



**CONSTRUCTION HEALTH AND SAFETY LEGISLATION, COMPARING ETHIOPIA
AND UNITED STATES OF AMERICA**

MSc. THESIS

BITSEAT ZELEKE TESHAYE

HAWASSA UNIVERSITY, HAWASSA, ETHIOPIA

MARCH, 2020

**CONSTRUCTION HEALTH AND SAFETY LEGISLATION, COMPARING ETHIOPIA
AND UNITED STATES OF AMERICA**

BITSEAT ZELEKE TESHAYE

**A THESIS SUBMITTED TO HAWASSA UNIVERSITY DEPARTMENT OF
CONSTRUCTION TECHNOLOGY AND MANAGEMENT, INSTITUTE OF
TECHNOLOGY, SCHOOL OF GRADUATE STUDIES, HAWASSA UNIVERSITY,
HAWASSA, ETHIOPIA**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF
MASTER OF SCIENCE IN CIVIL ENGINEERING (SPECIALIZATION:
CONSTRUCTION TECHNOLOGY AND MANAGEMENT)**

MARCH, 2020

ADVISORS' APPROVAL SHEET

This is to certify that the thesis entitled “**Construction Health and Safety Legislation, Comparing Ethiopia and United States of America**” Submitted in partial fulfillment of the requirements for the degree of Masters, with specialization in Construction Technology and Management, the Graduate Program of the School of Civil Engineering, and has been carried out by **Bitseat Zeleke Tesfaye** (ID. No. PGCoTM/013/10), under our supervision. Therefore, we recommend that student has fulfilled the requirements and hence hereby can submit the thesis to the department.

Dr. Girmay Kahssay (Ass. Professor)

Name of Major advisor

Signature

Date

Tariku Nigussie (MSc.)

Name of Co-advisor

Signature

Date

EXAMINERS' APPROVAL SHEET
SCHOOL OF GRADUATE STUDIES
HAWASSA UNIVERSITY EXAMINERS' APPROVAL SHEET

We, the undersigned, member of the Board of Examiners of the final open defense by Bitseat Zeleke Tesfaye have read and evaluate her thesis title entitled “**Construction Health and Safety Legislation, Comparing Ethiopia and United States of America**”, and examined the candidate. This is therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree.

Dr. Girmay Kahssay (Ass. Professor)

Name of Major Advisor

Signature

Date

Dr. Gebrekirstos Nurye (PhD)

Name of Internal Examiner-I

Signature

Date

Biruk Solomon (MSc.)

Name of Internal Examiner -II

Signature

Date

Dr. Belachew Asteray (PhD)

Name of External Examiner

Signature

Date

SGS Approval

Signature

Date

Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the school of graduate studies (SGS) through the Department/School Graduate Committee (DGC/SGC) of the candidate's department.

Stamp of SGS Date: _____

CERTIFICATION OF THE FINAL THESIS

I hereby certify that all the corrections and recommendation suggested by the Board of Examiners are incorporated into that final Thesis entitled “Construction Health and Safety Legislation, Comparing Ethiopia and United States of America” by Bitseat Zeleke.

Name of the Designate

Signature

Date

DECLARATION

I hereby declare that this MSc. thesis entitled “Construction Health and Safety Legislation, Comparing Ethiopia and United States of America” is my original work and has not been presented for an academic degree in this university or any other university, and that all sources of material used for this thesis have been properly acknowledged.

Name: Bitseat Zeleke

Email: yezelinabitse@gmail.com

Place: Hawassa University, Ethiopia

Signature: _____

This MSc. thesis entitled “Construction Health and Safety Legislation, Comparing Ethiopia and United States of America” has been submitted for examination with my approval as thesis advisor.

Name: Dr. Girmay Kahssay (Ass. Professor)

Signature: _____

Place and Date of Submission: Hawassa-Ethiopia

ACKNOWLEDGEMENT

First, I would like to thank the almighty God for granting me the strength and courage to finish my study and, I want to express my special thanks and heartfelt gratitude to Dr. Girmay Kahssay, I am exceedingly grateful to him for his constructive suggestions and dedicated supervision offered throughout the study and for making this work what is today. And, I would like to express my great thanks for Tariku Nigussie and Tadewos Awugchew of Construction technology and management department staffs for their unlimited supports in providing materials and giving me advice from the very inception until the end.

I am also grateful to my mother Genet Mamo; her support has been a great motivation, also my gratefulness and my undeserved thanks to my family and friends. Finally, to all of you who have been supporting and encouraging me, what you have done for me is priceless and cannot be quantified. Thank you so much!

TABLE OF CONTENTS

ACKNOWLEDGEMENT	V
ABBREVIATIONS	XIII
LIST OF TABLES	XV
ABSTRACT	XVII
CHAPTER ONE	1
1. INTRODUCTION	1
1.1. Background of the Study	1
1.2. Statement of the Problem	3
1.3. Research Questions	5
1.4. Objective of the Study	5
1.4.1. General Objective	5
1.4.2. Specific Objectives	5
1.5. Significance of the Study	6
1.6. Scope and Delimitation of the Study	6
1.7. Organization of the Paper	7
CHAPTER TWO	8
2. LITERATURE REVIEW	8
2.1. Introduction	8
2.2. Definition of Terms on Occupational Health and Safety	8
2.3. Construction Industry	9
2.4. Health and Safety in Construction Industry	9
2.5. Construction Health and Safety Legislation	10
2.5.1. Definition of Legal Terms	10
2.5.2. Necessity of Construction Health and Safety Legislation	11
2.6. Overview of Ethiopian Construction Industry	11
2.7. Health and Safety in Ethiopian Construction Industry	12
2.8. Construction Health and Safety Legislation and Regulations Available in FDRE	13
2.8.1. Introduction	13
2.8.2. The Constitution of the Federal Democratic Republic of Ethiopia	14
2.8.3. Civil Code of the Empire of Ethiopia	15

2.8.4.	FDRE Proclamations	15
2.8.5.	FDRE Regulation.....	17
2.8.6.	Ethiopian Construction Standard	17
2.8.7.	National Occupational Safety and Health Policy and Strategy	18
2.8.8.	FDRE Directives.....	19
2.8.9.	ILO Convention (C155) Occupational Safety and Health Convention	20
2.8.10.	Summary of Construction Health and Safety Legislation in FDRE	22
2.8.11.	Construction Health and Safety Legislation Enforcement in Ethiopia.....	23
2.9.	Health and Safety in International Practice and Their Legislation.....	25
2.9.1.	Introduction.....	25
2.9.2.	U.S.A Health and Safety Legislation and Practice	26
2.9.3.	International Labor Organization (ILO)	28
2.9.4.	Great Britain Health and Safety Legislation and Practice	29
2.9.5.	Australia Health and Safety Legislation and Practice.....	29
2.9.6.	UAE Health and Safety Legislation and Practice	30
2.9.7.	Comparison of International Countries Health and Safety Legislation	31
2.10.	Review of Construction Health and Safety Researches in Ethiopia.....	34
2.10.1.	Introduction.....	34
2.10.2.	Summary of Construction Health and Safety Researches in Ethiopia.....	34
2.11.	Review of FDRE and USA Legislation Governing Construction Health and Safety for Specific Works	39
2.11.1.	Introduction.....	39
2.11.2.	Demolishing Work.....	39
2.11.3.	Electrical Equipment and Electrical Work Practice.....	43
2.11.4.	Employer Rights and Responsibilities	47
2.11.5.	Excavations/Trenches and Earth work.....	51
2.11.6.	Fall Protection and Fall Arrest System	55
2.11.7.	Fire Protection and Prevention.....	60
2.11.8.	First Aid, Medical Care, Emergency Action Plan, Welfare and Training.....	63
2.11.9.	Ladder and Scaffolding.....	65
2.11.10.	Personal Protective Clothing and Protective Equipment.....	68

2.11.11. Safe and Healthy Workplace	71
2.11.12. Safety Harness, Belt and Safety Net	72
2.11.13. Signs, Signals, Barricades and Barriers	73
2.11.14. Workers' Right and Responsibility	75
2.12. Best Practices and Lessons from International Legislation	77
CHAPTER THREE	79
3. MATERIALS AND METHODS	79
3.1. Description of Study Subject	79
3.2. Research Design	79
3.3. Study Methodology	79
3.3.1. Research Method	79
3.3.2. Document Review	80
3.3.3. Data Presentation and Critical Analysis of Legislation Review	80
CHAPTER FOUR	81
4. RESULTS AND DISCUSSIONS	81
4.1. Introductions	81
4.2. Similarity between FDRE Legislation and OSHA Act	81
4.3. Difference between FDRE Health and Safety Legislation and OSHA Act	82
4.3.1. Distinguish between OSHA Act 1970 and FDRE Health and Safety Legislation In-terms of Focus and Role	82
4.3.2. Comparison between OSHA Act 1970 and FDRE Legislation In-terms of Specific HS Topics	83
4.4. Key Difference across the Legislations	105
4.5. Gaps of Ethiopian Construction Health and Safety Legislation	106
4.6. Recommended Changes to FDRE Construction Health and Safety Legislation	108
4.7. Summary	109
CHAPTER FIVE	113
5. CONCLUSIONS AND RECOMMENDATIONS	113
5.1. Conclusions	113
5.2. Recommendations	115
REFERENCE	117

DEDICATION

This thesis paper is dedicated to my deceased father Zeleke Tesfaye in memory of his support through my good and bad times, and to my family and friends especially my mother. Last, but by no means least, to my partner, who has shared my journey through life.

ABBREVIATIONS

ACGHI.....	American Conference of Governmental Industrial Hygienists
AIA	American Institute of Architects
ANSI.....	American National Standard Institute
Art.....	Article
CDZ	Controlled Decking Zone
CFR	Code of Federal Regulation
CHS	Construction Health and Safety
dB.....	Decibels
DHHS	Department of Health and Human Service
DOL	Department of Labour
EBCS.....	Ethiopian Building Code Standard
EU	European Union
FDRE.....	Federal Democratic Republic of Ethiopia
HS.....	Health and Safety
HSC.....	Health and Safety Commission
HSE.....	Health and Safety Executive
HSW	Health and Safety at Work
ILO.....	International Labor Organization
m.....	Meter
MoH.....	Ministry of Health
MoLSA.....	Ministry of Labor and Social Affair
MoWUD.....	Ministry of Work and Urban Development
MSDSs.....	Material Safety Data Sheets
MUDHo.....	Minister of Urban Development, Housing and Construction

NIOSH.....National Institute for Occupational Safety and Health

No.Number

No.....Number

OHS.....Occupational Health and Safety

OSHOccupational Safety and Health

OSH Act.....Occupational Safety and Health Act

OSHAOccupational Health and Safety Administration

OSHA Act.....Occupational Safety and Health Administration Act

OSHRC.....Occupational Safety and Health Review Commission

PPEPersonal Protective Equipment

Proc.....Proclamation

RF.....Russian Federation

SHSafety and Health

UAEUnited Arab Emirates

UKUnited Kingdom

USUnited States

USAUnited States of America

WHO.....World Health Organization

WHSWorkplace Health and Safety

LIST OF TABLES

Table 2.1: The Summary for Construction Safety Legislations in FDRE	23
Table 2.2: Comparison of Inspection According to Australian, Russian and Turkish Health and Safety Legislations according to Senem et al.	33
Table 2.3: Summary of Ethiopian Researches in Construction Health and Safety in terms of Computational Concepts.....	35
Table 2.4: The Summary of Construction Health and Safety Researches in Ethiopia	37
Table 4.1: Summary of Distinguish between OSHA Act 1970 and FDRE Legislation in terms of Focus and Role.....	82
Table 4.2: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Demolishing work.....	83
Table 4.3: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Electrical Equipment and Electrical Work Practice.....	85
Table 4.4: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Employer Responsibility.....	87
Table 4.5: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Excavation and Earth Work	88
Table 4.6: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Fall Protection and Fall Arrest System	91
Table 4.7: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Fire Protection and Prevention.....	93
Table 4.8: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of First Aid, Medical Care, Emergency Action Plan and Welfare.....	94
Table 4.9: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Ladder and Scaffolding.....	95
Table 4.10: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Personal Protective Equipment.....	98
Table 4.11: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Safe and Healthy Workplace	100

Table 4.12: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Safety Harness, Belt and Safety Net.....	101
Table 4.13: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Sign, Signals, Barricades and Barriers	102
Table 4.14: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Workers Right and Responsibility.....	103
Table 4.15: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Young Workers.....	104

ABSTRACT

Construction industry has various risks due to the activities, individuals and many companies in different scales that it contains. Besides, construction materials, machinery, tools, tasks and handling skills all come with their own risks. Therefore, construction industry is prone to many potential hazard and accident. Accidents can be avoided mostly by implementing health and safety laws and regulations by ensuring those protocols are continuously maintained.

In this study, Ethiopian construction health and safety legislation are discussed and suggestions for amendments are recommended. As different researches show that the Ethiopia construction industry has a safety problem moreover, the safety legislations are not being enforced in careful way. Therefore, in order to minimize the problem observed, it is recommended to amend and modify current legislation and control strategies with different ways of enforcement in construction industry to more rigorous legislation and control practices to enhance construction safety level in Ethiopia. Moreover, for making a better legislation and for recommending on how to amend the current legislation, comparison is made with comparative study by document review. The comparison is between American and Federal Democratic Republic Ethiopia (FDRE) construction OHS legislations and laws from the point of view of thirteen topics, the two countries have different legislative systems and implementation method, and which are from different continents, but America has strong economy and strong construction industry better than Ethiopia. There is no hesitation that the America is one of the world's leaders in Occupational Health and Safety (OHS) issue. As the comparison shows their exist key difference across the Legislations, from those the American Act states employer and employee's right and responsibility in detail and obligate the employer to make the workers aware of their right under the Act but Ethiopian neither include any rights of workers nor obligate employers to aware workers right. Moreover, Best practice and lessons from American legislation is included on the comparison, like some crucial ideas are left out and not included in the legislation of Ethiopia. I.e. precaution for Concrete construction, Conveyor, Cranes and Derricks, Precaution for Confined space are some lessons. The differences of these two countries OHS legislation and weakness of the OHS legislation of Ethiopia were acquired, with some suggestions legislations were promoted to be more beneficial and the findings of the study provide the gap exist on Ethiopian construction health and safety legislation's and recommend on gaps found and insights

and discussions are given and recommend for reviewing FDRE health and safety legislation. It was concluded from the study that the legislation of Ethiopia have some gaps which does not clearly state different terms in detail. Specifically Ethiopian Building Proclamation does not clearly identify the scope of application of the proclamation moreover, the scope of exclusion under Ethiopian Building Construction Standard (EBCS) 14 demolishing work, is narrow and does not provide sufficient information and do not consider current construction method of Ethiopia.

Keywords: *Construction Safety, Construction Safety Legislation, OHS, FDRE, OSHA Act*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Construction industry has experienced some changes due to the new technologies in this century. With the help of technology like machinery and new materials, time-consuming tasks are done faster. This issue leads to have building projects that was a dream in the past. Technology and machinery lead to have more complex work environments, Moreover, creates potentially hazardous environment. Due to this trait different accidents and safety problems may happen that is why they needs more caution and proper controlling systems. Moreover, the construction industry and related sectors always consist of too many labour-intensive works thus labor force like daily laborers', engineers, managers and operators which are undeniable parts of this industry and their health and safety is an important issue.

Occupational health and safety is about to protect the health, safety and welfare of people engaged in workplaces. Work related accidents are cause of too many injuries and fatalities that could be reduced by proper OHS strategies and legislations. Therefore, in order to control and minimize those accidents and injuries it is better to have a strict legislation that governs the construction personnel. Legislation is defined as a law or set of laws made by a government and the action of legislating specifically defined as the exercise of the power and function of making rules (such as laws) that have the force of authority by virtue of their promulgation by an official organ of a state or other organization (Alhajeri, 2011). Ethiopia as a country develop different legislation or set of law which will help for exercising the power of the government, from those different legislations construction safety legislation is one of them which will clearly show what and how to do jobs of construction and precaution during construction.

Here due to the above behavior of construction and its requirement for safety legislations in Federal Democratic Republic of Ethiopia, Ministry of Urban Development, Housing and Construction (previously Ministry of Work and Urban Development) is represented to implement and enforce the construction safety legislations to develop codes and standards. Additionally, Minister of Labor and Social Affair (MoLSA) is also responsible as it is a state organ to regulate workers' safety and health in workplaces, in which all the legislations and laws

states about precaution measures to be taken during construction, on way of site operations and cautions during design for occupational safety and health. It is also about the right and duty of workers at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on the working procedures (Dawit, 2006).

From those different Ethiopian legislations Ethiopia constitution is one and parent legislation, according to constitution of Ethiopia at Article 42 which gives point on right of labour on Sub-Article 2 states;

“Workers have the right to reasonable limitation of working hours, to rest, to leisure, to periodically leaves with pay, to remuneration for public holidays as well as healthy and safe work environments.”

Moreover, Article 89 Sub Article 8 of the FDRE Constitution states that;

“The Government shall endeavor to protect and promote the health, welfare and living standards of the working population of the country.”

Furthermore, according to Civil Code of the Empire of Ethiopia (1960), Article 2548;

“The employer shall take such measures which are required by the special circumstances of the work to safeguard the life, physical integrity, health and moral standing of the employee.”

Moreover, according to Labor Proclamation No. 1156/2019,

“The employer shall take necessary measures to safeguard adequately the health, safety, life, physical integrity and moral standing of the workers by complying with the Occupational Health and Safety requirements.”

Not only Ethiopia has Construction Safety Legislation, most countries in the world have set of laws for Construction Safety, for example we can find a USA practice which is enacted by the senate and house of representative of United States of America as OSHA Act of 1970 which is established by a government agency to regulate workplace safety, namely the Occupational

Safety and Health Administration (OSHA). The American Congress developed the legislation creating and empowering OSHA, USA department of labor has the power to enforce the Act.

Studies have shown that the Federal Democratic Republic of Ethiopia, Construction Safety Legislation is not being enforced by the government, which had been a reason for the non-practicing of Health and Safety at construction site and increasing of accident at construction site, due to this reason there has been troubles on employer, employee, client Moreover, general public. In addition, most of the Legislations are written and prepared by different personnel and professionals before decade in which it does not consider the current construction methodology and system which is different from the previous one. So, it had been very difficult to interpret, communicate and understand in a clear manner. This research work is therefore meant to address the problems and overview of the major health and safety legislation. Hence, in this study the researcher critically compares two countries legislations in terms of thirteen specific topics listed hereafter:- Demolishing Work, Electrical, Electrical Equipment and Electrical Work Practice, Employer Responsibility, Excavation/ Trenches and Earth work, Fall Protection and Fall Arrest System, Fire Protection and Prevention, First Aid, Medical Care, Emergency Action Plan, Welfare and Training; Ladder and Scaffolding, Personal Protective Equipment, Safe and Healthy Workplace, Safety Harness, Belt and Safety Net, Signs, Signals, Barricades & Barriers and Workers Right and Responsibility in terms of construction health and safety. It helped to gain better perspective of the position and situation of the health and safety of these countries especially Ethiopia. Therefore, this research paper is about comparison and analysis between FDRE Legislations and OSHA act for showing the difference and gap of between the two and suggestions and recommendation is made at the end of the chapter.

1.2.Statement of the Problem

Ethiopian construction industry has been experiencing a considerable development in construction method and activities in recent years. The construction method and material formerly and now is different, previously construction was adapted with mud and stone but lately during construction we use concrete, admixture and chemicals, steel, brick, hallow concrete block and other many materials and using those different materials and chemicals may had effect on the safety of workers and users. Moreover, jobs that require employees to work with heavy

machinery and equipment have a higher likelihood of injury improper usage may endanger people's safety and life.

Ethiopian legislation include among others the Civil Code is issued in 1960 and another construction safety legislations like national Health and Safety Policy and Strategy in 2014, Ethiopian Labour Proclamation No 1156/2019, Ethiopian Building Proclamation No. 624/2009, Council of Minister Building Regulation No 243/2011, Ministry of Labour and Social affairs Occupational and Health Directive in 2008 and Ethiopian Building Code Standards in 2014, all legislations are written but have not been updated since then. The construction level of our country was at the emergence level for the last years that high-rise building, mega projects and engineered works were not there. As the level of construction increases, construction become complex and the amount and intensity of accident and hazard will also increase, So that those legislations and regulations may not consider the current construction situations and current status. As it is known that high rise building and mega project construction emerges in the last ten years, the existed legislation and regulations which are based on previous method of construction may not represent the current situation and variation in mechanism of construction.

According to Seifedin (2014), in all over Ethiopia, millions of daily laborers work in big constructions in unsafe working environment and without supportive and protective equipment. They do not have protective caps, hand gloves, eye glasses, working clothes, shoes and so on. They work on high rise buildings standing on old and inclined wooden scaffolds and ladders; they even transport heavy construction materials on them. Moreover, the constructions do not have safety nets, restraint and fall arrest systems. As a result, a dozen of daily laborers Moreover, the general public gets along with serious injuries. Many, in fact, lose their life, which show not having Health and Safety practice.

This problem may come about due to not practicing of safety precautions and safety rules or rather, is a problem of non existence or inadequacy of safety rules, not making up to date, enforcement difficulty or non regulatory of the rules. So, those above problems made mystify the existence of construction safety rules in Ethiopia; if any exist, how it looks and the regulatory authority is usually very weak in implementing such rules effectively or it is inadequately satisfactory for securing the construction problems. It also mystifies whether the construction society is familiarity with the legislation and whether it should be improved and revised or the

current legislation is enough to cope up with safety problems and by comparing with other countries experience, gaps can be shown and make understandable real causes and where the problems exist, which made the way for not practicing safety. Therefore, this work is aimed at studying about what are the real causes by assessing FDRE construction Health and Safety legislation and its difference with international practices and recommending on what to alter on the current existed legislations and how to enforce it by comparing it with international practice of USA OSHA Act.

1.3. Research Questions

This research paper achieves the required objectives by answering the following key questions:

1. What are the Occupational Safety and Health legislation in Ethiopia and United States with its strength and weakness?
2. What are the major differences of Ethiopian construction Safety legislation with international practice specifically United States OSHA Act?
3. What can Ethiopian construction Safety and Health legislation learn from experience of international practices?

1.4. Objective of the Study

1.4.1. General Objective

The general objective of this study is to review and compare the existing profile of occupational Health and Safety legislation of Ethiopian construction industry and identify gaps at the national level on construction health and safety legislation with the USA OSHA Act 1970.

1.4.2. Specific Objectives

- To review and assess Ethiopian Construction Occupational Health and Safety legislation with respect to international standard of the 1970 Occupational Safety and Health Act of USA.
- To compare Ethiopian Construction Occupational Health and Safety legislation with USA OSHA Act and identify key differences between the two.
- To identify gaps and explore best practice for future Construction Health and Safety Legislation improvement in Ethiopia.
- To develop conceptual framework for future and add new contributions to the existing knowledge regarding construction health and safety.

1.5. Significance of the Study

Construction projects in Ethiopia do not have very high safety performances. The role of government is very important in construction safety management in any country is highly influenced by its legislation. This study attempts to investigate construction health and safety legislation applicable in Ethiopia construction industry and review and analyze the gaps in those legislations by critically comparing with international practices specifically the United States. A comparative study is also made to understand the provisions with regard to construction safety, specified in both the Act and the legislations. The finding of this paper is very important for development of Ethiopian Health and Safety practice in the construction industry.

This research study could help the government regulatory body or policy makers who are responsible for occupational health and safety to have a way to revise and modify the current applicable construction safety legislation. Moreover, it could also help to give attention of the issue of construction health and safety. In addition, the finding of this study helps construction companies, consultants, workers/employees in construction and the general public. So, this study is very important to create awareness change the current problems on occupational health and safety related accidents, hazards and deaths that may occur due to the gaps existed on the construction health and safety legislation. Finally, the results of this study have a constructive idea for who are ready to do research on this specific title and related ones.

1.6. Scope and Delimitation of the Study

This research paper focus on detail assessment of Ethiopian legislation and regulations formulated for construction health and safety only that are applicable at Federal level and it is limited to the following list of documents; The constitution of the FDRE Proclamation No. 1/1995, Civil Code of the Empire of Ethiopia, FDRE Building Proclamation No. 624/2009, Ethiopian Labour Proclamation No. 1156/2019, Council of Minister Building Regulation No. 243/2011, Ethiopian Building Code Standards (EBCS 14), National Health and Safety policy and Strategy, Ministry of Labour and Social affairs Occupational Safety and Health Directive and Construction Minister Building Directive, versus comparison with U.S. OSHA Act on thirteen specific health and safety topics which are: Demolishing Work; Electrical, Electrical Equipment and Electrical Work Practice; Employer Right and Responsibility; Excavation/ Trenches and Earth work; Fall Protection and Fall Arrest System; Fire Protection and

Prevention; First Aid, Medical Care, Emergency Action Plan, Welfare and Training; Ladder and Scaffolding; personal protective equipment; Safe and Healthy Workplace; Safety Harness, Belt and Safety Net; Signs, Signals, Barricades & Barriers; and Workers Right and Responsibility.

1.7.Organization of the Paper

This research is organized in six chapters as shown below:

Chapter 1: is about general introduction and foundation of the research and it is grouped into:

- Introduction to the study which consist of background and statement of the problem;
- Research questions, objectives and significance of the study;
- Outline scope and limitation of the study; and

Chapter 2: of this research deals with literature review on occupational health and safety, health and safety legislations particularly in Ethiopia, and by drawing on health and safety legislation of other international practices.

Chapter 3: present research method and methodology and tells about the study subject with data type and shows on how the research had been executed, so that the research method and research approach used is clearly stated.

Chapter 4: studies Ethiopian legislation in detail moreover dwells on the international legislations and policies of occupational health and safety in the construction industry especially American's and it also consists of critical review and comparative analysis of FDRE construction occupational Health and safety legislation's with USA OSHA Act is done.

