913 by the trio of France, Belgium, and Switzerland. FIDIC is headquartered in Switzerland and now boasts of membership from over 60 different countries. Over the years, FIDIC has become famous for its secondary activity of producing standard form contracts for the construction and engineering industry (Udom, 2014).

Starting from its first book, entitled 'The Form of contract for works of Civil Engineering construction,' in 1957, FIDIC stated the importance of worker's safety and security up to the recent versions. As the title is shown, this first Contract aimed at the sector, and it soon became famous for the color of its cover, and thus, The Red Book. It has become the norm that FIDIC contracts are named in popular in the manner of speaking by the color of their cover (Udom, 2014).

Clause 2.3 states as the employer shall be responsible for ensuring his workers and other contractors on the site for the concern of SH at the site.

Clause 4.1 on contractors' general obligations states the SH concern as the contractor shall be responsible for the adequacy, stability, and safety of all site operations and construction methods. Likewise, clause 4.8 for safety procedures: The contractor shall comply with all applicable safety regulations and take care of the safety of all persons entitled to be on the site. In the same token clause 4.21 of the FIDIC condition of Contract on the Progress report of the construction project correctly spelled out each report shall include: safety statistics, including details of any unsafe incidents and activities related to environmental aspects and public relations.

Clause 6.4 stated about labor law as the contractor shall comply with all the relevant labor laws applicable to the contractor's personnel, including laws relating to their employment, SH, welfare, immigration, and emigration, and shall allow them all their legal rights. The contractor shall require his employees to obey all applicable laws, including those concerning safety at work.

Furthermore, clause 6.7 correctly spelled out SH's issue as "the contractor shall at all times take all reasonable precautions to maintain the SH of the contractor's personnel." The contractor shall appoint an accident prevention officer at the site responsible for maintaining safety and protection

against accidents. This person shall be qualified for the duty & shall have the authority to issue instructions and proactive measures to prevent accidents. Through the execution of the works, the contractor shall provide whatever is required by this person to exercise his responsibility & authority.

Similarly, any accident happened on-site, the contractor shall send, to the Engineer, the details of an accident report just happened. The contractor shall maintain records and make reports concerning the health, safety, & welfare of persons, & damage property, as the Engineer may reasonably require.

Apart from other duties clause 7.3 states about the inspection expected to conduct on-site in that the employer's personnel shall at all reasonable times & on clause 7.6 Remedial work as apart any previous test or certification; the Engineer may instruct the contractor to execute any work urgently required for the safety of the works, because of an accident, unforeseeable event.

For quick reference the main clauses of the above-mentioned condition of contract are summarized in the following table:

Table 4: Summary of Clauses and Concepts of SH in FIDIC Condition of Contract

Clause	Description	Responsible
2.3	Take actions similar to sub-clause 4.8 [safety procedures] and under sub-clause 4.18 [protection of the environment]	Employer
4.1	Responsible for the adequacy, stability, and safety of all site operations	Contractor
4.8	(a) Comply with all applicable safety regulations	Contractor
	(b)Take care of the safety of all persons to be on the site	
4.21	Progress report: Each report shall include: Safety statistics, including details of any hazardous incidents & activities	Contractor
6.4	Comply with all the relevant labor laws	Contractor
	Require employees to obey all applicable laws	
6.7	Shall takes all reasonable precautions to maintain the SH & send, to the Engineer, details of any accident as soon as practicable after its occurrence. Maintain records & make reports concerning the SH	Contractor
7.6	Remedial work: Execute any work which urgently required for the safety of the works, whether because of an accident	The Engineer

As observed from the summary listed on PPA and FIDIC Conditions of the Contract, the issue of SH stated sufficiently, and it needs due attention for further application in the construction sites.

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

3.1 Research Approach

Research is the process of arriving at a reliable solution to a problem through a planned and systematic collection and analysis of data (Singh, 2006). Accordingly, a research design is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the research. The design of a study defines the study type, data collection methods, and a statistical analysis plan (Creswell, 2014).

In this study, a descriptive research design was used to identify the nature of SH law and enforcement practice in the Ethiopian construction industry.

3.2 Population and Sampling Technique

This part of chapter three presents the sample and sampling techniques, data collection tools, and method of data analysis. Hence, a cross-sectional descriptive study was used to identify SH law and enforcement practices. Currently, there are eleven financial institutions headquarter building projects under construction in Addis Ababa. Out of these eleven projects, only one construction project was undertaken by a local contractor, but the rest ten projects constructing by different Chinese firms in Lideta and Kirkos sub-cities.

3.2.1 Target Population

A population is an entire group of individuals, objects, or events, while a sample is a small portion drawn from a population (Abate, 2018). This study focused on building construction projects, especially high rise building construction projects undertaken for financial institutions in Addis Ababa by local grade-one (GC-1) and other foreign (GC-1) construction companies.

3.2.2 Sampling Technique

Sampling is the process of obtaining data about an entire population by examining only a part of it. There are different types of sampling techniques, i.e., probability (simple random, systematic random, stratified random, cluster random & multi-stage random) and non-probability (accidental, availability, purposive, snowball & quota) (Kothari, 2004). For this study, a purposive sampling technique was used.

Sample size refers to the number of items to be selected from the universe to constitute a sample (Kothari,2004). The size of the sample should neither be excessively large, nor too small. It should

be optimum. An optimum sample is one that fulfills the requirements of efficiency, representativeness, and reliability. In deciding the size of the sample, the researcher must determine the desired precision as also an acceptable confidence level for the estimate. Since ten projects are undertaken by foreign contractors & one by a local firm, only four selected from the foreign & one local firm, a total of five sample projects. The basis for selection of the projects are:

- The clients of the projects are financial institutions,
- The projects start time; since 2015,
- The projects progress more than 35% and above and
- The height of the buildings is more than 15 stories, i.e., it is in the category of a high rise.

As per the criteria discussed above, out of the ten projects under construction by foreign contractors, one contractor holds four bank projects, one insurance company, and one microfinance (credit and savings) projects. From the mentioned projects of the contractor, one bank and one insurance projects were selected based on their status, i.e., the two projects status were more than 35%. Similarly, another foreign contractor holds three bank projects; however, one project civil work is constructed by another contractor. Yet, the selected contractor signed an agreement for finishing & aluminum cladding works, & the other project does not start due to unfinished land leas issue with the municipality and the last from this contractor selected for this study. In the same way, the other foreign contractor holds one bank headquarters project, and it is selected automatically. The last one selected project was the insurance project construction undertaking by a local GC-1 contractor.

3.3 Data Sources and Data Collection

The data collection approach adopted for conducting this research includes primary and secondary sources: a questionnaire, interview, focus group discussion, and actual project documents. The different documents and correspondences provide the primary data, and the secondary data sources include books and journals in construction project management, as well as related archival documents on SH issues about construction works.

3.3.1 Questionnaire

A questionnaire is a type of survey where respondents write answers to questions posed by the researcher on a question form. As indicated in Appendix-I, for this study an open-ended questionnaire is used to collect data about OSH law and enforcement practice in Ethiopia because it helps the respondents to make choices among a set of alternatives given. Likert five scale of

agreement level, i.e., strongly agree=5, agree=4, neutral=3, disagree=2, and strongly disagree=1, was used to measure the respondents' opinions, perceptions, feelings, and attitudes (Kothari, 2004).

The survey was developed based on a review of studies related to OSH. The following steps used in preparing the questionnaire:

i. The general purpose and specific requirements needed for the study were first determined. Thus, the general purpose of a questionnaire was to assess the academic qualifications, experiences, and perceptions of key informants.
ii. Then, the questions that need to be asked developed: A closed-ended questionnaire formulated so that they could generate relevant answers to the research questions.
iii. The questionnaire structured in two main parts: The first part was a cover letter with information about the research project, contents of the questionnaire, and how the responses would be utilized. The second part was the questionnaire.

To collect reliable data since professionals are few in every project, all have participated in the questionnaire survey. The project Manager, Site Engineer, & Safety Officer from the contractor, Resident Engineer from the Consultant, & Client representative were selected.

3.3.2 Interview

A person-to-person interaction, either face to face or otherwise, between two or more individuals with a specific purpose in mind, is called an interview (Kumar, 2014). Therefore, in this study as indicated in Appendix-II semi-structured interview was conducted for one foreman from each project; that is, a total of five foremen interviewed. The main reason for the selection of the foreman was that their duty allows them to observe the day to day activity of the projects, & they are closer than others to the workers in project activity and SH issues in the sites. Besides, they are first-hand witnesses to any safety issues. Also, they are capable of identifying workers' attitudes, weaknesses, & strengths.

