FUTURA EDITRICE

RESEARCH REPORT ON EVALUATION OF SAFETY AND HEALTH PRACTICES IN THE CONSTRUCTION SECTOR IN ADDIS ABABA

APRIL 2024

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Research Report on Evaluation of Safety and Health Practices in the Construction Sector in Addis Ababa

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Table of contents

Abbreviations and acronyms vii
Acknowledgements ix
Abstract xi
Introduction 1
1. Context and foundations of the study 7
1.1. Background of the study 7
1.2. Objectives 11
1.2.1. General objective 11
1.2.2. Specific objectives 11
1.3. Statement of the problem 12
1.4. Rationale and significance of the study 12
2. Review of related literature 17
2.1. Safety and health hazards in construction sites: types with different trades 18
2.1.1. Chemical hazards 21
2.1.2. Physical hazards 22
2.1.3. Biological hazards 24
2.1.4. Social hazards 25

2.2. Construction health and safety rules and regulations 26
2.3. Construction health and safety rules in Ethiopia 26
2.4. General duties of competent/responsible authorities in health and safety practice 29
2.4.1. Contractors 29
2.4.2. Safety officer/manager 29
2.4.3. Consultants/Supervisors 30
2.4.4. Client 30
2.4.5. Safety committees 32
2.4.6. Outside agencies 32
2.4.7. Workers 33
2.4.8. Factors that affect health and safety performance of laborers 34
2.4.9. Selection of qualified contractor for safety 35
2.5. Safety and health management: adherence to OSH standards 35
2.6. Health and safety management policy 42
2.7. Management commitment and support to health and safety 47
2.8. The role of trade union in promoting safety and health 50
2.9. Prevention, inspection, and reporting of hazards 53
2.10. Challenges in managing health and safety in construction sites 56
3. Research methodology 59
3.1. Study area 59
3.2. Data sources 60

3.3. Study design 60
3.4. Study population 61
3.5. Sample size and sampling method: quantitative part 61
3.6. Sample size and sampling method: qualitative part 62
3.7. Data management and analysis 62
3.8. Reliability and validity 64

4. Results and discussion 65

4.1. Company and current project information 65

4.1.1. Work experience of the organization and respondents' professional experience in the construction industry 66
4.1.2. Educational status of respondents 67

4.2. Scope of health and safety implementation 68

4.2.1. Causes of injury 70
4.2.2. Integration of OSH 72

4.3. Roles of the client, consultant and contractor in health and safety consideration 75
4.4. Factors that affect health and safety performance of workers 77
4.5. Roles of trade union in OSH 82
4.6. Result from key informant 83

4.6.1. Key informants response analysis 83
4.6.2. Opinion and remarks by key informants on the situation of OSH practice in construction enterprises 85
4.6.3. Associated gaps and limitations 90

4.6.4. Strength and Weakness 91
4.6.5. Challenges 94
4.6.6. Recommended measures to improve OSH practice in the construction sector 99
5. Conclusion and recommendations 103
Conclusion 103
Recommendations 105
References 107

Abbreviations and acronyms

BC - Building Contractor
COA - Cost of accident
COP - Cost of prevention
CSA - Central Statistical Agency
GC - General Contractor
GDP - Gross Domestic product
GTP - Growth and Transformation Plan
H & S - Health and safety
HSC - Health and Safety Commission
HSE - Health and Safety Excusive
HSW - Health and Safety at Work
ILO - International Labor Organization
ISO - International Standardized Organization
NGO - Non Governmental Organization
OSH - Occupational Safety and Health
PLC - Private Limited Company
PM - Project manager
PPE - Personal Protective Equipment
UK - United Kingdom
USA - United States of America
USD - United States Dollar
WB - World Bank
WHO - World Health Organization

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Fiorella Prodi
President, NEXUS Emilia Romagna

