ADDIS COLLEGE

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

IMPLEMENTATION CHALLENGES OF SAFETY AND HEALTH REGULATION IN PRIVATE BUILDING CONSTRUCTION PROJECTS (A CASE STUDY IN YEKA SUB-CITY)

A Thesis Submitted to Addis College the School of Graduate Studies in Partial Fulfillment of the Requirements for the Degree of Master of Science in Construction Technology and Management

BY: Eyerusalem Kinfemichael

August, 2024

Addis Ababa, Ethiopia

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Advisor: **Mr.Amlaku Melese**

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Endorsed by:

1. Advisor	Signature	Date
Mr.Amlaku Melese	_____	_____
2. Chairperson	Signature	Date
Dr.Sileshi kore	_____	_____
3. Internal Examiner	Signature	Date
Mr.Semere Yilma	_____	_____
4. External Examiner	Signature	Date
Dr.Argaw Asha	_____	_____
5. School Dean	Signature	Date
Mr.Biruk Tibebu	_____	_____

Declaration

I, the undersigned, declare that the study entitled "Implementation Challenges of Safety and Health Regulation in Private Building Construction Projects (A Case Study in Yeka Sub-City)" is the result of my effort and study that all sources of materials used for the study acknowledged. I have conducted the study independently with the guidance and comments of the research advisor.

This study has not been submitted for any degree in any other university. It is all sources of material used for the thesis have been fully acknowledged and conducted for the partial fulfillment of the Degree of Master of Science in Construction Technology and Management.

Name: Eyerusalem Kinfemichael

Date:

Signature:

Place: Addis Ababa, Ethiopia

Statement of Certification

This is to certify that Eyerusalem Kinfemichael has carried out her project work entitled "Implementation Challenges of Safety and Health Regulation in Private Building Construction Projects (A Case Study in Yeka Sub-City)". This work is original in nature and is suitable for submission for the award of Master of Science in Construction Technology and Management.

Mr.Amlaku Melese	**----------**	**----------**
Advisor name	Signature	Date

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Abstract

The construction Industry can be described as the sum of all economic activities related to civil and building works: their conception, planning, execution, and maintenance. Occupational injuries pose a major public health and developmental problem, which results in serious health, social, and economic consequences for workers and their employers. According to the labor proclamation, every employee has the right to enjoy suitable measures of protection safety, and hygiene at work as the employer is required to take all necessary measures to safeguard the health and safety of workers. This study aimed to assess the implementation challenges of safety regulation in private building construction, the case of the Yeka sub-city. The factors investigated in this study include current occupational safety regulations and ethical problems, workers' awareness, management status, safety clauses on a contract, and communication channels for implementation of safety regulations. A descriptive and explanatory research design was used to attain the objective of the study. The sample size of the study was 54 and a purposive sampling approach was used. Multiple regression analysis using SPSS version 26 was conducted to analyze the data. A structured questionnaire was used to collect quantitative data on the factors of safety regulation implementation practice in the study area. The data were analyzed qualitatively & quantitatively using descriptive statistics. The findings of the study on factors of safety regulation enforcement showed that independent variables such as current occupational rules safety regulations, workers' awareness, ethical problem management status, clauses on the contract, and communication channels have a positive significant effect on the implementation of safety regulation. The extent of following the existing safety regulations was found to be good but visible gaps that need improvements in incorporating mandatory safety clauses, communication channels, involvement of management bodies, providing safety equipment and facilities, and in the creation of awareness for workers and other concerned bodies. This research recommended that to enhance the implementation of safety regulation it is important to regularly assess existing regulations, develop and disseminate a clear guideline on safety protocols and best practices, offer regular training sessions, establish a regular schedule for safety inspections, collaborate with construction companies, to formulate safety and health policies, forms and checklists, and establish a safety committee.

Keyword: Safety Regulation, Safety, Safety and Health Management

Contents

Table of Contents

List of Table

List of Figure

List of Acronyms

ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
FFH	Falling From Height
FIDIC	Federation International des Ingénieurs-Conseils
GDP	Gross Domestic Product
ILO	International Labor Organization
MoLSA	Ethiopian Ministry of Labor and Social Affairs
MoUDC	Ministry of Urban Development and Construction (MoUDC
MOUDHC	Ministry of Urban Development, Housing, And Construction
OSH	Occupational Safety Health
PPE	Personal Protective Equipment
SH	Safety and Health
VR	Virtual Reality
WHO	World Health Organization

1. Introduction

This chapter provided the reader with an overview of the entire thesis. The study's background, problem statements, general objective, specific objectives, research questions, scope of the study, significance of the study and limitations are all covered in this thesis format.

1.1 Background of the Study

The Construction Industry can be described as the sum of all economic activities related to civil and building works: their conception, planning, execution, and maintenance. Such works normally comprise capital investment in the form of roads, railways, airports, ports and maritime structures, dams, power generating stations, irrigation schemes, health centers and hospitals, educational institutions, warehouses, factories, offices, and residential premises.

Safety at all job sites does not just occur. A safe operation is organized, clean, and efficient. If all the employees view accidents in the same way as we consider all other aspects of the company operations, we are in an excellent position not only to control accidents but also to improve the total performance of our company. Therefore, it is of utmost importance that all aspects of our safety management be strictly enforced and followed. Although it is difficult to obtain accurate statistics in an industry in which many accidents go undetected and unreported, in many countries known fatal accidents, and those involving loss of working time, frequently exceed those in any other manufacturing industry (Meena et al., 2013). Safety is aspect of employee, welfare that has been separately identified as being a significant area of welfare provision. Occupational injuries pose a major public health and developmental problem, which results in serious health, social, and economic consequences for workers and their employers. According to the labor proclamation, every employee has the right to enjoy suitable measures of protection safety, and hygiene at work as the employer is required to take all necessary measures to safeguard the health and safety of workers.

To provide occupational health services to all working people worldwide, regardless of the type of employment, size of the workplace, location, or economic sector, WHO and ILO jointly launched the Development of Basic Occupational Health Services (BOHS) initiative (Rantanen, 2005). The convention outlines the preventive and protective measures to the effect that appropriate precautions shall be taken to ensure that all workplaces are safe and without risk of injury to the

safety and health of workers. Emphasis is also made in so far as information and training are concerned to the effect that workers shall be adequately and suitably informed of potential safety and health hazards to which they may be exposed at their workplace and instructed and trained in the measures available for the prevention and control of, and protection against those hazards (Safety and Health in Construction Convention, 1988).

The state of the construction industry in a country is symptomatic of the state of its national economy. Put another way, the fate of any national economy cannot be separated from that of the construction industry. This is a consequence of the forward and backward linkages the construction sector forges with the rest of the economy (Drewer, 1980). The backward linkages refer, for instance, to the construction materials and services sectors of the economy. The forward linkages refer to the economic activities that result from the use of constructed buildings and facilities. Further, the national laws or regulations shall provide that worker shall have the right and the duty 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 adopted as they may affect safety and health and comply with the prescribed safety and health measures.

The present industrial development level of Ethiopia, compared to other developing countries, is low. Industry plays a leading role in the realization of the Agricultural Development Lead Industrialization Strategy of the country. This is because of its economic and technological contribution in supplying inputs such as raw materials, machinery, hand tools, spare parts, components, and construction materials as well as in expanding infrastructure and providing materials and technical services for agriculture and other economic sectors (Tekele Hagos and Mahelet Shewangzaw, 2009).

The construction sector is considered one of the most dangerous economic sectors for workers. To alleviate this governments have developed various laws and regulations to control the hazards that construction workers face. These regulations impose safety and health requirements that must be enforced at all workplaces under both domestic and international legal systems. However, the implementation of these regulations faces many challenges. Gebre et al., 2018; Abebe and Tsegaye, 2020; Tadesse and Kassa, 2019) investigated the challenges in implementing safety regulations in Ethiopia. The researchers indicated that inadequate awareness creation and safety training, lack of enforcement mechanisms, lack of personal protective equipment (PPE), corruption, and others as barriers to implementing safety regulations. However, these research works did not consider the

challenges in private high-rise building construction projects. High-rise construction buildings have a unique feature than short construction buildings because of their height. This height of the building has its challenge in the implementation of the safety regulations. This research work investigated the challenges in implementing safety regulations in the case of the Yeka sub-city.

1.2 Statement of the Problem

Due to accidents at any construction site, there are injuries to one or more workers which may lead to the death of one or more workers. No doubt the compensation in the form of insurance is paid to the worker; medical assistance is granted; still there are always certain indirect expenses in any form; that the contractor has to bear (Meena et al., 2013).

The tendency to protect self, family, and friends is a natural one that has been evident throughout the history of the human race. However, people have invariably been willing to take chances in exchange for possible gains sometimes with tragic consequences. Accident prevention is not the priority that it should be, for the most part, due to ignorance of hazards and the magnitude and consequences of potential accidents. The question might be asked whether it is necessary to construct and enforce safety and health standards, codes, and regulations. It seems that while people in positions of responsibility should consider the welfare of others as a matter of conscience, they frequently fail to uphold standards of safety and health, either from ignorance or selfishness (Haupt, 2001).

Developing countries like Ethiopia are striving hard to improve their basic amenities by building schools, hospitals, housing complexes, shops, offices, highways, power plants, industries, bridges, and other infrastructures. However, all these construction activities are carried out by unskilled labor forces at a cheap rate. Occupational injuries and accidents among these workers are high due to illiteracy, poverty, lack of health and safety training, and information on health hazards and risks at the workplace. Such workers are known to face rapidly changing workplaces, a high degree of competition, and bouts of unemployment (Thomas, 1992). Hence, in developing countries, the occupational health and safety hazards faced by construction workers are greater than those in industrial countries. The impact is also 10 to 20 times higher in these countries, where the greatest concentration of the world's workforce is located (Dong, 2005).

There are some research works on the challenges of safety regulation implementations (Gebre et al., 2018; Abebe and Tsegaye, 2020; Tadesse and Kassa, 2019). Gebre et al. (2018) examined the

challenges of safety regulation enforcement in high-rise building construction projects in Ethiopia. The researcher identified inadequate safety training, lack of enforcement mechanisms, and corruption as significant barriers to effective safety regulation implementation as challenges for safety regulation implementation. Tadesse and Kassa (2019) also assessed the role of government regulations in ensuring safety and health standards in high-rise building construction in Ethiopia. Tesfaye, W. S. (2017) assessed the safety practices involving workers in public building projects in the case of Addis Ababa public building construction projects. Tesfaye, W. S. (2017) concluded that the safety of workers in Addis Ababa public building construction projects is classified as unsafe practice and requires high improvement.

Private construction in urban areas, such as Yeka Sub-City, often faces significant challenges in meeting safety regulations, thus risking the well-being of inhabitants and the structural integrity of buildings. Despite the presence of regulatory frameworks, the implementation of safety standards in private building construction projects remains a persistent concern. These challenges raise questions about the effectiveness of current enforcement mechanisms and the ability of stakeholders to ensure compliance with safety standards. Even if there are studies that assess the effect of individual factors on implementing safety regulations. There is no previous work that collectively investigates the effect of the communication channel, workers' awareness, knowledge of safety regulation and ethical problems, management status, and safety clauses in contracts on the implementation of safety regulation. Therefore, this research paper assessed the implementation challenges of safety regulation in private building construction projects: The case of the Yeka sub-city.

1.3 Objective

1.3.1 General Objective

The general objective of this research is to assess the implementation challenges of safety and Health regulation in private building construction projects, in the case of the Yeka sub-city.

1.3.2 Specific Objective

1) To evaluate the extent to which private building construction projects in Yeka Sub-City follow existing safety and Health regulations.
2) To identify the implementation challenges of existing safety and Health regulations.

3) To formulate viable measures to address identified implementation challenges to enhance the effectiveness of safety and Health regulation in private building construction within Yeka Sub-City.

1.4 Research Questions

1) How private building construction projects in Yeka Sub-City comply with existing safety and Health regulations?

2) What are the challenges in implementing safety and Health regulations in private construction projects in Yeka-sub city?

3) What remedial measures can be proposed to address the identified implementation challenge to enhance the effectiveness of safety and Health regulation in private building construction within Yeka Sub-City?

1.5 Scope of the Study

The scope of the study on the implementation challenges of the last 5 years of safety and health regulation in G+10, 11, 13, 15, 17, 19, 20, 21, and 25 private building construction projects within Yeka Sub-City encompasses several key aspects. Firstly, the study was focus on evaluating the adherence of private building construction projects to existing safety and helath regulations within the specific geographical area of Yeka Sub-City. This involved assessing the extent to which safety regulations are followed during various stages of construction, including planning, design, and execution. Additionally, the study assessed the awareness levels of stakeholders regarding safety regulations and their capacity to implement and enforce them. This involved gathering insights from various industry professionals involved in private building construction projects within the Yeka Sub-City.

1.6 Significance of the Study

The significance of this study lies in its potential to make substantial contributions to the field of private building construction safety and health regulation, particularly within the context of Yeka Sub-City. By identifying implementation challenges and proposing remedial measures, this research can lead to enhanced safety standards in private building construction projects. This, in turn, can mitigate risks associated with structural failures, accidents, and hazards, ultimately safeguarding the lives and well-being of residents and workers. Moreover, the findings can inform strategies to improve compliance with safety and Health regulations and strengthen enforcement

mechanisms, contributing to more effective monitoring and enforcement of safety standards by relevant authorities. Addressing implementation challenges identified in the study can help reduce risks and costs associated with non-compliance, including property damage, financial losses, legal liabilities, and reputational damage. Furthermore, by fostering collaboration and communication among stakeholders involved in private building construction, this research can promote a conducive environment for sustainable development and urban growth. Ultimately, the significance of this study lies in its potential to promote safer, more resilient, and sustainable private building construction practices in Yeka Sub-City, benefiting both the community and the broader urban environment.

1.7 Limitations of the Study

The study on the implementation challenges of safety and Health regulation in the last 5 years of private building construction projects in Yeka Sub-City is subject to several limitations. Firstly, the scope of the study is confined to a specific geographical area, and time potentially limits the generalizability of findings to other urban contexts or construction sectors. Additionally, access to comprehensive data on construction projects and regulatory enforcement activities was limited to within the last 5 years, impacting the depth of analysis and the representativeness of results. Furthermore, constraints such as time, resources, and access to stakeholders may restrict the sample size, potentially affecting the breadth of perspectives captured. Moreover, stakeholders' responses may be influenced by bias, as their perspectives may be shaped by their interests and experiences.

1.8 Organization of the Thesis

This document consists of five main chapters. The first chapter focuses on the background of the study, the statement of the problem, the objectives of the research, the research questions, the scope of the study, the limitations of the study, and the significance of the study. The second chapter delves into literature reviews. The third chapter addressed the research methodology, answering the purpose of the research goal. It includes the research design, research approach, target population, sample size, data collection sources, and data analysis method. Subsequently, the outcomes and discussions were presented in the fourth chapter. Furthermore, the results of this chapter were showcased through tables, graphs, and pie charts. Finally, conclusions and recommendations were drawn in the fifth chapter.

2. Literature Review

In this section, this paper dive into the reviewed literature encompassing theories, empirical studies, and the conceptual framework that provides substantiation for the study's independent variables such as Ethical Problems, Worker's Awareness, Communication Channel, Clauses on Safety and Monitoring, and Management Status, and dependent variable Implementation of Safety Regulation. Additionally, a brief overview is provided regarding the interconnection between safety regulations.

2.1 Related Works

The construction industry is pivotal for urban development, with tall buildings symbolizing economic growth and modernization. However, the construction of private buildings entails intricate safety challenges that necessitate rigorous adherence to safety regulations. This literature review delves into the complexities surrounding the implementation of safety regulations in such constructions, shedding light on the inherent challenges and exploring potential solutions.

A study by Gebre et al. (2018) examined the challenges of safety regulation enforcement in high-rise building construction projects in Ethiopia. The researchers identified factors such as inadequate safety training, lack of enforcement mechanisms, and corruption as significant barriers to effective safety regulation implementation. They emphasized the need for improved training programs for construction workers and enhanced regulatory oversight to ensure compliance with safety standards. Similarly, Tadesse and Kassa (2019) investigated the role of government regulations in ensuring safety and health standards in high-rise building construction in Ethiopia. The study highlighted issues such as weak implementation of safety regulations, limited resources for regulatory agencies, and a lack of awareness among stakeholders about safety requirements. The authors recommended collaborative efforts between government agencies, industry stakeholders, and international organizations to strengthen safety regulation enforcement and promote a culture of safety in the construction sector.

Additionally, a study by Abebe and Tsegaye (2020) focused on the challenges of implementing safety regulations in tall building construction projects in Ethiopia's capital, Addis Ababa. The researchers identified factors such as resource constraints, inadequate training programs, and the

informal nature of the construction sector as key impediments to effective safety regulation compliance. They proposed measures such as increasing government investment in safety training and awareness campaigns and enhancing collaboration between public and private sector stakeholders to address these challenges.

Lam et al. (2019) conducted a study in Hong Kong to investigate the challenges faced by contractors in complying with safety regulations in high-rise building construction. The research identified factors such as tight construction schedules, limited site space, and subcontractor coordination issues as significant barriers to safety regulation implementation. The authors recommended measures such as improved planning and coordination among project stakeholders to address these challenges effectively. In a study by Song et al. (2020) conducted in South Korea, researchers examined the challenges of safety regulation enforcement in high-rise building construction projects. The study highlighted issues such as inadequate safety training, insufficient oversight by regulatory authorities, and a lack of safety culture among workers as key obstacles to effective safety regulation compliance. The authors emphasized the importance of strengthening regulatory enforcement mechanisms and enhancing safety awareness programs to improve safety outcomes in tall building construction.

Similarly, a study by Zhang et al. (2018) focused on safety regulation challenges in high-rise building construction projects in the United States. The researchers identified factors such as cost pressures, subcontractor turnover, and resistance to change within the industry as significant barriers to safety regulation implementation. They suggested strategies such as incentivizing safety performance, increasing penalties for non-compliance, and promoting safety leadership to overcome these challenges and improve safety outcomes.

2.1.1 Regulatory Compliance in Construction

Safety regulations serve as the backbone of construction projects, aiming to protect workers, occupants, and assets. Nonetheless, ensuring compliance with these regulations is a formidable task, particularly in privately funded projects driven by profit motives (Gillen et al., 2017). The efficacy of safety regulations hinges on the commitment of stakeholders to prioritize safety over economic considerations.