3.3.3 Focus Group Discussion (FGD)

A focus group is a small group of people whose response to something is studied to determine the responses expected from a larger population (Merriam-webster, 2019). It is a form of qualitative research consisting of interviews in which a group of people usually conducted by inviting six to ten people asking about their perceptions, opinions, beliefs, and attitudes towards a product, service, concept, idea, or packaging (Abate Deribsa, 2018).

For this study, ten senior professionals with greater or equal to ten years of experience from governmental, professional associations, and private organizations directly and indirectly related to the research topic invited and participated. From governmental organizations, MUDHC, MoLSA, Addis Ababa City Administration Construction Bureau, and BOLSA participated. From professional associations, the Ethiopian Civil Engineers Association (EACE) and Ethiopian Construction Technology and Management Professionals Association (ECoTMPA) participated. Also, a member of the Consultants and Contractor's Association have participated. Also, from Addis Ababa City Administration Fire & Emergency office and Addis Ababa Red Cross Society were invited due to their emergency service during accidents in the city also participated.

The FGD consisted of two parts: (1) introduction and presentation of the research topic, and (2) focus group discussion. The moderator (the researcher) described the purpose of the study and the function of the focus group, the focus group rules (i.e., equal status and voice of each participant to provide suggestions), and the confidentiality of the discussions. After getting permission from the participants, the meeting was recorded by audio.

At the beginning of the focus group, participants introduced themselves and stated their position and organization. After the introduction and presentation, a semi-structured participative discussion was conducted. The moderator made notes during the FGD to capture participants' opinions and feedback. The moderators also facilitated the discussion by elaborating on and further explaining the suggestions and questions posed by participants. The explanations allowed the moderator and participants to cross-check their respective understandings of the ideas and opinions provided during the discussion, thus helping to minimize information bias and distortion.

3.3.4 Case study

A case study is a detailed study of a single, group, organization, event, or project. The data for case studies come from a variety of sources, including observation, interviews, questionnaires, reports, and archival records (such as minutes of meetings) (Kumar, 2014). The case study approach has at least four uses in construction management research: as a source of insights and ideas, to describe phenomena, project-biography, and illustrative stories (Fellows & Liu, 2008). As indicated in Appendix –V to collect necessary data for the first and third research objectives checklist prepared to list out and prioritize the task and then the case study conducted in the five projects. To collect the necessary data for the study the researcher spent three months from March 2020 to May 2020 by frequent visiting in the sites.

3.3.5 Observation

Observation, as the name implies, is a way of collecting data through observing. Observation as a data collection method can be structured or unstructured. In structured or systematic observation, data collection conducted using specific variables and according to a pre-defined schedule. Unstructured observation, on the other hand, is conducted in an open and free manner in a sense that there would be no pre-determined variables or objectives (Kumar, 2014).

For this study, the researcher collected data based on the checklist indicated in Appendix IV. Also, discussed the observed activities of the workers in the projects in different working hours.

3.4 Secondary Data Sources

Secondary data sources provide a general understanding of the focus area by presenting a wide range of ideas in the area, which helps to supplement other information obtained from the primary data sources. It includes books, journals, and others.

3.5 Method of Analysis

In this research, descriptive and inferential statistical methods were used. The number of responses belonging to each category, percentage, frequency, and mean by using MS Excel Spreadsheet 2016.

The qualitative data gathered from interviews, case study, observation, and the focused group were analyzed separately, but presented in combination with the quantitative data. In line with this, the test of the agreement was done item by item so that no response and respondent answer neglected during the analysis stage.

Also, document analysis and observation are used to triangulate the data gained through questionnaires and interviews.

3.6 Ethical Considerations

Research ethics are moral principles that guide researchers to conduct and report research without deception or intention to harm the participants of the study or members of the society as a whole, whether knowingly or unknowingly (Editage, 2019). The ethical issues essential to be considered in scientific research are also considered in this study. The study results depend on the data provided by the respondents and the qualitative data obtained, and the process is realistic and bias-free. The researcher asked for the consent of the interviewees and pledged to keep the confidentiality of the information gathered to conduct this study.

CHAPTER 4 RESULTS, ANALYSIS, AND DISCUSSION OF FINDINGS

In this chapter, the data obtained from questioner, interviews, FGD, and case study presented and discussed as follows:

4.1 Questionnaire Response and Quality of Respondents

In this part of this chapter, the questioner response & quality of the respondents discussed as follows:

4.1.1 Questionnaire Response Rate

A total of 30 questionnaires were distributed to client representatives, consultants, and contractors. Out of the 30 questionnaires: 15 were distributed for contractors, 10 to consultants, and 5 to client representatives. From the distributed 30 questionnaires, 25 professionals responded to the survey where 13 out of 15, i.e., 86.67%, from Contractors, 8 out of 10, i.e., 80% from Consultants, and 4 out of 5, i.e., 80% from Client representatives.

The returned questionnaires checked for their completeness. Five questionnaires were incomplete and rejected, i.e., two from contractors and consultants each and one from client representatives. Of the 25 questionnaires returned, 20 found it suitable for data analysis that yields a response rate of 80.00%. The questioner response rate details are summarized in Table 5 below.

Table 5: Questionnaire Survey Response Rates

Respondents Category	Questioners		Returned Questioner in Percentage	Returned Valid Questioner	Valid Questioner in Percentage
	Distributed	Returned			
Contractor	15	13	86.67%	11	84.62%
Consultant	10	8	80.00%	6	75.00%
Client Rep.	5	4	80.00%	3	75.00%
Total	**30**	**25**	**83.33%**	**20**	**80.00%**

Besides, one foreman from each project interviewed, to capture information missed during the questionnaire survey and obtain more detailed qualitative data concerning OSH practices on each project site. The reason for conducting interviews with the foremen is that they are closer to day-to-day project activity and workers. Moreover, to consolidate and triangulate the data gathered through interviews and questionnaires, a focus group was conducted involving participants representing various public and private organizations that have a direct and indirect relation to OSH in the construction industry. As stated in 3.4.4 a case study also conducted in all five study projects.

4.1.2 The Respondents' Educational Background

The respondents' educational background is presented in Figure 3 below.

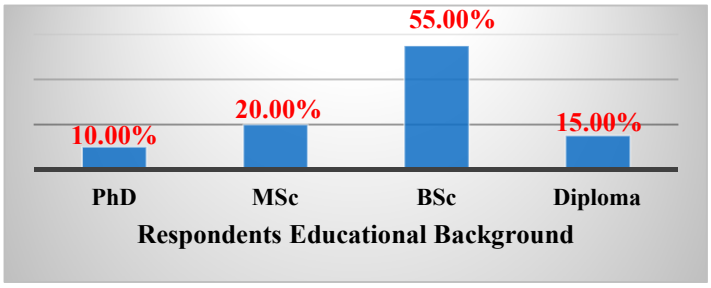


Figure 2: Educational Background of the Respondents

4.1.3 The Work Experience of Respondents

The respondents' experience in the industry is presented in Figures 3 below.

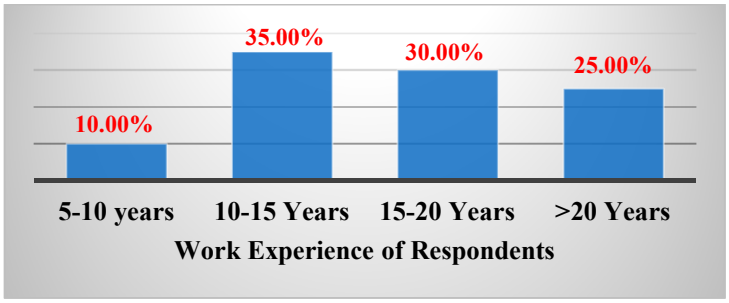


Figure 3: Work Experience of Respondents

4.1.4 The Average Number of Employees

The number of employees in any given working days on average is presented in Figure 4 below.

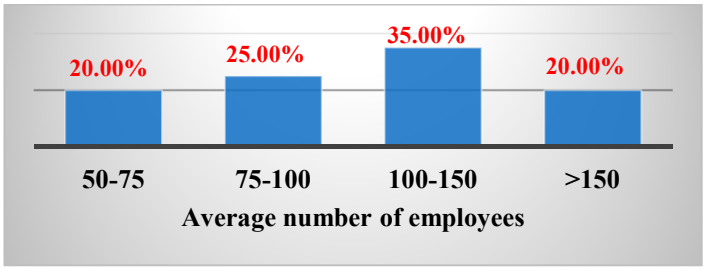


Figure 4: Average Number of Employees

As we have seen from the above Figures 2, 3, and 4 the respondents' work experience and educational background, the quality of data from these highly educated and well-experienced professionals managing on average 100-150 workers per day were vital to gain some insight on OSH practices in the Ethiopian construction industry.