Abstract

The construction industry has been seen as one of the hazardous industries. This is because the industry has a poor health and safety performance record compared to other industries all over the world, including Ethiopia. Labor law in every nation provides that it is the duty of an employer to ensure that every worker employed works under satisfactory, safe and healthy conditions but the role of other relevant stakeholders who has responsibilities along the value chain is usually overlooked. The research is focused on evaluating the health and safety issues in building construction projects in Addis Ababa, Ethiopia with focus a on the role of trade unions. The roles of the Client, Consultant and Contractor in health and safety consideration during project implementation were examined. It also determined the factors affecting health and safety performance of workers and enterprises. Whether safety is used as criteria in selecting a contractor during the prequalification phase of public bidding was also identified. Building Construction Companies which are unionized and non-unionized were involved in the sampling. All the information that could help in attaining the study objectives

were collected, reviewed and formalized from the literature review. Views and information from key informants were collected and analyzed to triangulate with other results Data were collected and evaluated and the Relative Importance Index for each factor affecting health and safety was determined. The study determined the practical situation of building construction projects in consideration of health and safety, which was evaluated as low to medium. Relative Importance (RII) index of 12 factors affecting health and safety performance of labors was calculated. The top three factors identified were: (1) Non availability of a clear company Health and safety policy (0.82); (2) Inadequate enforcement of the existing building rules and regulations (0.80); and (3) Safety awareness of the company's top management (0.79). To improve the safety and health performance of building construction projects, the following major recommendations were proposed: Each company should develop and implement its own safety and health policy to ensure comprehensive oversight; include safety as a pay item in contract document; and allocate budget and time frames for health and safety in the contract document.

Index Terms— Addis Ababa, Company Policies, Hazards, Health and Safety Practices, Rules and Regulations, Key Informants.

Introduction

This research was carried out within the framework of the project "Establishing Occupational Safety and Health System and Building Safety and Health Culture in the Construction Sector."

The initiative is supported by Nexus Emilia Romagna ETS and is part of a broader program implemented by the Confederation of Ethiopian Trade Unions (CETU) through its sectoral federation, the Ethiopian Industrial Federation of Construction, Wood, Metal, Cement. The program aims to establish a coherent and sustainable system of occupational safety and health (OSH) in the construction sector, while at the same time fostering a preventive safety culture that protects workers from accidents and occupational risks. Moreover, it seeks to ensure the fundamental rights of workers by promoting safe and healthy workplaces. The project has been financed by Nexus Emilia Romagna ETS and is implemented in collaboration with the Ethiopian trade union – CETU, in collaboration with CGIL.

The focus of the research is the assessment of the current status of occupational safety and health services and practices

in the construction sector of Addis Ababa. The study explores both the organizational and operational dimensions of OSH, paying particular attention to the involvement of different stakeholders such as contractors, consultants, trade unions and clients. It highlights the often underestimated but crucial role of trade unions in improving workplace safety conditions. Special consideration has been given to comparing unionized and non-unionized construction companies, in order to understand how trade union presence may affect health and safety practices.

The overall purpose of the research is to generate systematic and evidence-based knowledge that can serve as a foundation for improving OSH practices in the Ethiopian construction sector. The research sets out several specific objectives such as to identify the most common occupational health and safety issues in construction sites, particularly in building projects; to examine the roles and responsibilities of contractors, consultants, trade union and clients in integrating safety measures during project planning and implementation; to analyze the main factors influencing the safety performance of workers, including management commitment, awareness and the availability of safety equipment; to assess the contribution of trade unions in advancing occupational health and safety services in the construction industry.

By pursuing these objectives, the study seeks not only to provide a diagnostic picture of the current situation but also strengthen policies and interventions that can reinforce safety and health outcomes in the sector.

The reason for conducting this research lies in the significant yet problematic role of the construction sector in Ethiopia. On the one hand, construction is a vital driver of economic growth, employment, and infrastructure development, accounting for a substantial proportion of national GDP and job creation. On the other hand, the sector is notoriously hazardous, with a disproportionately high rate of accidents, injuries, and fatalities compared to other industries. Previous studies have shown that building construction workers in Addis Ababa experience an occupational injury prevalence ranging between 30% and 40%. Unsafe working conditions, insufficient use of personal protective equipment, poor hazard awareness and inadequate regulatory enforcement contribute to this alarming situation.

Despite the existence of labor laws and regulatory frameworks, the practical enforcement of safety standards remains weak and the overall integration of OSH services into construction projects is limited. Moreover, comprehensive and up-to-date evidence on the status of OSH in Ethiopia's construction industry is scarce. Without such evidence, it is extremely difficult for policymakers, employers, and unions to design and implement effective measures to address the problem. The present study therefore fills an important knowledge gap, providing a baseline assessment that can inform future strategies to create a safer and healthier construction industry.