2.1.2 Tall Building Construction Complexity

The construction of tall buildings introduces a myriad of complexities, ranging from structural intricacies to logistical challenges. Smith and Tam (2018) underscore the technical expertise required to address safety risks inherent in tall building construction. The fragmented nature of the construction industry exacerbates these challenges, necessitating seamless collaboration among stakeholders to ensure safety compliance.

2.1.3 Financial Constraints and Cost-Benefit Analysis

Financial considerations often pose a dilemma in construction projects, where safety investments compete with cost-saving measures. Hinze et al. (2016) emphasize the inherent tension between safety expenditures and financial viability, particularly in competitive real estate markets. Balancing safety imperatives with economic constraints remains a pervasive challenge in private building constructions.

2.1.4 Enforcement and Monitoring Mechanisms

Effective implementation of safety regulations relies on robust monitoring and inspection mechanisms. However, regulatory agencies encounter resource constraints and capacity limitations, particularly in emerging economies (Tefera et al., 2019). Weak enforcement mechanisms, coupled with regulatory loopholes, undermine efforts to ensure compliance with safety standards.

2.1.5 Community Engagement and Stakeholder Collaboration

Stakeholder collaboration plays a pivotal role in fostering a safety culture within the construction industry. Fong et al. (2020) advocate for community engagement to raise awareness about safety issues and promote accountability among stakeholders. Meaningful collaboration among government agencies, developers, contractors, and local communities is imperative to address implementation challenges effectively.

2.2 Classification of Building Construction Industry

The classification of the construction industry serves as a foundational framework for understanding its diverse facets, including the implementation challenges of safety regulation in private building construction projects. This literature review delves into various classification

systems utilized in the construction sector, providing insights into their implications for safety regulation enforcement.

2.2.1 Classification Systems in Construction

The classification of the construction industry encompasses a range of typologies, each tailored to address specific aspects of construction activities. One commonly utilized classification system is based on the type of construction projects, categorizing them into residential, commercial, industrial, and infrastructure projects (Smith et al., 2019). This classification provides a broad overview of the construction landscape, highlighting the diversity of projects undertaken within the industry.

2.2.2 Segmentation by Building Height

A pertinent classification criterion for understanding the challenges of safety regulation implementation is the segmentation of construction projects based on building height. Tall building construction, characterized by structures exceeding ten stories, presents unique safety challenges that warrant specialized attention (Smith & Tam, 2018). The heightened risks associated with tall buildings necessitate stringent safety regulations tailored to address structural complexities and logistical challenges.

2.2.2 Regional Variations in Construction Practices

The classification of the construction industry also varies across regions, reflecting differences in regulatory frameworks, cultural norms, and socio-economic factors. For instance, the construction sector in emerging economies like Ethiopia may exhibit distinct characteristics compared to developed countries (Tefera et al., 2019). Understanding regional variations in construction practices is essential for tailoring safety regulations to local contexts and addressing implementation challenges effectively.

2.2.3 Impact of Construction Industry Classification on Safety Regulation

The classification of the construction industry influences the formulation and implementation of safety regulations, particularly in the context of private building construction. Regulatory agencies must account for the diverse nature of construction projects and adopt targeted approaches to address safety risks inherent in tall building construction (Hinze et al., 2016).

Failure to recognize the unique challenges posed by tall buildings may undermine safety regulation effectiveness and compromise worker and occupant safety.

2.2.4 Challenges in Safety and Health Regulation Implementation

The classification of the construction industry sheds light on the specific challenges encountered in implementing safety regulations in private building construction. Financial constraints, regulatory enforcement gaps, and stakeholder coordination issues are among the prominent challenges that hinder compliance with safety standards (Gillen et al., 2017). Addressing these challenges requires a nuanced understanding of the classification systems governing the construction industry and the development of context-specific regulatory interventions.

2.3 Building Construction Projects

Building construction projects involve the planning, design, procurement, construction, and maintenance of various types of buildings, ranging from residential homes to commercial complexes and industrial facilities. These projects are complex undertakings that require the coordination of numerous stakeholders, including architects, engineers, contractors, subcontractors, suppliers, and regulatory authorities. This overview provides insights into the key phases, processes, and challenges associated with building construction projects.

2.3.1 Relation of Safety and Health Issues Related to Each Phases of a Project

Building construction projects typically follow a series of phases, each characterized by specific activities and deliverables:

Pre-construction Phase: In this phase, the project's scope, budget, and schedule are defined, and initial planning activities are undertaken. This may include site selection, feasibility studies, conceptual design, and securing necessary permits and approvals. The pre-construction phase is a critical stage in any construction project that greatly influences safety and health outcomes. During the pre-construction phase, potential hazards can be identified and assessed, safety considerations incorporated into the design, and safety policies and procedures will be established.

Design Phase: During the design phase, detailed architectural and engineering drawings are prepared, specifying the layout, dimensions, materials, and systems to be used in the construction

of the building. Design development, value engineering, and coordination with various consultants are key activities in this phase. In design phase, potential hazards can be identified and assessed, choosing safe, environmentally friendly, and non-toxic materials. Effective design can minimize risks associated with falling objects, electrical hazards, and other dangers that workers might face during construction and future operations.

Procurement Phase: The procurement phase involves the selection and acquisition of materials, equipment, and services required for construction. This may include issuing requests for proposals (RFPs), evaluating bids, negotiating contracts, and awarding work to contractors and suppliers. The selection of reputable contractors and suppliers who have a strong safety record is crucial to reduce risks related to unsafe practices and the provision of hazardous materials. The procurement phase involves selecting materials and equipment that meet safety standards. Understanding the health and safety implications of materials, such as hazardous substances or poorly designed equipment, can minimize risks during construction and in the long-term use of the building.

Construction Phase: The construction phase is where the actual building work takes place. This includes site preparation, foundation construction, erection of structural elements, installation of building systems (e.g., plumbing, electrical, HVAC), and interior finishes. Project management and quality control are critical aspects of this phase to ensure that work is completed safely, on time, and within budget. This phase is critical in terms of safety and health issues due to the complex environment and the multitude of activities that take place. This phase involves various activities that present different hazards, including physical, chemical, and ergonomic risks. Proper hazard identification and risk assessment are essential in mitigating potential dangers to workers. In this phase compliance with occupational safety and health regulations (OSHA) is done. In addition, this phase is creating an opportunity to implement safety training programs for workers.

Post-construction Phase: Once construction is complete, the building undergoes final inspections, testing, and commissioning to ensure that it meets regulatory requirements and functional specifications. Occupancy permits are obtained, and the building is handed over to the owner or operator. Ongoing maintenance and facility management activities may also be

initiated during this phase. This phase is crucial for ensuring the ongoing safety and health of the building's occupants, maintenance personnel, and the surrounding community. This phase is essential for ensuring compliance with building codes, safety standards, and health regulations. This phase is essential for evaluating the building's impact on the surrounding environment.

2.3.2 Implementation Challenge for Building Construction Projects

Construction projects involving buildings present unique implementation challenges due to their scale, complexity, and structural requirements. This review highlights some of the key challenges encountered in the implementation of such projects, focusing on aspects such as safety regulation compliance, structural integrity, project management, and stakeholder coordination.

Implementing urban building construction projects is often fraught with various challenges due to the complex nature of urban environments and the unique demands of construction in densely populated areas. Below are some of the key challenges faced during the implementation of urban building construction projects:

Limited Space: Urban areas typically have limited space available for new construction projects. This constraint can make it challenging to find suitable sites for building development and may require innovative design solutions to maximize space utilization.

Zoning and Regulatory Requirements: Urban construction projects must comply with zoning regulations, building codes, and other regulatory requirements set by local authorities. Navigating these regulations can be time-consuming and complex, especially in densely regulated urban environments.

Infrastructure Constraints: Urban areas often have aging infrastructure systems, including roads, utilities, and public transportation networks. Coordinating construction activities with existing infrastructure and mitigating disruptions to essential services can be challenging and may require extensive planning and coordination with local authorities.

Traffic and Transportation: Construction activities in urban areas can impact traffic flow and transportation routes, leading to congestion and delays. Minimizing disruptions to traffic and

coordinating construction schedules with public transportation services are essential to mitigate these challenges.

Community Engagement and Stakeholder Management: Urban construction projects often affect surrounding communities and stakeholders, including residents, businesses, and local organizations. Engaging with these stakeholders, addressing concerns, and managing community expectations are critical aspects of successful project implementation.

Environmental Considerations: Urban construction projects must adhere to environmental regulations and sustainability standards to minimize their ecological footprint. Managing construction waste, reducing noise and air pollution, and implementing green building practices are essential for mitigating environmental impacts.

Cost and Financing: Urban construction projects tend to be more expensive due to higher land costs, regulatory compliance requirements, and logistical challenges. Securing financing and managing project costs are significant challenges for developers and investors involved in urban building construction.

Workforce Availability and Skills: Skilled labor shortages and competition for construction talent can pose challenges for urban construction projects. Recruiting and retaining qualified workers, as well as providing ongoing training and development, are essential for ensuring a skilled workforce capable of meeting project demands.

Risk Management and Resilience: Urban construction projects are susceptible to various risks, including natural disasters, security threats, and economic downturns. Implementing robust risk management strategies and building resilient structures are crucial for mitigating these risks and ensuring project success.

Technology Adoption and Innovation: Embracing technology and innovation can enhance the efficiency, productivity, and sustainability of urban construction projects. However, integrating new technologies and processes into traditional construction practices may encounter resistance and require organizational change management.

2.3.2.1 Challenges in Safety and Health Regulation Compliance

Ensuring compliance with safety regulations is paramount in private building construction projects to safeguard the lives of workers and occupants. However, the implementation of safety measures faces challenges such as budget constraints, inadequate training, and enforcement gaps Loosemore, M., & Lim, B. (2016). Balancing safety requirements with cost considerations and maintaining a culture of safety throughout the project lifecycle are ongoing challenges for project stakeholders.

2.3.2.2 Structural Integrity and Engineering Complexity

Tall buildings require sophisticated structural engineering solutions to withstand gravity loads, wind forces, and seismic events. Designing and constructing tall buildings involve challenges related to structural stability, material selection, and construction techniques Odeck, J. (2014). Ensuring the structural integrity of buildings requires close collaboration between architects, engineers, and contractors to address design complexities and construction challenges effectively.

2.3.2.3 Project Management and Coordination

Managing building construction projects involves coordinating multiple activities, stakeholders, and resources to ensure timely completion within budgetary constraints. Project management challenges include scheduling conflicts, procurement delays, subcontractor coordination, and logistics management, Aziz, R. F., Abdel-Hakam, A. A., & Mousa, M. A. (2021). Effective project management strategies, such as employing advanced scheduling techniques and implementing robust communication protocols, are essential for mitigating risks and overcoming implementation challenges.

2.3.2.4 Stakeholder Coordination and Communication

Stakeholder coordination is critical in building construction projects, given the involvement of various parties, including developers, investors, contractors, architects, engineers, and regulatory authorities. Challenges arise from divergent interests, communication breakdowns, and conflicting priorities among stakeholders Shrestha, R. (2020). Building effective relationships, fostering open communication channels, and establishing clear roles and responsibilities are essential for successful project implementation.

2.3 OSH in the Ethiopian Construction Industry

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

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

Due to FFH, workers who fall from a height are more likely to sustain injuries to their upper bodies in particular (Selam Kassahun, 2017). The main reasons for accidents in Ethiopia are FFH, working without PPE, trench collapse, defective or misused equipment, struck by an object.

Lastly, electric shock is also a severe problem in Ethiopia. Further, inadequate site supervision is the main reason for accident occurrence in Ethiopia (Lucy Feleke, et al., 2016). Seifedin (2014) stated that as construction in developing countries is more labor-intensive than in the developed world, without a major difference between large & small contractors, unsafe conditions exist in many sites in Ethiopia. Due to this, workers are subjected to numerous hazards. There are no training programs, safety agendas in meetings, & orientations for the new staff in many sites. So, employees are forced to learn from their own bad experiences. Similarly, there is also a lack of medical facilities & substandard sanitation.

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

2.4 Safety and Health Laws and Enforcement Practices in Ethiopia

The issue of leading SL at work on a legal basis in Ethiopia dates back to the 1940s when the first legal instrument Proclamation No. 58/1945 promulgated. The origin of this law was a result of the advent of development that took place in the country. The country's law is framed on the fundamental principles underlined by the notable ILO conventions on labor inspection. Further, a comprehensive law on OSH management was substituted in 1964, i.e., Proclamation 232/1964. In Ethiopia, all laws are adopted from most European countries, especially France and the UK (Dawit Seblework, 2006). OSH law in Ethiopia was enacted at different times. It is better to start a review of the country's different legal documents as follows:

2.4.1 The FDRE Constitution

In any country of the world, governments need laws to manage the people of their country. Managers and politicians see the law as a means to attain their economic, cultural, political, and social policies and a tool for developing and fostering regulatory behavior in society. According to Hefer (2014), the law governs all parts of humans' lives in any given society, and it is of utmost usefulness that the viewers understand it to foster compliance & effectiveness. In Ethiopia, the supreme law basis is the constitution promulgated by Proclamation No. 1/1995. This law has several articles on matters of conducive work in general & of SH & environment in particular.

As stated in Article Nine, the supreme law of the country is the Constitution. In this article, any law customary practice, or decision of an organ of the state or a public official that breaches this constitution shall be of no effect. All international agreements endorsed by Ethiopia are an integral part of the law of the land, including all the ILO conventions endorsed by the country.

Also, Article thirteen highlights that the citizens' fundamental human rights and freedom shall be interpreted in a manner conforming to the principles of the Universal Declaration of Human Rights. Article forty-two of the FDRE Constitution spells out the rights of labor to form

associations to improve their conditions of employment and economic well-being. The right includes the right to form trade unions and other associations to bargain collectively with employers or other organizations that affect their interests. Similarly, the constitution provides this article that workers have the right to reasonable limitation of working hours, rest, leisure, periodic leaves with pay, remuneration for public holidays, and a healthy & safe work environment. Article forty-four of the constitution declares environmental rights and says that all persons have the right to a clean and healthy environment. About economic points, Article 89 (8) states that the government shall endeavor to protect and promote the health, welfare & living standards of the working population of the country.

Article 92 (1) States, the government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment. Fulfilling SH's issue is one of the basics of international human rights in which Ethiopia is accepted as a UN member country via ILO. The basic concepts of SH of other developed & developing countries' experiences are included in the Ethiopian constitution. This constitution is used as a foundation for the country's laws concerning OSH for responsible governmental authorities.

2.4.2 The Ethiopian Civil Code

The Civil Code of Ethiopia was promulgated during the time of Emperor Haile Selassie-I, the last king of the country, on May 5, 1960, by Proclamation 165 of 1960. This code indicated the responsibilities and duties of the employer about Safety and Health (SH). Article 2548 of the civil code states the employer's responsibility as "the employer should take necessary measures as are required by the special circumstances of the work to safeguard the life, physical integrity, health and moral standing of the employee.

Also, the employer shall, in particular, arrange the premises and keep up the equipment in his undertaking with this object in view, under the general practice and technical requirements for the working condition." In addition, Article 2549 of the code stipulates those accidents arising from work; in this condition, the employer shall be liable for accidents which the employee suffers from his work. Articles 2550 and 2551 clearly state the responsibility of the employer during the time of an accident on workers as; the employer shall be liable for accidents which the

employee suffers arising from activities which he performs in the interests of the undertaking, notwithstanding that the employer has not ordered these activities.

2.4.3 The Ethiopian Labor Law

The Ethiopian Ministry of Labor and Social Affairs (MoLSA)has coordinated the nation's labor and social affairs and implemented programs thereof (Chilot, 2019). MoLSA prepared and endorsed different laws for the protection and well-being of the country's workers.

One of the laws prepared by the ministry and endorsed by a higher constitutional entity is the Labor law of the nation. Currently, Labor Proclamation No. 1156/2019 is the principal national law on labor issues & functions as of the 5th day of September 2019. Proclamation No. 1156/2019 covers all establishments with one or more workers. It addresses a wide range of issues such as employment relations and contracts, obligations of employers and workers, wages and working time, working conditions and occupational safety and health, occupational injuries, labor disputes, and conciliation. It also sets out provisions for the labor inspection service, giving inspectors wide-ranging duties and enforcement powers and prohibiting obstruction of inspectors in performing their duties & other necessary issues concerning workers' rights, duties & benefits. Under article 12, 5 & 6 of labor law 1156/2019, the employer and worker's obligation are clearly stated as the employer is responsible for taking all the necessary OSH measures. Similarly, abiding standards & directives given by the appropriate authorities in respect of these measures are obliged to cover the cost of medical examination of the worker whenever required by law or the appropriate authority.

Likewise, in article 13, numbers 5 & 6, the duty of workers is stated. Article 92 states that the fundamental obligation of an employer to put in place all the necessary measures to ensure, workplaces are safe, healthy, and free from any danger to the wellbeing of workers. In the same article, the employer is obliged to take, in particular, the subsequent measures to safeguard the SH of the workers.