Chapter 5: is about results and discussion with analyzing the data collected from literature review and legislation review and differences and gaps will be interpreted and analyzed with best practices and propose changes to FDRE H&S legislation.

Finally, chapter 6: is the conclusion and recommendation part and hence the end product of the study.

CHAPTER TWO

2. LITERATURE REVIEW

2.1.Introduction

In this chapter the research attempt to review literature related to construction health and safety and review health and safety legislations in the construction industry of Ethiopia. This chapter primarily helps to provide sufficient understanding of the subject occupational health and safety and the legislations adopted in Ethiopia for occupational health and safety. In addition to that issues related to experience of other international practice especially the USA on occupational health and safety legislation with their method of practicing Moreover, try to review different comparative researches on CSH. At last, findings of previous empirical studies are presented with their gaps.

2.2.Definition of Terms on Occupational Health and Safety

Health is the general condition of a person in mind, body and spirit, usually meaning to be free from illness, injury or pain. The World Health Organization (WHO) defined health in its broader sense in 1946 as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO, 2006).

Safety can be defined as the state of being "safe", the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk. This can take the form of being protected from the event or from exposure to something that causes health or economic losses. It can include protection of people or of possessions (Bernold et al. 1993).

Occupational Health and Safety has been defined by the ILO, (2001) as: "The prevention and maintenance of the highest degree of physical, mental and social well-being, the prevention of ill-health among workers caused by their working conditions, The protection of workers from factors adverse to their health in their employment, and the placing and maintaining workers in occupational environments adapted to their individual and psychological conditions."

Occupational Accident is any organic injury or functional disorder sustained by a worker including damage to property as a result of any cause extraneous to the injured worker or any effort he/she makes during or in connection with the performance of his work (FDRE Proclamation No.1156/2019).

Occupational Disease is any pathological condition whether caused by physical, chemical, biological or ergonomically factors which arise because of the type of work performed or the surrounding during a certain period prior to the date in which the disease is evident (FDRE policy and strategy, 2014).

2.3. Construction Industry

Construction is the mobilization and utilization of capital and specialized personnel, materials, and equipment to assemble materials and equipment on a specific site in accordance with drawings, specifications, and contract documents prepared to serve the purposes of a client. In developing countries, the construction industry is playing a vital role to achieve socio-economic development goals, providing shelter, infrastructure and employment, and above all contributing significantly to the GDP of the country (Tariku, 2014).

The construction industry is the builder of our modern world. From dams to skyscrapers, all that we have and see was in some way fashioned by construction contractors and workers. But construction can be a dangerous work. People in the construction industry not only face the dangers of being the first on a job site but face potential health risks and exposures throughout the building process (Charles & James, 2006).

2.4. Health and Safety in Construction Industry

Health and safety in the context of construction industry are the discipline of preserving the health and safety of those who build, operate, maintain and demolish engineering works, and other involved in those works. The term safety generally applies to the protection from risk of injury and from avoidable accidents whereas the term health refers to the well-being from the immediate and long-term effects of exposure to unhealthy working condition (Abebe, 2005).

Construction workplaces the workers are exposed to hazards of occupational diseases and injuries and the adverse effects of excessively long hours of work. Machines, plants and other sophisticated construction equipment pose danger to the operators, who in most cases do not

have prior skills for operating such machines or plants. A worker should be assigned duties in relation to his physical and mental health and skills. Further, employers should have complete control over their employees and therefore ensure adherence to safety practices. The company must comply with all provisions of safety and health regulations that pertain to the construction works itself. The chance of being disabled by injury or serious illness is much greater than in most other industrial fields. Every construction worker is likely to be temporarily unfit for work at some time because of a minor injury or a health problem after working on a construction site (Ahmed et al., 2000).

2.5. Construction Health and Safety Legislation

2.5.1. Definition of Legal Terms

Legislation is defined as a law or set of laws made by a government. The action of legislating specifically is the exercise of the power and function of making rules that have the force of authority by virtue of their promulgation by an official organ of a state or other organization.

Regulation is principle or rule employed in controlling, directing or managing an activity, organization or system. Regulations are enforced usually by regulatory agency formed or mandated to carry out the purpose or provision of legislation and its function to ensure uniform application of law.

‘**Policy**’ is predetermined course of action, which is established to provide a guide towards acceptable strategy and objective.

‘**Procedure**’ ultimate goal is to provide the reader with a clear and easily understood plan of action required to carry out or implement a policy.

“**Standards**” are used by a diverse range of organizations to enhance their products and service, improve safety and quality, and meet industry best practice by referring standards in legislation, regulations draw on existing best practice developed. A standard is not, itself, mandatory or legally required. A standard has to be incorporated by reference in an act or delegated legislation in order to be mandatory. Once referenced, it becomes part of the technical regulation framework.

“**Code**” is collection of laws and rules which provide correct procedure to maintain safety. Moreover; a code is set of rules and specification for the correct method and material used in a

certain product, building or process. The main purpose of codes is to protect the public by setting up the minimum acceptable level of safety for building, products and processes.

“**Directive**” is something that serves to direct, guide and usually impel towards an action or goal especially, government: an authoritative order or instrument issued by a high level body or official a presidential body.

Occupational Safety and Health Standard means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.

(Source from Charles & James, 2006)

2.5.2. Necessity of Construction Health and Safety Legislation

Safety is defined to be the control of recognized hazards to achieve an acceptable level of risk. This can take the form of being protected from the event or from exposure to something that causes health loss (Bernold et al. 1993). Construction workplaces the workers are exposed to hazards of occupational diseases and injuries and the adverse effects of excessively long hours of work (Ahmed et al., 2000). Health and safety in construction industry are the discipline of preserving the health and safety of those exposed workers who build, operate, maintain and demolish engineering works, and other involved in those works (Abebe, 2005). Standards and regulations have been developed to guide and direct the construction industry and maintaining safe and healthy workplaces for themselves and their workers. They were developed because of accidents, injuries, illnesses, catastrophes, and deaths within the construction industry (Charles & James, 2006).

Health and safety norms/ codes are basically designed to provide practical guidance on a legal, administrative, technical and educational frame work for safety and health in construction. It is to prevent accidents and harmful effects on health of workers arising from employment in construction, and providing guidelines for safe implementation of construction projects (Abebe, 2005).

2.6. Overview of Ethiopian Construction Industry

The evolution of modern construction industry in Ethiopia is a recent phenomenon and can generally be summarized into four distinct periods. The first period covers the period prior to the year 1968 when most civil works including roads were carried out by foreign contractors. The

second era was that spanning the period 1968 -1982 when some small domestic contractors started to emerge and, in this era, three main domestic contractors emerge as domestic and they were “BERTA” Construction Company, National Engineers and Contractors (NEC) and the Ethiopian Building and Road Construction (ETBRC). The third period in the evolution of the industry was the period of the “Derg” regime, which had brought domestic private construction companies under state control and establishing state-owned construction companies. It was regarded as the lost opportunity for the creation of a competitive private construction industry in the country. The fourth period begins from May 1991 where. Economic management has shifted from command to free market system and private construction companies have been introduced and started flourishing (Tariku, 2014).

2.7. Health and Safety in Ethiopian Construction Industry

Construction is a dangerous work; People in the construction industry not only face the dangers of being the first on a job site also face potential health/safety risks and exposures (Charles & James, 2006). Safety of workers on construction site must be of paramount importance to any construction company that wants to continue to operate. Though much improvement in construction safety has been achieved in the developed countries, the industry still continues to lag behind in most other industries with regard to safety. In developing countries, safety rules usually do not exist; if any exist, the regulatory authority is usually very weak in implementing such rules effectively. Furthermore, work hazards at the construction workplace are either not perceived at all, or perceived to be less dangerous than what they actually are (Ali, 2006).

The construction sector is also growing in Ethiopia and providing employment opportunities. Due to the hazardous nature of the sector there may be a lot of accidents and occupational diseases that will occur. But, there are no adequate inspection services in this dangerous sector. This is due to lack of trained inspectors and absence of technical OSH standards for specialized inspections. As a result of many predisposing factors, the situation of OSH in Ethiopia remains to be at its premature stage. Presently, there is no much strength in the OSH system in relation to legislation and policy, implementation of legislation, infrastructure, skills and capacity etc. all in all the weakness predominates (Dawit, 2006).

Many companies in Ethiopia do not follow strict health and safety guidelines as construction workers are more likely to be killed by construction accident than any other type of employment.

Limitations on the part of supervisory authority in the construction industry means such guide lines exist but only on paper leaving the safety and well-being of construction workers in Ethiopia at the mercy of employers. The need for up-to-date information on health and safety is of critical importance for the purposes of identifying areas of required action and for setting priorities for policy initiatives on improving health and safety at work (Seifedin, 2014).

According to Dawit(2006),Summarization the Strengths and Weaknesses of OSH System in Ethiopia; the following strengths had been written; comprehensive legislations is available Moreover, directive that clearly stipulated issues of OSH does exist and Government policy and program indirectly addresses positively to OSH Moreover, as it is stated Ethiopia had a weaknesses of; Lack of strong and effective national OSH policy and program, Lack of trained man power in OSH, Lack of streamlined system for addressing the existing low awareness of OSH and Absence of co-operation and coordinating mechanism among the concerned bodies to put in place strong networking and cooperation system of OSH.

2.8.Construction Health and Safety Legislation and Regulations Available in FDRE

2.8.1. Introduction

In many developing countries, the legislation governing OHS is significantly limited when compared with the UK. Researchers report further that there are rarely any special provisions for construction workers' safety and the general conditions for workers are often not addressed (Tariku, 2014).

Ethiopia is currently enjoying a relatively strong growth in construction activities. The country's booming construction sector is attracting thousands of labourers. Unfortunately, Ethiopia's construction industry suffers from poor safety and health conditions, even though; the constitution (1995) article 42/2 declared rights of labour to work in a healthy and safe work environment. The framework of the existing occupational safety and health conditions is fragmented and inadequately enforced, making construction sites more hazardous (Seifedin, 2014).

The issue of governing Safety and Health at work on legal basis in Ethiopia dates back to 1940's, when the first legal instrument Proclamation No. 58/1945 was promulgated. The origin of this legislation was a result of the advent of industrialization that took place in the country. This

legislation framed itself on the basic principles underlined by the two notable ILO conventions on Labor Inspection. A more comprehensive legislation on occupational Safety and Health management replaced this in 1964 i.e. Proclamation 232/1964 in order to address the change occurred. All the laws of that period were adopted from most of the European countries especially of the British taking in to account of the prevailed condition of the country's industrialization and the pre maturity of the development of Labor administration system (Dawit, 2006).

Like many African countries and most of developing countries, Ethiopia has no developed standards of own. Most of existing standards and guidelines are of ILO and other related organizations such American conference of Governmental Industrial Hygienist (ACGIH) and EU. ILO guidelines and codes of practice in many areas of safety and Health issues are applied in guiding employers and workers to achieve adequate safety and health at the workplace particularly in the management of noise, radiation, chemicals, construction, notification of occupational accident, injuries. In developing OSH legislation, the ILO conventions and other countries laws have also been used as basis for setting provisions. Recently, efforts have also been made to bring the legislation in to conformity with the current phenomena and concerns including the principles underlined by international standards (Dawit, 2006).

2.8.2. The Constitution of the Federal Democratic Republic of Ethiopia

The parent legislative framework of the land is the constitution of the Federal Democratic Republic of Ethiopian Constitution Proclamation No. 1/1995 (Addis Ababa-21st August, 1995). This legislation has several law and regulations which states about certain human and democratic rights incorporating, the right of security of person on Article 16 as it is written as “everyone has the right to protection against bodily harm”. And on Article 18, Sub-article 3 it is articulated as “no one shall be required to perform forced or compulsory labour”. In another statement in Article 36 right of children sub-article 1(d), Every child has the right not to be subject to exploitative practices, neither to be required nor permitted to perform work which may be hazardous or harmful to his or her, health and well-being. And basically, on Article 42 of right of labour on Sub-article 2 as stated “Workers have the right to reasonable limitation of working hours, to rest, to leisure, to periodically leaves with pay, to remuneration for public holidays as well as healthy and safe work environments.” The other is on Article 44 Sub-article 1 which

states about environmental rights and states that all persons have the right to clean and healthy environment. Article 89 Sub Article 8 of the constitutions stipulates that “the government shall endeavor to protect and promote the health, welfare and living standards of the working population of the country.” The other one is Article 90 sub-article 1 which states that the government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment.

2.8.3. Civil Code of the Empire of Ethiopia

The second governing code of legislative framework is civil code of the empire of Ethiopia, Proclamation No. 165/1960, has several provisions about safety precaution to be taken by the employer, in section four from Article 2548 up to 2559. In Article 2548(1) it states, “The employer shall take such measures as are required by the special circumstances of the work to safeguard the life, physical integrity, health and moral standing of the employee.” As well as, in Article 2549, it states about accidents arising from work and mandate the employer to be liable for accidents which the employee suffers arising from the work.

2.8.4. FDRE Proclamations

2.8.4.1. Labour Proclamation

The Labour Proclamation; Proclamation No. 1156/2019, is one of the main document of the Ethiopian legislations that deal with labour matters in FDRE. The former Labour Proclamation No 377/2003 was amended by Labour Proclamation No 494/2006, and again in 2019 it is replaced by 1156/2019. However, the new one does not include any new statement related to health and safety issue other than repeating the old version contents. Part seven of the labour law deals with the occupational safety, health and working environment, which includes three chapters with twenty-one articles. The Labor Proclamation is comprehensive legislation which includes provisions on responsibilities and rights of employer and workers, administration and dispute resolution processes notable for its strong emphasis on the creation and enforcement of OSH standards. Moreover, it sets forth a range of general provisions on contracts, contract termination, wages, hours of work and rest, leave, working conditions, OSH, collective relations, period of limitations and priority of claims, enforcement, and penalties. Also, it provides guidance through general and specific provisions on OSH and the working environment, labour inspection roles and responsibilities, the labour inspection process, penalties and remedies; and court and labour board adjudications and mandate for labour inspections.

2.8.4.2. Building Proclamation

The Building Proclamation; Proclamation No. 624/2009, is also the main document of the Ethiopian legislations that deals with construction matters in FDRE. Part three of the proclamation deals with the land use, related studies and design, which includes seven articles and three of them states related to safety. In part five of the same proclamation it is stated about fire protection and firefighting installation which includes three articles from Art. 44 to 46. To ensure construction health and safety in construction sites; in this proclamation the government of Ethiopia has set precautionary measures that could be taken during construction and stipulate responsibilities of the building officers and designers regarding health and safety.

2.8.4.3. Public Health Proclamation

The objective of Public Health Proclamation, proclamation No. 200/2000 is to legally determine the mechanism and steps to be taken for the promotion of the health of the society and creation of healthy environment. It also covers the obligation of putting in place of minimum requirement of health and hygiene to be maintained in each enterprise. The competent authority to oversee the implementation of the law is the Ministry of Health and its regional counterparts. It is also clearly indicated that the competent authority shall appoint qualified and capable inspectors to implement the provisions of the proclamation. The law has clearly spelled out that subsequent laws related with public health shall be issued. The inspectors who do have powers without prior notice can enter into premises to inspect matters that endanger the public health including those that affects the health of workers. The matters which directly related to occupational Safety and Health that are provided by the law are those that deal with Occupational Health control and use of machines, and the waste handling and disposal as a part of the obligation of the employer through the same law in its Article 12 & 13.

2.8.4.4. Environmental Impact Assessment Proclamation

Environmental Impact Assessment Proclamation, Proclamation No. 299/2002, deals with setting legal basis in order to manage and control the environmental effects which are caused by development activity before resuming operational level at design, construction, operation or an or going one as a result of its modification or termination through impact assessment in order to put in place mitigating intervention. The law has set all the mechanism and steps to be taken in order to determine the project, or there would be production system can entail as a harmful effect

on the entire environment in general and of the working environment in particular. The issue identifying Occupational Safety and Health impacts is also a central theme of the Environmental Impact Assessment Proclamation and the subsidiary regulation, standards set for the effective implementation of the principles of the law. The law clearly stipulated that any owner of project for which environment impact assessment, should be done in order to identify the likely adverse impacts the project can bring to the environment.

2.8.5. FDRE Regulation

2.8.5.1. Council of Minister Building Regulation

The Building Regulation, Regulation No. 243/2011 which is prepared by Council of Minister in part five deals with the land use, related studies and design, includes six articles in which they spell about design, precaution measures to be taken during construction; building site operation methods; and safety of electrical installations and lift work. Moreover, part seven of the regulation with three articles from Art. 41 up to 43 includes, fire protection and firefighting or fire extinguishing instrument installation and method for supply of water for fire protection.

2.8.6. Ethiopian Construction Standard

Ministry of Urban Development, Housing and Construction (MUDHo) has the responsibility to prepare the country's building code, issue standards for design and construction works, and follow up and supervise the implementation; Building Code Standard revision committee of MUDHo prepares Ethiopian Building Code Standard (EBCS 14) in 2014 for occupational health and safety in FDRE. The Ethiopian Construction Standard which is about health and safety in construction, having been prepared under the direction of Ethiopian Building Proclamation, was first published under the authority of the Ministry of Urban Development, Housing and Construction on August 2013. It is adopted from United States Occupational Safety and Health Administration (OSHA) and California Code of Regulation. Then it is revised in December 2014, but only for review purpose with adding four provisions; the first one is about workers participation for preparation of safety plan and hazard assessment process with the right of workers to be informed the hazard existed and the methods to be used to control the hazard; the second provision added is, where to use fall arrest system which limit fall arrest system that could be used to ensure workers protected from falling a temporary or permanent structure only to be applied for three specific cases which are; if a worker may fall: from a vertical distance of 5

meter or more; from a vertical distance of less than 5 meter for unusual possibility of injury; and for falling in to a hazardous substance or object. In addition, the third provision added is about marking an excavation, if a danger of public and a worker in particular falling in to an excavation exist, it obligate the employer to ensure aware of the excavation through flagging or marking; and the last provision added on the revised standard regarding duty to use PPE, if the hazard assessment indicates the need for PPE it obligate the employer to ensure the workers to wear PPE with giving training to the workers on correct use and care, also it require the workers to use and wear properly the appropriate PPE. The new version which is EBCS 14 of 2014 is adopted from United States Occupational Safety and Health Administration (OSHA), California Code of Regulation and Government of Alberta, Occupational Health and Safety Code of 2009, which is one of the provinces in Canada in which it is divided into its own local government.

2.8.7. National Occupational Safety and Health Policy and Strategy

While, creation of safe, healthy and productive workforce and ensuring reliable industrial peace in country are among necessary preconditions to bring about rapid economic and social development and for the sustainable development capacity, the Council of Ministers of the Federal Democratic Republic of Ethiopia in its 69th Regular Session of 23 July 2014 issue the National Occupational Safety and Health Policy and Strategy. Since Occupational safety and health service has economic, social and human dimensions; it protects the workforce from occupational injuries. The vision of this policy is to see workplaces and workers are prevented and protected from occupational accidents and work-related disease and hazards. Further. its Mission is to protect the productive workforce from occupational accidents and health hazards with objective of contributing to the national social and economic growth and development by providing efficient and effective occupational safety and health services at all workforces, preventing and controlling risks and health hazards at the source and reducing the incidence of occupational accidents and diseases and appropriately preventing human atrocity due to work-related injuries. In-addition, the scope of the policy and strategy is to be applicable in all workforces and economic activities.

2.8.8. FDRE Directives

2.8.8.1. Building Directive

On our country existing situation of a construction work creation of safe, healthy and productive workforce and ensuring reliable industrial peace in country are among necessary preconditions to bring about rapid safe construction industry, based on Federal Democratic Republic of Ethiopia Council of Ministers Building Regulation No. 243/2011, Ministry of Urban Development and Construction (current name Ministry of Construction) has issued the Building Directive No. 5/2003 on May 2003 in Addis Ababa. In part four of the Directive it include about; scaffold and ladder, demolishing work, height and roof work, earth work and excavation work, chemicals, toxic and Explosives, personal protective equipment, fire protection, first aid, emergency exits, safe working place, and record keeping and reporting.

2.8.8.2. Occupational Safety and Health Directive

FDRE Ministry of Labour and Social Affairs (MoLSA) by powers vested in under article 98(3), 102(1), 170(1)(a-e) of the Labour Proclamation No. 1156/2019, has issued the Occupational Safety and Health (OSH) Directive, establishes the duties of employers, duties of workers, responsibilities of the labor inspectorate, and mandatory conditions on overcrowding, sanitation, fire safety, and preparedness. Part II of the directive provides guidance on mandatory employer responsibilities; its part III give provisions for ambient working conditions and certain hazards; and Part IV describes specific and general hazards by work practices or types of manufacturing processes, machinery operation or job performance procedures, and part V covers OSH for construction.

2.8.8.3. National Directive on Prohibition of Activities for Young Workers

The Ministry of Labor and Social Affairs adopted a directive on the prohibition of activities for young workers issued on May 3, 2013. The directive defines “Young worker” as being “a person who has attained the age of 14, but is not over the age of 18 years.” On Article 89(2), it is clearly spelt out that it is prohibited to employ young workers; which on account its nature or due to the condition in which it is carried out can endangers the life or health of the young workers performing it. Also Article 89(4), it is well spelt out that the ministry of the competent authority may prescribe the list of activities prohibited to young worker as result of that they are found to jeopardize the safety, health and the development future of the child. It is also clearly provided

that the provisions concerning the working conditions of young workers in the law shall not apply to work performed by young workers who are following courses in vocational schools that are approved and inspected by the competent authority. Moreover, it is well indicated on the same article that the normal hours of work for young workers may not exceed seven hours a day with prohibition to employ on night work between 10 P.M and 6 A.M, overtime work, weakly rest and public holydays.

2.8.8.4.National Directive on Prohibition of Activities for Woman & Pregnant Workers

In order to protect the health, childbearing and rearing functions of female workers the Ministry of Labor and Social Affairs stipulates harmful working conditions and occupations in which the employment of female is prohibited. harmful working conditions in which the employment of female worker is prohibited: workplaces with pressure higher than the atmospheric pressure; working in mines; working in high and sheer workplaces; workplace unsuitable for women's mentality and psychology; working immersed in water or in dirty water that can easily cause infection; and direct exposure to chemicals that can cause gene damage. Female workers who suffer from illnesses or occupational diseases because of performing prohibited jobs shall be entitled to allowances in kind, health care, medical examination and medical treatment. The employer is not also allowed to dismiss a woman during her pregnancy and at her confinement apart from those reasons that are not related to giving of birth and pregnancy. Moreover, according to the directive, women shall not be discriminated against employment and payment on the basis of their sex. And, it is also prohibited to employ women on type of work that may be listed by the ministry to be particularly categorized as harmful to their health and safety of both the mother and the womb.

2.8.9. ILO Convention (C155) Occupational Safety and Health Convention

The ILO is a specialized agency of the United Nations with 176 member States and establishes & monitors the international labor standards, which are embodied in Conventions, protocols/recommendations. The ILO supervises the implementation of Conventions and Protocols by member States who are parties to those instruments.

Ethiopia has been a member state of ILO since 1923, four years after its establishment, has ratified about 22 ILO conventions including Occupational Safety and Health Convention, 1981 No 155 (C155). According to Article 9 of FDRE Constitution, all international agreements

ratified by Ethiopia are an integral part of the law of the land, based on this Article these ratified conventions are now the part of law of the land an Implementation of the Convention's obligations falls within the jurisdiction of the FDRE Ministry of Labor and social Affairs, and within the jurisdictions of the regional MoLSA bureaus.

On Article 4, The Convention provides that each member state shall formulate, implement and periodically review a coherent national policy on occupational safety and health in the working environment. The objective of the policy shall be to prevent accidents and injury to health arising out of, linked with or occurring in the course of work by minimizing, as far as possible, the causes of hazards inherent in the working environment. The Convention defines the main spheres of action of such a policy (Articles 4-7). It lays down a series of quite detailed provisions concerning action at the national level, and at the level of the workplace. Article 11 of the Convention requires the progressive implementation of certain functions as part of the national policy.

At Article 7, the Convention also requires a process of review of occupational health and safety and the working environment to be carried out at appropriate intervals, with a view to identifying problems and devising effective methods to address any such problems. In Article 8; at the national level it provides in particular for the adoption of laws or regulations or any other appropriate method for the operation of a system of inspection in Article 9 and for measures to be taken from the design stage onwards.

Moreover, in Article 16 at the workplace level, the Convention provides among other things, that employers are required to supply adequate protective clothing and equipment and to ensure that, so far as is reasonably practicable, the workplaces, machinery, equipment and processes under their control, as well as chemical, physical and biological agents and substances used in the workplace, are safe and without risk to health.

Furthermore, the Convention provides that workers and their representatives in workplaces shall co-operate in the fulfillment by employers of their obligations in Articles 19 and 20. Also in Article 13, it provides that workers who report hazardous working conditions or cease work when they believe the situation presents an imminent and serious danger to life or health are to be protected from undue consequences.

2.8.10. Summary of Construction Health and Safety Legislation in FDRE

Ethiopia does have legislation of construction health and safety alone; rather a law which include provision of health and safety, specifically in construction it says: The Constitution of the of Ethiopia under human and democratic rights incorporating articles related to general HS issues, Civil Code of Ethiopia also incorporate HS issue in general for all works and specially it is about employer responsibility. Ethiopian Labour Proclamation states about working environment, labor inspection roles and responsibilities of employer, Ethiopian Building Proclamation and council of Ministers Building Regulation also has small provision in regard of HS.