4.1.5 Questioners Mean Score and Rank Results

In the selected five high rise building projects, there are three groups of professionals; contractors, consultants, and clients. The data collected from the questionnaire was analyzed by the level of agreement and rank of the question to determine the OSH practices on construction projects. In this case, the level of agreement and disagreement decided by the cutoff point in which; if the respondents result higher than or equal to 3, they showed agreement if it is less than three they showed disagreement.

Therefore, the responses of contractors, consultants, and client representatives regarding OSH law are presented below.

4.1.5.1 OSH Law in The Ethiopian Construction Industry

Respondents asked to evaluate the extent to which they agree regarding OSH law in the Ethiopian construction industry. Table 6 presents the mean score and ranking of OSH legislation.

Table 6: Mean Score and Rank Value for Objective One

I	OSH law in the Ethiopian CI	CONTRACTOR		CONSULTANT		CLIENT REP.	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1	Familiar with the Ethiopian constitution, & law about OSH at work	3.00	2	3.33	1	3.00	2
2	The gov. of Ethiopia established policy & regulation for the implementation of SH	3.09	1	3.00	2	3.33	1
3	The management of the company is aware of the law of OSH of Ethiopia implemented in the company	2.55	5	2.67	4	2.00	5
4	The contractor has a written SH policy	2.82	3	2.83	3	2.67	3
5	The policy communicated to all concerned parties in the company	2.73	4	2.50	5	2.33	4

The results in Table 6 indicated that all parties involved in the projects agreed that they are familiar with the Ethiopian constitution &legislation about SH at work and the government of Ethiopia established policy & regulation for the implementation of SH.

Similarly, all parties involved in the projects disagreed that the management of the company is aware of the law of OSH of Ethiopia & implemented in the company, the contractor has a written SH policy & the policy communicated to all concerned parties in the company. This indicated that even though

all stakeholders confirmed their familiarity with the country law, the reality in the sites doesn't reflect in the projects as well. Because if they have proper awareness about the country's OSH law the three raised questions are expected to be addressed properly.

Thus, recommended that all the companies involved in the study expected to develop strategies to improve the awareness gap emanate from the improper attitude toward OSH law and find a better mechanism to communicate and distribute their SH policies to their employees and relevant stakeholders partaking in their projects.

4.1.5.2 Stakeholders Awareness On SH Law & Enforcement Practices

To identify and assess the level of awareness of the stakeholders on SH law and enforcement practices, a questionnaire comprises seven questions presented to the stakeholders in the project. Table 7 shows the mean values and ranks of the gaps in the enforcement practice of OSH law for each of the three respondent groups.

Table 7: Mean Score and Rank Value for Objective Two

II	Assess The Level of Awareness of The Stakeholders on OSH Law & Enforcement Practices	CONTRACTOR		CONSULTANT		CLIENT REP.	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1	The contractor assigns the SH officer.	3.18	2	2.83	4	2.67	3
2	The contractor holds safety meetings Regularly	3.00	5	2.91	3	2.33	6
3	Workers are aware of the available insurance service in their company	2.73	7	2.67	3	2.00	7
4	The contractor conducts regular site safety inspections	3.09	4	2.67	4	2.67	3
5	I Have the safety awareness needed for the hazards we face on this job	3.64	1	3.50	1	3.67	1
6	The company has medical insurance for all workers	3.10	3	3.50	1	3.33	2
7	The contractor provides safety induction & training to employees	2.82	6	2.33	6	2.67	3

The results in Table 7 indicated that the contractor engineers agreed on "the contractor assigns the SH officer, the contractor holds safety meetings regularly & the contractor conducts regular site safety inspections" but the resident engineer of the consultant & client representative disagreed on the raised issues.

Similarly, "I have the safety awareness needed for the hazards we face on this job & the company has medical insurance for all workers" agreed by all parties. Likewise, "workers are aware of the available insurance service in their company and the contractor provides safety induction and training to employees" disagreed by all parties in the projects.

Therefore, the above results of the contractors indicated that even if they said their capability of the awareness of OSH laws of the country it doesn't practical in their site as confirmed by the independent professionals of consultant & client representative. The professionals of the contractor showed their level of agreement on the questions to protect themselves from being liable for the unfulfilled OSH laws and contractual agreements.

Thus, it's recommended that the client representative and the consultant engineer closely follow the SH issues of the project sites and enforce the contractor to fulfill the necessary SH requirements stated in the contractual agreement and other laws of the country.

4.1.5.3 The Enforcement Practices of OSH Law

To identify and assess the gaps in the enforcement practices for the implementations of SH legislation, a questionnaire that comprises six questions presented to the stakeholders in the project. Table 8 shows the mean values and ranks of the gaps in the enforcement practice OSH law for each of the three respondent groups.

Table 8: Mean Score and Rank Value for Objective Three

III	The gap in the enforcement practices of SH Legislation	CONTRACTOR		CONSULTANT		CLIENT REP.	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1	The gov. of Ethiopia established policy & regulation for the application of SH	3.00	2	3.00	2	3.00	2
2	The contractor has an SH committee	3.18	1	2.83	4	2.00	6
3	The policy communicated to all concerned parties in the company	2.42	6	2.50	5	2.33	4
4	The contractor conducts regular site safety inspections	3.33	5	2.00	6	2.58	1
5	The company has medical insurance for all workers	3.00	2	4.17	1	2.33	4
6	The safety inspection results documented and communicated	3.00	2	2.95	2	2.67	3

The results in Table 8 indicated that all parties in the project sites agreed on" the government of Ethiopia established policy and regulation for the implementation of SH" and disagreed on "the policy communicated to all concerned parties in the company".

Furthermore, the contractor engineers showed their level of agreement independently from other professionals in the sites on "the contractor has an SH committee, the contractor conducts regular site safety inspections and the safety inspection results documented and communicated" on the contrary the consultant and client representatives disagreed on it. Also, the consultant strongly agreed on "the company has medical insurance for all workers" because it was one of the requirements in the tendering time and all contractors submitted contractors all risk insurance. This state of affairs reflected the level of professionals' similar consent to unfulfilled SH policy of the companies and the gap on distribution and communication of SH for other professionals in the sites.

From the above questions, the results of the questioner revealed that the enforcement in the project sites is not implemented according to the contract agreement and other OSH laws in the sites. The main reasons for this are that the improper attitude & lack of commitment between the professionals in the project sites. Having a proper attitude and commitment is an important tool for applying the OSH to the construction sites. And this is useful for building a good reputation and moral satisfaction for the implementers of OSH.

In this questioner, discrepancies are observed between the professionals in the sites. The reasons for the discrepancies between the respondents in the project sites were that the contractors' professionals were not willing to take responsibility for the unfulfilled SH contractual as well as other laws concerns by the management of the company. The improper answers of the contractor engineers arise due to fear of being liable for the unimplemented OSH law and contractual clauses.

Therefore, the resident engineers recommended applying the contractual agreement strictly in the projects on those who work unsafely & unlawfully to minimize the gap in the enforcement of contractual as well as other OSH legislation.

4.1.5.4 SH Related Clauses On the Condition of Contract

Table 9 shows the mean values and ranks of Clauses on the Condition of Contract about OSH to improve the enforcement practice for each of the three respondent groups.

Table 9: Mean Score and Rank Value for Objective Four

IV	Clauses on The Condition of Contract about SH To Improve The Enforcement Mechanisms	CONTRACTOR		CONSULTANT		CLIENT REP.	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1	The contract document included the SH	3.36	1	4.50	1	3.00	2
2	The project has an SH committee	3.27	2	2.67	4	2.67	4
3	The contractor assign SH officer	3.09	4	3.00	3	3.00	2
4	The consultant enforce the contractor to fulfill the required PPE	3.18	3	3.83	2	3.67	1
5	The contractor conducts regular site safety inspections	2.55	6	2.67	4	2.33	6
6	The safety inspection results documented and communicated	3.00	5	2.63	6	2.67	4

Contractors engineers agreed on all the questions except "the contractor conducts regular site safety inspections". On the other hand, the client engineer and the consultant agreed that the contract document included the SH clauses; "the contractor assigns the SH officer, & the consultant enforces the contractor based on the contract to fulfill the required PPE". Both disagree on "the project has an SH committee, the contractor conducts regular site safety inspections, & the safety inspection results documented & communicated".