Also, comply with the work-related SH requirements provided for in the Proclamation, take appropriate steps to ensure that workers are adequately instructed and notified concerning the hazards of their respective works, and assign safety officers, and establish an OSH committee,

provide workers with PPE, clothing, and other materials and instruct them of their use, register employment accidents and occupational diseases and report the same to the labor inspection service, arrange, according to the nature of the work, at his own expense for the medical examination of newly employed workers and those workers engaged in hazardous work, as may be necessary except for HIV/AIDS unless and otherwise, the country has an obligation of an international treaty to do so, ensure that the workplace and premises of the undertaking do not pose threats to the SH of workers, take appropriate precautions to ensure that all the processes of work in the undertaking shall not be a source or cause of physical, chemical, biological, ergonomic and psychological hazards to the SH of the workers and finally implement the instructions given by the Competent Authority under this Proclamation. In Article 93, the law provides the obligations of workers about the required cooperation and putting into practice the Regulation and instruction given by the employer to ensure safe health and working conditions at workplaces. The following are the primary obligations set by the law for workers to take:

- To cooperate in the formulation of work rules to safeguard the worker's health and safety,
- To inform forthwith the employer of any defect related to the appliances used and incidents of injury to the health and safety of workers that he is aware of in the undertaking;
- Report to the employer any situation, which he/she may have a reason, to believe could present a hazard and which he/she cannot avoid on his/her own or any accident to health that arises in the course or in connecting with work,
- To make proper use of all safety devices & other appliances furnished for the protection of the SH of others,
- To obey all the SH instructions issued by the employer or by competent authorities, In the same law, specified that no worker might inhibit with remove, displace, damage, or destroy any safety devices or other appliances furnished for his/her protection or the protection of others and may not hinder any method or process adopted to abate the work-related hazard. This law has specified occupational injuries in its Articles 95-112 as follows:
- The provisions start by defining working injury, accident, and occupational diseases.
- The law also specifies that an employer shall be liable for all working injuries on workers except those caused intentionally by workers in case of non-obedience to safety orders, nonobservance of accident avoidance rule & injuries caused by being intoxicated. This law

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

The degree of permanent impairment and temporary partial impairment is fixed under the assessment table prescribed by directives issued by the MoLSA. Besides, the provision states that a competent medical board shall use the assessment table, to determine the extent of the degree of disablement as far as possible within twelve months from the date of injury. Per the provision of Articles 104-106, details of special obligations, types of benefits, and duration of benefits liability are put on the employer.

It also stated that the injured worker's medical benefits should be withdrawn following the Medical Board's decision. Articles 107-110 have also clearly put that the cash benefit that the worker ought to provide, i.e., periodic payment during temporary impairment, impairment person, or privilege compensation in case of permanent impairment and survivors' pension to satisfy or compensation to dependent where the worker dies. The law has also clearly indicated that the maximum compensation upon the death of the worker due to a fatal accident is to be five times his annual salary. In this case, the employer's liability can be managed by a pension scheme for state-owned enterprises or insurance schemes arranged by enterprises for private-owned enterprises.

An employer shall pay a lump sum of damage compensation to workers who are neither covered by pension law nor insurance scheme. Articles 177-179 have spelled out the labor Inspection Services, powers, and duties of labor inspectors & Measures to be taken by labor inspections. Article 185 states that the administrative measures on those who breach the provisions of Article 19 of this Proclamation will fines from Birr 5,000 up to Birr 10,000 if the violation is for the first time, from Birr 10,000 up to Birr 15,000 if it is committed for the second time & from Birr 15,000 up to Birr 30,000 it is committed for the third time.

Whereas if the act is committed more than three times may result in the closure of the undertaking. Inspectors are appointed by MoLSA and BoLSA to follow the activities of the organization SH with the labor law. Only 530 labor inspectors were assigned by MoLSA for Ethiopia & 135 labor inspectors for Addis Ababa city. Furthermore, labor inspection services are expected to be conducted in working places to follow the applicability of the Proclamation in

every aspect. As mentioned in the law, the offices have only 530 inspectors in MOLSA and 135 in BOLSA. Accordingly, as per the report, BOLSA in 2016-2019 2790, 2843 & 3260 labor inspection was conducted in industries in Addis Ababa. Out of, this only 8% were conducted in construction sites, especially in city Administration housing projects.

In this proclamation, article 92 stated that the fundamental obligation of an employer is to put in place all the necessary measures to ensure, workplaces are safe, healthy, and free from any danger to the well-being of workers. However, the researcher observed that the responsible body does not follow the mentioned issue in the selected site for this study. Correspondingly, this Proclamation was endorsed recently & came up with an amendment of fines stated in Article 184 of the 377/2003 proclamation by Article 185 (c) from 5,000.00 up to 30,000.00 ETB.

2.4.4 National OSH Policy and Strategy

The Council of Ministers of the Federal Democratic Republic of Ethiopia (FDRE), at its 69th regular session of July 18, 2014, discussed and made amendments to the national occupational SH policy and strategy prepared by the MoLSA. The Council has decided that the policy was implemented thereon.

The policy approved legitimate protection addresses and guided the implementation of preventive measures to create a safe and healthy working environment in Ethiopia. This policy guide to developing & implementing effective SH measures at workplaces to identify implementation gaps & propose parallel remedial actions, to adequately address emerging SH problems associated with industrial development and technology transfer (MoLSA, 2014). Furthermore, this policy provided basic principles for the prevention and protection of the workplace from occupational accidents and injuries. Similarly, the policy endorsed the protection of communities residing around industries from environmental pollutants & industrial wastes to ensure and sustain their developmental contribution.

To safeguard their social and economic benefits, including the provision of quality products and services as the policy attaches due to the above-stated issues, industrial products, and services are expected to be environmentally friendly & ascertain fundamental rights at work. This policy is a national tool for OSH services at workplaces. Based on this, sectoral policies & execution

programs shall be formulated & implemented accordingly. Also, workplaces & enterprises are expected to develop SH policies or programs with similar operation strategies to fall from their sectorial policy frameworks to implement at task levels (MoLSA, 2014)

- The preparation of this policy and strategy is an activity that is appreciated by the ministry, as a guiding instrument for the industry.
- The policy aims to address and guide the implementation of preventive measures to create a safe and healthy working environment in Ethiopia to develop and implement effective SH measures at workplaces. However, that lack of commitment was observed in Addis Ababa.

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

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

2.4.6 Ethiopian Building Proclamation

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

Article eleven correctly spelled out Building Officers as “Every urban administration or designated organ shall appoint a building officer, with the required educational and professional qualifications to enforce, on its behalf, the provisions of this Proclamation and other laws." In addition, this article stated that a building officer is empowered to order the inspection of exempted buildings erected before the effective date of this Proclamation and order the

demolition or rectification of such buildings if public safety is at risk. Article 18 occupancy permits on buildings addressed as a building officer may provide occupancy permits for the partially completed building provided safety is ensured.

2.4.7 Ethiopian Building Code of Standards

The Ministry of Urban Development, Housing, And Construction (MOUDHC) prepared the Ethiopian Building Code of Standards. This code is the official English language version of "Occupational Health and Safety-EBCS-14: 2014." The code contains 13 sections about the basic concepts and procedures to be followed while working on any construction site. This code, as mentioned in its preamble, is prepared in the highest level of standards adopted from the developed world's best practice to make construction sites an excellent and convenient workplace, but applicable in the projects selected for this study.

2.4.8 Ethiopian Building Regulation

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

a) Cover the construction site with acceptable materials;

b) Protect utility lines in the ground from being damaged during excavation;

c) Ensure the well-being of the traffic flow around the site;

d) Prevent the exposure of inflammable construction materials to fire;

e) Provide safety wear for site employees and visitors;

f) Take precautionary measures to avoid danger to the life of human beings and property which may be caused by the misuse of chemical products for construction purposes; and

g) Employ appropriate mechanisms that protect any mote of dust, smoke, rays, and other similar elements from causing nuisance and pollution to the area. In line with this, the Regulation endorsed the fine, and penalties that were expected to apply to the contractor failed to do so in part eight, Article 44 number 11.

2.4.9 Ethiopian Building Directive

The Ministry of Urban Development and Construction (MoUDC), under the powers and duties conferred on it by the definition of powers and duties of the Executive Organs of the FDRE Proclamation No. 691/2010 prepared and endorsed Building Directive No. 5/2003 based on Ethiopian Building Proclamation No. 624/2009 for the most straightforward understanding and application of the Proclamation as well as other codes and standards of the country in national level with similar and consistent way. This directive gives due attention to the protection of workers, pedestrians, and others near the sites. In articles 42-45, the directive spells out SH's issue to protect the workers, the community around the project, and guests who need to visit the site.

2.4.10 Building Regulation of Addis Ababa City Administration

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

- In part two, article eleven, point seven stated the duty of the building official's duties to work on the protection and fulfillment of the building Proclamations, regulations & directives. In the construction work, one of the expected duties by the stakeholders is in the issue of SH, hence it is one of the building officer's duties.
- Also, article 40, stated the follow-up & inspection of construction addressed well. Upon this article, the contractor & consultant ordered to fulfill insurance based on the capacity of the project for contractors ‘Contractors All Risk’ & consultant ‘Professional Indemnity.’
- Furthermore, table 22.1 of the Regulation states the penalties for those who may not fulfill SH's issue, in which Building Category B ETB 3,000.00 and Building Category C ETB

5,000.00. In the same way, regarding the issue of insurance for different categories of the building, the contractor expected to buy from ETB 500,000.00 up to ETB 2,000,000.00 from a recognized insurance firm in the country.

- Part four clauses 32- 44 of the Regulation, the safety precautions to be taken into consideration during the building construction period stated adequately.

2.4.11 Ethiopian Construction Industry Development Policy

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

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

To foster the industry's capacity, the Ethiopian Construction Industry Council has been established with the mandate to modernize the construction sector. The establishment of the Council was officially declared following the successful completion of a two-day founding conference held here in Addis Ababa in December 2017.

The Council is said to play a pivotal role in identifying shortcomings in the industry through studies and proposing alternative solutions. Formulate ideas that would help the practical implementation of policies, programs, laws, and strategic issues geared towards modernizing the sector. Appropriate government organs, presidents of regional states, Mayors of the City Administrations of Addis Ababa and Dire Dawa, and representatives of the private sector are members of the Council (CEAA, 2018). This policy gives direction to:

- Ensure & enhance the role of the construction industry in the development of Ethiopia in general;

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

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

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

2.4.12 Conditions of Contract on SH in the Construction Industry

A construction contract agreement is a document that sets a date and specifies which parties are going to participate in the construction process. The contract agreement signed between the owner of the project & the contractor or supplier providing the requested services & contains several sections of clauses defining the scope, terms, & conditions of such agreement.

Also, in a contract agreement, there are different sections used to execute the works in a conducive manner. One of the critical concerns in the construction works is the OSH issue of the sites. OSH concerns stated in the Contract section include Construction conditions & responsibilities & Contract laws (Rodriguez, 2019). Similarly, Faustmann (2017), explained that construction contracts comprise an agreement, general conditions, drawings, specifications, and other documents. In local construction, the contracting agreements started a few years back by the Building and Transport Construction Design Authority (BaTCODA) 1987, Ministry of Urban Development, Housing, and Construction- Standard Conditions of Contract for Construction of Civil Works Projects (MUDHC 1994), PPA 2006, and PPA 2011. For projects undertaken by

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

2.4.12.1 Construction SH in PPA Conditions of Contract

The FDRE, an essential legal act regulating questions related to public procurement procedures, including those that refer to the auditing of procurement procedures, is endorsed by the Ethiopian Federal Government Procurement & Property Administration Proclamation No 649/2009. In this contractual document, several articles presented the issue of SH to protect the workers' lives. Some of them are listed below: Clause 1.2 in the Schedule of rates, the provision, and care of all staff, labor, payment, accommodation, transport, fares & other requirements including First Aid, welfare, and safety requirements are clearly stated as other necessary conditions for the activities to be done on the site.

Regarding safety payments, clause 2 of the contract agreement spelled out that; the Contractor shall pay due regard to the safety of his workers; Where appropriate, the Contractor shall pay particular attention to the safety of operators and all persons in the vicinity of fuel transfer or storage operations. A prohibition on smoking must be enforced when close to flammable liquids. All equipment and vehicles shall be in excellent and safe working conditions. Besides, the contractor shall take full responsibility for the adequacy, stability, and safety of all procedures and methods of construction under the Contract stated in clause 34.2 of this condition of the Contract. The issue of insurance is stated adequately in clause 40.2 that, the contractor shall take out insurance covering his liability concerning industrial accidents and civil liabilities to any person employed by him on the works, to the Public Body, and to any employee of that authority, arising from the execution of the works.

Such liability shall be unlimited in the case of personal injuries. SH is appropriately stated in Clause 45 of this condition of the Contract as; "the Contractor shall have the right to ban access to the Site to any person not involved in the act of the contract, except for persons legal by the Engineer or the Public Body to protect from unexpected harm." The contractor shall ensure the safety on sites during the whole period of execution and shall be responsible for taking the

necessary steps in the interests of his employees, agents of the Public Body, and third parties to prevent any loss or accident that may result from carrying out the works. In another part of look at the same clause, the Contractor shall take all essential steps, on his responsibility and at his expense, to ensure that existing structures & installations are protected, preserved, & maintained.

For the circumstance of formal notice required clause 45.4 states that, during the implementation of the tasks, urgent measures are necessary to obviate any risk of accident or damage or to ensure security following an accident or damage, the Engineer shall give formal notice to the Contractor to do what is necessary.

In a similar token, the Contractor's staff shall follow a system of accident recording by the Contractor's accident reporting procedures. All notifiable accidents shall immediately be brought to the attention of the Engineer. The Contractors shall initiate to cooperate in all preventive measures against fire or any other hazards. They are also expected to notify the Public Body of any change in the Contractor's working practices.

2.4.12.2 Construction SH in FIDIC Conditions of Contract

The country was injected to boost its growth of different consultants and contracts coming to work with the Ethiopian government. Most of the responsible governmental and private bodies signing with international construction firms bind their interest, beliefs & duties from them by the Federation International des Ingénieurs-Conseils (FIDIC) condition of contact. It is the French-language acronym which means the International Federation of Consulting Engineers (Udom, 2014). It was started in 1913 by the trio of France, Belgium, and Switzerland. FIDIC is headquartered in Switzerland and now boasts membership from over 60 different countries.

Over the years, FIDIC has become famous for its secondary activity of producing standard-form contracts for the construction and engineering industry (Udom, 2014). Starting from its first book, entitled 'The Form of Contract for Works of Civil Engineering Construction,' in 1957, FIDIC stated the importance of worker safety and security up to the recent versions. As the title shows, this first Contract aimed at the sector, and it soon became famous for the color of its cover, and thus, The Red Book. It has become the norm that FIDIC contracts are named popular in the manner of speaking by the color of their cover (Udom, 2014).

Clause 2.3 states that the employer shall be responsible for ensuring his workers and other contractors are on the site for the concern of SH at the site. Clause 4.1 on contractors' general obligations states the SH concern as the contractor shall be responsible for the adequacy, stability, and safety of all site operations and construction methods. Likewise, clause 4.8 for safety procedures: The contractor shall comply with all applicable safety regulations and take care of the safety of all persons entitled to be on the site. In the same token clause 4.21 of the FIDIC condition of the Contract on the Progress report of the construction project is correctly spelled out each report shall include: safety statistics, including details of any unsafe incidents and activities related to environmental aspects and public relations. Clause 6.4 states about labor law as the contractor shall comply with all the relevant labor laws applicable to the contractor's personnel, including laws relating to their employment, SH, welfare, immigration, and emigration, and shall allow them all their legal rights.

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

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Similarly, for any accident that happened on-site, the contractor shall send, to the Engineer, the details of an accident report just happened. The contractor shall maintain records and make reports concerning the health, safety, & welfare of persons, & damaged property, as the Engineer may reasonably require. Apart from other duties clause 7.3 states about the inspection expected to be conducted on-site that the employer's personnel shall at all reasonable times & on clause 7.6 Remedial work as apart any previous test or certification; the Engineer may instruct the

contractor to execute any work urgently required for the safety of the works, because of an accident, unforeseeable event.

2.5 Empirical Review

For the last few decades, construction activity has been a major concern for government stakeholders, health and safety researchers, and professionals. To ensure a profitable construction business, health and safety legislation has been developed and more participants in different projects are taking on a high level of responsibility to manage the risks. Injury and safety management in the construction industry has shifted from preventing accidents to more proactive ways of reducing the risk of hazards.

A study by Smith et al. (2018) examined safety regulation implementation challenges in high-rise building construction projects in urban areas. The researchers identified factors such as inadequate safety training, lack of enforcement mechanisms, and communication gaps among stakeholders as significant barriers to compliance. They recommended strategies for enhancing safety culture, improving communication channels, and strengthening regulatory oversight to address these challenges effectively. In another study, Johnson and Brown (2019) explored the role of leadership in promoting safety compliance in large-scale construction projects. The findings highlighted the importance of transformational leadership in creating a culture of safety and empowerment among employees. The study emphasized the need for proactive safety management practices, employee involvement in decision-making, and regular safety audits to mitigate implementation challenges.

Additionally, a research project conducted by Lee et al. (2020) investigated the impact of technology adoption on safety regulation compliance in tall building construction projects. The study found that the integration of digital tools such as Building Information Modeling (BIM) and Virtual Reality (VR) improved communication, enhanced safety planning, and facilitated real-time monitoring of safety performance. However, challenges related to technology adoption, such as cost and training requirements, were also identified. Furthermore, a case study by Wang and Zhang (2021) examined the implementation challenges of safety regulation in private building construction projects in a developing country context. The findings revealed issues such as corruption, lack of regulatory enforcement, and inadequate safety infrastructure as significant

barriers to compliance. The study recommended policy reforms, capacity-building initiatives, and stakeholder collaboration to address these challenges and improve safety outcomes.

2.6 Research Gaps

There are few works on the challenges in implementing safety regulations. However, Research on the implementation challenges of safety regulation in private building constructions has identified several gaps that require further investigation. Some of the gaps include:

- The underlying causes of non-compliance with safety and Health regulations in private building construction like the awareness and attitude of key stakeholders are not well studied. Hence, there is a need for more research to better understand the issue.
- Tall construction buildings have a unique feature than short construction buildings because of the height. This height of the building has its challenge in the implementation of the safety and Health regulations. Some of the unique behaviors include i) greater risk to construction workers due to factors such as higher potential falls, increased exposure to strong winds, and more complex construction processes, ii) taller buildings have higher logistical challenges such as ensuring timely delivery of safety equipment and materials to different levels of the construction site, and providing adequate emergency escape, iii) higher buildings require specialized trained workers to handle unique safety challenges they face, and others. Safety regulation challenges in high-building construction were not investigated.
- Even if there are studies that assess the effect of individual factors on implementing safety and Health regulations. There is no previous work that collectively investigates these factors listed in this paper on the implementation of safety regulation.
- Nowadays, there is an increasing use of technology in the construction industry. It is believed that these technological tools and innovations improve compliance monitoring in private building construction more than the previous time. Hence, comparative studies across different countries or regions, and periods help to identify best practices and lessons learned in implementing safety regulations in private building constructions.

Hence, investigating the effect of management status, workers' awareness, communication channels, clauses on safety and monitoring, and ethical problems on the implementation of safety regulations in private building construction building projects is necessary.