Table 2.1: The Summary for Construction Safety Legislations in FDRE

No.	Legislation (Applicable Laws, Directives and Standards)	Specific Area
1.	The Constitution of the Federal Democratic Republic of Ethiopia, Proclamation No. 1/1995	Art. 16, Art. 18(3), Art. 36(1)(d), Art. 42(2), Art. 44(1), Art. 89(8), Art. 90(1)
2.	Civil Code of the Empire of Ethiopia, Proclamation No. 165 of 1960	Section Four; Art. 2548-2559
3.	Ethiopian Labour Proclamation, Proclamation No. 1156/2019	Part seven; Art. 92 -112
4.	Ethiopian Building Proclamation, Proclamation No. 624/2009	Part Three; Art. 30, Art 31 & Art 32 Part Five: Art. 44-46
5.	Council of Minister Building Regulation, Regulation No. 243/2011	Part Five; Art 28(4) & Art 29 Part Seven: Art. 41-43
6.	The Federal Republic of Ethiopia, National Occupational Safety and Health Policy and Strategy	The whole document
7.	The Federal Republic of Ethiopia Ministry of Labour and Social Affairs, Occupational Safety and Health Directive	Part five
8.	Ethiopian Building Code Standards (EBCS 14), Health and Safety in Building Construction by Minister of Work and Urban Development	The whole document

2.8.11. Construction Health and Safety Legislation Enforcement in Ethiopia

2.8.11.1. Introduction

Considering complex nature and hazardous behaviors of construction, Federal Democratic Republic of Ethiopia issue Health and Safety provisions in the legislations, and represent

responsible organs for regulating, implementing and enforcing construction health and safety in workplaces. From those responsible organs MUDHo is one, who is represented to implement and enforce the construction safety legislations and to develop codes and standards. Additionally, MOLSA is also responsible as it is a state organ to regulate workers' safety and health in workplaces (Dawit, 2006).

2.8.11.2. Ministry of Urban Development, Housing and Construction (MUDHo)

As the Proclamation define the power and duties of the executive organs of the Federal Democratic Republic of Ethiopia Proclamation No 691/2010 and Ethiopian Building Proclamation No 624/2009, empowers the Ministry of Urban Development, Housing and Construction to prepare the country's Building Code, issues Standards for design and construction works, and follow up and supervise implementation of same. They issue Ethiopian Building Code Standard Number 14 on December 1, 2014, which is about occupational health and safety. According to the Minister, MUDHo objective and purpose is "mandated to frame policies, strategies and programs that would help to establish well governed cities. The ministry of Urban Development and Housing (previously the Ministry of Works and Urban Development) was re-established in 2015 following proclamation No916/2015 which define the institutional power and function of Federal Democratic Republic of Ethiopia's government bodies (MUDHo, 2019).

2.8.11.3. Ministry of Labor and Social Affair (MoLSA)

Ministry of Labour and Social Affairs was established in 1957 by Legal Notice No. 15 as the "Ministry of Community Development" and nine years later in 1966, It was re-established by legal notice No. 46 as the "Ministry of Community Development and Social Affairs" and made to incorporate in to its mandate programs pertaining to public life development, Social Security and labour affairs. Finally, in 1977 it was given its present name "Ministry of Labour and Social Affairs" by Proclamation No. 127. And MoLSA is responsible for the application of safety rules and regulations specified in Ethiopia labour law. The mission of Ethiopian MoLSA is to promote effective, healthy and peaceful industrial relations through promoting social dialogue and to ensure good labour administration, with occupational safety and health services at both national and regional levels (Tariku, 2014).

The Ministry of Labour and Social Affairs is the Federal Governmental Agency who's effective and healthy and peaceful Industrial Relations through promoting dialogue and to ensure good labour administration that ensures occupational safety and Health services, both at national, regional and undertake levels are put in place. The establishment of the services has the objective of preventing injuries, diseases, creating of harmonious and peaceful industrial relations where there are no strikes and industrial unrest. Within the ministry, administratively, there is the department of Occupational Safety, Health and Working Environment dealing with the two inspection functions commonly called the technical and non-technical labour Inspections. The department has three teams responsible to undertake the major functions of Labour Inspection as per the provisions of Labour Law Proclamation 1156/2019 and the principles set by the ILO Labour Inspection Conventions (Convention No. 81/1947, Convention No 129/69). The teams are Occupational Safety Team, Occupational Health Team and The Minimum Labour Condition Team. Among these, there are also around eleven regional Inspection services established as a result of the Federal system of Administration in the country. There are around 79 Inspectors deployed in the Federal Ministry and 11 regional state Inspection services of the country. And the professional profiles of the staff of the department are four Chemists three with 1st degree and one is doing MSc, three Biologists all with 1st degree, one Lawyer and one Diploma Civil Engineer (Dawit, 2006).

2.9. Health and Safety in International Practice and Their Legislation

2.9.1. Introduction

Considering the importance of health and safety of construction workers in the industry, different countries have designed their own norms, which fit their specific objectives. Nevertheless, the principles all over the world are the same except adapting to the economic status and the technology employed in a particular country (Abebe, 2005).

Construction regulations are often difficult to understand. Sometimes the safety standards or standards governing chemicals do not exist for construction or are designed for factory workplaces, such as the use of asphalt, for which no specific regulation exists. The need for health and safety programs in the construction industry has been an area of controversy for some time. Many in the construction industry feel that written safety and health programs are just more paperwork, a deterrent to productivity, and nothing more than another bureaucratic way of

mandating safety and health on the job. But over a period of years, data and information have been mounting in support of the need to develop and implement written safety and health programs in the construction industry (Charles and James, 2006).

According to Cotton et al. (2005) noted that the institutional and legal governance frameworks on occupational health and safety in developing countries have little impact. The majority of contractors are small and medium Enterprises operating within their domestic markets where enforcement of health and safety standards and labour standards is very lax. Enforcement of health and safety regulations remains a problem due to lack of adequate resources available to government institutions responsible for occupational health and safety administration. Also, there remains an acute need for contract provisions to support the enforcement of labour laws in developing countries.

2.9.2. U.S.A Health and Safety Legislation and Practice

In the U.S.A, Occupational Safety and Health Act (OSHA), the first of its kind in the world, was established in 1970 as an overall occupational safety and health law it is also called the Williams-Steiger Act. It was signed by President Richard Nixon on December 29, 1970 and became effective from April 29, 1971. The OSHA Act assigned the responsibility of implementing and enforcing the law to a newly created agency, the OSHA. From OSHA's official duties, OSHA, as a government agency, is performing purposely on safety management system studies and establishment of safety-related regulations and standards as well enforce these as strongly as possible to be applicable on work areas. Since OSHA's superintendent is not allowed to notify of his visit plan in advance unless there is an urgent matter of danger, it is enough to make effective superintendence possible. Except that the organization does not make an ordinary regular checkout but focuses on the investigation of workplaces, where an accident has occurred or ascertainment of the fact a worker has petitioned to (Charles & James, 2006).

The Occupational Safety and Health Act (OSHA Act) of 1970 is such a law and most such federal laws contain the following contents: The reason for the law, A statement of the national policy related to the law, Objectives/goals/outcomes expected of the law, Authorization of the agency responsible for implementation, Requirements and structure of the regulations to be developed, time frames for regulation implementation or deadlines, enforcement guidelines to be followed, fines or assessments available to the enforcing agency and specific actions required by

the law. The federal law OSHA Act of United States of America has the following contents including thirty two sections; The Act starts from section 2 containing congress finding due to excessive injuries and illnesses employers have specific responsibilities regarding occupational safety and health with stating the responsibility of the Secretary of Labor to institute OSHA, oversee the development/implementation of workplace health and safety standards including any research and training required as well as to assure the enforcement of OSHA standards and develop reporting requirements for injuries and illnesses and section 3 of the Act defines the employer as “a person whose company is engaged in a business that affects commerce” also define employees as “persons employed by an employer who affects commerce”. Section 4 and 5 is about the application of the Act with describing as it is not applicable to other federal agencies that exercise their own authority. It states the Act supersedes other existing federal laws and regulations related to OSH.

Moreover, the Code of Federal Regulation (CFR) is a codification of the general and permanent rules published in the Federal Register by Executive departments and agencies of the Federal Government. The code is divided into 50 titles, which represent broad areas that are subject to federal regulations and each title is divided into chapters which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas. Based on this breakdown, the OSHA is designated as Title 29, regulation relating to Labor in Chapter XVII (OSHA) and is broken down into parts. Part 1926 contains the Construction Industry Standards. And the Construction Industry Standards are further broken down into subparts, sections, and paragraphs. Each volume of the CFRs is revised at least once in each calendar year and issued on a quarterly basis and the CFRs are kept “up to date” by individual revisions issued in the Federal Register. The CFR and the Federal Register publications must be used together to determine the latest version of any given rule. Federal register is daily publication for communicating regulations and other legal documents of federal agencies to the public (Charles & James, 2006).

The practice of safety in construction in the USA is regulated by governmental agencies such as the Occupational Safety and Health Administration (OSHA), which provides strict rules and regulations to enforce safety and health standards on job sites. The general duties of the government are listed below: Establishment of the Department of Occupational Health and Safety Administration (OHSA) with the strong terms of punishment for those who make safety

violation; Following up the safety performance in the construction sites by visiting the construction site and evaluating the safety performance during the construction project; and Providing safety courses on how to improve safety performance in the construction sites for officials of safety in the construction projects, this is to be held annually (Tariku, 2014).

2.9.3. International Labor Organization (ILO)

The International Labour Organization (ILO) is a specialized agency of the United Nations. It was established in 1919 with the principal objective of protecting Human Rights of workers and to promote decent work for all races. The organization drafts and adopts conventions, with its recommendations to all member states that have accepted the ILO conventions, and are in pursuance of its aims and objectives. The ILO combines standard-setting, among other things, to all member states who have adopted, pledged to respect and promote human rights. To this effect, in 1988, the Health and Safety in Construction Convention (No. 167) and its associated Recommendations (No. 175) were adopted to serve as a blueprint upon which legislations and policies of member states' health and safety issues would be built on. The enactment of the law on occupational health and safety in the construction industry was necessary to reflect the broad approach in tackling the health and safety problems in the construction industry. Complementing this law is the ILO Code of Practice on Health and Safety on Construction sites which was also approved in 1992 (Frederick, 2010).

The international labor organization provides specific guidelines on health and safety in construction activities. The general objectives of health and safety norms/ codes in any country construction industry can be summarized as: To help prevent accidents and harmful effects on the health of those employed in the construction industry; To provide guidelines in appropriate design, selection, installation and safe operation of equipment and process related civil engineering works; To thrive guidance in establishing administrative, legal and educational frame works within which preventive remedial measures can be implemented in all aspects involving safety and health in construction industries; To promote consultation and cooperation between concerned government authority, employer's organization and workers organization in the improvement of safety and health in construction industries (ILO, 2001).

2.9.4. Great Britain Health and Safety Legislation and Practice

The Health and Safety at work Act 1974 is the principal piece of legislation for occupational health and safety in Great Britain, however, there are other regulations to implement health and safety under the Act which are designed to keep workplaces safe. Other regulations like: workplace Health, Safety and Welfare regulation 1992, Personal Protective Equipment Regulation 2018, Management of Health and Safety at Work Regulation 1999 and Manual Handling Operations Regulations 1992. The HSW Act is made from 8 sections which are: Introduction- structure and objectives of the Act; The health and safety Commission and the Health and safety Executive; Duties under the act; Enforcing authorities and agencies, and inspectors; Improvement and prohibition notices; Offences, penalties and prosecutions; Regulations and Approved Codes of Practice; and Licensing and appeals against decisions on licensing, are the contents of the Act (Seong-man, 2006).

In the Great Britain, the Health and Safety Executive is responsible for the enforcement of the Health and Safety at Work Act and carrying out the day-to-day work to enable the Health and Safety Commission to carry out its functions. The HSC is responsible for the promotion of the HSW and encouraging research, training, providing an information and advisory service (Alhajeri, 2011).

2.9.5. Australia Health and Safety Legislation and Practice

The WHS laws in Australia consist of a three tiered structure- the WHS Act 2011, the WHS Regulation and Codes of Practices. They are designed to protect the health, safety and welfare of persons at work and those who may be affected by work activities undertaken by others. The WHS Act is the principal legislation which sets out who has duties and what they are. The WHS Regulation is the middle tier, which contain detail on how the outcomes required by the WHS Act can be achieved. The third and final tiers are the Codes of Practice which provide guidance about what is known about a hazard or risk in specific situations and what is reasonably practicable to ensure health and safety. The object of WHS Act is to provide for a nationally consistent framework to secure the health and safety of workers and workplaces by; as set out in section 3 (1).(a) Protecting workers and other persons against harm to their health, safety and welfare through the elimination of risks arising from work or from specified type of substances or plant (Alhajeri, 2011).

2.9.6. UAE Health and Safety Legislation and Practice

The health and safety construction in the UAE is administered by the labour Law No. 8 of 1980 as amended by Federal Laws No. 24 of 1981, No.15 of 1985 and No.12 of 1986. It specifies certain provisions regarding employee safety and health care, which are stipulated under articles 91 to 101. The labour law includes articles on industrial safety and health care for workers and it requires employers to protect workers against the hazards of occupational injuries and diseases by providing appropriate safety measures. The law requires employers to provide medical care facilities and medical professionals to carry out general medical examinations, at regular intervals of not more than 6 months (Alhajeri, 2011).

The UAE's Labour Law No. 8 of 1980 is a federal law regulating labour relations throughout the country. It is regularly amended by ministerial resolutions, as issued by the Ministry of Labour and approved by the Council of Ministers. The Ministry of Labour is responsible for implementing the federal labour law, but each emirate can also set up its own agencies to enforce the federal labour law. The law sets the terms for workers compensation in cases of work-related accident, disease or death. As already noted, it requires employers to report instances of work-related injuries and occupational diseases to the police and to the Ministry of Labour.

The provisions of the Law require the following measures and procedures to be adhered to are (UAE Labour Law, 1980): Every employer should provide his employees with suitable means of protection against: injuries, occupational fire and hazards which may result from the use of machinery and other equipment in the workplace. The employer shall also apply all the other precautionary measures specified by the Ministry of Labour and Social Affairs. The employee, however, must use the safety equipment and clothes given to him for this purpose and he shall also follow his employer's instructions which aim to protect him from danger; Every employer shall display in a permanent and prominent place at the work site detailed instructions regarding the means of preventing fire and the means of protection of employees from hazards to which they may be exposed to during work; Every employer shall make available a first aid kit or kits containing medicines, bandages and other first aid material as directed by the Ministry; Every employer must ensure the workplace is kept clean and well ventilated. Each employee should have adequate lighting and rest rooms, and be provided with suitable drinking water; The employer shall provide its employees with the means of medical care to the standard determined by the Ministry in consultation with the Ministry of Health; The employer or his deputy shall

inform the employee of the dangers of his job and the means of protection that he must take. He shall also display detailed written safety instructions at the work premises (Alhajeri, 2011).

2.9.7. Comparison of International Countries Health and Safety Legislation

According to Senem et al. (2014) on comparison about inspection of Australian, Russian and Turkish occupational health and safety legislations:

2.9.7.1. General Information about Inspection

Workplace inspection is an essential component of monitoring and maintenance that have been mentioned by laws and regulations. The impact of inspection in identifying existing hazards is clear and it leads to taking proper corrective action and finally prevention of injuries and illnesses. Different kinds of inspections and audits may be implemented about the construction projects. Totally there are two kinds of inspection. Internal inspection is done by the enterprise supervisors, managers and responsible. External inspection is a kind of inspection which is done by an inspector from outside. These inspectors should be authorized by the related organization or regulator. Usually the periods of the internal inspection are shorter than external inspections. About the external inspection part nine of Australian OHS law which is named “Securing compliance” focuses on inspection issue. According to section 156, the inspector is a member of the staff of the regulator or a person who is appointed as an inspector under a corresponding WHS law of a State or a person in a prescribed class of persons. This part consists of six divisions about the inspection and related issues which are (Safe Work Australia, 2011): Appointment of Inspectors, Functions and Powers of Inspectors, Powers Related to the Entry, Damage and Compensation, Other Matters and Offences in Relation to Inspectors. OHS control in RF is implemented by the Federal Safety Inspectorate of RF. The external inspection is divided as planned and unplanned inspections by the law. Control frequency of planned inspections, according to Article 11 and 12 of the No. 294-FZ law, maximum of 3 years from the date of previous control. However, some hazardous facilities may be inspected more frequently. Planned inspections must be reported to the employer at least 3 days ago it happens. During the unplanned inspection, inspectors control the compliance with the laws and standards, omissions detected given by the inspector during planned inspections, fulfillment of orders and instructions related the elements that can damage and life-threatening for employees (294-FZ Law, Section 16, Article 10).

Turkish Law has studied inspection under the fourth section titles as “Inspection and Administrative Sanctions.” According to Article 24 of Turkish OHS Law, inspection is carried out by the labour inspectors of the Ministry of Labour and Social Security authorized to carry out OHS inspections. The Ministry of Labour and Social Security has the authority to carry out occupational health and safety measurements, examinations and investigations, to take samples for this purpose and to control and inspect training institutions and joint health and safety units. The authorized personnel in this respect are obliged to avoid interrupting the work as much as possible and to keep professional secrets of the employer and the workplace and what he/she sees and learns confidential. The procedures and principles of such control and inspection are regulated by the Ministry of Labour and Social Security (Ministry of Labour and Social Security, 2012). Internal inspections are done by the enterprise supervisor, syndicate representative and responsible.

2.9.7.2. Comparison of Inspection

Australian OHS laws have studied inspection part deeply and its effort for covering the all aspects of this issue is admirable. Too many details which could be related to this issue from the entry to quit of workplace, treatment with inspector, powers of inspector, and other WHS entry permit holders and so on are mentioned by Australian comprehensive WHS law.

Russians gives much attention to OHS inspections. Inspectors have the authority closing all kinds of establishments. There are two types of external inspection; planned and unplanned. Although there are many institutions engaged in exterior inspection, usually the Federal Safety Inspectorate of RF performs exterior inspections in construction industry. Internal inspection is done by the syndicate representative and responsible.

Turkish law only addressed two roles of inspection which are ceasing and the authority of inspectors without supplying any information about the powers, entry permits, reason of inspection, offences in relation to inspectors, damage and compensation during inspection and so on. According to mentioned reasons the inspection part of Turkish OHS is one of the weakest parts of it. Lack of detailed information, inadequate focus on issues and weak classification are some other disadvantages of this part.

Table 2.2: Comparison of Inspection According to Australian, Russian and Turkish Health and Safety Legislations according to Senem et al.

Australian Legislation	Russian Legislation	Turkish Legislation
The inspector is a member of the staff of the regulator. Function and power of inspector Requiring compliance with the model WHS Act; Assisting with particular disputes that may arise under the model WHS Act; Reviewing disputed Provisional Improvement Notices; Investigating contraventions of the model WHS Act; Inspect, examine and make inquiries; Take measurements, conduct tests and make sketches or recordings; Take and remove for analysis a sample of any substance or thing without paying for it; Require a person at the workplace to give the inspector reasonable help; and Obtaining and retaining documents that are relevant to the exercise of their powers seizing anything that is evidence of an offence. •Offences in relation to inspectors A person must not intentionally hinder or obstruct an inspector in exercising his compliance Powers;	-Inspection is generally carried out by the Federal Safety Inspectorate of Russia Function and power of inspector Inspection of all workplaces; Requiring compliance with the Federal Law; Planned inspection for checking documentations of workplaces; Unplanned inspection for checking corrections and fulfillment of instructions giving; Hygiene norms and personal protective equipment needs checking; Risk assessments and comprehensive analysis of the working conditions are done. Gaps • Lack of syndicate power in interior inspection (interior inspection is done by syndicate representative or responsible employee)	• Inspection is carried out by the labor inspectors of the Ministry of Labour and Social Security. Inspectors have power To cease the work in case of any situation found dangerous to workers' life, operations shall be stopped until hazards are eliminated and in case of a lack of risk assessment at the workplaces classified as very hazardous where serious industrial accidents may take place. Gaps • Turkish law only addressed to two roles of inspection which are cease and the authority of inspectors. • Lack of information and inadequate focus on issues about: Power of inspector, Entry permits, -Reason of inspection, Offences in relation to inspectors,

A person who is not an inspector must not hold himself out to be an inspector; and A person must not directly or indirectly assault or threaten an inspector.	• Strict control and high pressure law does not have a positive effect.	Damage and compensation during inspection and Weak classification.
---	---	--

2.10. Review of Construction Health and Safety Researches in Ethiopia

2.10.1. Introduction

There are many literatures which are written about occupational health and safety but, from those there are very few relating to health and safety in construction in developing countries like Ethiopia. The table below shows summary of different researches which are written related to Construction Safety in Ethiopia with computational concepts of containing definition of health and safety, explanation of nature and importance of health and safety, construction safety practice and culture in Ethiopia, Legal matters for health and safety cases, study of Legislation's existed associated to health and safety in FDRE with its Enforcement, and International practice in HS legislation and its enforcement.

2.10.2. Summary of Construction Health and Safety Researches in Ethiopia

The summary of researches which are done in Ethiopia related to Construction Health and Safety, are shown in table 3 and 4 below.

Table 2.3: Summary of Ethiopian Researches in Construction Health and Safety in terms of Computational Concepts

Authors	Computational Concepts						
	A	B	C	D	E	F	G
Tariku, (2014)	√	√	√	√			
Seifedin, (2014)	√	√	√				
Fasil, (2017)	√	√	√				
Tadewos,(2019)	√	√		√	√	√	
Solomon,(2014)	√	√	√	√			
Concept for computation A:Definition of Health and Safety B: Nature and importance of Health and Safety C: Construction Safety practice and culture D: Legal matters for Health and Safety cases E: Legislations of Health and Safety in FDRE F: Enforcement of Health and Safety Legislation G: International practice in H&S legislation and its enforcement							

As summarized in the table, by assessing the researches done in Ethiopia related to construction health and safety in respect of seven computation concepts which are basic to this research, found out all the researches stated above covers the concept of definition and nature and importance of health and safety in common. And practice and culture of HS studied by four researchers and three researchers study about Legal matters for Health and Safety cases in

FDRE. However, only one researcher study about, construction health and safety legislation in FDRE including its enforcement, and no research had been done about international experience in terms of health and safety legislation and practice with its enforcement. Which shows no any research had been done related to the gap of the law or legislation of Ethiopian construction health and safety. Moreover, there is no any researcher which study about International practice on legislation and its enforcement method which can be used as a lesson for our country's health and safety.

Table 2.4: The Summary of Construction Health and Safety Researches in Ethiopia

Year and author(s)	Title	Summary of the research
Tadewos, (2019)	Factors-affecting implementation of construction health and safety regulations, their effects and mitigation measures in building construction project sites of Hawassa city	The study finds out that the top factors which affect the implementation of CHS regulation are; Availability& development of a clear health and safety policy and review, Health and safety inspections by top management and Conducting health and safety training and orientation. Analyze implementation or non-implementation of Construction Health and Safety regulations has effect on the worker's productivity & job satisfaction and Rate of accidents & cost greatly. Recommends developing a clear health and safety policy, management commitment for implementation of health and safety regulations and giving health and safety education and training.
Solomon, (2014)	The practice and challenges of occupational health and safety in Ethiopia	The study assessed the extent of OHS hazards and practices as well as the cost implication of these work-related incidents. It indicates, work in the construction severely affects worker's health, as most activities are insecure, hazardous and take place in unhealthy and unsafe environment. Recommends, ensuring to adhere strictly to International Labour Organization safety and working conditions or standard.
Seifedin, (2014)	Study of occupational safety and health in Ethiopian construction industry: a case study of Addis Ababa and Welkite	The research finds out poor working conditions and environment and lack of PPE are the main causes of accidents. It also indicates, overall safety and health condition in the Ethiopian construction industry is very poor and there is a very low level of implementation of OSH standards, rule and policies in the construction companies.

Fasil, (2017)	Assessment of construction safety and health management in high rise building in Addis Ababa	The research finds out the basic cause for injuries and fatality highly are Objects falling from height, scaffolding & ladders. And it concludes attitude of Owners, Role of government & engineering society affects the performance of HS in construction very highly.
Tariku, (2014)	Assessment of Building construction safety management in Hawassa city	The study is about effects and importance of CSH management by assessing the causes of accident, use of accident prevention tools and practices of building construction projects. And through evaluating the status of safety management practices concludes there exist less awareness and practices about the safety requirements and procedures among the participants of the construction.

The summary of the above table shows, researches which are done in Ethiopia consist of the study of existing practice related to occupational health and safety including the challenges for exercising health and safety in construction and study about how the construction safety and health management system looks like in Ethiopia. Moreover, most researches are about the enforcement level of construction health and safety laws in Ethiopia specifically in different regions. However, most researches does not consist of studies about, how the legislation of Ethiopia is written and from where they were adopted and what are the gap existed on the legislation, and knowing this may help to know; why the law is not implemented accordingly and can create away to construction health and safety practice existence.

2.11. Review of FDRE and USA Legislation Governing Construction Health and Safety for Specific Works

2.11.1. Introduction

In this Part a review of the legislation governing Occupational Health and Safety in construction industry is given on emphasizing on the FDRE and USA. At First, to provide sufficient understanding the legislation adopted in Ethiopia and in second, related to experience of other countries practice on occupational Health and Safety legislation. This part reviews the international legislations and policies especially American Occupational Health and Safety (OHS) Legislations in the construction industry and thereafter of review the Ethiopian legislations and regulations. The international legislations and polices are important because most of the National laws and regulations on Health and Safety are often adopted based on international conventions, declarations and practice and experience. To this end, the legislations and regulations of Occupational Safety and Health (OSH) from the America safety legislation (OSHA Act 1970) set the tone to review Ethiopia's safety legislation. Moreover, critical review of USA and FDRE CHS Legislation on specific topics of Demolishing Work; Electrical Equipment and Electrical Work Practice; Employer Responsibility; Excavation/ Trenches and Earth work; Fall Protection; Fire Protection; First Aid, Medical Care, Emergency Action Plan, Welfare and Training; Ladder and Scaffolding; personal protective equipment; Safe and Healthy Workplace; Safety Harness, Belt and Safety Net; Signs, Signals, Barricades & Barriers; and Workers Right and Responsibility has been made.