From the responses of the professional in the site, the questioner results revealed that even though the contractor professionals agreed on the availability of SH clauses in the condition of contract it's not implemented as well because the attempted questions confirmed by the consultant indicated that the contractors didn't respect the contractual agreement on the daily activity of the site about SH.

4.2 Results of the interview

In this study, a semi-structured interview was conducted with one foreman from each project; that is, five foremen interviewed. The results of the qualitative analysis of data and information obtained through the interview are summarized and presented below.

The first question raised by the researcher for each foreman was the extent of the implementation of OSH legislation. The foreman from the local construction company believes that the implementation of OSH laws and regulations is strong enough. Based on the prior foreman experience, further believes participating in international projects improve the implementation of OSH law and policies since the bidding process and contract agreements warrant the necessity of demonstrating proper

awareness and good safety performance records. The foremen further pointed out the difficulty to fulfill all the required regulations since it needs additional budget due to lack of payment plan in the bidding criteria, i.e., the required safety equipment budget not allocated on the BOQ.

The second question raised for all Foreman was the main problem of employees about implementing SH-related issues in the workplace. All interviewed foremen responded that most of the workers come from rural areas with lower literacy levels, language diversity, and awareness gap. Also, most of the workers' age group is in the younger category and showed negligence and unwillingness to respect the rules of SH in the site due to an improper attitude toward SH. For such conditions, the foremen suggested that giving frequent training by common languages of the country & serious follow up with appropriate enforcement eases the mentioned problems.

The third question was the SH issues as an agenda in the site meetings; the foremen replied as rarely if any problem happened in the site or the monthly meeting if the issue was raised by the consultant or client. Is there a specific rule that enforces the contractors to take responsibility if the accidents happened on the works? The researcher raised as the fourth question as agreed that the condition of contract has a clause of an obligation to all parties, even though they do not have to mention a specific clause. Yet, no one tried to enforce us based on the contractual agreement.

The root causes that hindered on contractual enforcement was one of the questions raised for the foremen was the fifth question. Accordingly, they replied that the most serious duty in doing a safe working atmosphere started from the government offices by creating awareness about the benefits of respecting OSH laws, but it is not applicable. Similarly, the construction company always needs to maximize profit than investing in SH. Sometimes the companies supplied helmets, vests, and hang posters but the issue of SH beyond this. It’s all about human beings' life & needs serious attention.

Likewise, whether the contractual agreement fixes the cost for SH or not, the consultant must enforce the contractor to minimize the cause of the site's accidents. The obligation of the stakeholders stated in the contractual agreement between clients and contractors in the site respected accordingly was another question. The interviewed workers replied that they are not in a position to say all obligations respected duly instead of a few of the respected and implemented on the project sites.

The hazards that happened to workers and the mechanisms they mitigated the problem were the final questions raised for each project's foreman. They replied: in project-1, from November 2019 up to December 2020 there were 22 near misses, 43 accidents, four lost days due to accidents, & 4 first aid cases happened. Even though the researcher did not get the document, one death accident happened. The worker's family compensated as per the agreement with the local insurance company

& one major accident on the left hand of the worker cut by the grinder & treated in Menelik II & Zewditu Hospital.

Similarly, in project-2, from December 2019 to February 2020, 28 minor accidents happened and were relieved by first aid treatment. In project-3 also, starting from September 2019 up to January 2020, there was no accident recorder in the site due to the minimal working condition but formerly in the structural part of the work 2017 from October up to January 12th significant and 65 minor accidents happened in the site. Workers got the accidents treated in the hospital, and the bill was refunded by the contractor. During the structural work time, one major accident happened, due to the unwillingness of the management of the contractor the work went to court and spent six months to get the decision of the court about his compensation. The worker compensated after the court decided for the worker in project 4. Unfortunately, practically the assigned safety officer didn't work in his position he works as a site engineer. Also, there is no data recorded for the accidents in projects 4 & 5 as the foreman of the two projects' response. The data of SH did not record due to the unavailability of a safety officer or the assigned safety officers who did not fit for the position and were assigned to other vacant places in the site.

4.3 Results of Focus Group Discussion (FGD)

To get additional information apart from the questioner, interview, case study, and observation, the researcher conducted FGD to enhance the quality of data with senior experts. The FGD participants have a direct and indirect stake in the Ethiopian construction industry. Therefore, the senior experts with ten years and above experience in governmental as well as private organizations, directly and indirectly, related to the research topic participated. The discussion points raised during the FGD, and the participants' response are presented below:

The availability and awareness level of stakeholders on SH law was raised as the first question for the FGD participants. One participant believes that SH regulation awareness is high in the construction sector. But the participant didn't give more explanation for the response. At the same time, the majority of respondents argue that awareness is low. They further agreed that awareness is poor despite the existence of a wide range of SH law because the responsible governmental offices endorsed different laws at different times without collecting sufficient information about the existing laws from the stakeholders. The FGD participants agreed that the reason for low awareness was attributed to the poor implementation of OSH practices and almost non-existent enforcement of OSH law by the respective regulatory public bodies. The regulatory bodies in the federal and regional

state of the country didn't assign qualified building & labor inspectors to follow the day to day activities of the project sites constructed in their premises.

Also, Ethiopia ratified the ILO conventions related to OSH as part of other laws of the country. The other participants also agreed on the availability of OSH legislation.

The SH law enforcement practice gap in Ethiopia, raised for FGD participants as a second question; they replied that as a country, Ethiopia enacted building Proclamation, Regulations & Directives at different times. However, the penalties and fines are not applied to enforce an unlawful party. Also, to make the enforcement practice strong enough to push the stakeholders, the regulatory body's working capacity is properly organized in the workplace with necessary logistics. Unfortunately, the governmental structure does not have sufficient platform & sufficient workers to supervise the activities of the project's construction undertaken in the city.

Who is responsible for respecting the OSH law in the construction projects raised as the third question for the FGD participants. They replied that everybody participating in the project is responsible for SH in the workplace. Especially those contractually agreed parties are liable for the SH, and of any individual who is working in the project site. Also, a significant share of the responsibility must go to clients. They must incorporate the issue of SH during their feasibility study & must give due attention during the tender document & contractual agreement preparation. One of the participants' responses in the country Constitution, Civil code, PPA 2011, & FIDIC Conditions of Contract, the contractor is more responsible for fulfilling the SH condition of the working area because they are morally and legally the prime responsible party for the SH of their workers.

Likewise, the ability of clauses of the condition of contract about SH in the construction sites was raised in a similar way for the FGD participants as the fourth question. They replied that apart from other laws and regulations, the last governing instrument in the construction industry is the contractual agreement having general and specific conditions under the scope of the project. Even though the issue of SH stated on the general condition of the contract, it is advisable to prepare in the special condition of contract for every specific project based on the scope of the projects. On the contractual document, the safety audit also advisable to be included with the appropriate budget by the consultant, the budget for SH allotting in a provisional sum. The main problem that arises in this condition is that the Contract Administrator in the consulting firm and the Client Representative who expected to follow such substantial investment projects, capacity must be powerfully capable in the contract and related issues expertise to prepare the contractual agreement accordingly.

The last question raised for the FGD participants was how to make a difference for the current SH problems observed by the government in the construction industry? They replied that during the license issuance and renewal time of contractors and consultants, OSH performance advisable to be one essential parameter from their previous projects and plans. The registration and issuance office of contractors' and consultants' licenses must have a linking structure with MoLSA and BoLSA in criticisms of OSH issues. During license renewal time, if the company's OSH performance is poor and has fatalities and accidents, the regulatory body advised preparing a law to penalize with a gradual increment and then suspend the company. If the proper application of OSH is repeatedly weak & the company did not show improvement, the company can be suspended from future bid participation at least for a year. Suppose if it does not make any difference in company attitude toward SH it's possible to list them on the blacklist, as one criterion. Given that, the reverse can be applying for those who respect the country's OSH law advised to get a reward for their excellent performance.