2.7 Conceptual Frameworks

From the theoretical postulate, the local construction company holds the opinion that the existing implementation of occupational safety and Health laws and regulations is robust. In response, they stated that the primary responsibility for establishing a safe working environment lies with government offices, which should raise awareness about the advantages of adhering to occupational safety regulations. Likewise, construction companies prioritize maximizing profits rather than investing in safety and health measures. Similarly, regardless of whether the contractual agreement stipulates the cost for workplace safety, the consultant needs to ensure that the contractor takes necessary measures to reduce the occurrence of accidents on site. Another issue pertains to the fulfillment of obligations outlined in the contractual agreement between clients and contractors regarding site safety.

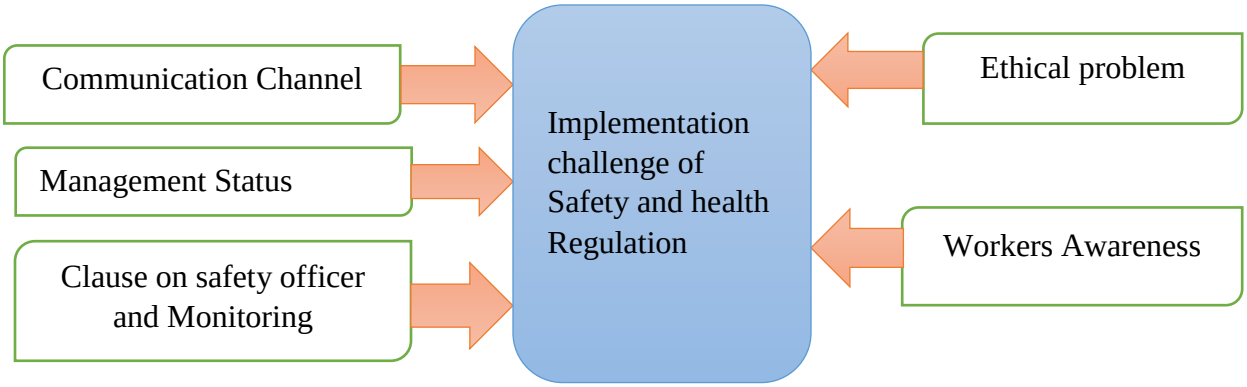


Figure 2.1 Conceptual Frameworks

Lingard (2005) says that safety is when there's no danger present, meaning that the environment has to be a safe place for people to do their jobs without any risks Jannadi and Bukhamsin (2002) agree that the construction environment should be secure enough for people to do their stuff.

Essentially, Ethiopia's Construction Industry Policy from 2012 sought to create an efficient and sustainable development of their local industry, to meet the demand for services and help the country achieve social and economic success. It appears to have been effective, as the

construction sector increased from 4.3% in 1993 to 5.8% by 2002, producing a positive effect on the country's GDP. The Federal Democratic Republic of Ethiopia constitution states that the Civil Code (Proclamation #165/1960) together with the Labor Code (Proclamation No 377/20003) is the general legal constitute for health and safety rules in Ethiopia. Under this, several articles elaborate on the proclamation.

2.8 Summary

Table 2.1 Summary of Literature Review

Topics	Discussed
FDRE Constitution	Proclamation No. 1/1995 Article 42 stated labor right.
Civil code	Proclamation 165 of 1960, Article 2550 and 2551 stated responsibility of employer.
Labor law	Article 12, 5 & 6 of labor law 1156/2019 stated the employer and worker's obligation
MoLSA	Article 98(3), 102(1), 170(1) (a-c) of Proclamation No 377/2003 issued OSH Directive
Building proclamation	Building Proclamation No. 624/2009 and the FDRE Proclamation No.691/2005 stated necessary precautions in construction process.
Building regulations	FDRE Proclamation No. 691/2005 and Ethiopian Building Proclamation No. 624/2009 clarified the safety precautions.
Building Directive	Ethiopian Building Proclamation No. 624/2009, articles 42-45, stated SH's issue to protect the workers, the community around the project, and guests who need to visit the site.
Construction SH in FIDIC	Clause 2.3, 4.1 states responsibility for ensuring his workers SH.
Research Gaps	• Challenges of SH in high rise building is not investigated. • No previous work that collectively investigates these factors. • Awareness and attitude of key stakeholders were not well studied.
Independent Variables	Management Status, Communication Channel, Workers Awareness, Ethical Problem, and Clause on safety officer and Monitoring.
Dependent Variable	Implementation of Safety and Health Regulation

3. Research Methodology

3.1 Introduction

This part provides an overview of the exploration methodology used in the course of this exploration process. It discusses the research area, research design, and identification of the population and the sample of the study. It also established the tool that was used in the data collection and the system of data analysis.

3.2 Study Area

The research conducted in Addis Ababa, the capital city of Ethiopia, situated centrally within the country, provides valuable geographical insights. Addis Ababa occupies a plateau amidst mountain ranges, with elevations ranging from 2200 to 3000 meters above sea level. The city spans an area of 540 square kilometers, encompassing 11 Sub-cities and 116 administrative Woredas. Additionally, it dedicates 220 square kilometers to green spaces, including forests, parks, river buffers, and urban agriculture zones. Yeka sub-city is one of the eleven sub-cities of Addis Ababa with 14 woredas that are located in the north eastern parts of the city. Yeka sub-city is one of the sub-cities that covers. According to Ethiopian Statistics Service (2022), 85.98 km² Area, and a population density of 5,682/km².

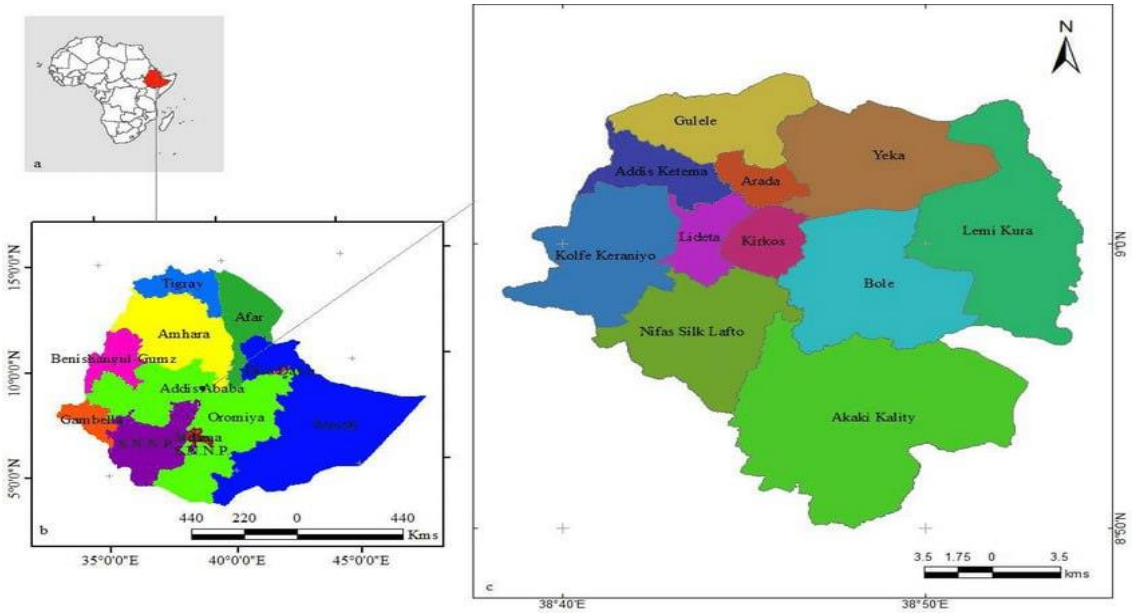


Figure 3.1 Location of Yeka sub-city administrative units of Addis Ababa Chandravanshi, B.. (2021).

3.3 Research Design

According to Mouton J. (2001), a research design is a person's intended course of action or blueprint for conducting research. The way a researcher plans to conduct research is known as research design. The research design used in this study was a descriptive and explanatory survey type because it dealt with causal relationships between the variables and it described the assessment of the major challenges in the implementation of safety regulations in the last 5 years of private building construction projects in Addis Ababa. In addition, descriptive research design is good for analyzing both qualitative and quantitative data.

3.4 Research Approach

The study was conducted using a mixed approach using quantitative data (formal survey) and qualitative document review components. Quantitative data is more suitable for highly structured research that may be statistically measured Bloomfield, J., & Fisher, M. J. (2019). A quantitative survey is the best choice when one is to use it for an investigation to describe the degree of relationship between the variables. The literature claims that quantitative data frequently helps to explain, evaluate, and comprehend the behavior or significance of certain phenomena.

3.5. Target Population of the Study

The target population of a study is the entire population, or group, that a researcher is interested in researching and analyzing. The study population for this research was selected among the ongoing building projects in the Addis Ababa Yeka sub-city during the research period. According to the data from the Addis Ababa City Administration Building permit and control authority, there are about 25 private building construction projects. From 25 active sites, 15 sites were identified and investigated for this study. From 15 sites contractor personnel in the form of a project manager, site engineer, resident engineer, safety officer, and contract administration manager are targeted for the study.

3.6 Sampling Techniques

A purposive sampling approach was utilized to deliberately select relevant sample units for addressing the implementation challenges of safety regulation in private building construction

projects, specifically focusing on the case of Yeka Sub-City. The sample size of target sites was determined by using the following formula as used by different researchers (Hassanein & Hanna, 2008).

$$n = \frac{n'}{1+\frac{n'}{N}} - - - - - - - - - - - eq\ 3.1$$

Where; n′ is the sample size from a finite population, which can be calculated using

n'$= s^2/v\text{^}2 - - - - - - eq\ 3.2$

where

V: Standard error of sample population equals 0.05 for the confidence level 95 %=1.96

S: Standard error variance of population elements, where s^2= (1 - P); maximum at P = 0.5

n: sample size from finite population

N: Total population (25 active private construction building projects at the time of study)

n'$= \frac{s^2}{v^2} = \frac{(0.5)^2}{0.05^2} = 100$

The sample size was calculated as

$$n = \frac{n'}{1+\frac{n'}{N}} = \frac{100}{1+\frac{100}{25}} = 20$$

Twenty (20) sites therefore should be studied. However, due to time and budget constraints, this research paper purposively selected 15 sites from the 20 sites. The selection criteria are based on the distance from the researcher, the activeness of the project, and others. On each site; an average of 4 questionnaires were distributed randomly to site workers in the form of contractors, consultants (site engineers), client representatives, and contract administration managers. Therefore, a total of 60 questionnaires were distributed.

This research intentionally targeted top managers among respondents who possess significant insights into the identified problem. Additionally, a subset of design and contract documents from selected projects facing severe challenges was obtained through desk study, employing the same purposive sampling technique. A purposive sample refers to the selection of units based on

personal judgment rather than randomization Tongco, M. D. C., 2(007). The purposive (non-probability) sampling technique may be used with both qualitative and quantitative research techniques and is most effective when one needs to study a certain cultural domain with experts within. According to Tongco, M. D. C. (2007), choosing the purposive sample is fundamental to the quality of data gathered; thus, the reliability and competence of the informant must be ensured. To get the right response from respondents, and increase the quality of data this research paper employs a purposive sampling method. The selection of respondents was guided by the availability of relevant expertise and firsthand experience in navigating safety regulation implementation challenges in the specified context. Contractor and consultant information was sourced from the Addis Ababa City Administration Building permit and control authority.

Topics relevant to the investigation encompassed the identification of specific safety regulation implementation hurdles encountered within private building construction projects in Yeka Sub-City, the examination of factors contributing to these challenges, and the exploration of potential strategies for addressing and mitigating them effectively. Additionally, the research delved into the roles and responsibilities of various stakeholders in ensuring compliance with safety regulations, the impact of inadequate enforcement practices on project outcomes, and the broader implications for safety, quality, and sustainability within the construction sector of Yeka Sub-City.

3.7 Sources of Data

Primary and secondary sources of data were used. The project manager, resident engineer, safety officer, site engineer, safety officer, and contract administration manager are considered as primary sources of data for the study as well target population. Primary sources of data are more credible as evidence and provide raw information. Because of this target population was selected as the primary source of data for raw and genuine information.

The secondary data used in this study are academic journals, related books, legal documents, articles of different authors, and information from the website which contain related and relevant subjects to the study.

3.8 Questionnaire Design

The survey questionnaire design aims to achieve the answer to the research questions i.e. what are the weaknesses and strengths of building construction injuries and safety practices in building construction projects, what are the different types of injury in building construction, and what should be done to reduce the problems of building construction injuries and safety issues specifically for private building construction projects. A survey questionnaire was sent to Contractors staff, Consultants & Client representatives of building construction projects. The survey questionnaire was used to gain insight into the conditions of projects and to evaluate the implications and compliance with the construction regulations by all parties concerned, the main focus is to assess the safety regulation implementation challenge in private building construction projects and to get feedback how different factors affect the performance of safety regulation on this construction projects.

In a questionnaire, participants fill out a form with the researcher's questions and their responses. It helps the respondents to make choices among a set of alternatives given. Likert five scale of agreement level, i.e., strongly agree=5, agree=4, neutral=3, disagree=2, and strongly disagree=1, was used to measure the respondents' opinions, perceptions, feelings, and attitudes (Kothari, 2004). The survey was developed based on a review of studies related to Occupational Safety Health. The following steps were used in preparing the questionnaire:

- First, the study's overall goal and particular requirements were established. Thus, the general purpose of a questionnaire was to assess the academic qualifications, experiences, and perceptions of key informants.
- Then, the questions that needed to be asked were developed: A closed-ended questionnaire was formulated so that they could generate relevant answers to the research questions.
- The questionnaire was structured in two main parts: The first part was a cover letter with information about the research project, the contents of the questionnaire, and how the responses would be utilized. The second part of the questionnaire aims to collect reliable data from professionals who participated in the questionnaire survey such as Project Manager, Site Engineer, and Safety Officer from the contractor, and Resident Engineer from the Consultant representative.

3.9 Data Analysis

During this study, descriptive statistics was the major technique of analysis using Statistical Package for Social Science (SPSS) version 26. The quantitative data collected from sample respondents who are working on the building project as contractors, clients, and consultants were analyzed using averages, percentages presented by tables, and figures to answer implementation challenges and safety regulation measures, weaknesses, and strengths of building construction injuries and safety practices in these selected private buildings construction projects. The qualitative data were finally gathered from general comments and interviews and analyzed separately but presented in combination with the quantitative information. Also, document analysis and observation are used to triangulate the data gained through questionnaires and interviews.

3.10 Model and Variable Specification

For the analysis of the dependent variables and independent variables of the study multiple regression model used in the regression analysis was stated as follows:

$$Y=a+\beta1X1+\beta2X2+\beta3X3+\beta4X4+ \beta4X5+e$$

$$Y=a+\beta1EP+\beta2WA+\beta3CC+\beta4CCSE+ \beta4MS+e$$

Where:

e = the error term

a = Coefficient of intercept (Constant)

β1… β4 = the regression coefficients representing the change in Y relative to a one-unit change in X1 … X4, respectively.

Y=dependent variable (Implementation of Safety Regulations)

X1 = Ethical Problems (EP)

X2 = Workers Awareness (WA)

X3 = Communication Channel (CC)

X4 =Clauses on Safety Officer and Monitoring (CCSE)

X5 = Management Status Lean Construction Practices (MS)

3.11 Tests for Assumption

Before the results of the regression, the researcher must evaluate the three fundamental assumptions for the regression analysis, namely normality, linearity, and multi-collinearity. Diagnostic checks and tests are to test for statistical problems and to ensure compliance with the Classical Linear Regression Model (CLRM) assumptions. This was done to avoid parameter estimates being biased, inefficient, and inconsistent (Gujarati, D., & Porter, D. C., 2010).

3.11.1 Linearity Test

The linearity test is used to determine whether the relationship between the independent variables and the dependent variable is linear or not. The linearity test is a requirement both in correlation and regression analysis. In a good regression model, there should be a linear relationship between the free variable and the dependent variable. There are several methods for assessing the linearity of variables. It means checking whether the variables are linearly related or not. These methods are broadly classified as graphical (associated with graphical tests), and statistical methods (associated with statistical techniques). The researcher employed a statistical test with an ANOVA table. ANOVA table can be computed for the linear and nonlinear components of any pair of variables. If the F-significance value for the nonlinear component is below the critical (sig., < .05), then there is significant nonlinearity (Garson, G. D., 2012).

3.11.2 Normality Test

Normality is the assumption that the error term is normally distributed with a mean of zero and a constant variance. A test of significance can only be conducted when the data has a normal distribution. The test of normality of residuals was conducted based on the Kolmogorov-Smirnov Test. Non-normality can be reduced by removing outliers, transforming the data so that its distribution is nearly normal, using other standard distributions to replace the normal distribution as models, or using modern bootstrap methods and permutation tests that do not require normality or any other form of the sampling distribution (Gujarati, 2004 & Brooks, 2008).

3.13.3 Multi-Collinearity Test

When independent variables show multi-collinearity, it is difficult to determine which variables contribute to the variance of the dependent variables. The Variance Inflation Factor (VIF) method is the best way to test the hypothesis. A good regression model should not occur, and correlation of independent variables or multi-collinearity should not occur. Multi-collinearity test as a basis for VIF of multi-collinearity results using the SPSS test, and implementation process in the multi-collinearity test. A perfect linear combination of the independent variable already in the equation is a sign of small tolerance ($1-R^2$).

- ✓ If the VIF value is between 1 and 10, there is no multicollinearity.
- ✓ If the VIF value is <1 or> 10, then there is multicollinearity.

3.12 Validity and Reliability

To clearly state the validity of the data acquired and to give strong depth the questionnaire was initially piloted by a few numbers of project managers to ensure consistency, clarity, and relevancy, and cross-checking was done. The data sources that have been gathered are official and re-checked from other secondary sources so that it helps to picture out the real-world scenario specifically for this project site. The secondary resources are research papers and articles from relevant journals and research institutes. It is well known that cross-checking data helps to remove errors and to catch complete confidence in data.