The research is organized into five main chapters. The first chapter provides the background and objectives, setting the scene for the investigation. The second chapter reviews

related literature, focusing on the types of hazards found in construction sites, national and international OSH regulations, and the roles of key stakeholders in promoting safety. The third chapter presents the methodology used for the study, including the study area, population, sampling strategies and methods of data collection and analysis. The fourth chapter discusses the findings, including the level of OSH integration in construction companies, the main causes of injury, the role of trade unions and the perspectives of key informants. The final chapter concludes with a synthesis of the main findings and puts forward practical recommendations aimed at improving OSH practices in the Ethiopian construction sector.

The results of the research confirm that the level of occupational safety and health integration in construction enterprises in Addis Ababa remains generally low to medium. Among the key challenges identified are the absence of clear and company-wide OSH policies, weak enforcement of existing building safety regulations, and limited safety awareness among senior management. At the same time, the study finds that unionized companies tend to demonstrate better safety practices, suggesting that trade unions can play a pivotal role in advocating for and institutionalizing OSH standards. Moreover, the improvement in occupational safety and health in the Ethiopian construction sector requires a multi-stakeholder approach. Companies must be encouraged to adopt comprehensive OSH policies, allocate budgets and resources for safety measures, and integrate OSH criteria into contract

documents and procurement processes. Trade unions need to enhance their capacity to monitor and advocate for workers' safety rights. Government agencies and regulators must strengthen enforcement mechanisms and provide more consistent oversight. By combining these efforts, the sector can move towards a genuine safety culture that not only reduces accidents and fatalities but also contributes to more productive, equitable, and sustainable construction practices and to the reduction of the social and human costs caused by workers' deaths and/or injuries.

1.
Context and foundations of the study

1.1. Background of the study

Construction is a vast and an active sector, which is a backbone of the world's economy in general and Ethiopia in particular, by mobilizing an enormous amount of various resources and budgets and embracing huge manpower by creating a large job opportunity. It accounts for about 20% of the total employment created in the nation (CSA, 2018). The construction industry is divided into three major segments: buildings contractors, general contractors for residential, industrial, commercial buildings and civil engineering contractors for infrastructure projects (Engineering Management Research, 2013).

The construction industry has unique characteristics compared with other economic sectors and is also known as the most dangerous industry. The construction industry is a dangerous industry due to the high incidence of accidents and fatalities (Ganesh *et al*., 2016; Abas *et al*, 2021).

Occupational accidents cause important social and economic problems by loss of life and physical harm. Globally

every day, 6,300 people die as a result of occupational accidents or work-related diseases more than 2.3 million deaths per year. 317 million accidents occur on the job annually; many of these result in extended absences from work. The human cost of this daily adversity is vast and the economic burden of poor occupational safety and health practices is estimated at 4 per cent of global Gross Domestic Product (GDP) each year i.e. 3 trillion USD (ILO, 2023).

Construction sector involves high risk due to its production processes and labor-intensive characteristic and because of occupational accidents the sector faces financial loss in large scale. In developing countries, construction sector is one of the most important sectors that have a great contribution to economic development with its employment capacity and added-value to the economy. On the other hand, due to the lack of preventive measures, occupational accidents occur frequently in construction sector. The construction industry has accounted for about 11% of all occupational injuries and 20% deaths resulting from occupational accidents. International Labor Organization estimates that at least 60,000 fatalities occur at construction sites around the world every year. This means that one fatal accident occurs every ten minutes in the sector. Most of these accidents occur to unsafe behavior and unsafe conditions. Hence, health and safety problem in building construction is the major and worldwide issue which needs strong consideration since it affects the life of the workmen (manpower), project time, project cost and also project quality (Mouleeswaran, 2013).

The improvement of safety, health and working conditions depends ultimately upon people working together, whether government, employers or workers. Safety management involves the functions of planning, identifying problem areas, coordinating, controlling and directing the safety activities at the work site, all aimed at the prevention of accidents and ill health. Effective safety management has three main objectives: to make the environment safe; to make the job safe; and to make worker safety conscious. The key elements identified include: providing safety managers on site; providing written and comprehensive safety and health plans; introducing project-specific training and regular safety meetings; providing safety and health orientation training, and involving employees in safety and evaluation. Occupational health and safety measures are strategies and standards aimed at preventing and controlling occupational hazards. These include the use of primary and secondary measures together with provision of proper personal protective equipment (PPE), adherence to safety protocols and other dimensions of safety measures (ILO, 2013).