2.11.2. Demolishing Work

2.11.2.1. Demolishing Work (1926.850) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act, CFR (1926.850) stairs, passageways and ladder, in subpart 1926.850(a)-(k) states, when undertaking demolition work; an engineering survey must be completed prior to the start of the demolition project which makes use of to determine condition of the framing, floors, and walls. Once work is ready to start, all utilities or energy sources should be turned off, all floors or walls to be demolished should be shored or braced, and all wall or floor openings must be protected. During demolition involving combustible materials, charged hose lines, supplied by hydrants, water tank trucks with pumps, or equivalent, are made

available. And During demolition or alterations, existing automatic sprinkler installations are retained in service as long as reasonable. The operation of sprinkler control valves are permitted only by properly authorized persons and they should be checked daily at close of work to ascertain that the protection is in service.

Moreover, the Act regulate, during demolishing use only stairways, passageways, and ladders which are designated as a means of access to the structure of building. Stairs, passageways, ladders, and incidental equipment must be periodically inspected and maintained in a clean and safe condition. Stairwells must be properly illuminated and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed.

According to U.S. OSHA Act, CFR (1926.854), removal of Walls, Masonry Sections, and Chimneys in subpart (1926.854)(a)-(i) state; Masonry walls, or other masonry sections, are not permitted to fall upon the floors of buildings in such amount as to exceed the load limit of the floor. No wall section which is more than one story in height should be allowed to stand without lateral bracing, unless originally designed to do so, and still has that integrity. Workers should not work on top of walls when weather constitutes a hazard. No structural or load-supporting member are to be cut or removed until all stories above have been demolished or removed, except for disposal openings or equipment installation. Floor openings within 10 feet of any wall being demolished must be planked solid or workers must be kept out of the area below. Moreover, in skeletal-steel constructed buildings, the steel frame may be left in place during the demolition of masonry, but all beams, girders, or other structural supports should be kept clear of debris and loose materials. Walkways and ladders must be provided so workers can safely reach or leave any scaffold or wall. Walls which retain or support earth or adjoining structures are not removed until the earth or adjoining structure is supported.

In addition, according to U.S. OSHA Act CFR (1926.857), Storage in subpart (1926.857)(a)(e) states that, the allowable floor loads shall not be exceeded by the waste or debris being stored there. It is required to provide storage space for debris and assure that no falling material will endanger the stability of the structure. Storage space, into which materials are dumped, is blocked off, except for the openings necessary for material removal. These openings shall be kept closed when not in use.

Furthermore, according to U.S. OSHA Act CFR (1926.858), removal of Steel Construction in subpart (1926.858)(a)-(d) states, when floor arches have been removed, Planking shall be provided for the workers engaged in razing the steel framing. Cranes, derricks, and other hoisting equipment must meet the construction specifications. Steel construction shall be dismantled column length by column length, and tier by tier and any structural members being dismembered shall not to be overstressed.

2.11.2.2. Demolishing Works under Ethiopian Building Code Standard (EBCS 14 Section 8)

According to EBCS 14 Sub-Section 8.1, General Requirements, Prior to permitting employees to start demolition operations, an engineering survey and plan shall be made, by a competent person, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall acquire approval of the plan as per the Ethiopian Building Proclamation. And It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed, and the hazard eliminated before demolition is started. Moreover, for demolition of buildings by explosives, the contractor submit special plan fulfilling approved international standards and inland security requirements for approval. Before the work of demolishing begins; a building should be checked and it should be verified that it is vacant, all electric, water, telephone and other service lines are shut off, If it is necessary to maintain any electric power, water or other services during demolishing operations, they should be adequately protected against damage.

In-addition, the code regulates during demolition, continuing inspections shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors or walls, or loosened material. And provisions for dust control shall include the use of water to keep material or debris sufficiently wet or other equivalent steps taken to prevent dust from rising; Mechanical equipment shall not be used on floors or working surfaces unless a qualified person has determined that such floors or surfaces are of sufficient strength to support the imposed load; When workers are to be exposed to demolishing procedures, glass and sash shall be removed

before other demolishing is started, and demolition shall proceed in an orderly manner from top to bottom of the structure. To protect the public, the danger zone round the building should be adequately fenced off and sign posted; A fence 2 meters high should be erected enclosing the demolition operations and the access gates should be secured outside working hours and Demolition activities should not be continued under climatic conditions such as high winds, which could cause the collapse of already weakened structures; Foundation walls serving as retaining walls to support each or adjoining structures should not be demolished until the adjoining structure has been underpinned or braced, and the earth removed or supported by sheet piling or sheathing. Furthermore, during demolition work it is essential for the workers to use the necessary personal protection clothes and equipment; When a building is being demolished, chutes shall be provided for the removal of brick or other loose debris and these chutes shall be enclosed, Chutes shall not extend in unbroken line for more than two stories in elevation and gates or stops shall be placed at the bottom of each chute.

According to EBCS 14 Sub-Section 8.2, Demolishing of Walls, Masonry walls or other sections of masonry shall not be permitted to fall or remain on the floors of the building in masses that exceed the safe carrying capacity of the floor; walls should be demolished story by story beginning at the roof and working downwards, unsupported walls should be left un-demolished; Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below. Sections of walls shall not be allowed to fall upon floors supported by wood joists or other floors unable to withstand such impact; Before demolishing an interior or exterior wall which is within 3 meters of an opening, the opening shall be substantially planked over, unless all workers are removed from all floors below and access to the floors is prohibited and prevented; Walls shall not be left standing in a dangerous or unstable conditions.

According to EBCS 14 Sub-Section 8.3, Demolishing of Floors, Materials and rubbish shall be removed as far as practicable and not allowed to accumulate on floors or upon the ground immediately outside of the building; When necessary to prevent danger, workers demolishing floors should be provided with planking or walkways on which to stand or move; Opening through which material is dropped should be adequately fenced or barricaded to prevent danger

and All works above each tier of floor beams should be completed before the safety of the tier supports is impaired.

According to EBCS 14 Sub-Section 8.4, Demolishing of Steel Structure Works, structural member which is being dismantled shall not be placed under stress other than its own weight, and the member shall be chained or lashed in place to prevent an uncontrolled swinging or dropping. Dismantling of truss members shall be carried out in such a way that the truss does not collapse while workers are inside and steel construction should be demolished tier by tier and structural steel parts should be lowered and not dropped from a height.

2.11.3. Electrical Equipment and Electrical Work Practice

2.11.3.1. Electrical Work (1926.400) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.403) General Requirement states as: all electrical conductors and equipment must be approved types and the employer must ensure that electrical equipment is free from recognized hazards that are likely to cause death or serious physical harm to employees. Electrical equipment should be firmly secured to the surface on which it is mounted. Wooden plugs, driven into holes in masonry, concrete, plaster, or similar materials can not to be used and No electrical equipment should be used unless the manufacturer's name, trademark, or other descriptive marking is in place. The organization responsible for the product must be identified on the equipment and unless other markings are provided giving voltage, current, or other ratings as necessary.

The Act also includes statement of, when a working space has electrical equipment with 600 volts, nominal, or less, there must be sufficient access. The working space must be well maintained and provide adequate space around all electrical equipment in order to permit ready and safe operation and maintenance of such equipment. The working space should not be less than 30 inches wide in front of the electrical equipment. And where there are live parts normally exposed on the front of switchboards or motor control centers, the working space in front of such equipment is not to be less than three feet. The minimum headroom of working spaces about service equipment, switchboards, panel boards, or motor control centers is 6 feet.

In-addition, the Act specifically states about Conductors Exceeding 600 volts as; Conductors and equipment used on circuits exceeding 600 volts, nominal, must comply with all applicable previous requirements, as well as with provisions which supplement or modify those requirements, but does not apply to the supply side of those conductors. Electrical installations in a vault, room, and closet or in an area surrounded by a wall, screen, or fence, access to which is controlled by lock and key or other equivalent means are considered to be accessible to qualified persons only. A wall, screen, or fence less than 8 feet in height is not considered adequate to prevent access, unless it has other features that provide a degree of isolation equivalent to an 8-foot fence. The entrances to all buildings, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, are kept locked, or are kept under the observation of a qualified person at all times. Installations should be accessible to qualified persons only, and they must comply with workspace requirements.

Furthermore, live parts of electric equipment, operating at 50 volts or more, should be guarded against accidental contact by using cabinets or other forms of enclosures, or by any of the following means: By location in a room, vault, or similar enclosure that are accessible only to qualified persons; By partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts and any openings in such partitions or screens must be so sized and located that persons are not likely to come into accidental contact with the live parts, or bring conducting objects into contact with them; By locating them on a balcony, gallery, or platform, and elevated and arranged so that it excludes unqualified persons; and By elevation of 8 feet or more above the floor or other working surface, and so installed as to exclude unqualified persons.

According to the Act which particularly articulate about installations accessible to unqualified persons as; Electrical installations that are open to unqualified persons should be made with metal-enclosed equipment, are enclosed in a vault, or are in an area where access is controlled by a lock. Metal-enclosed switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment shall be marked with appropriate caution signs. If equipment is exposed to physical damage from vehicular traffic, guards shall be provided to

prevent such damage. Ventilating or similar openings in metal-enclosed equipment are to be designed so that foreign objects inserted through these openings will be deflected from energized parts.

2.11.3.2. Electrical Work Practice (1926.416) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.416) states; No employer shall permit an employee to work in proximity of any part of an electric power circuit where the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by de-energizing the circuit and grounding it, or by guarding it effectively by insulation or other means. And in work areas where the exact location of underground electric power lines is unknown, employees using jack-hammers, bars, or other hand tools which may contact a line are to be provided with insulated protective gloves.

Moreover, according to the Act, before work is begun, the employer must ascertain, by inquiry, direct observation, or instruments; whether any part of an energized electric power circuit exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact with the electric power circuit. The employer must post and maintain proper warning signs where such a circuit exists. The employer shall advise employees of the location of such lines, the hazards involved, and the protective measures to be taken. And Barriers or other means of guarding should be provided to ensure that the workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed. Working spaces, walkways, and similar locations are to be kept clear of cords so as not to create a hazard to employees.

Also, according to the Act on CFR (1926.417) Lockout/Tagging of Circuits states, controls that are to be deactivated during the course of work on energized or de-energized equipment or circuits should be tagged. Equipment or circuits that are de-energized should be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized. Tags must be placed to identify plainly the equipment or circuits being worked on.

2.11.3.3. Electrical Installation under FDRE Building Proclamation Number 624/2009

On Building Proclamation Part Three Land use, related studies and Designs; according to Article 35 which is about electrical installation states as, electrical installation to buildings and materials used thereof shall comply with the requirements of safety standards so that no danger associated with the electrical installations exist.

2.11.3.4. Electrical installation under FDRE Building Regulation Number 243/2011

On Building regulation Part Five Land use, Related Studies and Designs, Article 32 Electrical Installations states as a building shall have sufficient power supply, a standardized security and fixed controlling devices to avoid the likelihood of danger and ensure safety of users.

2.11.3.5. Electrical Tools and Electricity under Ethiopian Building Code Standard (EBCS 14 Section 9.2)

On section 9.2 of EBCS 14 which states about electrical tools and electricity states; All electrical tools should be earthed, unless they are all insulated or double insulated tools which do not require earthing; All electrical tools should receive inspection and maintenance on a regular basis by a competent electrician, and complete records should be kept. Also, laying and maintenance of electric cables and apparatus on construction sites shall be governed by electrical rules and standards applied at the national level.

2.11.3.6. Electrical Equipment and installation under Ethiopian Building Code Standard (EBCS 14 Section 10)

According to EBCS 14, Section 10 General requirement; Power cables and other electrical installations shall be protected against mechanical injuries; Electrical installations should be constructed and maintained so as to prevent danger of electric shock, fire and external explosions; Moreover, Electrical installation workers should use appropriate protective equipment such as insulated tools, insulating boots and gloves. And as the code general requirement states, Electrical appliances and outlets should be clearly marked to indicate their purpose and voltage. If the layout of electrical installations cannot be clearly distinguished, the circuit and appliance should be identified by labels or other means; Electrical appliances and circuits carrying different voltages in the some installation should be clearly distinguished by conscription means such as colored marking.

Moreover, according to EBCS 14, Section 10, Part 10.2 which is about electrical equipment, installation of electrical appliances such as switches, fuses, and circuit breakers should not be at places where there are explosives and flammable liquid or gases unless they are flameproof; Equipment such as motors, distribution apparatus and switch gear should be protected against dripping or splashing water; Electrical apparatus and circuits should be provided with suitable switchboard and switch gear to facilitate control; Cover plates on electrical equipment and junction boxes should be kept in place at all times except during testing or repair.

The Code also regulates switch board and switch gear to be installed, located and guarded in the following manners: The control means will be safety and readily accessible to authorized person and live parts will be inaccessible to unauthorized person; Adequate clear space is provided between the top of the equipment and any ceiling having exposed combustible material; Adequate working space is provided for manual operation where required; and Access to unauthorized person should be prohibited and a notice to this effect posted at the entrance.

2.11.4. Employer Rights and Responsibilities

2.11.4.1. Employer Rights and Responsibilities under U.S. Occupational Safety and Health Act of 1970

The main obligations under this U.S. OSHA Act are imposed up on “employers”, which can be either natural or legal person. In the context, the employer will be the legal entity of the company and held accountable and responsible under the OSHA Act. Section 5(a)(1)“General Duty Clause,” of the OSHA Act states:

“Employers are obligated to provide his employees a place of employment which is free from recognized hazards that are likely to cause death or serious physical harm to employees. And Employers must; Abide by and comply with the OSHA standards, Make workers aware of their rights under the OSHA Act, Maintain records of all occupational injuries and illnesses, Maintain records of workers’ exposure to toxic materials and harmful physical agents, Provide, at a convenient location and at no cost medical examinations to workers, Report within eight hours to the nearest OSHA office all occupational fatalities or catastrophes, Abate cited violations of the OSHA standard within the prescribed time period, Provide training on hazardous materials and make MSDSs available to workers upon request, such as hazard communication training, Assure

workers adequately trained under the regulations and Post information required by OSHA such as citations, hazard warnings, and injury/illness records.”

According to the Act, each employer has the duty to comply with occupational safety and health standard promulgated under this Act and Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

2.11.4.2. Employer Rights and Responsibilities under Civil Code of the Empire of Ethiopia, Proclamation No. 165 of 1960

As the responsibility of safety is for every one evolving in the work and the contractor is the main body for the construction sites as the employer of workers and according to the code the employer is responsible for the articles listed below on Article 2548(1&2) on “principle” states:

“The employer shall take such measures which are required by the special circumstances of the work to safeguard the life, physical integrity, health and moral standing of the employee, Moreover; he shall in particular arrange the premises and keep up the equipment in his undertaking with this object in view, in accordance with the general practice and technical requirements. And as Article 2549 & 2550 regulate, the employer shall be liable for accidents which the employee suffers arising from his work and for Assimilated cases 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 these activities have not been ordered by the employer. Also on Article 2551 which is about Accidents at the time and place of work written down on its sub-article 1-3, Where the employee performs his work on the premises or at the place assigned to him by the contract of employment, the employer shall be liable for the accidents which the employee suffers during the time and at the place where he works including rest periods belonging to the work shall be regarded as part of the work-time. Article 2552 which is about Professional diseases in sub-article 1-3 states, the employer shall be liable for diseases which the employee contracts arising from his work, notwithstanding any proof to the deemed to have been contracted arising from work and the employee may at any time claim that he has contracted a disease arising from his work, which is not included in any list.”

In-addition, from Article 2556 up to 2559 on “Scope of liability for Medical and other expenses” regulate as:

“The employer shall meet all the medical, pharmaceutical, hospital, and other expenses which the accident or the disease necessitates for the employee and the employer shall on the same conditions, meet the funeral expenses where the employee dies because of the accident or the disease.

Moreover, for Non-liability of employer on Article 2553(1-2) & 2554 stated regarding “concerning of Fault of employee” states:

“The employer shall be relieved of his liability under the preceding articles, where he proves that the accident or disease is due to the intentional act of the victim, where he proves that the accident or disease has happened because the employee has contravened a regulation to which his attention had been especially drawn in writing and where he proves that the accident has no connection with the work of the employee or with the contract of employment with which it is associated.”

2.11.4.3. Employer Rights and Responsibilities under FDRE Labour Proclamation Number 1156/2019

On Labour Proclamation part seven which states about occupational, Safety Health and Working Environment in Chapter one it is written about preventive Measures, On which on Article 92 Obligations of an Employer states, an employer shall take the necessary measure to safeguard adequately the Health and Safety of the workers he shall in particular; Comply with the occupational health and safety requirements provided for in this Proclamation; take appropriate steps to ensure that workers are properly instructed and notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health and ensure that directives are given moreover, assign safety officer and establish an occupational, safety and health committee of which the committee's establishment, shall be determined by a directive issued by the Ministry; Provide workers with personal protective equipment, clothing and materials and instruct them of their use; Register employment accident and occupational diseases and notify the labour inspection; Arrange according to the nature of the work, at his own expenses for the medical examination of newly recruited workers and for those workers engaged

in hazardous work, as may be necessary; Ensure that the work place do not cause danger to the health and safety of the workers and take appropriate pre-executions to insure that all the processes of work shall not be a source or cause of physical, chemical, biological and psychological hazards to the health and safety of the workers; and Obey the directives issued by the appropriate authority in accordance with this Proclamation.

In-addition, Chapter two Occupational Injuries under Article 96 of Liability Irrespective of Fault stated as, The employer shall be liable irrespective of fault for employment injuries sustained by his worker and such liability shall be determined in accordance with the provisions listed as: The employer shall not be liable for any injury intentionally caused by the injured worker himself and any injury resulting from the following acts in particular shall be deemed to be intentionally caused by the worker, if it is caused by non-obedience safety instructions or non-observance of the provisions of accident prevention rule specifically issued by the employer or during reporting to work in a state of intoxication that prevents him from properly regulating his conduct or understanding.

Finally, Chapter three is about Benefits in the case of employment Injuries under section one which is General on Article 103, 104 & 110 of payment and responsibility to pay and special obligation states as, Injury benefits shall be paid in accordance with the provisions listed, as an employer shall have the following obligations; To provide the injured worker with first aid in time; To carry the injured worker by an appropriate means of transport to the nearest medical center; To notify the occurrence to the appropriate organ in accordance with the directives issued by the minister; And, to pay the funeral expenses which shall not be less than two month wages of the worker when a worker dies as a result of an employment injury.

2.11.4.4. Employer Rights and Responsibilities under Ethiopian Building Code Standard (EBCS 14 Section 2)

According to EBCS 14 Section 2 which is about employer rights and responsibilities, Contractors must involve affected workers in the hazard assessment and in the preparation of safety plans and Contractors must ensure that workers affected by the hazards identified in a hazard assessments report are informed of the hazards and the methods used to control or eliminate hazard. And, every employer should provide his employees with suitable means of protection against: injuries, occupational fire and hazards which may result from the use of

machinery and other equipment in the workplace and the employer shall also apply all the other precautionary measures specified by the Ministry of Labor and Social Affairs.

2.11.4.5. Employer Rights and Responsibilities under the Federal Democratic Republic of Ethiopia, National Occupational Safety and Health Policy and Strategy

Under FDRE SH Policy and strategy in Employers and Employer's Organizations Role, regulates the employer to: ensure that workplaces are decent, safe and free of occupational risks; ensure the industrial construction plans, raw materials, machinery and equipment's, work processes and procedures are safe and without risks to workers and the environment; Provide free of charge, suitable and standard working clothes and personal protective equipment to all workers and, train and monitor as to how to use the materials properly; Provide the necessary emergency medical services and avail practicable rehabilitation programmes for victims of occupational accidents and work-related diseases.

2.11.5. Excavations/Trenches and Earth work

2.11.5.1. Excavations/Trenches (1926.650) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.651) Specific Excavation Requirements in subpart 1926.651(a & b) states, All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees. And for underground installations, the estimated location of utility installations, such as the sewer, telephone, fuel, electric, or water lines, or any other underground installation that may be expected to be encountered during excavation work, shall be determined prior to opening an excavation. Prior to the start of the actual excavation, utility companies or owners shall be contacted within the established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be

determined by safe and acceptable means. While the excavation is open, underground installations shall be protected, supported, or removed, as necessary, to safeguard employees.

Also, according to the Act in subpart 1926.651(c) which discuss about Access and egress in structural ramps states, Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person qualified in structural design with having a uniform thickness and shall be constructed in accordance with the design. Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement. A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are 1.22m or more in depth so as to require no more than 7.62m of lateral travel for employees.

In-addition, according to the Act in subpart 1926.651(d&e) which discuss about Exposure to falling loads states, No employee shall be permitted underneath loads handled by lifting or digging equipment. To avoid being struck by any spillage or falling materials, employees shall be required to stand away from any vehicle being loaded or unloaded. And based on the Act in subpart 1926.651(f) which talks about warning system for mobile equipment states, When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

Furthermore, according to the Act in subpart 1926.651(g) which talks about Hazardous Atmospheres testing and control states, to prevent exposure to harmful levels of atmospheric contaminants, and to assure acceptable atmospheric conditions, the following requirements shall apply: Where oxygen deficiency (atmospheres containing less than 19.5% oxygen), or a hazardous atmosphere exists, or could reasonably be expected to exist, such as in excavations in landfill areas, or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22m) in depth; Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5% oxygen, and other hazardous atmospheres; Adequate

precaution shall be taken, such as providing ventilation to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

And on the same sub part which is about emergency rescue equipment states, Emergency rescue equipment such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist, or may reasonably be expected to develop during work in an excavation and Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it.

Moreover, according to the Act in subpart 1926.651(h) which talks about protection from hazards associated with water accumulation states, Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation and If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation. If excavation work interrupts the natural drainage of surface water, diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.

Also, according to the Act in subpart 1926.651(i) which is about stability of adjacent structures states, where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided for the protection of the employees to ensure the stability of such structures. Excavation below the level of the base, or footing of any foundation, or retaining walls that could be reasonably expected to pose a hazard to employees, shall not be permitted except when; a support system such as underpinning, is provided to ensure the safety of employees and the stability of the structure; The excavation is in stable rock; A registered professional engineer has approved and determined that the structure is sufficiently removed from the excavation so as to

be unaffected by the excavation activity or such excavation work will not pose a hazard to employees.

In-addition, subpart 1926.651(j) which is about protection from loose rock or soil states, adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face, Such protection shall consists of scaling to remove loose material installation of protective barricades at intervals as necessary on the face to stop and contain falling material. And employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations and Protection shall be provided by placing and keeping such materials or equipment at least 0.61m from the edge of excavations, or by using retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both, if necessary.

Finally, based on subpart 1926.651(k) which is about Inspections states; Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions and an inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift.

2.11.5.2. Excavation under Ethiopian Building Code Standard (EBCS 14 Section 6)

According to EBCS 14 section 6 which is about Excavation states as, before commencing excavation work the following pre-excavation requirements should be recognized: The location of the service facilities shall be accurately determined for Excavation works with power tools or equipment in an area likely to have underground conduits, cables or pipelines and Trees or boulders located within two meters of the area to be excavated shall be removed before commencing excavation work. Moreover, it oblige, to properly study the following points before the work of excavation begins on site: The nature of the ground should be verified by a competent person or organization; Proper safety plan should be submitted and approved to make sure that the excavation will not affect adjoining buildings, structures or roadways; and The concerned body should check and verify the position of all the public utilities such as water pipes, underground sewers and electrical conductors that may cause danger during work and a

worker shall not be permitted or required to enter an excavation over 1.5 meters in depth unless; and the sides of the excavation are firm or are sloped to safe angle, the sides have been secured by the use of sheet piling, shoring or bracing..

In-addition, if equipment or other heavy objects are located or operated close to the edge of excavation or if excavations are adjacent to or abutting buildings or other structures or a hazard is created by vibration from nearby equipment or from passing vehicles traffic, the added loads shall be considered in the design of the support system. When workers are required to enter excavations over 1.5 meters in depth, a ladder shall be provided in the immediate area where workers are employed and the ladder shall extend from the bottom of the excavation to the least 90 cm above the top of the excavation; With the exceptions of borrow pits, excavations of depth higher than 3.0 meters shall be guarded by substantial railings. Shallower excavations shall be marked along their perimeter by reflective ropes; Adequate measures should be taken to prevent the formation of dusts or to suppress as practicable as possible, such as by sprinkling water at regular intervals in excavation works and A worker shall not allow excavated materials to remain within 1.2 meters of the edge of a trench typed excavation, not within 1.5 meters of a pit-typed excavation;

On the same section of the code in marking an Excavation require the employer to ensure that the workers are made aware of the excavation through flagging, marking, safeguards or other appropriate and effective means if there is a danger of public in general and a worker or equipment in particular falling into an excavation.

2.11.6. Fall Protection and Fall Arrest System

2.11.6.1. Fall Protection (1926.500-503) under U.S. occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.500) subpart sets forth requirement and criteria for fall protection in construction workplace covered under 29 CFR part 1926 which includes Scope, Application, and Definition states as, Fall protection is not required when workers are making an inspection, investigation, or assessment of workplace conditions prior to the actual start of construction work, or after all construction work has been completed. Requirements relating to fall protection, as described in this section, do not apply to scaffolds, cranes and derricks, steel

erection, ladders and stairways, and tunneling operations, or to electrical power transmission and distribution construction, each of which has its own requirements. The major components of fall protection, described herein, are for installation, construction, and the proper use of body belts, lanyards, and lifelines, and the requirements for the training of fall protection.