To sum up the FGD participant's opinion on OSH law and enforcement practice, all participants agreed on the importance of keeping the workplace safe for workers and others in and around the project sites. Along with this, in Ethiopia the OSH laws are available but the awareness of professionals is not in a required position and there is also a huge gap observed in the enforcement practice of the OSH legislation. Concerning the duty of OSH in the workplace, the FGD participants agreed that as prime responsible party contractors are more responsible than others. Hence, the contractors must respect the country's OSH law and the contract agreement. Also, every contractually agreed party must work on the issue of OSH based on their contractual agreement. Also, the regulatory bodies are advised to work cooperatively to fill the gap between them. Besides this, the government advised to formulate rules & regulations used as one criterion in the license issuance & renewal period about the companies' OSH status report and also expected to work on the safety budget and audit issues. As a responsible body, the governmental offices are advised to work in a coordinated and harmonized manner.

4.4 Case Study of the High Rise Building Projects

For this research, five projects were selected for the case study. Four of these projects are constructing by Chinese international Contractors and one project by a local GC-1 contractor. Table 10 below summarizes the features of these projects, i.e., location, client, consultant, contractor, contract type, delivery type, commencement date, date of the handover, completion time, and contract price described in the table below.

Table 10: Summary of Projects Information

Project Information	Project-1	Project-2	Project-3	Project-4	Project-5
Location	Lideta	Lideta	Lideta	Lideta	Kirkose
Consultant	Wossen	AAU-AAiT	JDAW	Eskinder	Bete
Contract Type	PPA-2011	FIDIC-1999	PPA-2011	PPA-2011	PPA-2011
Delivery Type	DBB	DB	DBB	DBB	DBB
Contract Signing Date	20th Dec.2018	April 28th. 2015	19th Aug. 2016	May 14th, 2015	May 31st, 2018
Date of Site Handover	15th January 2018	June 27th, 2015	September 14th, 2016	May 25th, 2015	June 14th, 2018
Commencement Date	May 1st, 2019	July 27th, 2015	October 21st, 2016	June 12th, 2015	August 4th, 2018
Expected Completion Date	730	1300	1095	1260	1095
Initial Contract Amount	879,814,106.24 ETB	266,500,000.00 USD	1,237,224,873.01 ETB	1,310,152,558.53 ETB	832,133,400.00 ETB
% Completed	36.64	58	38.67	61.28	52.51
Aver. No. of Workers/Day	55	450	85	100	75
Plot Area	3,116.00m^2	18,374.00m^2	2500.00 m^2	3,338.00 m^2	1,236.00 m^2
Built-up Area	2,400.00 m^2	13,100.00 m^2	2,304.00 m^2	2,700.00 m^2	1,158.00 m^2
Floor Area	67,500.00 m2	165,476.00 m2	62,500.00 m2	65,350. 00 m2	24,500.00 m2

4.4.1 Project-1

In this project, the researcher tried to review the feasibility study, tender document & contractual document. Also discussed with the project manager, safety officer, & safety coordinator in the head office and resident engineer in the project about their level of awareness in the country's legal frameworks. All of them said that they have sufficient know-how about the SH of the country, and the management of the company they are working with has sufficient knowledge and commitment to work in a safe working atmosphere. Besides, the researcher reviewed and observed the contractual agreement with different formats and correspondences about the SH of the project. The company taking responsibility for constructing this project has an excellent organizational structure in the head office and at the project level. In the head office, the safety coordinator assigned to coordinate

the issue of SH for all projects. The coordinator prepared the OSH management plan, OSH policy, inspection procedures, different formats, checklists and follow the day to day activity of the sites, collect the monthly report from the sites, store and generate a final report to the company as per the reporting schedule to evaluate and monitor the management plan.

As per key personnel required for the project in the contractual agreement, the company assigned a safety officer to the site, but the safety officer does not meet the required academic qualification, he is a graduate of TVET diploma and trained on first aid application and took some pieces of training which are useful for first aid on the project site in Addis Ababa Red Cross Training Center. In line with this, the researcher observed that the company provides a helmet and vest for workers but does not supply safety shoes for day laborers and does not supply any PPE for the guest or visitors. However, in the contractual agreement, they signed in article 45, the employer expected to supply all necessary PPE. Accordingly, the researcher observed the clinic arranged without medical personnel. Also, it is observed that the safety officer tried to check the project's safety to start the specific date work activity. However, an inspection of such a massive site by a single person is not enough and make the follow up though.

Regarding insurance, the company signed & agreed on contractors all risk insurance policy with a local insurance firm. The contractor prepared different checklists, inspection procedures, management plans, & formats and fulfilled the ISO standards to participate in international tenders.

The professional in the site confirmed that as a country, Ethiopia formulated different laws of OSH. However, the problem is a lack of follow up and implementation from regulatory bodies. Nobody insisted to apply and challenged us in the projects about OSH laws. In line with this, the client Engineers could not confirm SH's availability on the feasibility study of the project.

4.4.2 Project-2

In this project, the researcher tried to review the feasibility study and tender document of the project about SH. The client representative confirmed that the project feasibility study did not include the issue of SH. However, the tender document ordered that the contractor be expected to respect the country law about SH. In the contractual document (GCC), it is observed that SH is available but did not state in the SCC. Even though the researcher tried to discuss with the Project Manager and Safety Officer in the project on the contractor side, due to the language difference and unavailability of the translator, it could not be practical. The contractor did not have an organized system for SH. Instead, the consultant is well organized & has a department for the concern of Safety, Health, and

Environment & gave ample information about SH status of the project. Also, it observed that the contractual agreement in the requirement of crucial personnel includes safety engineer, and it's already fulfilled by the contractor from China. However, the language is a barrier to communicate with the officer, & observed that the officer engaged in another activity as a site engineer. Also, the contractor prepared one clinic & two nurses useful for the project to give medical services in time of accidents. Besides PPE, the contractor supplied helmets, vests, gloves for workers not but not safety shoes. The good thing in this project is the helmet & vest supplied for visitors. Concerning insurance, the contractor signed an insurance policy for all risks with a local insurance company.

The researcher reviewed and observed the contractual agreement, different formats, and correspondences about the SH of the project. Besides the SH monthly report, the consultant prepared and communicated with other stakeholders for their actions on the project's monthly status. In three monthly reports, the researcher observed that the contractor's safety performance does not comply with the contractual agreement and strictly instructs the consultant to protect the SH of workers at the site. Besides this, the accident rate analysis conducted by the consultant from March 2018 up to December 2019 indicated that the rate of minor accidents decreased with the increased volume of works in the site. For instance, the number of minor accidents in April 2018 was 70 in a climax. It decreases with some fluctuations and comes with below 20 from May 2019 until February 2020. The usefulness of preparing accident risk analysis indicates the conditions or the time of accidents to follow before accidents happened.

Also, in the SH report for December 2019 up to February 2020, the consultant ordered the contractor to make a comprehensive institutional safety management plan to comply with the contractual document and provide strict safety enforcement work. However, it is not practical due to the unwillingness of the contractor.

4.4.3 Project-3

In this project, the researcher tried to review the feasibility study and tender document. However, the client representative could not confirm the feasibility to included SH. I also tried to check the GCC and SCC contract agreements. In this site, even though the contractual agreement indicated key as a safety engineer personnel requirements, no one available to manage the safety issue on the site. The researcher also observed the contractual agreement, different formats, and correspondences about the SH of the project.

In this project, the contractor does not have an SH report, documentation, and recording keeping system did not have inspection procedures and formats. However, the Resident Engineer recorded their monthly progress reports about the type of accident and the mitigating measures conducted on the site. For instance, from October 2017 to November 2017, 44 minor and nine major accidents happened and treated the on-site and hospital levels. Besides, frequent discussion and pressure from client representative and resident engineer at the mentioned time, the contractor facilitate the first aid room (a small clinic) with necessary medical equipment. In this site, the review of letters & meeting minutes could not be conducted.

4.4.4 Project-4

In this project, the researcher tried to review the feasibility study and tender document to check the SH issues' availability and checked the SCC and GCC of contract agreements. The company constructs this project expected to assign a safety officer in the project as per the agreement but not assigned. In line with this, the client Engineers confirmed that the project's feasibility study does not include an SH concern. Also, in the monthly progress report, they stated the unassigned issue of safety officer for three consecutive months. This indicates that they do not give due attention to OSH. For further analysis, the researcher tried to observe the correspondences and letters of the stakeholders in the project site but due to the unwillingness of the Chinese engineers and the fear of Ethiopian engineers its was not practical as well. The posters posted on the site used to indicate some safety procedures in the site worn out and damaged. PPEs' did not supply properly in site except for helmet and vest for few works. There is no training and induction conducted on the site.

Consequently, in this site, there is no induction, training, data recording and keeping system, no clinic, and medical personnel available. Regarding insurance, the contractor signed an agreement with the local insurance company of the type of contractor's all-risk policy, apart from this, one major accident compensated by the insurance company after the court decision.