3.13 Ethical Issues

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

4. Data Presentation and Analysis

4.1. Introduction

In this chapter, we delve into the data presentation and analysis, which forms an integral part of our thesis using the Statistical Package for the Social Sciences (SPSS). The effective presentation and thorough analysis of data play a pivotal role in deriving meaningful insights, validating research hypotheses, and drawing conclusions. This chapter serves as a bridge between the data collection phase and the interpretation of findings, enabling us to gain a comprehensive understanding of the research objectives.

The primary purpose of data presentation is to organize, summarize, and visually represent the collected data coherently. This aids in facilitating a clear and concise representation of complex information, allowing for a deeper understanding of the research subject. Moreover, effective data presentation techniques enhance the credibility and persuasiveness of the research findings, enabling the audience to grasp the underlying patterns and trends more easily.

4.2. Questionnaire Response and Quality of Respondents

Questionnaire response and the quality of respondents play crucial roles in the effectiveness and reliability of data collection. A well-designed questionnaire can yield valuable insights, but its true value lies in the quality of responses received. Respondent quality is determined by factors such as their willingness to provide accurate and thoughtful answers, their understanding of the questions, and their ability to recall relevant information. Adequate sampling techniques, including random selection and representation of diverse demographics, are essential for obtaining a representative sample of respondents. Additionally, clear instructions, proper framing of questions, and effective data validation measures contribute to the overall quality of the responses, ensuring that the collected data is reliable and suitable for analysis and decision-making purposes.

4.2.1. Questionnaire Response Rate

The result provides an insight into the distribution and response rates of questionnaires among different groups. Out of the total 60 questionnaires, 54 questionnaires were returned. This

indicated that 90% of the distributed questionnaires were returned. Whereas, the unresponsive rate was found to be 6(10%). Among the 54 returned questionnaires, 18(33.3%) of them were successfully filled and returned by contractors. Similarly, 11(20.4%) questionnaires were filled and returned by consultants. The remaining questionnaires were returned by project managers, clients, and workers constituting 6(11.1%), 5(9.3%), and 14(25.9%) respectively. Table 4.1 shows the returned questionnaires among different positions.

Table 4.1 Returned questionnaires among different job positions

Position held by respondent			
		Frequency	Percent
Valid	Engineer(Contractor)	18	33.3
	Consultants	11	20.4
	Project Manager	6	11.1
	Clients	5	9.3
	Workers	14	25.9
	Total	54	100.0

4.3. Socio-Demographic Characteristics of Respondents

Table 4.2 indicated that out of a total of 54 respondents who participated in the survey, 42 individuals identified as male, while the remaining 12 individuals identified as female. The frequency of male respondents is significantly higher, constituting approximately 77.8% of the total respondents, whereas female respondents make up approximately 22.2% of the total. These results indicated a substantial gender imbalance in the survey sample, with males being the predominant group. It is important to note that this disparity in representation may have implications for the generalizability and accuracy of the survey findings, as the experiences and perspectives of females may not be adequately reflected in the results. Further attention should be given to ensure a more balanced and inclusive representation of both genders in future studies or surveys to obtain a comprehensive understanding of the target population.

Table 4.2 shows the age categories of 54 individuals who participated in a questionnaire. The respondents were divided into different age categories. Among the participants, the largest group consisted of 31 individuals who were between the ages of 25 and 30. This group constitutes the majority, comprising approximately 57.4% of the total respondents. The second-largest age

category was the 31-35 range, with 10 respondents, accounting for around 18.5% of the total. The 36-40 age category had 8 respondents, making up about 14.8% of the total. Lastly, 5 respondents fell into the above 40 age category, representing approximately 9.3% of the total respondents.

The average number of employees in the respondents' category can be interpreted by analyzing the frequencies and percentages provided in the questionnaire responses as shown in Table 4.2. Out of a total of 54 respondents, 25 reported having below 75 employees, accounting for approximately 46.3% of the sample. The category of 76-100 employees was represented by 13 respondents, comprising around 24.1% of the sample. The range of 101-150 employees had the highest frequency, with 10 respondents, representing approximately 18.5% of the sample. Lastly, the category of above 150 employees was reported by 6 respondents, accounting for around 11.1% of the sample. Overall, the average number of employees can be estimated by calculating the weighted average of each category based on their respective frequencies and ranges.

Table 4.2 Demographic Characteristics of Respondents

Variable	Characteristics of Respondents	Frequency	Percentage (%)
Gender	Male	42	77.8
	Female	12	22.2
	Total	**54**	**100**
Age	25-30	31	57.4
	31-35	10	18.5
	36-40	8	14.8
	Above 40	5	9.3
	Total	**54**	**100**
Education Level	PHD	0	0
	MSc/MBA Degree	7	13.0
	BSc/BA Degree	28	51.9

	Diploma and others	19	**35.2**
	Total	54	**100**
Work experience	Below 6 Years	26	48.1
	6-10 Years	13	24.1
	11-15 Years	10	18.5
	Above 15 Years	5	9.3
	Total	**54**	**100**
Average number of Employees	Below 75	25	46.3
	76-100	13	24.1
	100-150	10	18.5
	Above 150	6	11.1
	Total	**54**	**100**

4.3.1 Respondent Age

The respondents were divided into different age categories. Among the participants, the largest group consisted of 31 individuals who were between the ages of 25 and 30. This group constitutes the majority, comprising approximately 57.4% of the total respondents. The second-largest age category was the 31-35 range, with 10 respondents, accounting for around 18.5% of the total. The 36-40 age category had 8 respondents, making up about 14.8% of the total. Lastly, 5 respondents fell into the above 40 age category, representing approximately 9.3% of the total respondents.

4.3.2. The Respondents' Educational Background

This research paper constitutes different respondents from different educational backgrounds. Based on the data collected from the questionnaires, it is evident that out of a total of 54 respondents, the distribution of educational qualifications varied significantly. The respondents included individuals with diverse educational backgrounds. Table 4.2 indicates that none of the respondents held a PhD, suggesting that the sample lacked individuals with the highest level of

academic achievement and specialization in a particular field. MSc/MBA degree holders accounted for 7 respondents, making up 13.0% of the total. BSc/BA degree holders comprised the largest group, with 28 respondents, representing 51.9% of the sample. Those with a diploma and others constituted the majority, with 19 respondents, making up 35% of the total. Overall, the majority of respondents possessed a diploma, while the smallest proportion had an MSc/MBA degree or a PhD. Figure 4.1 shows the percentage of the level of education of respondents. It indicates that half of the respondents to the questionnaires were holders of Diplomas.

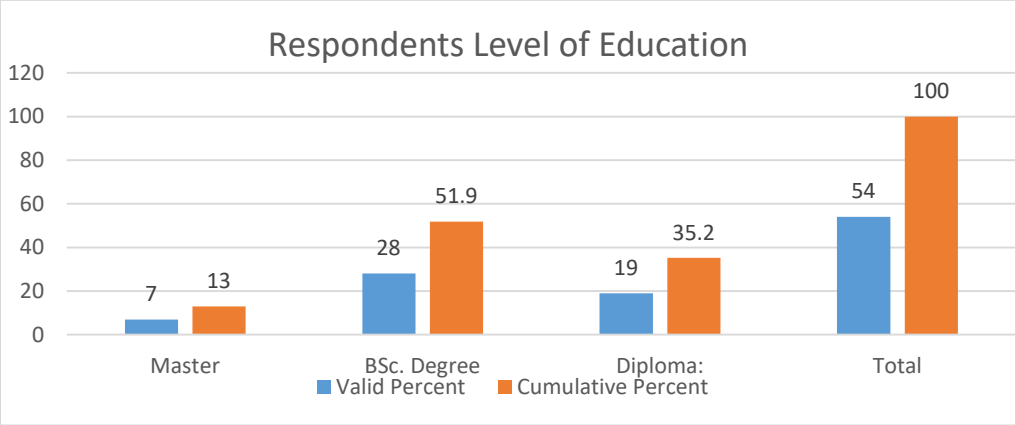


Figure 4.1 Respondents' level of education

4.3.3. The Work Experience of Respondents

The survey collected responses from a total of 54 participants as shown in **Table 4.2**. Among them, 26 respondents reported having less than 6 years of service experience, which accounts for approximately 48.1% of the total. The category of 6-10 years was chosen by 13 participants, representing around 24.1% of the respondents. Additionally, 10 individuals, or approximately 18.5% of the total, reported having a service duration of 11-15 years. Lastly, the "Above 15 years" category was selected by 5 participants, accounting for roughly 9.3% of the respondents. These findings provide valuable insights into the distribution of service years among the survey participants, allowing for a better understanding of the composition and experience levels within the group. These results demonstrate a diverse range of service years among the respondents,

with the largest proportion falling under the category of less than 6 years. Fig 4.2 shows the work experience of respondents in the study.

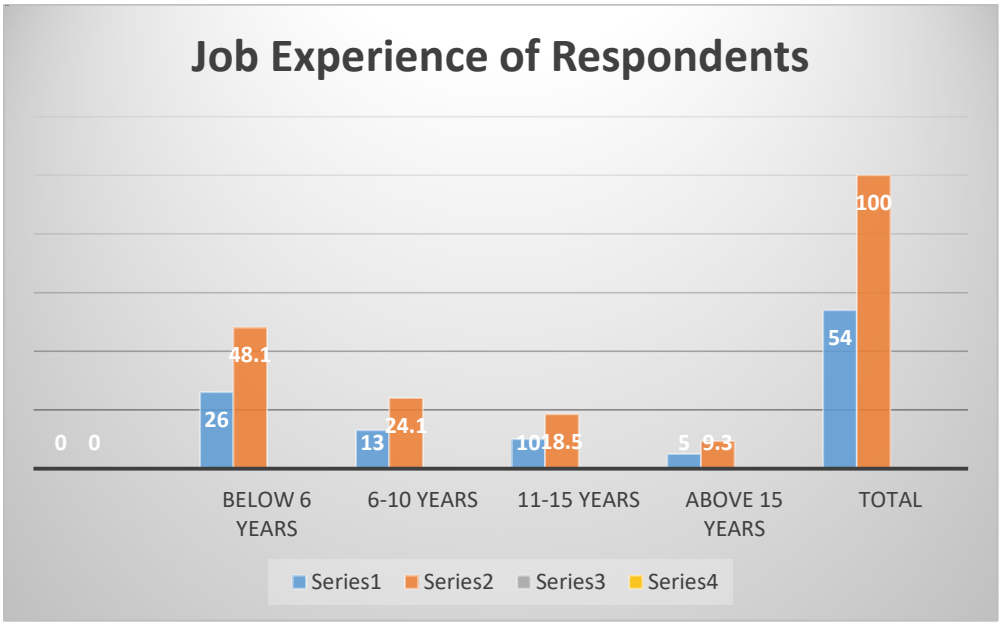


Figure 4.2 Percentage of respondent's service years

4.4 Reliability Result

The Cronbach's alpha testing model has been used for the internal consistency test. As a result, the total scale dependability of this study is 0.6964, which is nearly equal to or more than 0.700, as shown in the table above. According to Sekaran (2006), a Cronbach's alpha value of 0.7 serves as a benchmark for approving or disapproving reliability. The outcome thus demonstrates the excellent reliability of the study's Cronbach's alpha coefficient. The reliability result in this study was found to be 0.678 which is very close to the benchmark (0.7). Hence, the responses are reliable. The reliability of the questionnaire administered using SPSS version 26 is displayed in Table 4.3 below

Table 4.3 Reliability Test

Item	Valid Item	Corn alpha
Ethical Problems	10	.729
Workers Awareness	15	.787
Communication Channel	10	.611
Clause on Contracts	8	.610
Management Status	9	.653

	Overall Reliability	**.678**

Source: SPSS Survey Output, 2024

4.4 Descriptive Statistics of Safety Regulation

4.4.1 Descriptive Statistics of Safety Regulation Implementation

Regarding the Knowledge of safety regulation policies and ethical problems affecting the implementation of safety regulations, the majority of respondents (mean=3.61, SD=1.172) respondents agreed. This indicated that the majority of the respondents know safety regulation policies and ethical problems. Regarding the effects of workers' awareness on the implementation of safety regulations and communication channels a mean of 3.54, and 3.89 respondents agreed respectively. Conditions on the contract and management status affect the implementation of safety regulations affects the implementation of safety regulations. Regarding these issues, a mean of 3.65 and 3.74 respondents agreed respectively. Overall a mean of 3.686 respondents agreed on the effects of the points considered on the implementation of safety regulation. Table 4.4 shows descriptive statistics of safety regulation implementation.

Table 4.4 Descriptive Statistics of Safety Regulation Implementation

Descriptive Statistics			
	N	Mean	Std. Deviation
Knowledge of safety regulation policies and ethical problems affects the implementation of safety regulations.	54	3.61	1.172
Workers' awareness affects the implementation of safety regulations.	54	3.54	1.270
Communication channel affects the implementation of safety regulations	54	3.89	1.093
Conditions on the contract affect the implementation of safety regulations.	54	3.65	1.176
Management Status affects the implementation of safety regulations.	54	3.74	1.291
Overall	**54**	**3.686**	

Source: SPSS Survey Output, 2024

4.5.2 Descriptive Statistics of Current Occupational Safety regulations and Ethical problems in the Ethiopian construction industry.

Table 4.5 Descriptive Statistics of Current Occupational Safety regulations and ethical problems in the Ethiopian construction industry.

Descriptive Statistics of Ethical Problems in the Implementation of Safety Regulation			
	N	Mean	Std. Deviation
Familiar with the FDRE Constitution about Safety & Health related at work	54	3.80	1.203
The government of Ethiopia established a firm policy and regulation for the implementation of Safety & Health	54	3.76	1.373
The management of the company is aware of the legislation, Safety, and Health-related of the country & implemented accordingly	54	3.59	1.325
The management of the company has a written Safety & Health policy	54	3.91	1.170
The current Occupational Safety regulations in the Ethiopian construction industry effectively address ethical issues and ensure the safety of workers.	54	3.87	1.182
Occupational Safety regulations in the Ethiopian construction industry protect the well-being of workers.	54	4.15	.940
The policy of Safety and Health is communicated to all concerned parties in the company.	54	3.74	1.348
Ethical concerns, such as worker exploitation or safety shortcuts, are prevalent in the Ethiopian construction industry.	54	3.35	1.348
Overall Mean	**54**	**3.7712**	

Source: SPSS Survey Output, 2024

The descriptive statistics in Table 4.5 reveal that the current occupational safety regulations and ethical problems in the Ethiopian construction industry are perceived positively but with room for improvement. Respondents are generally familiar with the FDRE Constitution regarding safety and health at the workplace (mean = 3.80, SD=1.203). The government's firm policy and regulation implementation (mean=3.76, SD=1.373) is acknowledged. However, there is variability in the management's awareness and implementation of legislation (mean = 3.59, SD=1.325) and the management of the company has written safety policies (mean = 3.91, SD=1.170). This indicates that most respondents including the management of the company know that the FDRE constitution includes provisions related to the right to safety but not the

detailed. Hence, awareness creation programs regarding the FDRE constitution and implementation of safety regulations should be made by the company and concerned bodies.

The effectiveness of current regulations in addressing ethical issues and ensuring worker safety is moderately rated (mean = 3.87, SD=1.182). Regarding the Ethiopian occupational safety regulations in protecting the well-being of workers a mean of 4.15, and SD=.940 were agreed. The policy of safety and health issues communicated to all concerned parties in the company is recognized but inconsistent (mean=3.74, SD = 1.348). Ethical concerns, such as worker exploitation, are prevalent (mean = 3.35, SD = 1.348), indicating a need for stronger enforcement and ethical standards. Overall, while regulations exist, their implementation and communication need enhancement. The results indicated that Ethiopia has made strides in developing regulations to ensure worker safety and address ethical issues in the construction industry even if ongoing challenges remain. Strengthening enforcement, improving training, and fostering a culture of safety and ethical responsibility are essential for enhancing the effectiveness of these regulations. Generally, continuous collaboration between the government, employers, workers, and civil society is crucial for creating a safer and more ethical work environment in the construction sector. Generally, given the questionnaire and employing the midpoint mark of 3.00 the descriptive result showed that the respondents have a strong agreement (overall=3.77) on the effect of Ethiopian current occupational safety regulation and safety ethics on low performance of safety regulation enforcement in the study area.

4.5.3 Descriptive Statistics of workers' awareness of Safety regulations and enforcement practices.

Table 4.6 Descriptive Statistics of workers' awareness of Safety regulations and enforcement practices

Descriptive Statistics of Workers' Awareness of Safety Regulations			
	N	Mean	Std. Deviation
The contractor assigns a health and safety officer	54	3.48	1.370
The contractor holds safety meetings Regularly	54	3.56	1.144
Workers are aware of the available insurance services in their company	54	3.88	1.342
The contractor conducts regular site safety inspections	54	3.44	1.254
I Have the safety awareness needed for the hazards we face on this job	54	3.70	1.268

There is a sharing of best practices or ideas from other contractors regarding accidents.	54	3.48	1.424
There is a culture of using and preparing manuals for workers' safety.	54	3.54	1.410
Periodical safety training is given to workers	54	3.57	1.207
The contractor provides safety shoes, helmets, and goggles for workers	54	3.78	1.192
The contractor enforces and controls workers for using safety kits	54	3.85	1.172
The contractor assigned a qualified person & medical facility in case of accidents	54	3.61	1.309
The contractor has Insurance coverage for workers	54	3.93	1.163
The contractor provides water and sanitation for workers	54	3.91	1.202
The contractor always takes lessons learned from accidents on construction sites.	54	4.00	1.064
The contractor keeps records of accidents on the construction site	54	3.72	1.140
Overall Mean	**54**	**3.697**	

***Source**: SPSS Survey Output, 2024*

Table 4.6 shows the descriptive statistics provide insight into workers' awareness of safety regulations and enforcement practices in the Ethiopian construction industry. The mean scores for most items indicate a moderate to high level of awareness and enforcement, but there is significant variability. Contractors assigning health and safety officers (mean = 3.48, SD =1.370) and holding regular safety meetings (mean=3.56, SD=1.144) are moderately rated, suggesting consistent but not universal practice. Regular site safety inspections (mean = 3.44, SD = 1.254) are somewhat inconsistent, implying room for improvement in enforcement. The results indicated that most companies assign a safety officer to many responsibilities some of the responsibilities including i) creating and implementing safety policies that comply with legal regulations and organizational standards, ii) conducting regular risk assessments to identify potential hazards in the workplace, and recommending control measures to mitigate those risks, iii) to organize training sessions for employees to ensure they understand safety protocols and procedures, iv) ensuring adherence to safety regulations and company policies, and others.