Additionally, according to U.S. OSHA Act, in CFR (1926.501), which is about Duty to Have Fall Protection, states that it is the employers' responsibility to determine if the walking/working surfaces on which their employees are to work have the strength and structural integrity to support employees safely. Employees are allowed to work on those surfaces only when the surfaces have the requisite strength and structural integrity. Any time a worker is on a walking/working surface, or constructing a leading edge with an unprotected side or edge which is 6 feet or more above a lower level, the worker must be protected from falling by using guardrail systems, safety net systems, or personal fall arrest systems.

Also, Workers in a hoist area shall be protected from falling 6 feet or more to lower levels by using guardrail systems or personal fall arrest systems. If guardrail systems (chains, gates, or guardrails), or portions thereof, are removed to facilitate the hoisting operation (e.g., during landing of materials), and the worker must lean through the access opening, or out over the edge of the access opening that employee must be protected from fall hazards by using a personal fall arrest system. And each worker on a walking/working surface is to be protected from tripping in, or stepping into or through holes (including skylights), and from objects falling through holes by using covers.

Moreover, according to the Act, each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by using personal fall arrest systems, safety net systems, or positioning device systems. Also, workers on ramps, runways, and other walkways are to be protected from falling 6 feet or more to lower levels by using guardrail systems; workers at the edge of an excavation 6 feet or more in depth are to be protected from falling by using guardrail systems, fences, or barricades; and, workers at the edge of a well, pit, shaft, and similar excavation which is 6 feet (1.8 m) or more in depth must be protected from falling by using guardrail systems, fences, barricades, or covers.

Also, Workers less than 6 feet above dangerous equipment shall be protected from falling into or onto the dangerous equipment by the use of guardrail systems or equipment guards. When workers are 6 feet or more above dangerous equipment, they must be protected from fall hazards by using guardrail systems, personal fall arrest systems, or safety net systems. And when workers are performing overhand bricklaying and related work 6 feet or more above lower levels, they must be protected from falling by using guardrail systems, safety net systems, personal fall arrest systems. If these workers must reach more than 10 inches below the level of the walking/working surface on which they are working, they should be protected from falling by using a guardrail system, safety net system, or personal fall arrest system.

Moreover, according to the Act, Workers engaged in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet or more above lower levels, are to be protected from falling by using guardrail systems, safety net systems, or personal fall arrest systems; or, they are to be protected by using a combination of a warning line system and guardrail system; a warning line system and safety net system; a warning line system and personal fall arrest system; or a warning line system and safety monitoring system. When on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels, workers must be protected from falling by using guardrail systems with toeboards, safety net systems, or personal fall arrest systems. And During the erection of precast concrete members including, but not limited to the erection of wall panels, columns, beams, and floor and roof, and related operations such as grouting of precast concrete members, those working 6 feet or more above lower levels are to be protected from falling by using guardrail systems, safety net systems, or personal fall arrest systems.

Also, each employee working on, at, above, or near wall openings, where the outside bottom edge of the wall opening is 6 feet or more above lower levels, and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface, must be protected from falling by using a guardrail system, safety net system, or personal fall arrest system. And when workers are exposed to falling objects, the employer must have each employee wear a hardhat and implement one of the following measures: Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels, Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced and Barricade the area to which objects could fall;

prohibit employees from entering the barricaded area; and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

Additionally, according to U.S. OSHA Act CFR (1926.502), which is about fall protection systems criteria states; Employers are obligated to provide and install all fall protection systems before an employee begins the construction work that necessitates the fall protection. The fall protection system, selected by the employer, is to be the one which the employer deems is most appropriate for protecting the workforce.

2.11.6.2. Fall Protection under Ethiopian Building Code Standard (EBCS 14 Section 5)

According to section 5 of EBCS 14 which is about Work at Heights and Roof work; Working at Height includes, When workers are engaged in working at height and if the height of the fall would exceed two meters above a floor, he/she should be protected by means of safety belts and safety devices such as cradles with toe board or other equivalent protection devices shall be used. And Construction sites in built-up areas and/or alongside roads should be barricaded and notice boards informing the public about the activities the possible danger and expected completion time should be posted at suitable locations and If the use of such equipment is impossible because of the nature of the work, workers shall be provided with a safety net or equivalent to be affixed with safety cables or ropes, or other anchoring safety methods shall be used in order to ensure safety.

Also, every floor opening into which a worker may fall or slip shall be protected by a guardrail; Construction sheds and toolboxes shall be as located as not expose workers to the danger of falling walls and other falling objects. And a cradle which is placed in order to prevent falls from a height shall have a handrail with a height of 1 meter, a toe board and an intermediate handrail at a height of 0.5 meters. Elevated workplaces should be provided with safe means of access and egress such as stairs, ramps or ladders. The safe means of access used for elevated workplaces should be of adequate strength to withstand safety of the loads they will have to carry.

Furthermore, on Guardrail System section; Guardrail systems and their use shall comply with the following provisions: Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.05 m) plus or minus 3 inches (8 cm) above the walking/working level. Mid rails shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (50 cm) high. And Mid rails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

Moreover, on Fall Arrest System section; Personal fall arrest systems and their use shall comply with the standards provided by Ethiopian Standards Agency; Fall arrest system shall be used to ensure that a worker is protected from falling at a temporary or permanent work area, if a worker may fall; A vertical distance of 5 meter or more, A vertical distance of less than 5 meters if there is unusual possibility of injury, or and Into or onto a hazardous substance or object, or through an opening in a work surface.

According to Protection from Falling Objects section: Falling object protection shall comply with the following provisions: Toe boards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below; Toe boards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface; During the performance of overhand bricklaying and related work no materials or equipment except masonry and mortar shall be stored within 4 feet (1.2 m) of the working edge; During the performance of roofing work materials and equipment shall not be stored within 6 feet (1.8 m) of a roof edge unless guardrails are erected at the edge.

2.11.6.3. Fall protection under Federal Republic of Ethiopia Ministry of Labour and Social Affairs, Occupational Safety and Health Directive

According to Occupational Safety and Health Directive Fall protection, window washers or cleaner working outside building 6m or more above the ground or other surface unless protected from falling by other means shall use safety belts attached to suitable anchors. And Workers who are required to climb and work on top of poles 6m or more shall use safety belts on top of

structures where there is no place to strap a safety belt, a messenger line shall be installed for strapping the safety belt or lifeline.

2.11.7. Fire Protection and Prevention

2.11.7.1. Fire Protection and Prevention (1926.150) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act of 1970 CFR 1926.150(a) General requirement; in sub part 1926.150(a)(1-5) states, the employer shall be responsible for the development of fire protection program to be followed throughout all phases of the construction and demolishing work, and he shall provide for the firefighting equipment as specified in this subpart. Moreover, access to all available firefighting equipment shall be maintained at all times and the Act regulates, to conspicuously locate all firefighting equipment which are provided by the employer with including periodical inspection, and maintenance in operating condition and Defective equipment shall be immediately replaced.

Moreover, based on CFR (1926.150)(b) Water supply; in subpart 1926.150(b)(1-2) states; A temporary or permanent water supply of sufficient volume, duration, and pressure, required to properly operate the firefighting equipment, shall be made available and If underground water mains are to be used for firefighting, they shall be installed, completed, and made available for use as soon as practicable.

Also according to CFR (1926.150)(c)(1) Fire extinguisher and small hose lines; in subpart 1926.150(c)(1) (i-x) states; A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet. Each floor must have one or more fire extinguishers. On multi-story buildings, at least one fire extinguisher must be located adjacent to stairway.

And according to CFR (1926.150)(c)(2) Fire hose and connection; in subpart 1926.150(c)(2)(i-x) states, One hundred feet or less of 1½-inch hose, and with a nozzle capable of discharging water at 25 gallons or more per minute, may be substituted, in a designated area, for a fire extinguisher rated not more than 2A. This may be done if the hose line can reach all points in the area. And if

fire hose connections are not compatible with local firefighting equipment, the contractor must provide adapters, or the equivalent, to permit connections.

In addition according to CFR (1926.150)(d) Fire fixed firefighting equipment, 1926.150(d)(1) sprinkler protection; in subpart 1926.150(d)(1)(i-ii) states, If the facility being constructed includes the installation of an automatic sprinkler protection, and the installation closely follows the construction, and is placed in service as soon as applicable, laws permit following completion of each story, and this is considered fixed firefighting equipment.

Finally, according to CFR (1926.150)(e) Fire alarm devices, subpart 1926.150(e)(1) states, An alarm system (e.g., telephone system, siren, etc.) shall be established by the employer whereby employees on the site and the local fire department can be alerted of an emergency. In subpart 1926.150(e)(2) states, the alarm code and reporting instructions shall be conspicuously posted at the phones and employee entrances.

2.11.7.2. Fire Protection and Fire-Fighting under FDRE Building Proclamation Number 624/2009

On part five of Building Proclamation which states about Fire protection and Firefighting installation in Article 44 which is about General Requirement states as, any public building shall be designed and constructed in accordance with acceptable fire protection design standards so that it becomes fire resistant and, if fire occurs, it minimizes accident to its users and its surroundings. Moreover, Article 45 which is about Fire Fighting Installation articulates as, any approved firefighting installation may be connected to the water supply system of the urban administration or designated organ; provided, however, that the urban administration or designated organ may, subject to any conditions it may consider necessary, allow such firefighting installation to be connected to: (1) any approved alternative source of supply; or (2) any source of non portable water, where such water is not to be used for domestic or any other purpose which, in the opinion of the urban administration or designated organ might give rise to health hazard.

2.11.7.3. Fire Protection and Fire Fighting Installation under FDRE Building Regulation Number 243/2011

On part seven of the Building Regulation which is about fire protection and firefighting installation Article 41 which is about General requirement on its sub-articles states as (1)Any building shall have an access for fire fighters to get into in case of fire accident. (2)Category “C” buildings shall have installed their own fire alarm and automatic fire extinguisher system. (3)Category “C” buildings shall have installed their own emergency escape routes and exit signs in a conspicuous place so as to be visible at all times. (4)There shall be a suitable storage for inflammable chemicals. (5)In buildings having more than five floors, there shall be safe escape route for emergency cases besides the main staircase. (6)The emergency escape route of a building shall be easily accessible and shall have international standard exit signs posted to indicate the escape route in case of emergency and shall also have alternative power supply for illumination during power interruptions.

In addition, Article 42 states about installation of fire extinguishing instruments in its sub-articles as; (1) Fire extinguishing instruments shall be installed by licensed persons having professional certificate. (2) Fire extinguishing instruments and lines shall be placed in a position where they can be easily seen and with their user manuals. (3) The fire extinguishing instruments shall meet the standard, approved by the concerned body and shall be regularly inspected. (4) A fire extinguisher installed in a public building shall be made ready at all times for its purpose. (5) The owner of a Category “C” building shall keep a record of the maintenance of fire- extinguishing and protection equipment available for inspection by the concerned body. And Article 43: Supply of Water for Fire Protection states as, the firefighting water hose shall meet acceptable standards of water pressure and supply.

2.11.7.4. Fire Protection under Ethiopian Building Code Standard (EBCS 14)

According to EBCS 14 Section 2, every employer shall display in a permanent and prominent place at the work site detailed instructions regarding the means of preventing fire and the means of protection of employees from hazards to which they may be exposed to during work.

2.11.8. First Aid, Medical Care, Emergency Action Plan, Welfare and Training

2.11.8.1. First Aid and Medical Assistance under U.S. Occupational Safety and Health Act of 1970

According to U.S. Occupational Safety and health Act CFR (1926.50) Medical service and First aid subpart (1926.50)(a)-(g) states, each jobsite should maintain a first-aid log that includes the following information; Injured employee's name, Immediate supervisor; Date and time of injury; Nature and cause of the injury; Injured employee's craft; Treatment rendered and disposition of employee (returned to work or sent for medical attention). Moreover, all employees should be provided with the location of the first-aid stations on each project/jobsite. Instructions for using first-aid equipment should be located at each station. In the event of an emergency, employees are to contact any supervisor or individual who is trained in first aid.

Moreover, according to the Act "Emergency action plan and Emergency Firefighting Procedures" should be an integral part of a good safety and health program. There should be guidelines for firefighting, such as all firefighting equipment should be conspicuously located and readily available at all times, all firefighting equipment should be inspected and maintained in operating condition, and all fire protection equipment should be inspected no less than once monthly with documentation maintained for each piece of equipment inspected. Discharged extinguishers or damaged equipment should be immediately removed from service and replaced with operable equipment, and all supervisors and employees should search for potential fire hazards and coordinate their abatement as rapidly as possible. Individuals assigned safety responsibilities should receive the necessary training to properly recognize fire hazards, inspect and maintain fire extinguishers, and know the proper use of each. And the emergency procedure should be spelled out as related to response, action, and expectations for workers when such emergencies occur. These may include a standard warning alarm, emergency telephone and communication procedures, and an evacuation plan.

2.11.8.2. First aid, Medical care and Welfare under Ethiopian Building Code Standard (EBCS 14 Section 13)

According to EBCS 14 Section 13, First Aid; Employers of a construction work should be required to provide equipment and facilities enabling first aid to be rendered to their employer

when they are injured or become ill at work; Every working area should be provided with appropriate set up for emergencies such as first aid, first aid personnel and equipment, means of communication and means of transportation; Where the work involves risk of drowning, asphyxiation or electric shock, first aid personnel should be proficient in the use of resuscitation and other life-saving techniques and in rescue procedures; Employers must inform their employees of arrangement that have been for rendering first aid, including the location of equipment, facilities and personnel and All injuries should be reported, treated and recorded as soon as practicable at the nearest first aid post; and There must be at least one first-aid box on any construction site or work locations.

Also, according to EBCS 14 Medical Care; Workers of a construction site should undergo a pre-employment medical examination with special emphasis on physical and psychological conditions and if the project site is susceptible to epidemics such as Malaria, the contractor should provide protective means to the workers.

Moreover, according to EBCS 14 Emergency Action Plan; an employer must have an emergency action plan. The emergency action plan must be in writing, kept in the workplace, and available to employees for review. However, an employer with 10 or fewer employees may communicate the plan orally to employees. The Plan should contain, but not limited to the following: The location of the nearby health institutions where an injured employee/visitor could be taken (based on the type of injury); The means of access to the institution; The methods of communications with the institutions; and The responsible persons to be communicated.

Additionally, according to EBCS 14 Training; Workers shall be adequately and suitably, instructed and trained in the measures available for the prevention and control of, and protection against potential hazards, The employer of the construction work should have to provide appropriate instructions and training as is necessary to ensure the health and safety at work of his employees Moreover, others who may be affected by acts of omission. And the employer shall provide short courses for all new personnel that include an outline of the organization and management of the company, personnel and welfare arrangements, health and safety, and staff

facilities available. Furthermore, section 13.1.4 of EBCS 14 states, welfare to be provided as Ethiopian building proclamation.

2.11.8.3. First aid and Medical care under Federal Democratic Republic of Ethiopia

Ministry of Labour and Social Affairs, Occupational Safety and Health Directive

According to Occupational Safety and Health Directive First aid and Medical care; every employer shall make available a first aid kit or kits containing medicines, bandages and other first aid material as directed by the Ministry. Every employer shall ensure that signs showing the location at which first aid is available in the workplace are posted in conspicuous places in the work place and Every employer shall ensure that a seriously ill or injured worker is transported immediately to a hospital or medical facility and shall provide for a means of transportation that is readily available and in the case of distant or isolated workplace, the means of transportation shall be capable of accommodating an occupied stretcher or where a municipal or private ambulance service is available, ensure that a means of communication to the ambulance service is available at the workplace.

2.11.9. Ladder and Scaffolding

2.11.9.1. Scaffolds (1926.450) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.451), General Requirements; each scaffold and scaffold component must be capable of supporting, without failure, its own weight, and at least 4 times the maximum intended load applied or transmitted to it. And each suspension rope including connecting hardware used on nonadjustable or adjustable suspension scaffolds shall be capable of supporting without failure, at least 6 times the maximum intended load applied or transmitted to that rope.

Also, according to U.S. OSHA Act CFR (1926.451), Scaffold components manufactured by different manufacturers shall not to be intermixed unless the components fit together without force, and the scaffold's structural integrity is maintained by the user. Scaffold components made of dissimilar metals are not to be used together unless a competent person has determined that galvanic action will not reduce the strength of any component below accepted support levels. In addition the Act states about accessing scaffold as, When scaffold platforms are more than two

feet above or below a point of access, portable ladders, hook-on ladders, attachable ladders, stair towers, stairway-type ladders, ramps, walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface shall be used and Cross braces shall not be used as a means of access and obligate to use integrated prefabricated scaffold access frames and obligate to position Stairway-type ladders, a stair-rail, which consists of a top-rail and a mid-rail, shall be provided on each side of each scaffold stairway with specifically stating its requirement and detail.

Moreover, it also states about Access during Erecting or Dismantling, obligate the employer to provide a safe means of access for each employee erecting or dismantling a scaffold and write up best method to be used of access during Erecting or Dismantling. And the Act generalize rule for all scaffolds as: Scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities; Scaffolds shall not be moved horizontally while employees are on them; Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration; and it prohibit Employees from working on scaffolds covered with snow, ice, or other slippery material.

2.11.9.2. Ladders (1926.1053) under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act CFR (1926.1053); the employer must as necessary, provide training for each employee using ladders and stairways. The program should enable each employee to recognize hazards related to ladders and stairways, and train each employee in the procedures to be followed to minimize these hazards. And the employer needs to ensure that each employee has been trained by a competent person in the following areas: the nature of fall hazards in the work area; the correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used; the proper construction, use, placement, and care in handling of all stairways and ladders; the maximum intended load-carrying capacities of ladders; and the contents of the OSHA standards regarding ladders.

Moreover, according to the Act rule for all ladders are general requirements are stated as: the ladder's side rails shall extend at least 3 feet above the upper landing surface to which the ladder

is used to gain access; ladders should be maintained free of oil, grease, and other slipping hazards; Also, ladders shall not to be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity; Ladders shall be used only on stable and level surfaces unless secured in order to prevent accidental displacement; Ladders shall not be moved, shifted, or extended while occupied; and Ladders shall be inspected on a periodic basis by a competent person for visible defects, and after any occurrence that could affect their safe use.

2.11.9.3. Ladder and Scaffolding under Ethiopian Building Code Standard (EBCS 14 Section 3)

According EBCS 14 Section 3, which is about preventive and protective measures for ladders and scaffolding the following general requirements apply to all portable ladders including job-made ladders; Ladder rungs, cleats and steps must be parallel, level and uniformly spaced when the ladder is in position for use; Provide a metal spreader or locking device on each stepladder to hold the front and back sections in an open position when the ladder is being used; Ladder components must be surfaced to prevent injury from punctures or lacerations, and prevent snagging of clothing; The type of ladder to be used around electric lines should not be made of a conductor; The bottom of a ladder should be of such material that develops friction with the floor; Do not tie or fasten ladders together to create longer sections unless they are specifically designed for such use; The minimum clear distance between the sides of individual rung/step ladders and the minimum clear distance between the side rails of other fixed ladders shall be 16 inches. Furthermore, it also includes proper use and safe work practice for; step ladder, single ladder, Extension Ladders, Job- made Wooden Ladders.

According to the provision for scaffoldings, the following general requirements apply for all scaffold: All scaffoldings shall be designed in such a way that it is safe against falling, breaking and sway and get approval; The employer shall provide safe means of access for each employee erecting or dismantling a scaffold where the provision of safe access is feasible and does not create a greater hazard and The employer shall have a competent person to determine whether it is feasible or would pose a greater hazard to provide, and have employees use a safe means of access; The vertical supports of scaffolds shall rest on a firm foundation or sills; All scaffolds above 3 meters high above ground shall be equipped with a guardrail not less than 1 meter height

and an intermediate rail; Scaffolding shall be erected plumb line, and level, and all connections shall be securely fastened; The width of work platforms on scaffolds shall be not less than 40 cm; Materials only for current use shall be kept on scaffolds; Safe means of access (ladder or equivalent) shall be provided to all working levels of the scaffolding; Overhead protection shall be provided for workers on a scaffold exposed to overhead hazards; Employees shall not work on scaffolds during storms or high winds; Tools, materials, and debris shall not be allowed to accumulate on scaffolds; Scaffolds shall be secured to permanent structures, through use of anchor bolts or other equivalent means. Window cleaners' anchor bolts shall not be used; Buildings with curtain walls shall be provided with facilities that support suspension scaffolds; and Scaffolding safety report need be prepared every week containing inspection results on: connections; anchorage; and comments from users. Moreover, it also includes proper use and general requirements for; wood pole scaffolds, Form Scaffolds, Metal Bracket Form Scaffolds, Ladder Jack Scaffolds, Suspension Scaffolds, Swinging Scaffolds or Two-Point Suspension and Single-Point Adjustable Suspension Scaffolds.

2.11.10. Personal Protective Clothing and Protective Equipment

2.11.10.1. Personal Protective Equipment under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act, CFR (1910.132 (a)) Application for PPE states, Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used and maintained wherever it is necessary by reason of hazards encountered in a manner capable of causing injury on any part of the body.

Also, the same part of OSHA states, the employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE the employer shall: Select the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; Communicate selection decisions to each affected employee; and Select PPE that properly fits for each affected employee. And Defective or damaged personal protective equipment shall not be used.

Moreover, the employer has a responsibility to provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following: When PPE is necessary; what PPE is necessary; How to properly don, doff, adjust, and wear PPE; The limitations of the PPE; and the proper care, maintenance, useful life and disposal of the PPE.

According to U.S. OSHA Act, CFR (1926.101), Eye and face protection general requirements, The employer shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

According to U.S. OSHA Act CFR (1926.101), Ear protection general requirements, The employer shall ensure that each affected employee uses appropriate Noise protection when long-term exposures to sound levels at or above 85 Db and When it is not feasible to eliminate noise that exceeds 85 dB, it is necessary to protect the worker from the environment with hearing protection.

According to U.S. OSHA Act CFR (1926.101), Hand protection general requirements, the employer shall ensure that employee uses appropriate Hand protection when workers are exposed to nails, wood, splinters, sharp objects, and chemicals.

According to U.S. OSHA Act CFR (1926.101), Foot protection general requirements the employer shall ensure that employee uses appropriate Foot protection when workers are subjected to foot injuries, risk of falling objects and punctures of nails or other debris.

2.11.10.2. Personal Protective Clothing and Protective Equipment under Ethiopian Building Code Standard (EBCS 14 Section 12)

According to EBCS 14 Section 12 which is about uses of PPE and Clothing, through the topic of duty to use personal protective equipment in its sub-section states, If the hazard assessment indicates the need for personal protective equipment, an employer must ensure that: Workers wear personal protective equipment that is correct for the hazard and protects workers; Workers properly use and wear the personal protective equipment; The personal protective equipment is

in a condition to perform the function for which it was designed, and Workers are trained in the correct use, care, limitation and assigned maintenance of the personal protective equipment; and require an employer to ensure that the use of personal protective equipment does not itself endanger the worker.

Also, the same sub-section regarding workers duty to use personal protective equipment states, a worker must: Use and wear properly the appropriate personal protective equipment specified in this code in accordance with the training and instruction received; Inspect the personal protective equipment before using it; Not use personal protective equipment that is unable to perform the function for which it is designed.

According to EBCS 14 under the topic protective clothing and safety equipment states; Head, hand and foot protection appropriate to the type of exposure, shall be worn by workers on demolishing projects; If work is performed in places of vicinity of traffic, the worker shall wear a bright waistcoat and in the dark/underground the worker shall wear a reflector band; In the construction site the contractor shall provide the following protective clothing and safety equipments: Safety footwear shall be generally used on construction sites and Water proof shoes shall be provided for workers working in muddy areas and concrete; Protective breathing equipment for workers at work where dust produced; Suitable gloves for workers exposed to hot, corrosive or toxic substances; and Ear protectors where it is not practicable to reduce noise exposure to below prescribed levels.

2.11.10.3. Protective Equipment under FDRE Public Health Proclamation No. 200/2000

According to Article 11 of FDRE Public Proclamation states, employers shall ensure the availability of occupational health services to his employees and the use of any machinery or instrument which generates excessive noise is prohibited and any person who uses such machinery or instrument shall install noise reducing apparatus.

2.11.11. Safe and Healthy Workplace

2.11.11.1. Safe and Healthy Workplace under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act, OSHA Compliance, Assuring a Safe and Healthy workplace states, Workers have the right to refuse hazardous work and unhealthy workplace. This is not a right which is free of stipulations. Workers must assure that three criteria to met: Workers have a reasonable belief, based on what they know at the time, that there is a real likelihood they could be killed or suffer serious injury or imminent danger; When the employer or supervisor has been asked to eliminate the danger and does not take action, the worker should ask for another assignment while the previous one is made safe. The worker should not return to the jobsite unless ordered to do so and; if the employer does not respond, workers should call the closest OSHA office to explain the circumstances. If OSHA cannot respond in a timely manner, because of time constraints, the worker has no other alternative but to refuse the work.

Also, it state, Workers have the right to receive the results of any OSHA test for vapors, noise, dusts, mists, fumes, radiation. This includes observation of any measurement of hazardous materials in the workplace. If the hazards of the workplace are such that personal protective equipment is required for workers, workers should be provided, at no cost, the proper and well-maintained personal protective equipment appropriate for the job.

According to U.S OSHA Act, OSHA Compliance on setting up the site part different requirement are stated as follows: Safe means of access on to and around the site for people and vehicles; Construction site to be fenced off and suitably signed; Good housekeeping; First aid facility; Welfare facility of adequate toilet and washing facility; Rest facility for wind and rain shelter and for break and meal break; Storing and drying place for clothing and PPE; Drinking water; Lighting; Emergency procedures and Site rules.