4.4.5 Project-5

In this project, the researcher tried to review the feasibility study, tender document & Checking contract agreements SCC and GCC, SH report, Monthly progress report, Correspondences, Meeting minutes studied & Inspection procedures, and formats.

Accordingly, the feasibility did not include SH, and the contractual agreement indicated that the safety engineer was one requirement, but as per the consultant engineers' confirmation, the contractor did not assign a safety engineer. Occasionally the site engineer act like a safety engineer.

In line with this, there is no clinic, nurse, and other PPEs except vest and helmet observed in a few workers on the site. It is also observed that there is no SH data collection and documentation system in the project. No induction and training was conducted. To enforce the contractor, the resident engineer raised the issue of SH in their regular monthly meeting. On the progress report, the construction company does not show any commitment to solving the said problem. Also, the client Engineers could not confirm the feasibility study status of the project about SH. The researcher tried to check the meeting minutes and correspondences about SH. In the meeting, minutes and e-mail correspondences the researcher observed that the resident engineer tried to raise the issue of SH, but the response from the contractor and client-side was not satisfactory or they were not willing to respond to the request of the resident engineer quickly and timely. All professionals confirmed that the building officer rarely visited the study project sites. They did not give due concern like design and land issues in the site. Similarly, they confirmed that no one visited the sites from BOLSA from governmental construction offices.

4.5 Observation results

Apart from collecting information in the mentioned projects, the researcher tried to observe the SH activities of the stakeholders. The primary data collected here is that the projects are:

In the study sites, the safety officers and site engineers' arrived before working hours. Furthermore, the projects have time-keepers. The safety officer could not control late comers to follow the proper dressing styles and procedures to start the given date work properly.

Furthermore, dressing styles in the projects was not consistent. In the study projects, the dressing styles of workers expected to be uniform as per their tasks in the site to differentiate worker's duty and proper dressing for the worker to protect from accidents, but such kind of preparation not observed in the study sites. To solve the gap in preparation before starting daily activities and safe working conditions, having appropriate knowledge through training from the regulatory bodies is essential. As a responsible body for the industry, the regulatory body does not give any pieces of training for the employees about OSH in general. As observed, the formats are not similar for the same activities in the sites.

Also, the regulatory body does not establish an organizational structure up to the last governmental structure at the city level to follow the day to day activities of the projects OSH conditions and do not visit the sites in a regular and undeclared visiting schedule. The gap in follow up by the

regulatory body made the construction sites could not respect the OSH laws of the country. The projects in the study site communication systems via formats, posters, and meetings not similar.

Also, clients are reluctant to the SH concerns as observed in different letter correspondences and meeting minutes and letters; they did not react quickly to the reported SH concerns.

Chinese contractors are not willing to give any information. They do not have the SH report, but the contractor in Project-1 prepared the monthly report. The safety officers assigned in Project 2 and 5 have additional duties as a site engineer in the sites and could not communicate with the workers in English and Amharic, safety officers' educational background in Project-1 is under the requirement, SH committee did not observe in all sites. The posters were posted in the projects used to indicated the safety procedures worn out. Due to the number of workers in the project, SH concerns in the projects by a single safety officer in project-1 were severe. The consultants working on the projects do not force the workers to keep the safety procedure and PPE.

4.6 Gaps Identified in the study

The gaps observed in the study projects by the stakeholders and the regulatory body discussed below:

4.6.1 Statistical Information Gaps

In Ethiopia, there is no centrally organized statistical information system regarding OSH, especially for construction accidents; limited attempts have been made to investigate the occurrence and associated factors in BOLSA and MOLSA. Besides this, the number of workforces and the workload in these governmental bodies is one constraint. Due to the absence of proper inspection, not reporting and underreporting of accidents by employers, the degree of the accidents and injuries in job sites is not statistically known.

4.6.2 Gaps Observed in the Stakeholders Role

The major stakeholders in the construction industry are clients, contractors, consultants, and regulatory bodies. In this study, significant gaps observed in the projects studied concerning SH law stated as follows:

4.6.2.1 Gaps in Government Offices Related to OSH

Governments in any country have a dual responsibility in the construction industry, as a policymaker and as clients in some projects. As a policymaker, the government expected to formulate the laws for the required area and, at the same time, expected to implement the law enacted by it.

Below are the gaps observed in the Ethiopian government concerning the endorsed laws, expected inspections, & enforcement gaps as follows:

a) Gaps in OSH Related Laws

To minimize fatalities and accidents, different countries formulate legal frameworks based on their development level. The legal frameworks are used to minimize apparent problems in the industry. In this regard, as a country, Ethiopia formulates different Laws, Policies, Regulations, and Directives. However, these laws faced some problems and gaps as:

- One of the problems is the penalty to be imposed on the employer who violates regulations and directives relating to OSH stated in the labor law 1156/2019, which is a too small amount, i.e., 5000.00 to 30,000.00 ETB. Even though the penalties enacted too small, it has not implemented.
- In another state, the Building Proclamation No. 624/2009 article 44, number 11 stated the penalties imposed on those contractors who violate the stated proclamation is too small. There is a lack of follow-up and inspection by building inspectors for the responsible office.
- Formulating Policy, Strategy, & Directive is a good starting point for the industry, but it is not sufficient for the OSH in working place, i.e., the most important thing besides this is that establishing a follow-up system & structure near for the projects to apply the penalty in the law,
- The regulatory bodies in MoLSA, MUDHC, and Addis Ababa City Administration Construction Offices is not work in a coordinated manner.

b) Inspection Gap of Governmental Offices

As stated in the labor law and building proclamations and regulations, the construction sites' day-to-day activities are expected to be followed by the regulatory bodies. However, gaps observed to be corrected by the responsible body as follows:

- Labor inspection is one of the essential instruments in the management of OSH. In Ethiopia, labor inspection not effectively organized, as stated in the Labor Proclamation. Besides this lack

of sufficient workforce, i.e., only 550 labor inspectors at the country level and 130 labor inspectors for Addis Ababa city are very limited and make the inspection impossible to manage.

- The format in which the building officers used to follow the project's activity does not have any part for the follow-up OSH.

c) Enforcement Gaps Observed in Projects

- Even though the Resident Engineers and the building officers follow the projects' activities, gaps observed in the sites about SH by not fulfilling all PPEs', except helmet and vest. Therefore, they have expected to enforce the contractor to fulfill all PPEs'.
- On the site workers are also shown an unwillingness to use a helmet, the contractor Engineers must push them to use the supplied helmet and penalize the unwilling ones,
- Even though the building officers follow the activities of the projects, the issue of SH not included in the format & they do not follow and enforce on the safety issue in the projects,
- The number of fines enacted on those who violated the OSH laws does not apply to projects.

4.6.2.2 Gaps in Clients in The Concern of OSH

Construction clients must have a higher initiative in managing OSH in the projects they sponsor. Keeping the working place safe from accidents and fatalities starting from the initiation of the projects up to completion must be a default duty.

- Clients expected to study & prepare themselves for OSH. However, in this study, the client engineers do not give due concern for the SH before starting the project activity on their feasibility study.
- During design time, they have to give due concern and insisted on giving attention to SH to the consultant. During the design period, clients gave every responsibility to the consultant. They did not have sufficient know-how about what safety measures were conducted.
- Clients of the buildings must be capable of the country's OSH laws and but the companies constructing substantial investment projects in this study lack sufficient awareness.

4.6.2.3 Gaps in Contractors for The Concern of OSH

Contractors are a prime responsible body during the construction works for their employees and others. However, in the study projects, the following gaps observed from the contractors' work:

- Assigning an SH officer is a must duty for construction works in the building proclamation and regulation and conditions of the contract. But they do not assign qualified SH officer,
- In the condition of contract, contractors expected to establish an SH committee, but not implemented in the projects,
- PPEs are essential protecting equipment for construction workers, but except for helmets and vests, other equipment is not supplied.
- The contractors must give induction and training to widen the knowledge of workers, but not applied in some projects,
- The contractors do not follow the worker's activity on the issue of SH & do not penalize the unlawful workers.

4.6.2.4 Gaps in Consultants for The Concern of OSH

Consultants are professionals who are expected to advise their clients on all duties, starting from the initiation of the project up to completion. However, some gaps observed in the projects as follow:

- The consultants must ensure that the client is aware of their roles and responsibilities during the design and the construction phase, including the SH.
- The consultant must assign a qualified Engineer for the project's contract administration who can understand and implement the clause stated on the condition of contract about SH. However, it is not practical at all sites.
- The Resident Engineer assigned by the consultant in the projects do not push contractors to implement the SH clause which is available in the condition of contract,
- The contract documents prepared by the consultants lack a strong emphasis on such kind of massive investments on the particular condition of contract.