Regarding workers' awareness about the available insurance services in the company, the majority of the respondents agreed (mean=3.88, SD=1.342), indicating good communication about available benefits. Regarding workers' safety awareness for job hazards they face a mean = 3.4565, SD = 1.39397 was found, indicating a need for more targeted training. Sharing best practices or ideas from other contractors regarding accidents is one of the strategies to reduce

safety issues. Regarding this concern, a mean = 3.48, SD = 1.424 respondents were agreed. Regarding a culture of using safety manuals for workers' safety a mean = 3.54, SD=1.410 were found. This indicated that there are gaps in knowledge transfer and standardization. Regarding the periodical safety training for workers, provision of safety shoes, helmets, and goggles for workers, and enforcement of safety kit usage a mean of 3.57, 3.78, and 3.85 were found respectively. Regarding the insurance coverage for workers, and provision of water and sanitation for workers a mean of 3.93 and 3.91 were found respectively. Regular safety training sessions are mandatory for all workers to ensure they understand the risks associated with their work environment and the procedures in place to mitigate those risks. In addition, contractors should ensure workplace safety by providing necessary personal protective equipment (PPE) such as safety shoes, helmets, and goggles. Additionally, enforcing the use of these safety kits is crucial for minimizing the risk of accidents and injuries on the job site. The results indicated that there is good practice in basic worker welfare but this needs improvement.

The availability of qualified personnel and medical facilities (mean=3.61, SD=1.309) and insurance coverage (mean =3.4022, SD=0.71190) are rated moderately, indicating some variability in preparedness for emergencies. Finally, learning from accidents (mean= 4.00, SD= 1.064) and keeping accident records (mean=3.72, SD=1.140) indicate a recognition of the importance of safety data, though implementation may be inconsistent. Generally, while there are strong areas, such as safety training and gear provision, there is a need for improved enforcement, awareness, and sharing of best practices to enhance safety regulations in the construction industry. Given the questionnaire and having the midpoint mark of 3.00 the descriptive result showed that the majority of respondents have a strong agreement (overall mean=3.697) on the cause of workers' awareness on implementation of safety regulation in private building constructions found in the Yeka sub-city.

4.5.4 Descriptive Statistics of Enforcement Practice of Safety Regulations

Figure 4.3 Descriptive Statistics of Enforcement Practice of Safety Regulations

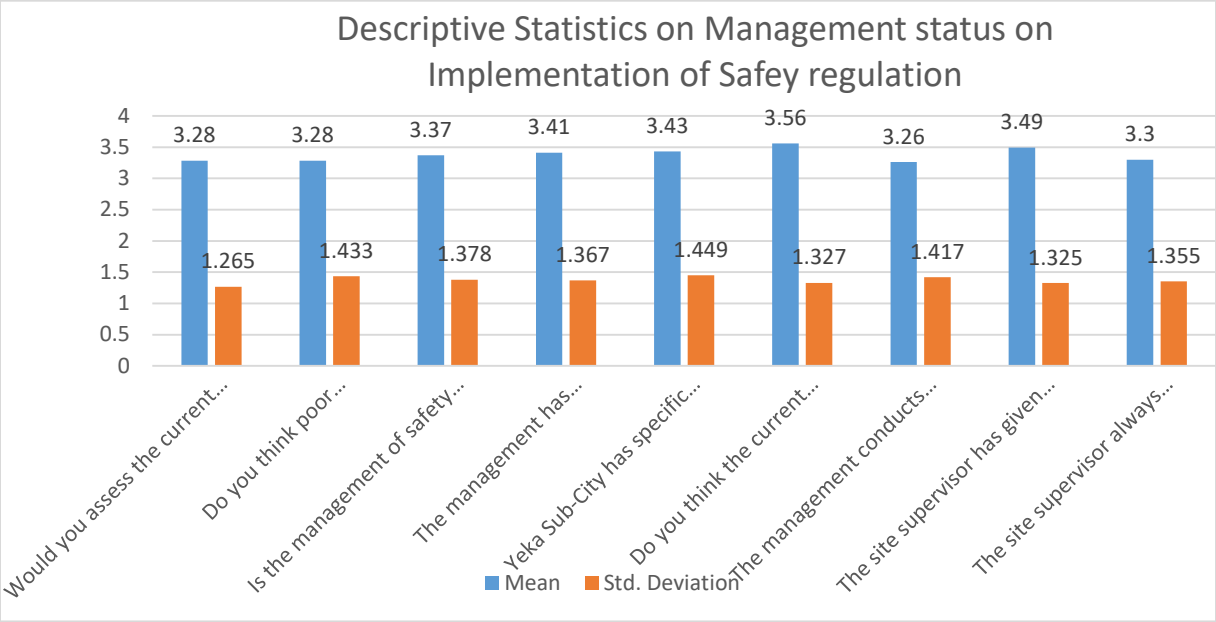


Table 4.7 Descriptive Statistics of Management Status on Implementation of Safety Regulation

Descriptive Statistics			
	N	Mean	Std. Deviation
Would you assess the current safety regulations and regulations governing private building construction projects in Yeka Sub-City?	54	3.28	1.265
Do you think poor management is the main challenge in the enforcement practice of safety regulations within construction projects?	54	3.28	1.433
Is the management of safety regulation enforcement within private building construction projects in Yeka Sub-City effective?	54	3.37	1.378
The management has impacted safety regulation enforcement practices in private building construction projects in the Yeka Sub-city.	54	3.41	1.367
Yeka Sub-City has specific strategies that have been implemented to improve the enforcement practice of safety regulations.	54	3.43	1.449
Do you think the current Occupational Safety regulations in the Ethiopian construction industry are comprehensive and effectively enforced?	54	3.56	1.327
The management conducts regular safety inspections and documents the results.	54	3.26	1.417
The site supervisor has given the right to suspend unlawful works	53	3.49	1.325
The site supervisor always follows the site safety rules and procedures	54	3.30	1.355
Overall Mean	**53**	**3.37**	

Source: SPSS Survey Output, 2024

Figure 4.3 shows the descriptive statistics reveal varying perceptions regarding the enforcement practices of safety regulations in private building construction projects in Yeka Sub-City. The mean score (3.28, SD=1.265) was found that indicate a strong consensus on the adequacy of current safety regulations. However, poor management is identified as a significant challenge (mean = 3.28, SD = 1.443) impacting the effectiveness of safety regulation enforcement within construction projects. The management's role in impacting safety regulation enforcement practices in private building construction projects is rated highly (mean=3.41, SD=1.367), and there is a recognition of specific strategies implemented to improve the implementation of safety regulation (mean=3.43, SD=1.449).

Opinions on the comprehensiveness and enforcement of current occupational safety regulations in the Ethiopian construction industry (mean=3.56, SD=1.327). Regarding the conducting of regular safety inspections by management received a low rating (mean =3.26, SD=1.417), highlighting an area needing improvement. Regarding the following site safety rules and procedures, the authority is given to supervisors to suspend unlawful works a mean =3.30, and 3.49 were found respectively. Overall, while regulatory frameworks are considered adequate, enforcement practices require significant enhancement. The results found that Poor management, regulatory framework, compliance monitoring, and training and awareness are certainly significant challenges in the implementation of safety regulation s within construction projects. Overall, the mean score under management status an improvement is needed to enforce the safety regulation. The descriptive result showed that most respondents strongly agreed (overall=3.37) that management status affected the safety regulation enforcement in the study area, with a midpoint score of 3.00 for the questionnaire.

4.5.5 Descriptive Statistics of Examine Clauses on the Condition of the Contract about Safety to improve the enforcement practice

Table 4.8 Descriptive Statistics of Contract Clauses on Safety Enforcement

Descriptive Statistics of Contract Clauses on Safety Enforcement			
	N	Mean	Std. Deviation
Is the contract document included the safety and health clauses	54	3.24	1.164
The project has a Safety committee	54	3.39	1.379

The contractor assigns a safety officer	54	3.22	1.475
The consultant enforces the contractor based on the contract to fulfill the required PPE	54	3.41	1.353
The contractor conducts regular site safety inspections	54	3.93	1.113
The safety inspection results were documented and communicated	54	3.43	1.382
There is a consistent enforcement of safety clauses in construction contracts.	54	3.72	1.338
There is a sufficient penalty for non-compliance with safety clauses.	54	3.52	1.342
Overall mean	**54**	**3.48**	

Source: SPSS Survey Output, 2024

Table 4.8 shows the descriptive statistics that offer insights into the enforcement of safety clauses within construction contracts to enhance safety practices. The inclusion of safety and health clauses in contract documents has a mean score of 3.24 (SD = 1.164), indicating a moderate level of inclusion but with some variability. The existence of a safety committee is similarly rated (mean = 3.39, SD = 1.379), suggesting its presence in most projects but not universally. The assignment of a safety officer by contractors is highly rated (mean=3.22, SD=1.475), reflecting a strong commitment to safety oversight. Regular site safety inspections by contractors also score high (mean=3.93, SD=1.113), indicating a prevalent practice. However, the enforcement by consultants for contractors to fulfill PPE requirements is moderate (mean = 3.41, SD=1.353), pointing to inconsistency in enforcement.

The documentation and communication of safety inspection results have a mean of 3.43 (SD=1.382), showing variability in practice. The existence of consistent enforcement of safety clauses in contracts is lower (mean = 3.72, SD =1.338), highlighting significant variability and room for improvement. Penalties for non-compliance are similarly rated (mean=3.52, SD=1.342), indicating that while penalties exist, they may not be sufficiently stringent or consistently applied. Generally, while there is a foundational framework for safety within contracts, enforcement practices are inconsistent. Enhancing the consistency and rigor of enforcement, as well as ensuring comprehensive inclusion of safety clauses, can significantly improve safety practices in construction projects.

The results indicated that the inclusion of provisions related to safety and health regulations to ensure compliance with applicable laws and the protection of workers and the public, the existence of a committee that regularly assesses safety hazards, and provides regular training sessions, the existence of assigned in safety officers, regular safety inspection, and consistent enforcement of the safety clauses helps implementation of safety regulation s. However, the concerns need enhancements. Generally, given the questionnaire and having the midpoint mark of 3.00 the descriptive result showed that the majority of respondents have a strong agreement (overall=3.48) on the cause of clauses and conditions in the contract on safety regulation enforcement in private building construction in Yeka sub city.

4.5.6 Descriptive Statistics of Communication Channel for Safety Regulations at the Construction Site Practices and Organizational-related Questions.

Figure 4.4 Descriptive Statistics of Communication Channel for Safety Regulations

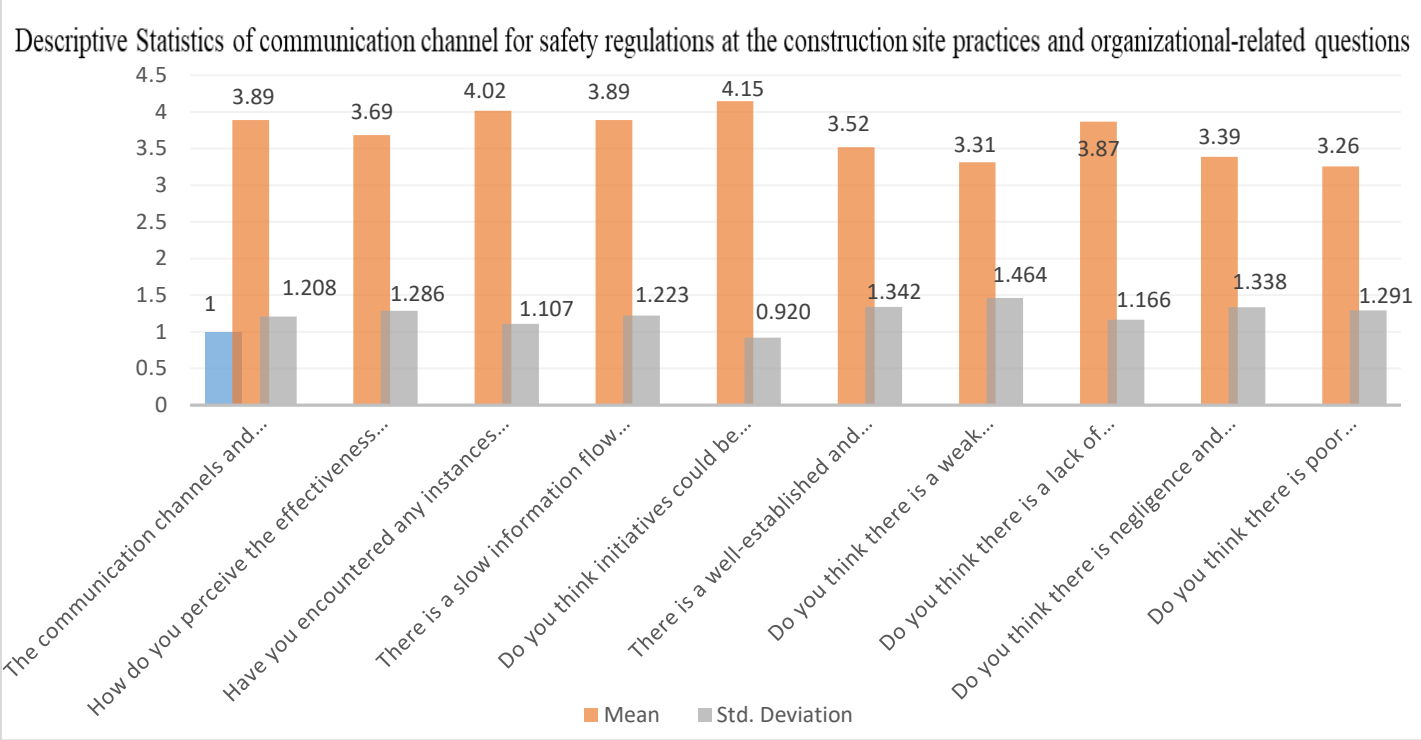


Figure 4.4 shows the descriptive statistics presented highlighting various aspects of communication channels and processes related to safety regulations within construction projects in Yeka Sub-City. The effectiveness of communication among stakeholders has a mean of 3.69 (SD = 1.286), indicating a relatively positive perception. Instances where lack of communication

has hindered safety regulation implementation scored 4.02(SD=1.107), suggesting that communication issues are fairly common. The flow of information among stakeholders is perceived as slow, with a mean of 3.89(SD=1.223), and there is a belief that initiatives to improve communication could be beneficial (mean=4.15, SD=0.920). However, there seems to be a discrepancy between the perceived need for improvement and the existence of established communication channels (mean = 3.52, SD=1.342).

Weak communication skills and management are noted (mean = 3.31, SD = 1.46), highlighting significant variability and indicating this as an area needing attention. The lack of appropriate communication mediums and advanced technology support scored 3.387(SD=1.166), showing moderate concern. Negligence and casualness in communication received a high mean score of 3.39(SD=1.338), reflecting a strong perception of these issues. Similarly, poor communication planning and lack of understanding among stakeholders scored high (mean=3.26, SD=1.291), further emphasizing the need for improved communication strategies.

4.6 Correlation Analysis

A correlation coefficient expresses quantitatively the magnitude and direction of the linear relationship between two variables, Pearson correlation coefficient reveals the magnitude and direction of relationships and the intensity of the relationship (-1 to1). In this section, a correlation analysis was done to establish whether relationships exist between implementation of safety regulation in private construction buildings in Yeka sub-city and explanatory variables; communication channel, Management status, clauses on the contract, workers awareness, and Ethical Problem. The results would enable the researcher to determine the regression on the dependent variable. The researcher used one of the most commonly used types of correlation coefficient which is the Pearson correlation coefficient method because of the statistical accuracy that usually results from this method to determine whether there are significant relationships between the dimensions of safety regulation enforcement and safety regulation. The following Pearson's Product Moment Correlation Coefficient relationship was computed.

- The relationship between Ethical Problems and Implementation of Safety Regulation Practice.
- The relationship between the Communication channel and Implementation of Safety Regulation Practice.

- The relationships between Clause Contract Safety Enforcement and Safety Regulation Practice.
- The relationship between Management Status and Implementation of Safety Regulation practice.

Table 4.9 Correlation Analysis

Correlations							
		AV_EP	AV_WA	AV_MS	AV_CCSE	AV_CC	AV_SR
AV_ISR	Pearson Correlation	.650**	.687**	.734**	.755**	.835**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	54	54	54	54	54	54
**. Correlation is significant at the 0.05 level (2-tailed). Ethical Problem (EP), WA (Workers Awareness), Management Status (MS), Clause Contract Safety Enforcement (CCSE), Communication Channel (CC), Implementation of Safety Regulation (ISR).							

Source: SPSS Survey Output, 2024

According to Pallant (2013), the strength of the relationship between variables is comprised of -1 to and 1 When the relation equals zero it means that there is no relation at all. When it is on the negative side, it means that this relationship is negatively impacting the dependent variable. However, when it goes to +1, this relation means that it is impacting positively the variable. In general, when the correlation is .10 to .29, this correlation is small. When the correlation is between .30 to .49 it means that this correlation is medium finally when the Pearson correlation is ranged from .50 to 1.0; it means that this correlation is large or strong. This research paper used Pearson correlation coefficients r and P-value to test the hypothesis whether to accept or reject the hypotheses.

There is a significant positive correlation between current occupational safety regulation and ethical problems with ($r = 0.650$, $p=.000<.05$), indicating that better safety regulation enforcement practices are associated with fewer safety and ethical issues. A significant strong positive correlation exists between the Communication Channel and the Implementation of Safety Regulations ($r =.8350$, $p=.000 < 0.005$), suggesting that an improved communication channel enhances the implementation of safety regulations practices.

Table 4.4 demonstrated that there is a strong positive correlation between clauses in construction safety enforcement and safety regulation implementation ($r = .755$, $p =.000<=.005$) indicating

that a well-defined safety clause in contracts highly improves implementation of safety regulations. There is a significant positive correlation between Management status and implementation of Safety Regulations ($r = .734$, $p=.000< 0.005$). Generally, the analysis emphasizes the importance of effective communication, Workers' awareness, clearly defining safety clauses, proper management, and addressing ethical issues for having a proper enforcement practice in improving safety regulations in the construction industry.