2.11.11.2. Safe and Healthy Working Place under Ethiopian Building Code Standard (EBCS 14 Section 2)

According to EBCS 14, Section 2, which is about planning, planning on hazard assessment with a subtitle of safety plan, site planning and layout; it address a contractor Site layout of a work

place of which shall incorporate the following about site layout of a work place: Before beginning work, site layout plan that contains the following items shall be prepared and approved: Safe means of access to and egress from all workplaces; The sequence or order in which work will be done; Access for workers on and around the site; The locations of danger zones and if there is any Storage for flammable materials it should be located; Routes for vehicular traffic; Storage areas for materials, construction waste and equipment: Materials need to be stored as close as possible to the appropriate workstation; The location of construction machinery which is usually dependent on operational requirements; The location of office rooms and trade workshops; The location of medical and welfare facilities; Delineation and fencing external border of the site and clearly marking it in order to keep away unauthorized persons and to protect the public from site hazards. The type of fencing will depend on the location of the site, but in populated areas it should be at least two meters high and without gaps or holes; appropriate lighting posts if night work or work when there is no adequate light is expected

2.11.11.3. Safe and Healthy Workplace under Federal Democratic Republic of Ethiopia Ministry of Labour and Social Affairs, Occupational Safety and Health Directive

According to OSH Directive which is about Safe and Healthy Workplace states, every employer must ensure the workplace is kept clean and well ventilated and each employee should have adequate lighting and rest rooms, and be provided with suitable drinking water; Employer shall assess the hazards and risks at the workplace so as to insure that the level of noise and or duration of exposure shall not exceed the limits established by the competent authority; and Employer shall specify low noise output of the processes and equipment as a condition of purchase a long side production related specifications.

2.11.12. Safety Harness, Belt and Safety Net

2.11.12.1. Safety Harness and Safety Nets under U.S. Occupational Safety and Health Act of 1970

According to U.S. Occupational safety and health Act, CFR (1926.105 and 502) Safety Nets, in sub part CFR (1926.105 and 502)(a-f) states; Safety nets shall be provided when workplaces are more than 25 feet above the ground or water surface, and when the use of ladders, scaffolds, catches platforms, temporary floors, safety lines, and safety harnesses is impractical and as the

code command when safety net protection is required, operations shall not be undertaken until the net is in place and has been tested and include to hung nets with sufficient clearance to prevent user's contact with the surface or structure below. Also the code specifically state about the size of the mesh to be used for safety net, the mesh size of nets shall not exceed 6 inches by 6 inches and all new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance as determined and certified by the manufacturers, and shall bear a label of proof test.

2.11.12.2. Safety Belt under Ethiopian Building Code Standard (EBCS 14 Section 12)

Safety belts equipped with safety ropes shall be used while working on scaffolding, roofs and work platforms and in other places where falling from a height cannot be prevented by other safety measures.

2.11.12.3. Safety Belt under the Federal Republic of Ethiopia Ministry of Labour and Social Affairs, Occupational Safety and Health Directive

As stated on OSH directive which is about Safety Belt, Workmen entering a sewer, flue, duct or other similarly confined places shall be provided and required to wear safety belt with lifelines attached and held by another person stationed at the opening ready to respond to agreed signals.

Moreover, according to the directive, Workers working in unguarded surface above open pits or tanks, steep slopes, moving machines and similar locations working from unguarded surfaces 6m or more above water, ground, temporary or permanent floor platform, scaffold construction or where otherwise exposed to the possibility of falls hazards to life or limb shall be secured safety belts and lifelines.

2.11.13. Signs, Signals, Barricades and Barriers

2.11.13.1. Sign, Signals and Barricades under U.S. Occupational Safety and Health Act of 1970

According to U.S. OSHA Act, CFR (1926.494) Signs, Signals, and Barricades, in subpart 1926.494 (G) states, The following must be implemented and enforced on each construction project: Danger Signs must be used wherever an immediate hazard exists and the danger signs must have red as the predominant color in the upper panel with a white lower panel for

additional sign wording; Caution Signs must be used to warn against potential hazards or unsafe practices and the caution signs must have yellow as the predominant color on a black upper panel with a yellow lower panel for additional sign wording; Exit Signs when required, shall be in legible red letters not less than 6 inches high on a white field; Safety Instruction Signs when used must be white with a green upper panel and white lettering to convey the principal message. Any additional wording must be in black lettering on the white background; Directional Signals must be white with a black panel and a white directional symbol. Any additional wording must be in black lettering on a white background; Traffic Signs must be posted at points of hazards in all construction areas; Accident Prevention Tags will be used as a temporary means of warning employees of an existing hazard, such as defective tools & equipment; Out of Order Tags will be used to designate equipment which requires repair or maintenance and Equipment with such a tag may not be used until the tag is removed.

Also, U.S OSHA Act, CFR (1926.202) Barricades states, Barricades for the protection of workers must conform to the National Standards Institute D6.1-1971, Manual on Uniform Control Devices for Streets and Highways, Barricades Section.

Moreover, U.S. OSHA Act, CFR (1926.494) Barriers states, Barriers are used to warn workers and others of existing hazards and are usually not as substantial as barricades. They may be made of rope, wire ropes, warning tapes, or plastic fencing. A warning sign should accompany such barriers, either detailing the hazard or cautioning not to enter the area cordoned off by the barrier.

2.11.13.2. Sign and Signals under Ethiopian Building Code Standard (EBCS 14 Section 2)

According to EBCS 14, Section two planning part states; site planning and layout in subsection three which is about Signs and signals, require; Warning, Cautionary, and Informative signs and signals shall be placed where required; Signs shall be visible at all times when work is being performed, and shall be removed or covered when the hazards no longer exist; Danger Signs: Danger signs shall be used only where an immediate hazard exists, Danger signs shall have red as the predominating color for the upper panel; black outline on the borders; and a white lower panel for additional sign wording; Caution signs: Caution signs shall be used only to warn against potential hazards or to caution against unsafe practices; Caution signs shall have yellow as the predominating color; black upper panel and borders, Yellow lettering of "caution" on the black panel and the lower yellow panel for additional sign wording. Black lettering shall be used

for additional wording; Standard color of the background shall be yellow; and the panel, black with yellow letters. Any letters used against the yellow background shall be black; Exit signs: Exit signs, when required, shall be lettered in legible red letters, not less than 6 inches (15 cm) high, on a white field and the principal stroke of the letters shall be at least three-fourths inch (2 cm) in width; Safety Instruction signs: Safety instruction signs, when used, shall be white with green upper panel with white letters to convey the principal message. Any additional wording on the sign shall be black letters on the white background; Directional signs: Directional signs shall be white with a black panel and a white directional symbol. Any additional wording on the sign shall be black letters on the white background; Accident prevention tags: Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

2.11.14. Workers' Right and Responsibility

2.11.14.1. Workers' Right and Responsibility under U.S. Occupational Safety and Health Act of 1970

According to U.S. Occupational safety and health Act, Workers' Rights and Responsibilities states, Workers having many rights under the OSHA Act in which those rights include the right to: Have safety and health standards established and enforced by law and Review copies of appropriate standards, rules, regulations, and requirements that the employer should have available at the workplace and Participate in the development of standards; Request information from the employer on safety and health hazards in the workplace, precautions that may be taken, and procedures to be followed if an employee is involved in an accident or is exposed to toxic substances; Access relevant worker exposure and medical records and to be provided with Personal Protective Equipment (PPE); to File a complaint with OSHA regarding unsafe or unhealthy workplace conditions and request an inspection and Not to be discharged or discriminated against in any manner for exercising rights under the OSHA Act related to safety and health. And along with rights go responsibilities and workers should be expected to conform to these responsibilities, Workers are expected to: Comply with the OSHA Regulations and Standards and comply with the employer's safety and health rules and regulations; Report any

hazardous condition and any job-related injuries to the supervisor or employer and cooperate with the OSHA Inspector during inspections when requested to do so.

2.11.14.2. Workers Right and Responsibility under FDRE Labour Proclamation Number 1156/2019

On part seven of Labour Proclamation which is about occupational, Safety Health and Working Environment in chapter one it is written about preventive Measures, according to Article 93 which is about Obligations of a worker on sub article 1 states, a worker shall co-operate with the employer in the formulation and implementation of work rules to safeguard the workers health and safety and on sub article 2 it is stated as, a worker shall Inform forthwith to the employer any defect related to the appliances used and injury to health and safety of the workers that he discovers in the undertaking and Report to the employer any situation which he may have reason to believe could present a hazard and which he cannot remedy on his own. And in sub article four and five it is written-up, to make proper use of all safeguards, safety devices and other appliance furnished for the protection of his health or safety and for the protection of the health and safety of others and to obey all health and safety instructions issued by the employer or issued by the competent authority. And in same chapter in Article 94 which is about Prohibition states as, No worker shall interfere with, remove, displace, damage or destroy any safety devices or other appliances furnished for his protection or the protection of others; or obstruct any method or process adopted with a view to minimizing occupational hazard.

2.11.14.3. Workers Right and Responsibility under Federal Democratic Republic of Ethiopia Ministry of Labour and Social Affairs, Occupational Safety and Health Directive

According to OSH Directive, The employee in any situation must use the safety equipment and clothes given to him for this purpose and he shall also follow his employer's instructions which aim to protect him from danger. The employer shall be responsible for the adequacy and proper maintenance of personal protective equipment used in his workplace. Moreover, Workers shall have the duty to take all responsible steps to eliminate or control hazards or risks to themselves and to others from hazards at work including proper care and use of protective clothing, facilities and equipment placed at their disposal for their purpose and they shall have the right to be consulted regarding any hazards or risks at work with having the right to inquire and receive

from the employer relevant information, training, and instructions and where necessary retraining in most effective methods regarding hazards or risks to safety and health at work.

Also, as the Directive states, Workers shall have; the right to take adequate precautions and cooperation with their employer to protect themselves and other workers against hazards or risks to safety and health at work and the right to request and be involved in relevant control measures and investigations.

2.11.14.4. Workers and Workers Organizational Role under Federal Democratic Republic of Ethiopia, National occupational Safety and Health Policy and Strategy

According to FDRE National OSH Policy and Strategy, Workers and Workers' Organizations Role states, workers has the responsibility to: cooperate and collaborate with employers and relevant government organizations in order to create safe and healthy working conditions; Actively participate in the formulation and review of occupational safety and health policies and legal instruments; Actively participate at workplace occupational safety and health committee; Report to the immediate supervisor and the employer when workplace occupational accidents/disease occur due to work processes; and properly use personal protective devices and work appliances supplied.

2.12. Best Practices and Lessons from International Legislation

Some of the best practices that have been observed indicate that:

Section Nine of OSHA Act states that, employers who have violated Section 5 of the Act or any standard, regulation, rule, or order related to Section 6 of the Act, shall be issued a citation and the citation will be in writing describing the particular violation and reference to the standard, rule, regulation, or order location in the Act and the Citation must be issued within 6 months following a detected violation. But no any Ethiopian legislation include about citation.

OSHA Act includes different HS written Criteria and practice for all laws, attached in Appendix part beside the code and regulation, to be followed. i.e.as stated on criteria of Fall Protection Equipment “Guardrail systems, safety net systems, personal fall arrest systems, positioning device systems and their components shall conform to the criteria in 1926.502 (on Appendix G)”.Moreover, OSHA includes specification for materials which will be applied in the code. I.e.

in requirement of fall protection, the minimum tensile strength of the rope for warning line is specified as; the rope, wire, or chain must be a minimum tensile strength of 500 pounds, and after being attached to the stanchions, must be capable of supporting, without breaking, the previously described loads.

Some crucial ideas beside the thirteen specific topics are included in OSHA Act. I.e. precaution for Concrete construction on CFR (1926.701); Conveyor, Cranes and Derricks on CFR (1926.555); Precaution for Confined space CFR (1910.146); Pile driving system CFR (1926.603); Working over water (1926.106); Underground construction (1926.800); Welding (1910.252); and Steel erection (1926.subpart R).

According to Australia Health and Safety Legislation and Practice (WHS Act 2011), the WHS Act is the principal legislation which sets out who has duties and what they are. The WHS Regulation is the middle tier, which contain detail on how the outcomes required by the WHS Act can be achieved. The third and final tiers are the Codes of Practice which provide guidance about what is known about a hazard or risk in specific situations and what is reasonably practicable to ensure health and safety.

CHAPTER THREE

3. MATERIALS AND METHODS

This chapter presents the methodology adopted in this research. Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically (Kothari, 2004). As data and methodology are highly interdependent, the methodology to be used for a particular research problem must always take into consideration the nature of the data that will be collected to resolve the research problem (Leedy and Ormrod, 2005).

3.1. Description of Study Subject

As the paper's main idea is to assess occupational health and safety legislation, this research covers the Construction Health and Safety legislation of the FDRE, by critically assessing the legislation and critical comparative analyze with international practice of the USA OSHA Act. The study designed to be analytical research which reviews available document which are legislation of Ethiopia and USA OSHA Act, and compare the two documents with using thirteen health and safety selected topics which are included in Ethiopian legislation and analyze them to make a critical evaluation of the subjects.

3.2. Research Design

The researcher used secondary data as a source of information. The documents such as construction health and safety provision of different proclamations and regulations and USA OSHA Act in this research are used by using desk study from different literature and magazines. Moreover, rules, regulations, code, standards, policies, strategies, conventions, directives, proclamation and regulations are used as source of data. The collected documents were derived from countries legislative sources and have been used in order to rule and govern the country related to construction health and safety.

3.3. Study Methodology

3.3.1. Research Method

The researcher used a qualitative study which deals with comparison of OHS legislations and laws in construction industry between American and Ethiopian, which are from different continents but American has strong economy and strong construction industry better than

Ethiopia. There is no hesitation that America is one of the world's leaders in OHS issue, so it is preferable to use and adopt their construction health and safety system.

3.3.2. Document Review

Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic (Bogdan, 2007). A document review and analysis are performed initially, based on the background literature and legislative, desk study and finally comparative analysis is done to endeavor and show the gaps existed. After the collection and assessment have been done it is finalized and the information is analyzed and interpreted. The researcher used two techniques for drawing data from documents: critically analyzing each article of Ethiopian Construction Health and Safety provisions compared to the counterpart document of the USA OSHA Act. The Second one is by notifying occurrences by using of particular words and concepts within the given document and showing the existence and difference.

3.3.3. Data Presentation and Critical Analysis of Legislation Review

The data analysis method for this paper was qualitatively analysis, based on data gathered from different literature and legislations. To summarize the collected data during data analysis and the researcher examined the data in depth to provide detailed description of the legislations and stated what is missing by comparing with international practices of USA OSHA Act. The researcher attempted to find meaning for the research result during interpretation. The analysis on this research was by using written material collected for the purpose of governing and ruling the country on occupational health and safety specifically in construction sector. These documents are already written/issued and used as a construction safety rule & regulations, policies & strategies, and codes & standards for the Federal Democratic Republic of Ethiopia and OSHA Act of USA. So, the research questions were answered through document analysis.

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1.Introductions

This chapter Summarize, Synthesize, Compare and Critiques Ethiopian CHS legislations with OSHA Act; it includes short statements that gives the main points of the legislation provisions particularly on the thirteen topics and combine the separated ideas of Ethiopian legislation and American to give a meaning; and moreover study the legislation with comparison to find out how similar and different they are and finally will give reaction to the ideas compared by including another international country experience beside the American. Therefore, by assessing and comparing the two countries legislation the researcher found out the similarity and key difference across the legislations; indicate best practice and lesson from American and explain the limitation area of FDRE HS legislation and Propose changes to it.

4.2.Similarity between FDRE Legislation and OSHA Act

In part of falling object protection both OSHA CFR 1910.29(k)(1) and EBCS 14 section 5.33(g) state similar terms on their general requirement, to use toe boards for protection from falling object and toe boards to be minimum of 3 ½ inch vertical height and with no more than ¼ inch clearance from bottom or working surface. Also, under OSHA CFR 1926.850(a) and EBCS 14 Section 8.11; both states when undertaking demolishing work, engineering survey to be completed prior to start work of demolishing. Moreover, under section 5(a)(1) OSHA Act, Article 2548 of Civil Code, Article 92 of Labour Proclamation and in FDRE OSH Policy and Strategy general requirement all states; for employer to be obligated to provide his employee a place of employment which is free from recognized hazard that are likely to cause death or serious physical harm.

Under, OSHA CFR 1926.150(a) and ministry of council Building Regulation Article 42, both states fire extinguisher instrument to be regularly inspected and maintained and also should be placed in position where they can be seen easily. Also, under OSHA CFR 1926.1053 and EBCS 14 Section 3.11.7, both states equal minimum clear distance length and side rail extension length; as the minimum clear distance between the sides of individual rung/step ladders and the minimum clear distance between the side rails of other fixed ladders shall be 16 inches. And

when using portable ladders to access an upper landing surface, the side rails must extend at least three feet (90 cm) above the upper landing surface. Moreover, under OSHA CFR (1926.494) and EBCS 14 Section 2, about sign and signal both articulate the same terms that; warning signs, danger signs, caution signs, exit signs, direction signs, safety instruction signs and accident prevention tags to be placed in required area with their type and color to be used.

4.3.Difference between FDRE Health and Safety Legislation and OSHA Act

The summaries of comparison of FDRE HS Legislation and OSHA Act are shown the following tables.

4.3.1. Distinguish between OSHA Act 1970 and FDRE Health and Safety Legislation In-terms of Focus and Role

Table 4.1: Summary of Distinguish between OSHA Act 1970 and FDRE Legislation in terms of Focus and Role

	OSHA Act 1970	FDRE Legislations
Role	The role of OSHA 1970 is to promote and encourage occupational safety and health awareness and to create effective safety and health workplace. The act also used as a instruction manual and work procedure for taking care of workers health and safety during work of construction.	The role of FDRE legislations is to cover occupational safety and health in different industry.
Focus	Focus on safe guarding health, safety and welfare of employees and people at workplace.	Focus on Occupational health and safety especially for industrial and manufacturing company's employee and employer.

As shown on the table above there is a difference in terms of role in Ethiopian and American legislations, according to American the role of safety legislation is specifically identified to be useful to sustain effective safety and health workplace with the benefit to be used as a guideline for safe work method, plus the Act can create safety and health awareness for the construction

society. Rather, according to Ethiopian; the legislation role is stated as, only for the coverage of HS in different industry, which does not particularly state what specific role the legislation, can cover. Furthermore, in terms of focus area of the legislations, American legislation is focused on safeguarding HS and welfare of employee and peoples at workplace generally. But, in case of Ethiopian, focus employee and employers' responsibility only, by excluding for construction work, but only for industrial and manufacturing works except that of the Building Proclamation and Building Regulation of FDRE.

4.3.2. Comparison between OSHA Act 1970 and FDRE Legislation In-terms of Specific HS Topics

4.3.2.1. Demolishing Work

Table 4.2: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Demolishing work

American Legislation (OSHA Act 1970, CFR 1926.850-858)	Ethiopian Legislation (EBCS 14 Section 8)
Engineering survey to be completed before undertaking demolishing Provision of disposal chutes for internal and chutes for external purpose by specifically limiting the external one to be enclosed. During demolishing for, dropping of materials to the external area chutes should be used which are at angle of 45 from the horizontal and entirely closed. And the place of landing should be protected by 4 inch barricade which is 6 feet back from the edge on all side Floor openings within 10 feet of any wall being demolished must be planked solid or workers must be kept out of the area Steel construction shall be dismantled column length by column length, and tier by tier and any structural members being dismembered shall not to be overstressed.	Prior to permitting employees to start demolishing, an engineering survey and plan should be made States only provision of disposal chute for disposing waste Not addressed

As summarized on the table, both legislations similarly includes, obligation to complete engineering survey and plan before undertaking any demolishing work. The Ethiopian legislation

state provision which regulate to use disposal chute for disposing wastes, without specifying whether to use for the internal part or external part of the building or for both. The American legislation is very specific at this point and obliges to have internal plus external chute and the external one to be enclosed so that it can mitigate danger from over head hazards of falling object. And, it requires the inclination degree to be provided be more than 45 degree from horizontal which is not addressed on the Ethiopian.

Demolishing of a structure part in EBCS14 is a direct copy of American CFR (1926.850-858). It does not consider our current construction method and material used, which are different from Americans. For example: Almost most Ethiopian building are constructed by using mud and as time and technology changes people's need to change/modify or repair their houses, so they have to demolish. But, the legislation does not include demolishing process and precautions for mud construction.

4.3.2.2. Electrical, Electrical Equipment and Electrical Work Practice

Table 4.3: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Electrical Equipment and Electrical Work Practice

American Legislation (OSHA Act 1970, CFR 1926.400-417)	Ethiopian Legislation (Building Proc. Article 35, Building Regu. Article 32 & EBCS 14 Section 10 &11)
According to workspace requirement working space should not be less than: - 30 inches wide in front of the electrical equipment - 3 feet where live parts normally exposed on the front of switchboards - 6 feet for minimum headroom of service equipment Precautions for Conductors Exceeding 600 Volts is stated Precautions for Live parts of electric equipment, operating at 50 volts or more is included The American Act includes obligation/prohibition of: • To keep clear of cords on walkways and similar locations • Not to use electrical equipment unless the manufacturer's name, trademark, or other descriptive marking is written or unless other markings are provided • To de-energized or grounded electric power circuit before starting works • To provide fence, wall, screen, or, access over the surrounded, with the height to be more than 8 foot with considering to be accessible to qualified persons only. • To include to have Ventilating or similar openings in metal-enclosed for deflecting foreign objects inserted through these openings.	Only specifies working space should be provided No equivalent terms exist

According to the comparison, the Ethiopian legislation is very limited on working space requirements, as it includes only providing working space is necessary. The American one, in addition to necessitate of workspace provision, list requirements to be fulfilled when providing workspace, as to workplace requirement include; working space not to be less than 30 inches wide in front of the electrical equipment, 3 feet away where live parts normally exposed on the front of switchboards and 6 feet space for minimum headroom of service equipments. And providing adequate working space around all electrical equipment is useful for permitting ready and safe operation and maintenance of such equipment.

Moreover, the American Act includes provisions which obligate to keep clear of cords on walkways and similar locations, so as not to create a hazard to employees and to de-energized or grounded electric power circuit before starting works, to protect against electric shock. In addition, it also prohibit not to use electrical equipment unless the manufacturer's name, trademark, or other descriptive marking is written or unless other markings are provided for giving voltage, current or other ratings information as necessary. As stated above, the legislation of America is very specific on various points on electrical work which includes: it specifies what the Precautions should be, for conductors exceeding 600 volts and live parts of electric equipment, operating at 50 volts or more. However, Ethiopian legislation does not include any provision like the above. And only oblige a building to have sufficient power supply, a standardized security and fixed controlling devices, which does not properly or sufficiently regulate what is the sufficient power supply and what are fixed controlling devices.

4.3.2.3. Employer Responsibility

Table 4.4: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Employer Responsibility

American Legislation (OSHA Act 1970, CFR section 5(a)(1))	Ethiopian Legislation (Civil Code Art. 2548-2552, Labour proc. Art. 92-104, OSH Policy and Strategy & EBCS 14 Section 2)
Employers are obligated to: - Comply with occupational SH standards and all rules, regulations, and orders issued pursuant to this Act - Provide his employees a place of employment which is free from recognized hazards - Maintain records of all occupational injuries and illnesses - Maintain records of workers' exposure to toxic materials and harmful physical agents - Provide, at a convenient location and at no cost medical examinations to workers - Make workers aware of their rights under the OSHA Act - Report within eight hours to the nearest OSHA office all occupational fatalities or catastrophes, - Provide training on hazardous materials - Make MSDSs available to workers upon request, - Post information required by OSHA such as citations, hazard warnings, and injury/illness records	Employers are obligated to: - Comply with the OH&S requirements provided for in this Labour Proclamation - Take the necessary measure to safeguard adequately the HS of the workers - Ensure the work place do not cause danger to the HS of the workers - Register and notify employment accident and occupational diseases - Properly instructed and notified concerning the hazards of respective occupations - Meet all the medical, pharmaceutical and other expenses which the accident or the disease necessitates & funeral expenses where the employee dies No equivalent term exist

As the comparison shows, from the similarities Employers are obligated to comply with the OHS requirements provided is one and provide his employees a place of employment which is free

from recognized hazards is other. Unlike Ethiopia, OSHA requires employers to report all occupational fatalities or catastrophes within eight hours to the nearest OSHA office with limiting the maximum allowed time which is 8 hours. Also, OSHA obligate employers to provide training for employee on hazardous materials and to Post information required by OSHA such as citations, hazard warnings, and injury/illness records. Moreover, principally under the OSHA Act employers have a duty to make workers aware of their rights, which is essential for the workers to legalize their rights.

4.3.2.4.Excavation/ Trenches and Earth work

Table 4.5: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Excavation and Earth Work

American Legislation (OSHA Act 1970, CFR 1926.650&651)	Ethiopian Legislation (EBCS 14 Section 6)
Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a Competent person qualified in structural design with having a uniform thickness. A stairway, ladder, ramp, or other safe means of egress shall be located trench excavations that are 1.22meter or more in depth so as to require no more than 7.62m of lateral travel for employees. Provide Protection by placing and keeping loose materials or equipment that could pose a hazard by falling or rolling into excavations at least 2 feet (0.6 m) away from the edge of excavations Emergency rescue equipment such as breathing apparatus, a safety harness and line, shall be readily available where hazardous atmospheric conditions exist If the stability of adjoining buildings, walls, or other structures is endangered by excavation systems such as shoring, bracing, or underpinning shall be provided. Employees shall not work in excavations in which	Nature of the ground should be verified by a competent person A worker shall not be permitted or required to enter an excavation over 1.5 meters in depth unless sides of the excavation are sloped to safe angle or ladder are provided. Provide Protection by placing and keeping loose materials or equipment that could pose a hazard by falling or rolling into excavations 1.2 meter away from the edge of excavations. No equivalent terms exist

there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken. To prevent exposure to harmful levels of atmospheric contaminants, and to assure acceptable atmospheric conditions, the following requirements shall apply: • Where oxygen deficiency (atmospheres containing less than 19.5% oxygen), or a hazardous atmosphere exists, or could reasonably be expected to exist, such as in excavations in landfill areas, or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth; • Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5% oxygen, and other hazardous atmospheres; • Adequate precaution shall be taken, such as providing ventilation to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.	
---	--

According to OSHA Act, for structural ramps that are used solely by employees as a means of access or egress from excavations it s mandatory to be designed by a competent person qualified in structural design and according to Ethiopian legislation, prior to excavation it obligatory to verify the nature of the ground by a competent person. However, unlike OSHA, the specific qualification of the competent person is not stated on Ethiopian.