4.6.2.5 Employees Gaps for The Concern of OSH

As one of the project participants, workers have a responsibility to protect themselves, tools, machinery, and their colleagues on the site and must keep the instruction commanded by their supervisors. In the study sites, one of the problems observed for the cause of accidents was the unwillingness of workers to use helmet and glove due to the limited supply of PPE. Therefore, workers must respect the sites' rules and regulations and use the supplied PPE properly to protect themselves and the community on the site.

4.7 Discussions of Research Findings and Existing OSH Practices in Ethiopia

For each of the following objectives the findings from the study are contrasted with the current OSH law and enforcement practice in Ethiopia as follows:

4.7.1 Availability and Ability of OSH Law in Ethiopia

As stated in the literature review, OSH law is the basis to protect workers' SH in the working place. In addition to this, the legal reasons are the binding force to prepare OSH laws in compliance with the national and international laws, codes, and standards for preventive, corrective, and compensatory damages. It puts the boundaries and governs the rules for the conduct of business. In countries like Ethiopia, construction safety regulations are the pillar for successful construction safety management. To minimize the accidents and fatalities in the working area, Ethiopia's government endorsed the issue of governing OSH on a legal basis starting from the 1940s. The findings of the study also discovered that the country endorsed different laws in different responsible governmental offices at different times, but did not work cooperatively.

4.7.2 Awareness Level of SH Law and Enforcement Practice

Protecting the work place from accidents and fatalities arise from not only legal reasons but also from moral reasons. The moral reason is all about the moral duty that every person obliged to others. It is not morally acceptable when people go to work and are exposed to accidents. Therefore, every employer is expected to have sufficient knowledge about the OSH laws to manage their employee SH in their working premises. To apply the law enacted by the regulatory body and to know the enforcements to be enacted in the unlawful party, having sufficient know-how about SH is the primary duty for the company and any professional in the workplace.

The study's findings indicated that the awareness level of the stakeholders on SH law and enforcement practices in the construction sites is poorer. Besides, the stakeholders in the sites confirmed that all of them have sufficient awareness about SH legislation. But the practice in the sites didn’t indicate their sufficient awareness due to weak handling of the site SH. However, the awareness gap emanates from the attitudinal gap problem of workers in the sites. Therefore, the industry stakeholders expected to change the attitude of the workers and peoples in and around the project sites by giving frequent training and induction in an appropriate time interval and necessary training tools.

4.7.3 Gaps in the Enforcement Practice of SH Legislation

SH legal frameworks are prepared based upon compliance with the national laws and international standards useful for preventive, corrective, and compensatory purposes. It demarcates the boundaries and governs the rules for the well-being of workers in the working places. Failure to achieve minimum standards set by laws can lead to enforcement actions.

In Ethiopia, legal frameworks and penalties are prepared to enforce the unsafe workers and companies that do not prepare a safe working atmosphere in the working places. Any stakeholder failed to do so, is expected to be penalized and pay the fines endorsed. But, the study results revealed that the implementation of OSH law in projects is not at a standard level expected in comparison with other countries', ILO & OSHA guidelines.

The main reason for the enforcement gap of SH is the improper attitude and lack of commitment of the professionals in the project sites. Likewise, discrepancies were also observed between the professionals in the sites. The reason for the discrepancies between the professionals in the project sites was the contractors' engineers were not willing to take responsibility for the unfulfilled OSH platform by the company in the foreign construction companies & be afraid of being liable. But having a proper attitude and commitments for OSH is useful for keeping a good reputation and moral satisfaction of the company as well as the industry.

Moreover, other country's experience of the enforcement practice of SH law Ethiopia can adopt the best practices from UK serious OSH management & implementation of penalties and fines, in France active enforcement and compensation, in Singapore, the officer under HDB takes the issue of OSH seriously and penalize those who don't fulfill the laws and assists the contractors' by frequent visit and supply of necessary posters, formats, and guidelines, in China in under MoHURD structural department the issue of SH followed seriously and made a difference by training and enforcement. Also, in the USA the program of "safty4site" makes a difference in workers and companies by training and enforcement, in Brazil Strong reporting and compensation system established, in Australia the Safety Commissioner engaged personnel with suitable experience & qualifications as a consultant, in Kuwait in cases of injury, the worker is compensated according to the number of days needed for recovery recommended by the medical board.

Furthermore, from African countries in South Africa, the employer is responsible for providing SH facilities in the workplace, including the costs for hazard identification and control and the provision of a medical investigation program. In Ghana, SH clauses in conditions of contract form part of the OSH management system's law and applied pieces of training and penalties on those who violate

the law. In Kenya, the OSHA requires every occupier to establish the SH committee at the workplace under regulations and SH audit of his workplace at least once in a year by SH advisor.

The construction industry in Ethiopia can be improved if applying the best experiences of all the above countries' OSH law and enforcement practices. Hence, the study results revealed that the industry needs a strong governmental office to assist & follow t site activities. Due to this, the MUDHC and the Addis Ababa City Administration Bureau of Construction advised establishing a department of OSH to assist & enforce the city and the country construction industry to alleviate the fatalities and accidents of workers in the project sites. Therefore, the labor inspector and building officers are expected to implement the penalties and fines endorsed by the government if a good working platform will be established.

4.7.4 OSH Clauses in Condition of Contracts

A construction contract agreement is a document that sets a date & specifies which parties will participate in the construction process. In this document, there are different sections used to execute the works in a conducive manner. One of the critical concerns in the construction works is the SH. In the study sites, the stakeholders agreed on the contract agreement that holds SH clauses. However, the study results revealed that the issue of SH was not met as at a required level to respect the SH and well-being of the workers.

Besides this, the result of the study indicated that every contractually agreed party must work on the issue of SH based on their contractual agreement. Even though the issue of SH is stated on the general condition of the contract, it is advisable to prepare in the SCC for every project upon the scope of the projects. On the contractual document, the safety audit is advised to incorporate with the appropriate budget by the consultant with the discussion of client and contractor. The budget for SH also advised being allotted in a provisional sum. Also, the government officials expected to formulate rules and regulations to take this as one criterion in the license issuance and renewal period about the companies SH status report.

Furthermore, one of the reasons for construction site accidents is FFH from temporary structural parts like scaffoldings. Clause 52.2 of PPA 2011 stated as the design of particular temporary works expected to be prepared by the employer, but this did not apply in the study sites. The consultant and contractor must take responsibility for this concern.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions and the recommendations of the study are as follows:

5.1 Conclusions

This study checked the availability & ability of OSH law in the Ethiopian construction industry. However, as a country, Ethiopia endorsed too many laws with little or no coordination with one another & not practical as expected to resolve the problem.

Also, the awareness level of stakeholders on OSH law & enforcement practices was checked in this study. To ensure OSH, the proper attitude for the SH issue is a basis in the working place. But, an improper attitude toward OSH in the construction industry was observed. Even though all project professionals on the sites said that they have sufficient awareness of OSH, there is still an awareness gap observed between them. The awareness gap emanates from an improper attitude and a lack of commitment to SH.

In Ethiopia, the construction industry SH law are used to protect workers as well as the community in and around the project site enforcement practice gaps observed. Besides this to minimize the rate of accidents as of the commencement of construction project sites, the role of building officers, labor inspectors & resident engineers is essential in the construction sites. But the study results indicated that nonexistence of inspection from regulatory bodies & gaps on serious follows up from resident engineers observed. The resident engineers didn't take serious measures to enforce contractors in applying the clauses mentioned in the contractual agreement. Thus, the contractors did not face any enforcement to apply OSH law in construction sites. Also, discrepancies observed between the professionals in the sites due to fear of liability, the foreign contractor engineers responded improperly to the raised questions about the application of OSH law and enforcement gaps. The fear of engineers of foreign contractors arises from difficulty to apply the necessary SH by themselves because of the weak platform and facilities in the companies.

Even though it has a limitation, the Clauses on SH in the PPA 2011 as well as FIDIC 1999 conditions of contracts are available to manage the OSH in the projects. But, it needs additional clauses related to allocating SH cost on the BOQ in provisional sum and SH audit at least once in a year. Also, one of the reasons for accidents in construction sites is FFH due to weak temporary structures. To protect workers from death, PPA clause 52.2 stated the design of particular temporary works responsibility is to the employer, but this is not practical in the construction sites in Ethiopia.