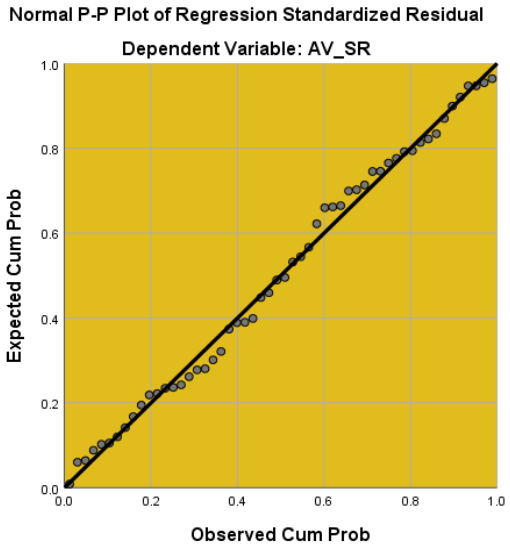
4.7 Assumptions

4.7.1 Linearity Assumption

The data points should follow a relatively straight line: In a Normal P-P plot, the standardized regression residuals are plotted against the expected cumulative probabilities. The linearity assumption suggests that the points on the plot should closely follow a straight line. Any significant deviations from a straight line may indicate non-linearity in the relationship between the predictor variables and the response variable. The residuals should be normally distributed: The Normal P-P plot assesses the normality assumption by comparing the observed cumulative probabilities of the standardized residuals with the expected cumulative probabilities under the assumption of normality. If the data points closely follow the expected line, it suggests that the residuals are normally distributed. Departures from the linearity of the plot indicate departures from normality.

The residuals should have constant variance (homoscedasticity): Homoscedasticity assumes that the spread or dispersion of the residuals is consistent across different levels of the predictor variables. In the Normal P-P plot, if the spread of the data points is approximately equal throughout the plot, it suggests that the assumption of constant variance is met. If the spread varies systematically across the plot, it indicates heteroscedasticity, which violates the linearity assumption. In summary, the linearity assumptions for the Normal P-P plot of Standardized Regression Residuals include a relatively straight line, normally distributed residuals and constant variance (homoscedasticity) of the residuals.

Figure 4.5 Normal P-P plot, the standardized regression residuals



4.7.2 Normality Assumption

Brooks (2014) states that, if the residuals are normally distributed, the histogram should look like a bell curve. Additionally, P-P plots can be used to test this assumption, which is important for multivariate analysis (Hair and Anderson, 2010). The histogram can be used to verify if the data is normally distributed; it will have more scores in the middle and fewer at the edges, forming a bell shape. The plot below shows that the distribution is normal, thus forming a bell curve.

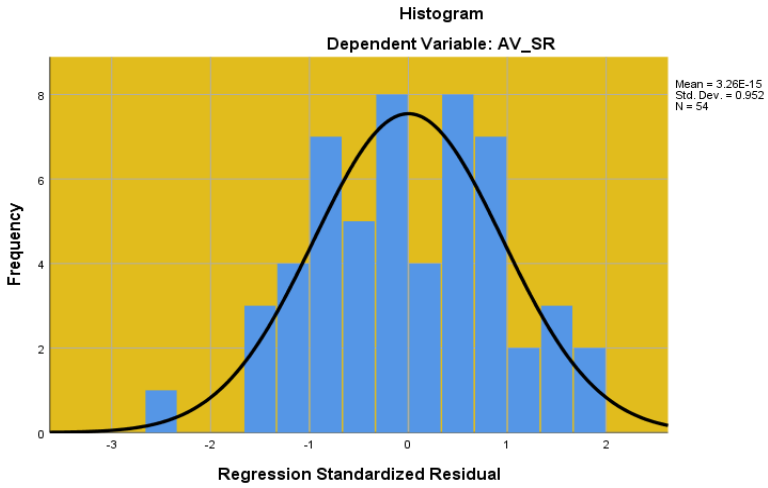


Figure 4.6 Normality Assumption

4.7.3 No Auto Correlation Test

The degree of similarity between a particular time series and a lagged version of itself over subsequent time intervals is represented mathematically by autocorrelation Smith, T. (2023,

March 20). The Durbin-Watson test is the most widely used technique to measure test autocorrelation. A statistic called Durbin-Watson is used to identify autocorrelation in regression analysis Smith, T. (2023, March 20). Because the existence of one does not necessarily indicate the occurrence of the other, autocorrelation is problematic Smith, T. (2023, March 20). Because autocorrelation denotes a lack of independence between variables, it presents a challenge for the majority of statistical tests. The Durbin-Watson test of the study variables is displayed in Table 4.10 below.

Table 4.10 Durbin-Watson Test

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.858[a]	.735	.708	.38316	1.996
a. Predictors: (Constant), AV_CC, AV_CCSE, AV_EP, AV_MS, AV_WA Ethical Problem (EP), WA (Workers Awareness), Management Status (MS), Clause Contract Safety Enforcement (CCSE), Communication Channel (CC),					
b. Dependent Variable: AV_ISR Implementation of Safety Regulation (ISR)					

Table 4.5 No autocorrelation test

The output of the Durbin-Watson test ranges from 0 to 4. According to the Durbin Watson test, if the Durbin Watson (D.W) coefficient value in the model summary table:

- D.W value is closer to 2 suggesting that the regression model has no autocorrelation
- D.W value closer to 4 suggests that the regression model has a negative autocorrelation exists, and
- D.W value closer to 0 suggests that the regression model has a Positive autocorrelation

In our study the Dubin Watson (D.W) value (1.996) is very close to 2, Hence, our regression model is free from autocorrelation problems, and can directly go through our regression model.

4.7.4 Multi-Collinearity

in multiple regression analysis, multicollinearity refers to the correlation among the independent variables. multicollinearity is a potential problem if the absolute value of the sample correlation coefficient exceeds 0.7 for any two of the independent variables, (Anderson et al., 2011). Hair et al. (2006) argued that a correlation coefficient below 0.90 may not cause serious multicollinearity problems, as cited by Muhammed (2012). Multi-collinearity can also be

detected using tolerance value and variance inflator factor (VIF) value. An insignificant tolerance value point to the variable under discussion is almost a perfect linear combination of the independent variables already in the equation and should be dropped out from the equation. In regression, multi-collinearity occurs when independent variables in the regression model are more highly correlated with each other than with the dependent variable when the independent variables in the regression model are highly correlated with one another; they are measuring the same thing. In other words, when two variables are highly correlated, they both communicate essentially similar information. One way to assess multi-collinearity is to examine correlations among the independent variables. If a correlation matrix demonstrates correlations of 0.90 or higher among the independent variables, there may be a problem with multicollinearity. Multi Collinearity does not exist among all the independent variables provided that the tolerance value of all the independent variables was greater than 0.1 and the VIF values of all the independent variables are also less than 10. As you can see from the table below all independent variables are greater than 0.1 and the VIF value of all the independent variables is also less than 10.

Table 4.11 Multi-Collinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	AV_EP	.220	4.553
	AV_WA	.205	4.873
	AV_MS	.265	3.768
	AV_CCSE	.284	3.520
	AV_CC	.158	6.339

a. Dependent Variable: AV_ISR: Implementation of Safety Regulation(ISR)

Ethical Problem (EP), WA (Workers Awareness), Management Status (MS), Clause Contract Safety Enforcement (CCSE), Communication Channel(CC),

4.8 Multiple Regression Analysis

This study used a multiple linear regression model to predict the implementation of safety regulations. The prediction was carried out based on the effect of the five predictors/explanatory variables workers awareness (WA), Communication Channel (CC), Clause on Contract Safety Enforcement (CCSE), Ethical Problem (EP), and Management Status (MS)**.** Besides, the coefficients for each explanatory variable generated from the model were subjected to a t-test, to test each of the hypotheses under study. The study hence came up with a model summary, the ANOVA, and the regression model confidence as presented in Tables 4.11, 4.12, and 4.13.

4.8.1 Model Summary

Table 4.12 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.858[a]	.735	.708	.38316
Predictors: (Constant), AV_CC, AV_CCSE, AV_EP, AV_MS, AV_WA Ethical Problem (EP), WA(Workers Awareness), Management Status(MS), Clause Contract Safety Enforcement(CCSE), Communication Channel(CC)				

The value of adjusted R^2 from Table 4.12 shows .735 this indicates that about 73.5% of the variations/changes in safety regulation were attributed to the effect explained by repressors namely; Ethical Problem (EP), WA (Workers Awareness), Management Status (MS), Clause Contract Safety Enforcement (CCSE), and Communication Channel (CC). The remaining 27.5% of the variation in Safety regulation enforcement (SR) was due to factors that are not included in this model, and the errors in the data collection process. Generally, 73.5% of the variance constitutes the final model formed by using the independent variables explained in the study. The findings suggested that the independent variables are an important tool for the Safety Regulation in private building constructions in the Yeka sub-city.

4.8.2 ANOVA

Table 4.13 ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.593	5	3.919	26.692	.000[b]
	Residual	7.047	48	.147		
	Total	26.640	53			
a. Dependent Variable: AV_ISR (Implementation of Safety Regulation)						
b. Predictors: (Constant), AV_CC, AV_CCSE, AV_EP, AV_MS, AV_WA Ethical Problem (EP), WA (Workers Awareness), Management Status (MS), Clause Contract Safety Enforcement (CCSE), Communication Channel (CC)						

As can see the ANOVA model in Table 4.13 indicates that the regression model was too adequate. The F-ratio was 26.692 and the p-value was .000 since less than a .05 level of significance alpha, thus we reject all the values of coefficients equal to zero, and conclude that at least one independent variable has a significant effect on safety regulation enforcement. In addition, from the above analysis of variance, the researcher could see the significant value of the model is below 0.05. Then the model is fit and all the variables (independent variable) could explain the dependent variables hence the model fitness is assured by the significance value. So, the researcher could go to the next step to see the model summary result which is the R^2 and adjusted R^2.

4.8.3 Coefficient Model

Table 4.14 Coefficient Model

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.097	.349		.279	.038
	AV_EP	.69	.161	.068	.428	.027
	AV_WA	.40	.186	.036	.217	.042
	AV_MS	.31	.144	.031	.212	.023
	AV_CCSE	.311	.144	.300	2.155	.036
	AV_CC	.606	.226	.501	2.679	.010
a. Dependent Variable: AV_ISR (Average Implementation of Safety Regulation)						

The multiple linear regression model that was used $Y= \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_{4+} \beta_5 x_{5+} e$ Where dependent variable Y shows Implementation of Safety Regulation (ISR), independent variable x_1 shows Ethical Problem (EP), x_2 shows Workers Awareness (WA) regarding safety regulation and enforcement, x_3 shows Communication Channel (CC) regarding implementation of safety regulations, x_4 shows Clauses on the Contract (CCSE), x_5 shows Management Status (MS) for safety regulation enforcement and e is the error term. The result equation of the regression model from Table 4.14, coefficients of the independent variables were $\hat{y}$(ISR)=.097+.69EP+.40WA +.606CC+ .311CCSE+.31MS+.349

4.9 Results and Discussion

4.9.1 Effect of Current Occupational Safety regulations and Ethical problems on Implementation of Safety Regulation

The findings of the research concluded that the current occupational safety regulation has a significant effect on safety regulation enforcement in private construction buildings. The high knowledge of current occupational safety regulations and the FDRE constitution regarding safety regulations by the employees and companies has a coefficient estimate (β1=.69, sig-value=.027). Consideration of current occupational safety regulation by an organization has a positive effect on the implementation of safety regulation, thus the higher the consideration of current occupational safety regulation and ethical problems by the organization and the employees, the greater the result and success for higher implementation of safety regulation. Hence, holding the four variables in the study constant, one unit increase in safety regulations and ethical problems results in .69 increases in implementation of safety regulation. As a result, consideration of Ethical Problems plays an important role in boosting safety regulation.

Occupational safety regulations are designed to protect workers from hazards that can cause injury or illness in the workplace. These regulations include hazard communication, personal protective equipment (PPE), training, and emergency preparedness. The regression coefficient indicated that the existence of workplace safety policies, standards, and regulations, knowledge of the regulations and standards, communication of these regulations to all parties, and other related points enhance the implementation of safety regulations in the study area.

4.9.2 Effect of Workers Awareness (WA) on Implementation of Safety Regulation (ISR)

The findings of the research concluded that the workers' awareness has a significant effect on the implementation of safety regulations in private construction buildings. The existence of workers' awareness of safety regulation has a coefficient estimate (β2=.40, sig-value=.042<.05). Existence of awareness regarding safety regulations, available insurance services, sharing of best practices, and other related issues has a positive effect on the implementation of safety regulation, thus the higher the existence of awareness about workplace safety both by employees and management, the greater result and success for the higher implementation of safety regulation. Hence, holding the four variables in the study constant, one unit increase in awareness results in .40 increases in the implementation of safety regulation. As a result, awareness plays an important role in boosting the implementation of safety regulations.

The regression indicated that Workers' awareness of safety regulations is crucial for promoting a safe and healthy work environment. Awareness of the necessity of periodical safety training, provision of safety shoes, helmets, and goggles for workers, and provision of water and sanitation for workers helps in minimizing workplace accidents, injuries, and fatalities. Awareness of the importance of assigning safety officers, holding regular safety meetings, sharing ideas and best practices, using manuals, and others helps to minimize workplace hazards and enhance legal compliance.

4.9.3 Effect of Communication Channel (CC) on Implementation of Safety Regulation (ISR)

The findings of the research concluded that the communication channel among concerned bodies has a significant effect on the implementation of safety regulations in private construction buildings. The existence of an established and effective communication channel on safety regulation has a coefficient estimate (β3=.606, sig-value=.010<.05). The Existence of an appropriate communication channel has a positive effect on the implementation of safety regulation, thus the higher the existence of an effective communication channel about workplace safety both by employees and management, the greater result and success for higher implementation of safety regulation. Hence, holding the four variables in the study constant, one unit increase in communication channel results in .606 increases in implementation of safety

regulation. As a result, the existence of effective and appropriate communication plays an important role in boosting the implementation of safety regulations.

4.9.4 Effect of Clause on the Contract Safety Enforcement (CCSE) on Implementation Safety Regulation (ISR)

The findings of the research concluded that the clauses on the contract regarding safety enforcement have a significant effect on the implementation of safety regulations in private construction buildings. Since the existence of clear safety regulation statements or clauses on the contract has a coefficient estimate ($\beta 4 = .311$, sig-value=.036<.05). Existence of clear safety regulations clause on the contract has a positive effect on the implementation of safety regulation, thus the higher the existence safety clauses about workplace safety both by employees and management, the greater result and success for the higher implementation of safety regulation. Hence, holding the four variables in the study constant, one unit increase in communication channel results in .311 increases in implementation of safety regulation. As a result, the existence of safety clauses in the contract plays an important role in boosting the implementation of safety regulations.

4.9.5 Effect of Management Status (MS) on Implementation Safety Regulation (ISR)

The findings of the research concluded that management status has a significant effect on the implementation of safety regulations in private construction buildings. Since the existence of a firm commitment of the management, the management decision to allocate sufficient resources (financial, human, and technological), Management's attitudes and behaviors to establish the organizational culture regarding safety, management support for employee engagement, and the management involvement in policy development and enforcement to implement safety regulations have a coefficient estimate ($\beta 5 = .31$, sig-value=.023<.05). Hence, holding the four variables in the study constant, one unit increase in management status results in .31 increases in implementation of safety regulation. As a result, the existence of strong management status plays an important role in boosting the implementation of safety regulations.

4.10. Results of the Interview

This study involved conducting semi-structured interviews with 2 contractors, 2 consultants, and 3 site foremen from different companies, resulting in a total of 7 respondents being interviewed.

The obtained data and information from these interviews were subjected to qualitative analysis, and the summarized findings are presented below. The initial query posed to each foreman by the researcher pertained to the degree of occupational safety legislation implementation. Regarding the existence of an established safety officer assigned and safety committee, the respondents indicated that in some of the companies, there is an established safety officer and committee but in some of the companies there is no established committee and assigned safety officer, and some of the respondents were not sure on the existence of the committee.

Regarding the availability of first aid service available on site, respondents indicated that in some of the companies, there is a first aid service that is immediately available if they become ill or injured on the job. However, in some of the companies, there is no first aid service. If accidents occur while the worker is on-site, respondents indicated that they respond to the accident by simply taking to the hospital, taking first aid, and providing first aid then contacting the supervisor for additional treatment or taking to the hospital if the case is critical, and calling emergency or ambulance. The results indicated that respondents are aware of the occurrence of workplace hazards but due to variation in the availability of first aid service, the response to accidents varies too.

Regarding the provision of safety training for employees, there is variation among companies. According to the respondents, most of the companies provide specific safety training or general safety training but some do not provide safety training. Regarding the way they ensure that all contractors and workers on the construction site adhere to safety protocols and procedures, there is a variation in response among the respondents. Some indicated by having follow-up and regular meetings, providing clear procedures and regulations before starting construction, or informing the responsible body. Respondents indicated that there is a variation in providing the right kind of PPE in sufficient amounts among the construction firms. These variations are due to the lack of awareness about safety, the Cost of the equipment (financial constraints), and the lack of regulation enforcement on construction. Generally, the main determinants found to affect Personal protection equipment use in organizations can be organized into three categories: Individual factors, such as knowledge, beliefs, attitudes, and socio-demographics; Environmental factors, such as equipment availability; and Organizational factors, such as management.

The respondents highlighted the challenges in meeting the necessary regulations, as they require additional funding that is not accounted for in the bidding criteria. Specifically, the allocated budget does not cover the expenses for essential safety equipment. The second concern raised by all the foremen pertains to the difficulties encountered by employees in implementing safety and health (SH) measures at the workplace. According to the respondents, a significant number of workers are from rural areas with limited literacy levels, linguistic diversity, and a lack of awareness. Additionally, most of the workers fall into the younger age group and display negligence and a reluctance to adhere to SH rules on-site, largely due to an improper attitude towards safety and health.