According to OSHA Act a stairway, ladder, ramp, or other safe means of egress shall be located to trench excavations that are 1.22 meter or more in depth so as to require no more than 7.62m of lateral travel for employees. And under the Ethiopian, workers are not permitted or required to

enter an excavation over 1.5 meters in depth unless sides of the excavation are sloped to safe angle or ladder are provided. They have difference in depth length, as the former says 1.22 meter and the latter is 1.5 meter. Moreover, the American specifically limits the maximum lateral travel for employee on egress located on trench to be not more than 7.62 meter.

Both the legislation regulate to provide protection by placing and keeping loose materials or equipments that could pose a hazard by falling or rolling into excavations. However, the Ethiopian specified at least 0.6 m away from the edge of excavation and the American specifies at least 1.2 meter away from the edge of excavation.

Unlike Ethiopia the American legislation obligates:

- If hazardous atmospheric condition exist emergency rescue equipment such as breathing apparatus, a safety harness and line, to be readily available for protecting against the hazard.
- If the stability of adjoining buildings, walls, or other structures is endangered by excavation systems such as shoring, bracing or underpinning, to be provided so as to give protection for the adjoining structure.
- Employees not work in excavations in which there is accumulated water or in excavations in which water is accumulating, unless adequate precautions have been taken.
- The following requirements to be applied, to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions,:
 - Where oxygen deficiency (atmospheres containing less than 19.5% oxygen), or a hazardous atmosphere exists, or could reasonably be expected to exist, such as in excavations in landfill areas, or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth;
 - Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5% oxygen, and other hazardous atmospheres;
 - Adequate precaution shall be taken, such as providing ventilation to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

The American legislation specifically states the types of hazards or exposures during excavation works and it regulates the specific precautions and requirements for the stated hazards or exposures.

4.3.2.5. Fall Protection and Fall Arrest System

Table 4.6: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Fall Protection and Fall Arrest System

American Legislation (OSHA Act 1970, CFR 1926.500-503)	Ethiopian Legislation (EBCS 14 Section 5 & MoLSA OSH Directive)
There is No distinction between low and high falls for fall arrest system -Provided for working surface 6 feet (1.8m) or more above a lower level -Safety belt is not recommended -Obligate workers to be protected by using guardrail systems, safety net systems, or personal fall arrest systems, fences, barricades and toeboards -Criteria for Fall protection systems are included Duty to have fall protection for: • Employee working on, at, above, or near wall/floor openings where the outside bottom edge of the wall/floor opening • Workers performing overhand bricklaying and related work; • Workers on roofing activities with low-slope roofs and unprotected sides and edges; • Workers in a hoist area;	The law works for Fall arrest system to be used for a vertical distance of 5 meter or more, only for unusual possibility of injury if vertical distance of less than 5 meter and falling in to a hazardous substance or object - Provided if the height of the fall would exceed two meters above a floor, -Safety belt is basically recommended -Obligate workers to be protected by safety belt, guardrail, barricades and toe boards only Not addressed Duty to have fall protection for: • Employees on Floor opening into which a worker may fall or slip, • Elevated work places; • Workers performing overhand bricklaying and related work; • Workers performing roofing work materials and equipment

• Workers at the edge of an excavation • Employees on the face of formwork or reinforcing steel; • Workers above dangerous equipment shall be protected from falling into or onto the dangerous equipment; • Workers During the erection of precast concrete members.	Not addressed
--	----------------------

Unlike Ethiopia, there is no any distinction between low and high falls for fall arrest system in American legislation. And safety belt is not recommended to be used for fall protection. However, the Ethiopian legislation recommends using safety belt as a fall protection and also specify height limit for fall arrest system as fall arrest system to be used for a vertical distance of 5 meter or more, only for unusual possibility of injury if vertical distance of less than 5 meter and falling in to a hazardous substance or object.

According to OSHA statement, employees working 1.8 meter or more above lower levels must be protected from falling by fall protection system. Though, according to Ethiopian fall protection is to be provided, if the height of the fall would exceed 2 meters above a floor. Both legislations have difference on length, the former one limit for 1.8 meters or more and the latter limit for 2 meter or more.

OSHA unlike Ethiopian includes fall protection systems criteria, it obligate employer to provide and install all fall protection systems before an employee begins the construction work and necessitates the fall protection in the beginning.

Ethiopian legislation on duty to have fall protection part, does not include requirement of fall protection for workers; in a hoist area, at the edge of an excavation, on the face of formwork or reinforcing steel and for workers above dangerous equipment. And also, does not include workers protection from falling into or onto the dangerous equipment unlike America.

4.3.2.6.Fire Protection and Prevention

Table 4.7: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Fire Protection and Prevention

American Legislation (OSHA Act 1970, CFR 1926.150)	Ethiopian Legislation (Building Proc. Art.44, Building Regu.Art.41&42 & EBCS 14 Section 2)
Fire protection and prevention is required for all building (Public, Private) The employer shall provide firefighting equipment as specified in this subpart as; a fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of the protected building and travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet. All building shall have safe escape route for emergency cases An alarm system shall be established by the employer and the alarm code and reporting instructions shall be posted at the phone and employee entrance. On multi-story buildings, at least one fire extinguisher must be located adjacent to stairway.	It is only limited to Public building Only stated as Buildings shall have installed fire extinguisher system Buildings having more than five floors, there shall be safe escape route for emergency cases besides the main staircase States category “C” buildings shall have installed fire alarm No equivalent term exist

The comparison shows according to the American Act, it is mandatory:

- For all building to have safe escape route for emergency cases and any multi-story buildings, at least one fire extinguisher to be located adjacent to stairway. Conversely, the Ethiopian legislation limit the requirement of safe escape route besides the main staircase for emergency cases, for buildings having more than five floors only. This shows buildings having less than five floors are not included in the Ethiopian legislation.
- An alarm system (e.g., telephone system, siren) to be established by the employer and the alarm code and reporting instructions to be posted at the phone and employee entrance.

Whereby employees on the site and the local fire department can be alerted if emergency happens. Conversely, Ethiopian legislation States category “C” buildings shall have installed fire alarm, which are any public or institutional building, factory or workshop building or any building with a height of more than 12 meters. This shows buildings with a height of less than 12 meter is not included in the requirement of an alarm system.

- Fire protection and prevention requirement for all type of building either public or private. However, Ethiopian legislation particularly limits the necessity of fire protection and prevention only to public building such as a theatre hall, public library, conference hall, a recreation place, academic institution, a medical center, a market or any other similar building serving the public. This shows buildings other than public, does not require having fire protection.

Unlike the Ethiopian the American legislation obligates the employer to provide firefighting equipment specified as; a fire extinguisher, rated not less than 2A, to be provided for each 3,000 square feet of the protected building and travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

4.3.2.7. First Aid, Medical Care, Emergency Action Plan & Welfare

Table 4.8: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of First Aid, Medical Care, Emergency Action Plan and Welfare

American Legislation (OSHA Act 1970, CFR 1926.50)	Ethiopian Legislation (EBCS 14 Section 13 & MoLSA OSH Directive)
Medical service and First aid, Emergency action plan and Emergency Firefighting Procedures are addressed	First aid, Medical care and Emergency action plans are addressed Emergency Firefighting Procedures is not addressed

According to the comparison summary, Ethiopian legislation addresses all issues like that of American except about obligation on precaution for emergency firefighting procedures, which obligate employer to locate maintained and inspected firefighting equipment in operating condition and the firefighting equipment to be conspicuously located and readily available at all time.

4.3.2.8.Ladder and Scaffolding

Table 4.9: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Ladder and Scaffolding

American Legislation (OSHA Act 1970, CFR 1926.450, 451 & 1926.1053)	Ethiopian Legislation (EBCS 14 Section 3)
When scaffold platforms are more than 2 feet above or below a point of access guardrail must be provided	All scaffolds above 3 meters high above ground shall be equipped with a guardrail
Scaffold & scaffold components must be capable of supporting without failure, its own weight, and at 4 times the maximum intended load applied	Not addressed
Suspension rope must be capable of supporting at least 6 times the maximum intended load applied	
Each portable ladder of self-supporting or non self-supporting must support at least 4 times the maximum intended load & plastic ladders shall sustain at least 3.3 times the maximum intended load	
Cross braces shall not be used as a means of access and obligate to use integrated prefabricated scaffold access frames and obligate to position Stairway-type ladders, a stair-rail, which consists of a top-rail and a mid-rail, shall be provided on each side of each scaffold stairway with specifically stating its requirement and detail.	States employer to provide safe means of access (ladder or equivalent) to all working levels of the scaffolding ;
Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration.	Not Addressed
Components of scaffold manufactured by different manufacturers shall not be intermixed.	
General rule for all scaffolds and scaffold	General rule for all scaffolds and scaffold components and ladders:
	• Employees shall not work on scaffolds/ladders during storms or high

components and Ladders: • It prohibits Employees from working on scaffolds/ladders covered with snow, ice, or other slippery material. • Scaffolds/ladders shall be used only on stable and level surfaces unless secured in order to prevent accidental displacement • Materials only for work on the time should be kept on scaffolds/ladders • Tools, materials, and debris should not be permitted to store and place on scaffold/ladders • Scaffolds/ladders shall not be moved horizontally while employees are on them; • Scaffolds/ladders shall not be loaded in excess of their maximum intended loads or rated capacities	winds; • The vertical supports of scaffolds/ladders shall rest on a firm foundation or sills; • Materials only for current use shall be kept on scaffolds/ladders • Tools, materials, and debris shall not be allowed to accumulate on scaffold/ladder Not Addressed
---	---

Based on the comparison, according to OSHA statement, when scaffold platforms are more than 2 feet (0.6m) above or below a point of access it obliges guardrail to be provided. Though, according to Ethiopian for scaffolds above 3 meters high above ground it is mandated to be equipped with a guardrail. Both legislations have difference on length, the former one obliges for more than 0.6 meter height and latter is for only above 3 meter height, guardrail is needed.

Also according to the American Act, it is obligated not to use cross braces as a means of access and obligate to use integrated prefabricated scaffold access frames or to position Stairway-type ladders, a stair-rail, which consists of a top-rail and a mid-rail, to be provided on each side of each scaffold stairway with specifically stating its requirement and details. According to the Ethiopian it is stated to provide safe means of access (ladder or equivalent) to all working levels of the scaffolding; without stating the requirement and detail as OSHA did.

Moreover, in American Act on scaffold components, it states as Scaffold components manufactured by different manufacturers are not to be intermixed unless the components fit together without force, and the scaffold's structural integrity is maintained by the user. And the legislation lists four criteria to Supported scaffolds with a height to base width ratio of more than

four to one shall be restrained from tipping, by guying, tying, bracing, or equivalent means. But, no any Ethiopian legislation has a provision of commanding about neither using scaffold components intermixed nor scaffold supporting criteria

As described in OSHA, Ladders (1926.1053) the employer must, as necessary, provide training for each employee, the training should enable each employee to recognize hazards related to ladders, and train each employee in the procedures to be followed to minimize these hazards. And the employer needs to ensure that each employee has been trained by a competent person. The legislation explains about giving training with detail explanation about its content of the training. However, no Ethiopian legislation include anything which discussion about training

Unlike the Ethiopian the American legislation obligates:

- Scaffold & scaffold components to be capable of supporting without failure, its own weight, and at 4 times the maximum intended load applied. Suspension rope must be capable of supporting at least 6 times the maximum intended load applied. Also, Scaffolds and scaffold components shall not be loaded in excess of their maximum intended load.
- Each portable ladder of self-supporting or non self-supporting must support at least 4 times the maximum intended load & plastic ladders shall sustain at least 3.3 times the maximum intended load.
- Fulfillment of general rule for all scaffolds and scaffold components and ladders:
 - Scaffolds/ladders not to be moved horizontally while employees are on them which uses for the safety of workers.
 - Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration with specifically stating requirement for the competent person.

Therefore, all the above points are only addressed by the American. However they are very important in terms of health and safety for working on scaffolding and ladders.

4.3.2.9. Personal Protective Equipment

Table 4.10: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Personal Protective Equipment

American Legislation (OSHA Act 1970, CFR 1910.132, 1926.101)	Ethiopian Legislation (EBCS 14 Section 12 & Public Health Proc. Art.11)
It addressed about Hand protection, Foot protection, Head protection, Eye protection and Ear protections in detail Obligate before using PPE, employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE; the employer shall Select the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment. -Obligate Employer to give training on: When PPE is necessary; what PPE is necessary; How to properly don, doff, adjust, and wear PPE; The limitations of the PPE; and, the proper care, maintenance, useful life and disposal of the PPE. States general requirements for the employer to ensure that; • On eye and face protection; each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. • Ear protection; each affected employee uses appropriate Noise protection when long-term exposures to sound levels at or above 85 dB and when it is not feasible to eliminate noise that exceeds 85 dB, it is necessary to protect the worker from the	It only addressed about Hand protection, Foot protection, Ear protection and Head protection No equivalent terms exist -Obligate Employer to give training for workers: trained in the correct use, care, limitation and maintenance of the PPE States general requirements for the employer to ensure that; Eye and Face protection is not addressed Ear protectors; where it is not practicable to reduce noise exposure to below prescribed levels.

environment with hearing protection. • Hand protection; employee uses appropriate Hand protection when workers are exposing to nails, wood, splinters, sharp objects, and chemicals. • Foot protection; employee uses appropriate Foot protection when workers are subjected to foot injuries, risk of falling objects and punctures of nails or other debris.	Hand protection; Suitable gloves for workers exposed to hot, corrosive or toxic substance Foot protection: workers shall in general use safety footwear on construction sites and Water proof shoes shall be provided for workers working in muddy areas and concrete.
--	--

According to the comparison, unlike the Ethiopian the American legislation obligates before using any PPE, employer to assess the workplace to determine if hazards are present or are likely to be present, which hazard necessitate the use of PPE; with the type to be use, also the employer shall select the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment.

Eye and face protection is not addressed in Ethiopian legislation, in which it is appropriate for exposure to eye or face hazards like from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

The American Act, states general requirements for the employer to ensure that protection is fulfilled form those ear protection is one, according to the Act, it is required for employee to wear for appropriate noise protection when long-term exposures to sound levels at or above 85 dB. However, according to Ethiopian it is only stated as requirement of ear protection be, when it is not practicable to reduce noise exposure to below prescribed levels. That does not specifically show the prescribed level of exposure. Furthermore on hand protection, the American obligate appropriate hand protection to use if there is exposures of nails, wood, splinters, sharp objects, and chemicals with detail specifications, but the Ethiopian only limit to use suitable gloves for hand protection in case of hot, corrosive or toxic substance. Also it does not include exposures of nails, wood, sharp objects and splinters, which are existed most of the time on construction works. Moreover on Foot protection the American obligate to have foot protection for workers who are subjected to foot injuries, risk of falling objects and punctures of nails. However the Ethiopian, generalize requirement of footwear on construction.

Moreover, both legislations obligate employer to give training for workers; according to American, train about when PPE is necessary, what PPE is necessary, How to properly don, doff, adjust, and wear PPE the limitations of the PPE and the proper care, maintenance, useful life and disposal of the PPE; and according to Ethiopian, train about the correct use, care, limitation and maintenance of the PPE. However, where and when to wear and useful life and disposal of the PPE training requirement, is not addressed on Ethiopian.

4.3.2.10. Safe and Healthy Workplace

Table 4.11: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Safe and Healthy Workplace

American Legislation (OSHA Act 1970, CFR 1926.General)	Ethiopian Legislation (EBCS 14 Section 2 & MoLSA OSH Directive)
Workers have the right to refuse hazardous work and unhealthy workplace.	No equivalent terms exist, Only employers duties are stated
Includes the following requirements on setting up the site:- - Safe means of access on to and around the site for people and vehicles; - Construction works to be fenced off and suitably signed - Good housekeeping: Good order, designate storage area and waste material storing method - First aid availability and location - Lighting - Drinking water - Welfare facility: adequate toilet and washing facility - Rest facility: for wind and rain shelter and for break and meal break - Storing and drying clothing and PPE - Emergency procedures - Site rules	Includes the following requirements on setting up the site:- - Safe means of access and egress of workplaces including access for workers on the site and routes for vehicular traffic; - Delineation and fencing external border of the site - Storage areas for materials, construction waste, equipment & machinery - The locations of danger zones & Storage for flammable materials; - The location of office rooms, trade workshops, medical and welfare facilities; - Drinking water Not Addressed

According to the comparison, only on American legislation Workers have the right to refuse hazardous work and unhealthy workplace. Moreover, Ethiopian legislations does not include welfare facility: adequate toilet and washing facility; Rest facility which can be used for wind and rain shelter and for break and meal break; storing and drying places for clothing and PPE, emergency procedures and site rules for workers to be available.

4.3.2.11. Safety Harness, Belt and Safety Net

Table 4.12: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Safety Harness, Belt and Safety Net

American Legislation (OSHA Act 1970, CFR 1926.105 &502)	Ethiopian Legislation (EBCS 14 Section 12 & MoLSA OSH Directive)
Safety nets shall be provided when workplaces are more than 25 feet above the ground or water surface, and when the use of ladders, scaffolds, catches platforms, temporary floors, safety lines, and safety harnesses is impractical and as the code command when safety net protection is required.	Only states Safety nets to be provided
The size of the mesh to be used for safety net, the mesh size of nets shall not exceed 6 inches by 6 inches all new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance.	No equivalent terms exist
Before using a safety net it should be tested by using a drop test.	No equivalent terms exist
Body safety belts may no longer be used for fall protection.	Workers working in unguarded surface 6m or more above shall be secured with safety belts and lifelines.

Based on the comparison, American legislation safety nets shall be provided when workplaces are more than 25 feet above the ground or water surface and the mesh size of nets shall not exceed 6 inches by 6 inches. However on Ethiopian, it is only stated, to provide safety nets in construction works, it neither includes where and its detail requirement.

Furthermore, a Body safety belt is not longer used for fall protection according to American. Conversely, it is recommended on Ethiopian legislation safety belt is required to be provided for unguarded surface above open pits or tanks, steep slopes, moving machines and similar locations working from unguarded surfaces 6m or more above water, ground, temporary or permanent floor platform, scaffold construction.

According to U.S. OSHA Act CFR (1926.105), before using a safety net at site it should be tested by using a drop test by competent person, the test is included in the legislation to be followed, When installed safety nets undergo a drop test which requires a 400-pound bag of sand, approximately 30 inches in diameter, to be dropped into the net from the highest working surface, but not less than 42 inches. If a drop test is not practical, the employer must certify and make a record attesting to the fact that it meets the compliance requirements. But, FDRE legislation proposes using Safety nets and safety belts with no requirement and specification.

4.3.2.12. Signs, Signals, Barricades and Barriers

Table 4.13: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Sign, Signals, Barricades and Barriers

American Legislation (OSHA Act 1970, CFR 1926.494&202)	Ethiopian Legislation (EBCS 14 Section 2)
-Danger sign, Caution sign, Exit sign, Safety instruction sign, Direction sign, Accident prevention tag, Out of order tags, Traffic signs, - Barricade under 1926.202 & Barrier under 1926.494 are addressed	Danger sign, Caution sign, Exit sign, Safety instruction sign, Direction sign & Accident prevention tag, are addressed But, Out of order tags, Traffic signs, Barriers & Barricades are not addressed

Based on the comparison, Both the legislations have similar provisions on Danger sign, Caution sign, Exit sign, Safety instruction sign, Direction sign & Accident prevention tag, about their type, color and usage place. However, the American Act unlike Ethiopian address provision about out of order tags, traffic signs, barriers & barricades requirement. Traffic Signs must be posted at points of hazards in all construction areas. Out of order tags will be used to designate equipment which requires repair or maintenance and Equipment with such a tag may not be used

until the tag is removed. And the Ethiopian legislation does not include provisions about Barriers and Barricades.

4.3.2.13. Workers Right and Responsibility

Table 4.14: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Workers Right and Responsibility

American Legislation (OSHA Act 1970, CFR 1926.General)	Ethiopian Legislation (Labour Proc. Art. 93&94, MoLSA OSH Directive & OSH Policy & Strategy)
Workers have the rights to: - Have the right to refuse to hazardous work and unhealthy workplace - Be provided with Personal Protective Equipment; - Request information from the employer on SH hazards, precautions that may be taken and procedures to be followed if an employee is involved in an accident or is exposed to toxic substances; - Have SH standards established and enforced by law; - Review copies of appropriate standards, rules, regulations, and requirements that the employer should have available at the workplace; - Participate in the development of standards; - Access relevant worker exposure and medical records; - File a complaint with OSHA regarding unsafe or unhealthy workplace conditions - Request an inspection from OSHA; - Not to be discharged or discriminated against in any manner for exercising rights under the OSHA Act related to SH Workers are obligated to: - Comply with the OSHA Regulations and Standards; - Comply with the employer's SH rules and regulations;	Workers have the rights to: - Be provided with Personal Protective Equipment - Be request and be involved in the relevant hazards control measures and the methods used to control - Right to require & receive from employer relevant information, training and instruction - Right to take adequate precaution & cooperate with their employee - Right to be consulted regarding any hazard No equivalent terms Workers have obligation to: - Obey all HS instructions issued by the employer or issued by the competent authority - Co-operate with the employer in the formulation and implementation of work rules to safeguard the workers HS - Inform and report forthwith to the employer any defect related to the

- Report any hazardous condition and any job-related injuries to the supervisor or employer; - Cooperate with the OSHA Inspector during inspections when requested to do so	- appliances used and injury to HS of the workers - Make proper use of all safeguards, safety devices and other appliance furnished for the protection of his and others HS - Actively participate in the formulation and review of occupational safety and health policies and legal instruments - Handle and properly use PPE and work appliances supplied for workers - Report to employer when
--	--

As the comparison shows, according to Ethiopian legislations workers have two rights which are to be provided with personal protective equipment and to be involved in the relevant hazards control measures/ methods. However, OSHA Act include other worker rights in addition to the above two rights which are written in Ethiopian.

According to OSHA workers have right to have SH standards established and enforced by law; review copies of appropriate standards, rules, regulations, and requirements that the employer should have available at the workplace and right of participation in the development of standards and can access relevant worker exposure and medical records. Furthermore according to the Act, workers can file a complaint with OSHA regarding unsafe or unhealthy workplace conditions and can request an inspection from OSHA. Basically OSHA give workers the right not to be discharged or discriminated against in any manner for exercising rights under the OSHA Act related to SH, so that they can be liberated of applying their rights which is supported by the law.

4.3.2.14. Young Workers

Table 4.15: Summary of Comparison between OSHA Act 1970 and FDRE Legislation in terms of Young Workers

American Legislation	Ethiopian Legislation
Prohibits construction work for anyone less than 16 years of age.	Prohibited to employ persons below 14 years of age. (National Directive for Young Workers) Prohibited to employ persons below 15 years of age. (Labor proc. No 1156/2019)

Based on the comparison, Unlike Ethiopian the American Act, prohibits construction work for anyone less than 16 years of age. However, according to National Directive for Young Workers, it is prohibited to employ persons below 14 years of age and according to Labor proc. No 1156/2019 it is, prohibited to employ persons below 15 years of age. Both the proclamation and the directive contradict to each other and they are different from that of American age limit.

4.4.Key Difference across the Legislations

- The American Act states employer and employee's right and responsibility in detail, and obligate the employer to make the workers aware of their right under the Act. But, FDRE do not include any regulation about right of employee rather all legislations of Ethiopia state responsibility of employee and employers.
- American legislation on 29 CFR 1926.20, include statement that requires subcontractors to be bound to the general contractor by the same contractual terms as between the owner and general contractor, which implicitly includes safety responsibilities. But Ethiopian legislation does not assign specific site safety responsibility to subcontractor.
- According to Code of federal regulation of American each volume of the CFRs is revised at least once in each calendar year and issued on a quarterly basis and the CFRs is kept "up to date" by individual revisions issued in the Federal Register, But FDRE legislation are not revised each year for example we can look civil code which is published in 1960th and another construction safety legislation's like National Health and Safety policy and strategy in 2014, Ethiopian Building Proclamation Number 624 in 2009, Ethiopian labour Proclamation Number 377 is in 2003 and updated at 2019 with No 1154/2019 but did not update its HS part, Council of Minister Building Regulation Number 243 is published in 2011, Ministry of labour and social affairs Occupational and Health Directive in 2008, Building Directive number 5/2003 is in 2003 and Ethiopian Building Code Standards which is so called EBCS 14 is in 2014, in which all are not "up to date" and not revised periodically so they should be revised and the legislation should include a law that obligate to revise Construction Health and Safety laws yearly because construction method or system is always upgrading rapidly and the legislations should be updated based on it.
- The Occupational Safety and Health Act (OSHA Act) of 1970 contain the following contents: The reason for the law, A statement of the national policy related to the law,

Objectives/goals/outcomes expected of the law, Authorization of the agency responsible for implementation, Requirements and structure of the regulations to be developed, Time frames for regulation implementation or deadlines, Enforcement guidelines to be followed, Fines or assessments available to the enforcing agency and Specific actions required by the law. And Ethiopian legislation have the following contents: The reason for the law, A statement of the national policy related to the law, Objectives of the law, Authorization of the agency responsible for implementation and Time frames for regulation implementation or deadlines. But, Ethiopian legislations does not include the following contents which are part of American legislation content; Requirements and structure of the regulations to be developed, Enforcement guidelines to be followed, Fines or assessments available to the enforcing agency and Specific actions required by the law.