5.2 Recommendations

The following recommendations are forwarded based on the finding of the study:

5.2.1 Recommendations for the Regulatory bodies

- Amending the current laws following the existing local construction industry development,
- Giving accreditation for contractors who fulfill the required SH related law and suspend or cancel others who violated the law of SH,
- Work cooperatively with all stakeholders for better practice of OSH in the construction industry,
- Increase the number of labor inspectors & building officer starting from the higher to a lower level of governmental structure
- Working on the improvement of attitudes of stakeholders in OSH related laws

5.2.2 Recommendations for the Clients

- Included the issue of OSH during the project feasibility study,
- Should aware of the level of their duty from being liable by the law about OSH,
- Cover the financial issues of OSH in provisional sum.
- Assign skilled professional to coordinate and supervise the project site,
- Follow and act quickly for the issue of OSH if its available

5.2.3 Recommendations for the Contractors

- Advised to be familiar with the country's OSH law & develop company SH policy,
- Advised establishing of an SH committee to follow the day to day activity of the site,
- Take SH in their management plan & shall appoint a competent contract administrator to manage it like other project performance parameters.
- Advised to give training and induction in the site to equip works on the OSH legislation
- Take SH as performance evaluation criteria on the employees' contractual agreement.
- The design of particular temporary works duties is advised to be handled by contractors.

5.2.4 Recommendations for the Consultants

- Prepare the contractual documents in addition to the general obligation of the stakeholders on OSH, the issue of SH budget, & SH in SCC based on the scope of the projects.
- Follow the site SH rules and procedures very carefully as per the country's rules and regulations, and the clauses stated in contractual agreements.
- Checking the design and capacity of particular temporary works.

5.3 Suggestions for Future Studies

This study tried to address the gaps associated with SH law and enforcement practices in the local construction industry, unusually high rise buildings. The researcher believes further work on the area is vital to guide the industry through the efficient use the SH issues in the industry.

i. Study on local construction Safety Management practices as compared to other country's practices.
ii. Study on Excellent SH Management Contributions to maximizing the reputation of construction companies in Ethiopia.
iii. Study on good SH practice on the efficiency of the Ethiopian construction industry as compared to international practices.
iv. Study on the impacts of poor SH Management of building Contractors in Ethiopia.
v. Comparative study of Safety, Health, and Environment in Ethiopian and foreign Construction companies in Addis Ababa.

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APPENDIX I-QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

CHAIR OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Dear respondents,

The questionnaire designed to obtain data concerning the implementation of safety and health-related laws, the enforcement practice gaps in Ethiopia. The responsible bodies for health and safety and about the contract documents on the health-related issues in construction industries to develop an MSc. Thesis entitled "An assessment of safety and health-related related laws and enforcement practices in the case of financial institutions' high rise buildings in Addis Ababa" for academic purposes.

The questionnaire has two-part parts. The first part is personal information about the respondents. The second part designed to measure the extent to which respondents agreed, abstained, or disagreed with the statements formulates to get data on the safety and health-related related laws and their enforcement practice in the construction industry. You are kindly requested to tick (√) the extent to which you agree with the statements given in the table below.

The level of the agreement is leveled as 1=Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, and 5= Strongly agree.

Thank you very much in advance for your cooperation!

Part one: Personal information of the respondents

1.1 Name of Organization (Optional): _____

1.2 Academic status

PhD. _____MSc. Degree: _____, BSc. Degree: _____Diploma: _____Other___

1.3 Type of Organization:

Client/Employer: ____, Consultant: _____, Contractor: ___, Sub contract: _____

If any other, please specify, _____

1.4 Years since Experience:

<5 years: ____5-10 years: ___10-15 years: ___ 15-20 years____≥20years____

1.5 Average number of Employees

50-75: _____ 75-100: _____ 100-150: _____ >150: _____

Part Two: Assessment of Safety and Health law their enforcement practices

- Please tick (√) the extent to which you agree with the statements given in the table below.

I.	**To study the current Occupational Safety and Health-related laws in the Ethiopian construction industry**	*Strongly Disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1	Familiar with the FDRE Constitution, law about Safety & Health-related laws at work					
2	The government of Ethiopia established a firm policy and regulation for the implementation of Safety & Health					
3	The management of the company aware of the legislation, Safety and Health-related laws of the country & implemented accordingly					
4	The management of the company has a written Safety & Health policy					
5	The policy of SH communicated to all concerned parties in the company					
II.	**Level of awareness of the stakeholders on Safety and Health-related laws and enforcement practices**					
1	The contractor assigns a health and safety officer					
2	The contractor holds safety meetings Regularly					
3	Workers are aware of the available insurance service in their company					
4	The contractor conducts regular site safety inspections					
5	I have the safety awareness needed for the hazards we face on this job					
6	The company has medical insurance for all workers					
7	The contractor provides safety induction & training to employees					
III	**Gaps in the enforcement practice of Safety & Health-related laws**					
1	The company has a safety and health committee					
2	The company provides safety induction & training to employees					
3	The company provides and enforces to use of PPE					
4	The company conducts regular safety inspection, & the results documented					
5	The site supervisor always follows the site safety rules and procedures					
6	The site supervisor has the right to suspend unlawful workers about					

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
IV	**Examine clauses on the condition of contract about Safety & Health to improve the enforcement practice**					
1	Is the contract document included the safety and health clauses					
2	The project has a Safety and Health committee					
3	The contractor assigns a health and safety officer					
4	The consultant enforce the contractor based on the contract to fulfill the required PPE					
5	The contractor conducts regular site safety inspections					
6	The safety inspection results documented and communicated					

APPENDIX II-INTERVIEW

ADDIS ABABA UNIVERSITY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

CHAIR OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

INTERVIEW FOR FORMAN

First of all, I would like to say thank you very much for being a volunteer for an interview. I am a post-graduate student at Addis Ababa University in the School of Civil and Environmental Engineering. The purpose of this interview is to gather data to carry out research on; An assessment of safety and health-related laws and the enforcement practices in the case of financial institutions of high rise buildings in Addis Ababa for academic purposes. Thus, your answers are very vital for the success of my study. The information used only for this research purpose and your response kept in secret to keep your privacy.

Thank you for providing your precious time!

- How safety and health-related laws implemented in your project?
- What is the main problem of Employees on the implementation of safety and health-related issues at the workplace?
- Do the project stakeholders discuss on-site meeting as an agenda the issue of safety and health of the workers?
- Is there a specific rule that enforces the contractors to take responsibility if the accidents happened on the works?
- What are the root causes that hindered on contractual enforcement techniques to take?
- Is the obligation of the stakeholders stated in the contractual agreement between clients and contractors in construction industries?
- Was there any hazardous that happened to workers? If you say, ‘yes,’ how did you mitigate the problem?

APPENDIX III-FOCUS GROUP DISCUSSION

ADDIS ABABA UNIVERSITY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

CHAIR OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

QUESTIONS FOR FOCUS GROUP DISCUSSION (FGD)

Dear respondents,

These questions are designed to obtain data concerning the implementation of safety and health-related laws and enforcement practice gaps in Ethiopia. To develop an MSc thesis entitled, an assessment of safety and health-related laws and the enforcement practices in the case of financial institutions' high rise buildings in Addis Ababa for academic purposes.

Therefore, you are kindly requested to discuss in groups the following questions in detail. Note that, if there are points which are not clear, please don't hesitate to ask me.

Thank you very much in advance for your cooperation!

- What can you say about the availability and awareness of SH related laws?
- What can you say about the safety and health-related laws enforcement practice gap in Ethiopia?
- Who is responsible for respecting the OSH related laws in the construction projects?
- What can you say about the condition of contract documents on the safety and health of construction projects?
- How can the government make a difference from the current SH problems observed in the construction industry?

APPENDIX IV-CHECKLIST USED FOR OBSERVATION OF STUDY

The following are the points used for the case study in the study projects to collect the necessary data:

- Time punctuality of safety officer and others,
- Preparation of workers before they are starting to work,
- Dressing style does it appropriate for work or not,
- Respecting site rules and work procedures,
- Posters and signage in and around the site
- Communication skills with each other.

APPENDIX V- CHECKLIST USED FOR CASE STUDY OF STUDY

The following are the points used for the case study in the study projects to collect the necessary data:

- Reviewing the feasibility study and tender document.
- Checking contract agreements SCC and GCC
- SH report,
- Monthly progress report,
- Correspondences
- Meeting minutes studied
- Inspection procedures and formats