The respondents indicated that to address these conditions, it would be helpful to provide regular training sessions in the national language and ensure strict monitoring and enforcement to alleviate the mentioned problems. Additionally, the third point raised was the inclusion of safety and health issues as a key topic in site meetings. According to the respondents, problems rarely occur on the site or during monthly meetings unless they are raised by the consultant or client. The researcher then asked if there is a specific rule that holds contractors responsible in case accidents occur during work. This question was raised as the fourth inquiry, acknowledging that the contract does include a general obligation clause for all parties, although it doesn't specify it explicitly. Surprisingly, no one has attempted to enforce this clause based on the contractual agreement. One of the questions raised for the foremen was the fifth query, exploring the root causes that hinder the enforcement of contractual obligations.

In response, they stated that the primary responsibility for establishing a safe working environment lies with government offices, which should raise awareness about the advantages of adhering to occupational safety regulations. However, this approach is not feasible. Likewise, construction companies prioritize maximizing profits rather than investing in safety and health measures. Although they may provide helmets, vests, and display posters, these efforts fall short of addressing the larger issue of ensuring occupational safety and health. The matter at hand concerns human lives and requires significant attention.

Similarly, regardless of whether the contractual agreement stipulates the cost for workplace safety and health (SH), the consultant needs to ensure that the contractor takes necessary

measures to reduce the occurrence of accidents on site. Another issue pertains to the fulfillment of obligations outlined in the contractual agreement between clients and contractors regarding site safety. When questioned, the workers interviewed stated that they could not confidently affirm that all obligations were duly respected, except for a few that were acknowledged and implemented on the condominium project sites.

The interview outcomes align closely with the questionnaire responses provided by the three key stakeholders involved, namely the Contractor, Consultant, and Client representative. The findings from the interviews reinforce the patterns and trends observed in the questionnaire data. This consistency between the two data sources lends credibility to the overall results and strengthens our understanding of the project's dynamics. The interviewees' perspectives further validate the questionnaire findings, confirming the shared viewpoints and highlighting areas of agreement among all three stakeholders. Collectively, these complementary sources of information paint a comprehensive picture of the project, enhancing our ability to make informed decisions and devise effective strategies moving forward. To enhance implementation of safety regulations, this researcher recommends the following remedial actions: i) Regularly assess existing regulations to ensure they meet current safety standards and address emerging challenges, ii) Developing and disseminating a clear guideline on safety protocols and best practices for construction sites, iii) Offer regular training sessions and workshops for construction workers, site managers, and engineers on safety regulations, iv) Establish a regular schedule for safety inspections, focusing on high-risk construction sites, and vi) Collaborate with construction companies, and establish safety committee comprised of various stakeholders to oversee compliance and address safety issues collectively to promote safety standards and regulations.

5. Summary, Conclusion and Recommendations

5.1 Summary of Major Finding

- Given the questionnaire and employing the midpoint mark of 3.00 the descriptive result showed that the respondents have a strong agreement (overall=3.77) on the effect of Ethiopian current occupational safety regulation and safety ethics on low performance of safety regulation enforcement in the study area.
- Given the questionnaire and having the midpoint mark of 3.00 the descriptive result showed that the majority of respondents have a strong agreement (overall=3.697) on the cause of workers' awareness about safety regulation on the implementation of safety regulation in private building constructions found in Yeka sub city.
- The descriptive result showed that most respondents strongly agreed (overall=3.37) that management status affected the safety regulation enforcement in the study area, with a midpoint score of 3.00 for the questionnaire.
- Given the questionnaire and having the midpoint mark of 3.00 the descriptive result showed that the majority of respondents have a strong agreement (overall=3.48) on the cause of clauses and conditions in the contract on safety regulation implementation in private building construction in the Yeka sub-city.
- The first objective of the study was to evaluate the extent to which private building construction projects in Yeka Sub-City follow existing safety regulations. The paper found that following the existing safety regulations was good but some gaps need improvements in providing safe health facilities, awareness creation for workers regarding safety, and others.
- The second objective of the study was to identify the implementation challenges of existing safety regulations. The study found that workers' awareness, management status, safety clauses on the contract, Ethiopian current occupational safety regulations and ethics, and the presence of communication channels were found to be causes for implementing safety regulations in the study area.
- The third objective of this research was to recommend measures required to enhance the effectiveness of safety regulation in the study area. This research paper recommends regularly assessing existing regulations, developing and disseminating a clear guideline on safety protocols and best practices, offering regular training sessions, establishing a regular

schedule for safety inspections, collaborating with construction companies, to form safety and health policies and checklists, and establishing a safety committee.

- Holding the four variables in the study constant, one unit increase in safety regulations and ethical problems results in .69 increases in implementation of safety regulation. As a result, consideration of Ethical Problems plays an important role in boosting safety regulation.
- The regression coefficient indicates that workers' Awareness regarding workplace safety (WA) is a significant cause for implementing safety regulation enforcement. For each unit increase in workers' awareness increases the safety implantation constantly by 0.40 units.
- Holding the four variables in the study constant, one unit increase in communication channel results in .606 increases in implementation of safety regulation. As a result, the existence of effective and appropriate communication plays an important role in boosting the implementation of safety regulations.
- Holding the four variables in the study constant, one unit increase in communication channel results in .311 increases in the implementation of safety regulation.
- The model of the study is $\hat{y}(ISR)=.097+.69EP+.40WA +.606CC+ .311CCSE+.31MS+.349$

5.2 Conclusion

This research paper concluded that there was a strong relationship between current occupational rules and safety regulations, workers' awareness, management status, clauses on the contract, communication channel, and dependent variable safety regulation enforcement at the 0.05 level of significance. The findings of the study indicated that the independent variables studied in this research paper have a positive significant effect on the implementation of safety regulations. Based on the results of this study, it can be concluded that to enhance the implementation of safety regulation it is important to regularly assess existing regulations, develop and disseminate a clear guideline on safety protocols and best practices, offer regular training sessions, establish a regular schedule for safety inspections, to collaborate with construction companies, and establish a safety committee. However, further research is needed to confirm these findings and examine other factors that affect the implementation of safety regulations of private building constructions in Yeka sub-cities or a large geographical scope.

5.3 Recommendations

Based on the findings, the following recommendations are suggested to enhance safety regulations in the Ethiopian construction industry:

- Given the significant positive correlation between enforcement practices and safety regulation adherence, it is imperative to enhance enforcement mechanisms. Regular and stringent safety inspections by management and site supervisors should be mandated to ensure compliance.
- Effective communication significantly influences both workers' awareness and the enforcement of safety-related contractual clauses. Construction companies should implement robust communication strategies, utilizing advanced technology and ensuring timely dissemination of safety policies and procedures to all stakeholders.
- Training programs focused on job hazards, safety protocols, and the importance of using safety gear should be intensified. Periodical safety training and awareness campaigns can significantly improve workers' understanding and adherence to safety regulations.
- Incorporating comprehensive safety and health clauses in construction contracts and ensuring their enforcement can mitigate ethical issues and enhance safety.
- Regular site safety inspections by contractors and enforcement by consultants should be emphasized.
- Address Ethical Concerns and problems, such as worker exploitation and safety shortcuts, are prevalent. Implementing a firm policy against such practices and ensuring ethical standards are upheld can improve overall safety and worker well-being.
- Sharing safety best practices across the industry and standardizing safety manuals can bridge knowledge gaps and promote a culture of safety.

By focusing on these areas, the Ethiopian construction industry can significantly improve its safety standards, ensuring a safer working environment and reducing ethical issues.

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Questionnaire

Dear Sir/Madam!

First of all, I would like to express my appreciation for your kind cooperation in providing me with relevant information. The questionnaire is designed to obtain data concerning the implementation of safety regulations, and the enforcement practice gaps in Ethiopia. The responsible bodies for safety and the contract documents on the safety regulation-related issues in construction industries to develop my MSc Thesis entitled “Implementation challenges of safety regulation in private building construction: the case of Yeka sub-city" for academic purposes.

The questionnaire has two-part parts. The first part is personal information about the respondents. The second part is designed to measure the extent to which respondents agreed, abstained, or disagreed with the statements formulated to get data on the safety and health-related regulations and their enforcement practices in private building construction projects. You are kindly requested to tick (√) the extent to which you agree with the statements given in the table below. The level of the agreement is leveled as 1=Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, and 5= strongly agree. The questionnaire has been designed to utilize a maximum of 15 minutes to complete. No name is required to appear anonymity is guaranteed.

Thank you very much in advance for your cooperation!

Name: **Eyerusalem Kinfemichael**

Email:eyukamichael27@gmail.com

Advisor: Mr. Amlaku Melese

Section I: Personal Data

1. **Name of Organization** _____

2. Gender Male ☐ Female ☐

3. Age 25-30 ☐ 31-35 ☐ 36-40 ☐ Above 40 ☐

4. Educational Background

Diploma ☐ BSC /BA ☐ MBA/ MSC ☐ PHD ☐

5. Work Experience in the Construction Projects

2- 5 years ☐ 6-10 years ☐ 11-15 years ☐ above 15 ☐

6. Position

Engineer ☐ Resident Engineer ☐ Project Manager ☐

Contract Administration ☐ Saftey Officer ☐ Other ☐

7. **Average number of Employees**: <50 ☐ 50-75: ☐ 75-100: ☐ >100: ☐

Part II: ***To study the current Occupational Safety regulations and ethical problems in the Ethiopian construction industry.*** **Please tick (√) the extent to which you agree with the statements given in the table below Rate the following aspects on a scale from 1(Strongly Disagree), 2(Disagree), 3(Neutral), 4(Agree), and 5(Strongly Agree).**

I.	**Current Occupational Safety regulations and ethical problems in the Ethiopian construction industry.**	***1***	***2***	***3***	***4***	***5***
EP1	You are familiar with the Federal Democratic Republic Ethiopia Constitution, and Safety & Health related regulations at work					
EP2	The government of Ethiopia has established a firm policy and regulation for the implementation of safety regulations					
EP3	The management of the company has awareness of the legislation and safety-related regulations of the country & implementation accordingly.					
EP4	There is a written safety regulation policy in the management of the company.					
EP5	All concerned parties of the company have communicated about the policy of safety regulation					
EP6	The current Occupational Safety regulations in the Ethiopian construction industry effectively address ethical issues and ensure the safety of workers.					
EP7	Occupational Safety regulations in the Ethiopian construction industry protect the well-being of workers.					
EP8	The policy of Safety and Health is communicated to all concerned parties in the company.					

EP9	Ethical concerns, such as worker exploitation or safety shortcuts, are prevalent in the Ethiopian construction industry.					

Assessment of Safety regulations and their enforcement practices @ *worker's awareness of Safety regulations and enforcement practices.* Please tick (√) the extent to which you agree with the statements given in the table below Rate the following aspects on a scale from 1(Strongly Disagree), 2(Disagree), 3(Neutral), 4(Agree), and 5(Strongly Agree).

II.	***workers' awareness of Safety regulations and enforcement practices***	***1***	***2***	***3***	***4***	***5***
WA1	A safety officer is assigned by the contractor					
WA2	The contractor regularly holds a safety meeting					
WA3	Workers know the available insurance services in their company					
WA4	The contractor regularly conducts site safety inspections					
WA5	Workers have the safety awareness needed for the hazards they face on the job.					
WA6	There is a sharing of best practices or ideas from other contractors regarding accidents.					
WA7	There is a culture of using and preparing manuals for workers' safety.					
WA8	Periodical safety training is given to workers					
WA9	The contractor provides safety shoes, helmets, and goggles for workers					
WA10	The contractor enforces and controls workers for using safety kits					
WA11	The contractor assigned a qualified person & medical facility in case of accidents.					
WA12	The contractor has Insurance coverage for workers					
WA13	The contractor provides water and sanitation for workers					
WA14	The contractor always takes lessons learned from accidents on construction sites.					
WA15	The contractor keeps records of accidents on the construction site					

Assessment of *Safety regulations* in the enforcement practice of Safety regulations. Please tick (√) the extent to which you agree with the statements given in the table below Rate the following aspects on a scale from 1(Strongly Disagree), 2(Disagree), 3(Neutral), 4(Agree), and 5(Strongly Agree).

III	**Management Status on the Implementation of Safety Regulations**	***1***	***2***	***3***	***4***	***5***
MS1	Would you assess the current safety regulations and regulations governing private building construction projects in Yeka Sub-City?					
MS2	Do you think poor management is the main challenge in the enforcement practice of safety regulations within construction projects?					
MS3	Is the management of safety regulation enforcement within private building construction projects in Yeka Sub-City effective?					
MS4	The management has impacted safety regulation enforcement practices in private building construction projects in the Yeka Sub-city.					
MS5	Yeka Sub-City has specific strategies that have been implemented to improve the enforcement practice of safety regulations.					
MS6	Do you think the current Occupational Safety regulations in the Ethiopian construction industry are comprehensive and effectively enforced?					
MS7	The management conducts regular safety inspections and documents the results.					
MS8	The site supervisor has given the right to suspend unlawful works					
MS9	The site supervisor always follows the site safety rules and procedures					

Assessment of Safety regulations and their enforcement practices @ Examine clauses on Safety officers and monitoring regulations related to improving the enforcement practice. Please tick (√) the extent to which you agree with the statements given in the table below Rate the following aspects on a scale from 1(Strongly Disagree), 2(Disagree), 3(Neutral), 4(Agree), and 5(Strongly Agree).

IV	**Examine clauses on the condition of the contract about Safety to improve the enforcement practice**	*1*	*2*	*3*	*4*	*5*
CCSE1	Is the contract document included the safety and health clauses					
CCSE2	The project has a Safety Committee					
CCSE3	The contractor assigns a safety officer					

CCSE4	The consultant enforces the contractor based on the contract to fulfill the required PPE					
CCSE5	The contractor conducts regular site safety inspections					
CCSE6	The safety inspection results were documented and communicated					
CCSE7	There is a consistent enforcement of safety clauses in construction contracts.					
CCSE8	There is a sufficient penalty for non-compliance with safety clauses.					

Assessment of Safety regulations and their lack of communication @ Safety regulation construction site practices and organizational-related questions. Please tick (√) the extent to which you agree with the statements given in the table below Rate the following aspects on a scale from 1(Strongly Disagree), 2(Disagree), 3(Neutral), 4(Agree), and 5(Strongly Agree).

VI	***Communication Channel for Safety Regulations at the* Construction site Practices and Organizational-related Questions.**	***1***	***2***	***3***	***4***	***5***
CC1	The communication channels and processes currently in place within the construction projects in Yeka Sub-City regarding safety regulation implementation					
CC2	How do you perceive the effectiveness of communication among different stakeholders involved in safety regulation compliance?					
CC3	Have you encountered any instances where lack of communication has hindered the implementation of safety regulations in construction projects in Yeka Sub-City?					
CC4	There is a slow information flow among stakeholders					
CC5	Do you think initiatives could be implemented to improve communication among stakeholders and address the challenges related to communication gaps in ensuring safety regulation compliance?					
CC6	There is a well-established and effective communication channel for construction safety regulation at the construction site practices within the organization.					
CC7	Do you think there is a weak communication skills					

	and management?					
CC8	Do you think there is a lack of appropriate communication medium and lack of advanced communication technology support?					
CC9	Do you think there is negligence and casualness in the communication?					
CC10	Do you think there is poor communication planning and a lack of understanding among stakeholders?					

Safety Regulation (Dependent Variable)

VI	***Safety Regulation***	***1***	***2***	***3***	***4***	***5***
SR1	Knowledge of safety regulation policies and ethical problems affects the implementation of safety regulations.					
SR2	Worker's awareness affects the implementation of safety regulations.					
SR3	Communication channel affects the implementation of safety regulations					
SR4	Conditions on the contract affect the implementation of safety regulations.					
SR5	Management Status affects the implementation of safety regulations.					

APPENDIX B: INTERVIEW GUIDE FOR KEY INFORMANTS

1. Is first aid service available on site? How do you do when accidents occur on the worker is on site?
2. Do you provide safety training for employees? If yes on what topics/issues do you train them?
3. Is there a safety officer assigned and safety committee is established?
4. How do you ensure that all contractors and workers on the construction site adhere to safety protocols and procedures?
5. Have you ever encountered any challenges in implementing safety measures on a construction site, and how did you address them?
6. What are the factors influencing to take any necessary safety measures and to provide the right kind of PPE in sufficient amounts?
7. How do you communicate and enforce safety policies and procedures with all stakeholders involved in a construction project?
8. How do you stay current with the latest safety regulations and industry best practices to ensure that your safety measures are up-to-date and effective?

Appendix

Implementation Challenges of Safety Regulation in Private Building Construction Projects A Case Study In Yeka Sub City			
በአዲስ አበባ ከተማአስተዳደር የግንባታ ፍቃድና ቁጥጥር ባለስልጣን			
ቁጥር	የ ባለቤት ስም	የ ሚ ነ ባበት ወረዳ	የ ከፍታ ማክን
1	ሴፍላንድ ሪል እስቴት አክሲዮን ማህበር	5	G+15
2	ትበልጫልህ ሃብቴ ወልዴ	5	G+11
3	እኔ ፀጌ ተስፋዬ	5	4B+G+21
4	እነ ጉስታፍ	6	2B+G+25
5	ስዬምጎ ሲ	6	2B+G+11
6	ዲ.ኤች ቤዝ	6	G+13
7	ቢሚኒ.ተ	6	2B+G+10
8	ቤተልሄምከተማ	6	2B+G+10
9	አበባ ታደሰ	6	G+10
10	አልማዝ አብዬ	6	G+11
11	ነጻነት ፍሰሃ	6	G+10
12	ሽሜልስ ገበየሁ	7	G+17
13	ፊሊሞን ገ/ሚድህነ	7	3B+G+20
14	ኖህ ሪልስቴተ	7	G2+19
15	የሺእሜቤት ገበየሁ	7	G+11
16	ኪዳኔ ተስፋዬ	7	2B+G+11
17	ፈጠነ ች ጫል	7	2B+G+11
18	አንታስ ሪልሲቴት	7	G2+20
19	ዋለልኝ ገላው	8	G2+15
20	ማክፍን ውብሸት	8	B+G+11
21	ራሄል ጸጋዬ	8	G+11
22	እነ አብረሀት ገ/ኪዳን	13	G2+15
23	ሂልበተምየ ማዘናኛ ሜዕከል	13	B+G2+15
24	ግሎሪየሰ ሪልአስቴት	13	B+G+10
25	ሙሳግስቱ ሀይሉ	13	B+G+10
TARGET POPULATION OF THE STUDY			