4.5.Gaps of Ethiopian Construction Health and Safety Legislation

- In Ethiopian National Directive on Prohibition of Activities for Young Workers on article 89(2), young worker means a person who has attained the age of 14 and it is prohibited to employ persons below 14 years. And according to labor proc. 1154/2019 chapter two Working Conditions of Young Workers Article 89, young worker means a person who has attained the age of 15 but is not over the age of 18 years and it is prohibited to employ persons less than 15 years of age. Those evidences contradict to each other.
- The constitution of Ethiopia include the provision about young workers with its Article 36 right of young workers, the right not to be subject to exploitative practices, neither to be required nor permitted to perform work which may be hazardous or harmful to his or her, health and well-being is stated. But the constitution did not state anything about woman and pregnant women.
- Labour proclamation No 377/2003 was amended by labour proclamation No 494/2006 and again replaced by labour proclamation No 1156/2019, but the amended proclamations do not update any statement/issue related to health and safety issues. Moreover, EBCS 14 of 2013 was also revised at 2014, but it does not update detail issues of HS except the four concepts which are not related to health and safety.
- EBCS 14 and Building Directive 5 are almost the same, they have the same contents, their difference is EBCS 14 is in English and Building Directive 5 is in Amharic.

- Building Proclamation number 624/2009 have very small provision for Health and Safety in construction, as it is a base for other legislation like Regulation, Standards and Directives it should have been profound and detail, but it is not.
- Building Regulation No 243/2011 has a technical error on Article 42, On Section 6 of EBCS14, in guard-rail section 6.31 (C) is already stated on 6.31 (B), it repeat the sentence mid rails, when used shall be installed at a height midway between the top edge of the guardrail system and the working level.
- Demolishing work is only stated in the EBCS 14, it is neither regulated in the proclamation nor in the regulation, which can create a gap for the construction society, which may open a way not to follow the code, as it do not follow the required sequence of law system. As stated earlier, in the primary position it should have been stated on the Proclamation then Regulation or Directive and finally standards or code of practice should support.
- FDRE MoLSA OSH Directive state about fall protection merely include fall protection for window cleaning or washing activity and works at pole which is six meter and above. But, it does not include any fall protection during construction works.
- In EBCS 14 national foreword introduction part, it is stated as this standard is, a technical document which by their nature require periodic updating, revised edition will be issued by the ministry from time to time, as appropriate. But, they did not revise from 2014 until now and they even do not include when the appropriate time to revise.
- On scope of application part of EBCS 14 confer; The Code applies to Building Construction, Maintenance, Renovation, Demolishing and other associated activities to all classes of Buildings which are stated in Ethiopian Building Proclamation. But, the Ethiopian Building proclamation does not state any scope of application for type of work.
- Ethiopia daily labour are personnel who are working as a contract employee and who does not have any contract of employment with the employer, but according to labour proclamation 1156/2019 the scope of application according to article 3(1) is, this proclamation shall be applicable to employment relations based on a contract of employment that exist between a worker and an employer. The proclamation do not specifically identify whether written agreements or oral agreements can be called a contract Moreover, the proclamation cannot be applied for daily labour who does not have any contract and only working in a shift.

- Regulations is delegated legislation which provides detail on the administration of principles in law, Ethiopian Building Regulation No 243/2011 which is delegated from Building Proclamation No 624/2009, do not regulated in complete and cover the same subject matter of the provisions stated on the proclamation related to construction health and safety. For example; According to Article 32 sub-article 6 of Building Proclamation, “urban administration or designated organ may device mechanisms to administer the safety requirement during construction”. And the building regulation should specifically identify or state mechanisms for administrating the safety requirements. But, it does not specifically identify.

4.6.Recommended Changes to FDRE Construction Health and Safety Legislation

The review identified a number of CH&S specific provisions which should be amended, including, but not limited to:

- Section ten of EBCS 14 appropriate means: the wording of this section does not give particulars of what an appropriate means is. It would be better if the appropriate means are specified.
- Part seven of Labour Proc No. 1156/2019 appropriate organ: the wording of this section does not give particulars of who is appropriate organ. It would be better if the appropriate organ is identified.
- Part seven of Labour Proc No. 1156/2019 directive issued by the Minister: the wording of this section does not give information about which directive to use. It would be better if directive is specified. The directive (Directive number or other identification) should be stated under the articles for the employer to give more description and will help the reader or user (of the proclamation) not to utilize wrong directive.
- Section six of EBCS 14 concerned body: the wording of this section does not give particulars of who the concerned body is. It would be better if concerned body is identified.
- On the legislations (Building Proclamation, Building Directive & EBCS) standard safety work procedure: the wording of this section does not give particulars of which standard is stated. It would be better if the name of the standard is clarified.

- The legislations should set out detail requirements and criteria for the stated works and materials specified on the legislations and provide minimum qualification requirement for those works and materials Moreover, the law should obligate preparation of material standards for materials used for construction like Americans did.
- Section 13 (C) of EBCS 14 reduces noise exposure to below prescribed levels: the wording of this section does not give particulars of what below prescribed levels means. It would be better if the minimum or maximum level of noise exposure is specified, saw like long-term exposures to sound levels at or above 85 dB. This will avoid subjectivity and address such claim issues properly.
- Adding penalty notice offences related to all OH&S legislations enforcement: and undertaking a review to consider the introducing penalty notice amount.
- Undertaking a review of adding authorization of work for the responsible organ which is required to issue penalty notice.

4.7. Summary

The difference between Ethiopian and American health and safety legislations are larger, the American OSHA Act has studied all parts deeply and its effort for covering the all aspects of the issue is admirable and satisfactory. Too many details which could be related to this issue from starting to finish of the work are stated for all points included in this research. Ethiopian law only addressed those specific comparison points without supplying any detail information about compliance criteria, requirements, and practices of the stated comparison points. Moreover, as the comparison shows most of the health and safety regulations are covered by Ethiopian building code standard but, neither the proclamation nor the regulation includes all topics. For example for demolishing work, excavation work, ladder and scaffolding works, personal protective equipment and sign and signal is only included on Ethiopian Building Code Standard. Employer right and responsibility is stated on the labour proclamation and EBCS 14, Fall protection, first aid and medical care, safe and healthy workplace and safety belts are stated only in EBCS 14 and MoLSA OSH directive; Fire protection is included in the Building regulation, Building proclamation, and EBCS 14; and finally, Workers right is incorporated in labour proclamation and MoLSA OSH directive.

The comparison result indicates that this statements are Lacking in Ethiopian legislations. Lack of:

- Eye protection in PPE, Workers right, Barriers & Barricades, Safety harness for fall arrest system, Emergency Firefighting Procedures and precaution.
- Criteria, practice, requirement and specification for all work parts in the legislation (i.e. Criteria and practices for fall protection systems).
- Enforcement guidelines to be followed, Specific actions required by the law, Requirements of the regulations to be developed and assessments available to the enforcing agency in the content of the legislation published.
- Supporting the laws and code of practices pictorially and with example.
- Including obligation for employer to provide training for employee on occupational health and safety issues which should enable each employee to recognize hazards and procedures to be followed to minimize these hazards.
- Some crucial ideas are left out and not included in the legislation of Ethiopia. I.e. precaution for Concrete construction on CFR (1926.701); Conveyor, Cranes and Derricks on CFR (1926.555); Precaution for Confined space CFR (1910.146); Pile driving system CFR (1926.603); Working over water (1926.106); Underground construction (1926.800); Welding (1910.252); and Steel erection (1926.subpart R). In which all are important and vital to Ethiopian construction industry.

The comparison result indicates this most provisions are too limited in Ethiopian legislations: Most of Ethiopian legislation (Building Proclamation, Building Directive & EBCS), does not explain and clarify the terms used. I.e.

- In Building Proc. No. 624 Article 35, oblige Electrical installation for buildings and materials to be used should comply with the requirements of safety standards. I.e. In Building Directive 5 Section 38 Excavation and Earth work part, oblige any electric lines which are installed inside earth should be installed based on standard safety work procedure. I.e. In to EBCS 14 Fall Arrest System part, oblige Personal fall arrest systems and their use shall comply with the standards provided by Ethiopian Standards Agency. But, all the above provisions do not clearly identify which safety standard to comply with.

- Section six of EBCS 14 Excavation and Earth work part, police the concerned body to check and verify the position/location of all the public utilities that may cause danger during work before excavation started. But, it does not identify who the concerned body is.
- Section ten of EBCS 14 Equipment, Plant and Machinery in Concrete Working Equipment part states, “loaded Concrete buckets should be guided in to position with appropriate means”, which does not clearly specify what are the appropriate means’s.
- In part five of FDRE Building regulation No. 243/2011 Article 32 Electrical Installations part, oblige a building to have sufficient power supply and a standardized security to avoid the likelihood of danger, the provision does not clearly explain what the amounts of sufficient power supply level are.
- Under Part seven of Labour Proclamation Number 1156/2019 Employer Rights and Responsibilities Article 92, which is about preventive Measures under Obligations of an Employer Confer, “an employer shall take the establish an occupational, safety and health committee of which the committee's establishment shall be determined by a directive issued by the Minister”. Moreover, on Article 104, which is about Benefits in the Case of Employment Injuries states, “an employer shall have the obligations...the appropriate organ in accordance with the directives issued by the Minister.” But, the articles do not specifically identify which directive issued by the Minister shall determine it.
- Under Part seven of Labour Proclamation Number 1156/2019 Employer Rights and Responsibilities Article 104, which is about Benefits in the Case of Employment Injuries states, “an employer shall have the obligations to notify the occurrence of accident to the appropriate organ in accordance”. But, the provision does not clearly explain who the appropriate organ is.
- In section 13 (C) of EBCS 14, PPE oblige to use Ear protectors where it is not practicable to reduce noise exposure to below prescribed levels. But, the code do not specify the maximum sound level or long term exposure to sound level, so the code does not clearly identify PPE application and if any injury occur on workers due to exposure above the prescribed level of sound the law cannot be interpreted properly due to it has a gap of stating the maximum exposure.

Ethiopia legislation does not address the following aspects of CS&H which are addressed by Federal OSHA. I.e.

- Citation for penalties, Criteria and practice for all law and specification for materials, safety responsibilities for subcontractors, government & client, rights of employee is included.
- Precaution for Concrete construction, Conveyor, Cranes and Derricks, Confined space, Pile driving system, working over water, Underground construction, Welding, and Steel erect is included.

Those ideas which are lacking, too limited and which are not included or not addressed in Ethiopian legislation are due to the prevailing construction stage; by the time the legislations and regulations was prepared the construction level of Ethiopia was on its initial stage. Most of the Legislations are written and prepared by different personnel and professionals before decade in which it does not consider the current construction methodology and system which is different from the previous one, which can be the initial cause for work related accidents happening today that is cause of too many injuries and fatalities which could be reduced by proper OHS strategies and legislations that can cope up with current construction system.

As it shows, the construction health and safety laws and regulations in Ethiopia are too scattered in lots of documents hence Government and all regulatory bodies should come out with a well compiled and concise document, regulations and laws on safety practices for the building construction projects to regulate the activities of the construction industry players; which may be due to the organization structure of personnel's and professional staffs working for reviewing, editing and preparing the legislations does not consider the experience and knowledge related to construction H&S, of individuals who issue CH&S laws or absence of trained professionals of health and safety in the organizations.

Moreover, those gaps are caused due to, absence of comprehensive and validated information of OSH at all level, absence of co-operation and coordination among the concerned bodies to put in place strong networking and cooperation system of OSH and lack of adequate financial resources.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This research through the review of the existing Ethiopian construction health and safety legislations and American construction health and safety legislation specifically OSHA Act 1970 and by comparing the two, it identified; key differences across the legislations; best practices and lessons from American legislation; gaps of Ethiopian construction health and safety legislations with recommended/proposed changes to FDRE construction health and safety legislation. With such a review and comparison ending the following conclusions are drawn out of the results and discussion as shown in the previous chapter.

- The legislation of Ethiopia have some gaps which does not clearly state terms used;
I.e. The legislations (Ethiopian Building Proclamation, Building Directive & EBCS) oblige to comply with safety standards on their provisions without explaining and specifying which standard to comply with. And police the concerned body to check and verify the position/location of all the public utilities without specifying who the concerned body is. Clarifying the name of the standard and the identity of concerned body would enable the regulator to take compliance action against responsible persons for offences against these provisions.
I.e. Labour Proc No. 1156/2019 obliges an employer to notify the occurrence of accident to the appropriate organ in accordance with the directives issued by the Ministry. But, the articles do not specifically identify who the appropriate organ is and which directive issued by the Minister to be used. The directive (Directive number or other identification) should be stated under the articles for the employer to give more description and will help the user of the proclamation not to utilize wrong directive.
- The Ethiopian Building Proclamation does not clearly identify the scope of application of the proclamation, for the application of which construction activities and type of work.
- The scope of exclusion under section eight of EBCS 14 demolishing work, is narrow and does not provide sufficient information and do not consider current construction method of Ethiopia and materials available in Ethiopia. This section needs to be elaborated more clearly

specifically with respect to the current Ethiopian construction system and additional information's are required.

- The Ethiopian legislation does not include some provisions in its content. Provisions like: Concrete construction, Conveyor, Cranes and Derricks, Confined space, Pile driving system, working over water, Underground construction, Welding, and Steel erection.
- Ethiopian legislation focuses exclusively on safety role and responsibility of employers and workers only and does not address the role of other entities like clients, architects or engineers.
- American legislations are updated annually, each agency adopt and modify federal regulation through an orderly process and after publication of proposed additions and changes, there is a period in which interested parties submit comment in writing or at public hearing then the proposed regulation may then be modified and then the proposed regulation become an official government policy and procedure after publication and become final regulation with including different professional personnel's thought. Therefore American experience is better and should be a good experience for implementing in Ethiopian, when preparing and publicizing a regulation professionals who had a deep knowledge about the area should be part of the work.
- Although the research carried out for small comparison topics to the whole CHS situations, it could be seen as a path for revising the legislation of our country and as footprint for further research within the specific topic area. A health and safety in the construction industry is a very vital one, as it protects the client, employee, contractor, sub-contractor, general public and customer from any harmful, it should have been seen as a critical element in the construction industry. As long ago in the 1960's, the construction industry has had tremendous development and growth, it is now increasingly important that the HS legislation have been written by the government of Ethiopia which is a good step for the construction industry and those legislations are required to be revised and updated to cope up with the current construction stage and level, in order to minimize the dangers and hazards that can happen as the technology advanced.
- Ethiopian legislation comparing with American in terms of economy: economic level is extremely smaller than America, in terms of human resource (labour): most construction works in Ethiopia are by labour force, in terms of type of equipment type/level and capacity:

Equipment types Ethiopia and America uses are very different in their technologic level and in terms of work methodology: as Americans working method is using equipment and Ethiopian works with labour force it is very different. So, It is better to adopt legislations which can be practicable and feasible on Ethiopia construction industry.

- Internationally, there is a wealth of information and best practice guidelines that construction H&S practitioners can access. However, notwithstanding the information sources that are available, in comparison there is a paucity of information available in Ethiopia.

5.2.Recommendations

In the light of the findings and conclusions of the study, the following recommendations are made:

- Recommends amending the following terms: to specify the name of the “standard” on the Building Proclamation, Building Directive & EBCS 14; specify the name of the “directive” which used on part seven of Labour Proc No. 1156/2019; and clarify the identity of the “concerned body” which is written on section six of EBCS 14.
- Recommends undertaking a review on scope of section eight of EBCS 14 on demolishing work, for providing sufficient information, by considering Ethiopian construction industry.
- Recommends Undertaking a review of adding a note on scope of application for the proclamation to identify its application as, “the proclamation applies to all construction activities, namely buildings, civil engineering, and erection and dismantling work, including any process, operation or transport on a construction site, from the preparation of the site to the completion of the project.”
- Ethiopian legislation focuses exclusively on safety role and responsibility of employers and workers only and does not address the role of other entities like clients, sub-contractors, architects or engineers. Moreover, does not address Government duty at all. Given that the document in effect implies the design professional, clients, subcontractors have no role in the construction process. But, designers and clients do influence HS during design and construction, the attention is more relevant during construction and design. So, the role and responsibility of designers should be included. Moreover, Sub-contractors tends to perform the vast majority of work on construction projects, it should also be focused to assign safety responsibility to subcontractors. Furthermore, Government is very responsible for

enforcement of Health and Safety laws so their role and responsibilities should be included. Therefore, on Ethiopian legislation responsibility for construction Health and Safety should be redistributed to all participants in the construction process.

- Recommends the legislations to include uncovered provisions and detail requirements and criteria for the stated works and materials specified on the legislations and provide minimum qualification requirement for those works and materials Moreover, it is better if it address about material quality, work methodology and safety precautions for materials, chemicals and equipment.
- Recommends undertaking a review to add Legal proceedings which is better to include the procedure for offences against the CH&S laws including prosecutions, sentencing for offences and the use of penalty notice. In creating penalty notice offences for CH&S, the regulator will be able to more effectively and efficiently undertake compliance and enforcement activities for making the law obligatory.
- With the latest technology advancement and trends worldwide all Ethiopian legislations should aim to bring the Ethiopian construction standard as per with the present state-of-the-art, and major benefits which are to be gained in applying this standard for ensuring appropriate level of workmanship and level of health and safety on construction should be considered and National laws and standards related to occupational Safety and Health shall be developed, implemented and reviewed periodically, As the rules and legislation do not completely consider the current construction stage and level, which the previous rules and regulations cannot represent the current situation and variation in mechanism of construction, but our countries legislations are not being reviewed periodically. Therefore the government and responsible organs (specifically Ministry of Works and Urban Development who issues Building Proclamation; Ministry of Labour and Social Affairs who issues Labour Proclamation; Council of Ministers who issues Building Regulation and Ministry of Urban Development, Housing and Construction who issues Occupational Health and Safety Standard (EBCS 14) and Building Directive, should give attention on revising and updating construction Health and Safety legislations of Ethiopia.
- Recommends Occupational Health and safety for construction in Ethiopia to have its own proclamation or regulation alone, as recently construction accidents, hazards and fatalities are critical and serious issue in Ethiopia construction industry.

REFERENCE

- Abebe Dinku. (2005). A Textbook of Building Construction. Addis Ababa University press, Addis Ababa, Ethiopia.
- Ahmed S.M., Kwan J.C., Ming F.Y.W. and Ho D.C.P. (2000). Site safety management in Hong Kong. Journal of Management in Engineering.
- Alhajer M. (2011) Health and Safety in the construction industry: challenges and solutions in the UAE. Unpublished Thesis. Coventry: Coventry University.
- Bogdan Robert. (2007). Qualitative Research for Education; An Introduction to Theory and Methods. Syracuse University. Fifth edition
- Charles D. Reese & James V. Eidons. (2006), Handbook of OSHA Construction safety and health, Second edition.
- Cotton A.P., Sohail, M. & Scott, R.E. (2005). Towards improved labour standards for construction of minor works in low income countries, Engineering, Construction and Architectural Management. Vol. 12 No. 6, pp. 617-632.
- Dawit Sebleworke. (2006). Ministry of labour and social affairs of the Federal Democratic Republic of Ethiopia, Occupational Safety and Health profile for Ethiopia, Addis Ababa.
- Fasil Argaw. (2017). Assessment of Safety and Health Management in High Rise Building in Addis Ababa. Master's thesis, Addis Ababa University, Addis Ababa, Ethiopia.
- Federal Democratic Republic of Ethiopia. (1960). Civil Code of the Empire of Ethiopia (Proclamation No. 165 of 1960). Federal Negarit Gazeta. Addis Ababa, Ethiopia.
- Federal Democratic Republic of Ethiopia. (1995). Constitution of Ethiopia (Proclamation No. 1/1995). Federal Negarit Gazeta. Addis Ababa, Ethiopia.
- Federal Democratic Republic of Ethiopia. (2009). Building Proclamation (Proclamation No. 624/2009). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (2011). Council of Ministers Building Regulation (Regulation No. 243/2011). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (2010). Definition of Powers and Duties of the Executive Organs of the Federal Democratic Republic of Ethiopia Proclamation (Proclamation No. 691/2010). Federal Negarit Gazeta. Addis Ababa, Ethiopia

Federal Democratic Republic of Ethiopia. (1964). Employment Injury Insurance in the Federal Democratic Republic of Ethiopia Proclamation (Proclamation No. 232/1964). Federal Negarit Gazeta. Addis Ababa, Ethiopia

Federal Democratic Republic of Ethiopia. (2002). Environmental Impact Assessment Proclamation (Proclamation No. 299/2002). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (2019). Labour Proclamation (Proclamation No. 1156/2019). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (1977). Labour Right and Expropriation Proclamation (Proclamation No. 127/1977). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (2000). Public Health Proclamation (Proclamation No. 200/2000). Federal Negarit Gazeta. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. (2014). National Occupational Safety and Health Policy and Strategy. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. Ministry of Labour and Social Affairs. (2008). Occupational and Health Directive. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. Ministry of Labour and Social Affairs. (2005). Directive on Prohibition of Activities for Woman & Pregnant Workers. Addis Ababa, Ethiopia.

Federal Democratic Republic of Ethiopia. Ministry of Labour and Social Affairs. Directive on Prohibition of Activities for Young Workers. Addis Ababa, Ethiopia.

- Federal Democratic Republic of Ethiopia. Ministry of Urban Development, Housing and Construction. (2003). Building Directive (Directive No. 5/2003). Addis Ababa, Ethiopia.
- Federal Democratic Republic of Ethiopia. Ministry of Urban Development, Housing and Construction. (2014). Occupational Health and Safety Standard (Ethiopian Building Code Standard 14). Addis Ababa, Ethiopia.
- Frederick Owusu. (2010). Study of occupational safety and health issues involving casual workers on building sites in Ghana, MSc thesis, Kwame Nkrumah University, Ghana.
- HSE, Health & Safety Executive. (2004). Improving Safety and Health in Construction. Retrieved from http://www.hse.gov.uk/research/crr_pdf/2001/crr01387.pdf, retrieved on October, 2004.
- Hughes, P. & Ferret, E. (2008). Introduction to Health and Safety in Construction Industry. Third Edition, Butterworth-Heinemann, Imprint Of Elsevier, USA, Pp 2-4.
- International Labor Organization. (ILO 1947). Convention No. 81/ 1947. “Labour Inspection Convention”. Geneva.
- International Labor Organization. (ILO 1969). Convention No. 129/ 1969. “Labour Inspection (Agriculture) Convention”. Geneva.
- International Labor Organization. (ILO 1981). Convention No. 155, 1981. “Occupational Safety and Health Convention”. Geneva.
- International Labor Organization (ILO 2001), The Construction Industry In The Twenty-First Century. [Http://Www.Ilo.Org/Public/English/Dialogue/Sector/Techmeet/Tmcit01/Tmcitr.Pdf](http://Www.Ilo.Org/Public/English/Dialogue/Sector/Techmeet/Tmcit01/Tmcitr.Pdf), Accessed On March 2019.
- Kothari C. (2004). “Research Methodology: Methods and Techniques” 2nd Edition, New Age International.
- Labour legislation of Russia Federation (2002). Retrieved September 2, 2020. from: <http://www.consultant.ru/tkrf/>

- Lee D. (2004). Generalization of LRFD Design Procedure for Column-Base Plate Connection under Concentric Compressive.
- Leedy P.D. & Ormrod J.E. (2005). "Practical Research: Planning and Design". 8th ed. Pearson upper saddle river.
- Leonhard E Bernold, Nil Guler and M Salim (1993). Analysis of injuries in Construction. Journal of Construction Engineering and Management. 119 (3), 607-621,1993.
- Ministry of Labour and Social Security. (2012). Occupational Health and Safety Law Number 6331 of Turkey.
- Occupational Health and Safety. (2018). In Merriam-Webster.com. Retrieved March 8, 2019, from [https://www.merriam-webster.com/dictionary/Occupational health and safety](https://www.merriam-webster.com/dictionary/Occupational%20health%20and%20safety).
- Occupational Safety and Health Administration. (OSHAct, 1970). United States Department of Labour. United States of America. Retrieved from <http://www.osha.gov/oshaweb>.
- Roger L. Brauer (2006). Safety and health for engineers, Second edition, by John Wiley & Sons, inc.
- Rowlinson Stephen (2003). Hong Kong Construction, Safety Management and the Law. Hong Kong. Sweet & Maxwell Asia
- Rowlinson Stephen (2000). Human Factors in Construction Safety - Management Issues.
- Safe Work Australia (2011). Model Work Health and Safety Regulations. Retrieved September 2, 2020. from <http://www.safeworkaustralia.gov.au/sites/SWA/>
- Seifedin Sermolo. (2014). Study of occupational safety and health in Ethiopian construction industry: a case study of Addis Ababa and Welkite. Master's Thesis, Addis Ababa University, Addis Ababa, Ethiopia.
- Senem Bilir, Emad Ghavam and Liliya Sancak. (2014). The comparison of occupational health and safety legislation of different countries from the view of inspection. Annual occupational ergonomics and safety conference, Istanbul Technical University, Istanbul.

- Seong-man B. (2006). A Study of the Industrial Safety and Health System Improvement Program. Master's Thesis, Chang-won University.
- Solomon Tibebe (2014). The practice and challenges of occupational health and safety in Ethiopia. Master's Thesis, Addis Ababa University, Addis Ababa, Ethiopia.
- Tadewos Awugchew. (2019). Factors affecting implementation of safety regulations, their effects and mitigation measures in building construction project. Master's Thesis, Hawassa University, Hawassa , Ethiopia.
- Tariku Nigussie. (2014). Assessment of building construction safety management. Master's Thesis, Hawassa University, Hawassa, Ethiopia.
- Tauha Hussain Ali (2006) Influence of National Culture on Construction Safety Climate in Pakistan. Griffith University.
- United Arab Emirates Federal Law (1980). Labour Law Number 8, UAE.