The causes of accidents and ill health in the construction industries are well known. Most of these accidents are created due to unsafe behaviors and unsafe conditions. Falling from heights, such as scaffolding, is one of the biggest problems, along with accidents involving transport, both on and off site. Dermatitis, occupational deafness, and silicosis and other respiratory tract health complications are among many occupational health impairments that continue to cause long term suffering for many workers in the industries (Fekele *et al.*, 2016).

Safety consideration in construction sector including in building construction has not yet been studied and evaluated as a problem in Ethiopia. Limited available studies show that the construction sector faces challenges such as a high rate of workplace accidents, unsafe working conditions, inadequate hazard protection, and a lack of organized and systematic safety and health services and practices. These issues contribute to a substantial burden of occupational injuries. Moreover, the employment situation being dominated by casual workers, often with limited education, constitutes a significant portion of the workforce obliged to working in hazardous conditions without proper protection (Sharma *et al.*, 2009).

In building constructions in Ethiopia, inadequate awareness of occupational hazard, limited use of PPE at the workplace, and poor personal hygiene were noted to be contributing factors to excess exposures such as unsafe work environment, dust and noise and to be the major cause of occupational injuries (Gululat, 2010; MOLSA, 2012). Studies done to assess the prevalence of occupational injuries among workers of building construction in Addis Ababa showed that it was 30-40% (Gebremeskel & Yimer, 2019). The non-use of personal protective devices, poorly organized workplaces, lack of job satisfaction were commonly observed behaviors among workers in housing construction. Similarly, behavioral factors such as smoking and alcohol use were significant predictors of injury among construction workers. A research (Abebe & Fantahun, 1999) found that failing to provide proper PPE was a factor associated with poor practices in safety

measures. Additionally, many studies found that receiving safety training, adequate management support and the attitude toward safety measures were predictors of good practices in occupational health and safety measures (Abebe & Fantahun, 1999; Sharma *et al.*, 2009).

1.2. Objectives

1.2.1. General objective

To evaluate the status of OSH services and assess safety and health practices among construction companies in in Addis Ababa and its vicinity.

1.2.2. Specific objectives

The study will generate comprehensive evidence on the following specific objectives:

1. Identify health and safety issues prevalent in building construction projects.
2. Investigate the roles of the Client, Consultant, and Contractor in prioritizing health and safety measures throughout project execution.
3. Analyze the various factors influencing the performance of laborers in terms of health and safety on construction sites.
4. Assess the role of trade union in the occupational safety services of construction sites.

1.3. Statement of the problem

There are many safety concerns in construction projects. Workers are not protected enough from various risks like falling, soil sliding, body part injury and fatality. Contractors encourage lenience in supervision to quickly complete projects. Material quality is not maintained to save cost without realizing its effect on safety. OSH is not well planned and implemented. Workers are not trained on safety and health in construction and OSH is not considered as one vital element of construction projects. Poor workmanship is exhibited because of assigning are not well skilled and experienced workers. The employment relationship in most cases seems to be triangular (more of subcontracting, most of the workers being casual and non-skilled. Most of the sector workers are not unionized, particularly among Chinese and some local investors).

1.4. Rationale and significance of the study

Construction industry makes significant contributions to the socio-economic development process of any country. Its importance emanates largely from the direct and indirect impact on all economic activities (Kanchana *et al.*, 2015). While the sector contributes significantly to economic and social development, the absence of proper safety and health practices and systems has led to occupational injuries, significant economic losses, and reduced productivity at construction sites

and workplaces. Although countries differ substantially in their structural industrial distribution or level of occupational health and safety, injuries in construction industries are the major health and safety concerns in many countries. Moreover, the rate of death of workers is higher in the construction industry than in any other industry. (Andreoni, 1986; Larsson and Betts, 1996; ILO, 2004; Rikhardsson and Impgaard, 2004; Hämäläinen *et al.*, 2006).

In the new innovative approach recommended for the second millennium of both the development and promoting Occupational Safety and Health at work places, policies meant to put in place a system approach do not succeed or fail by their own unless they have or lack strong mechanism of organizing, planning, implementation, monitoring and evaluation in order to bring about continuous improvement. Likewise, Occupational safety and health in construction industry should also be viewed in this way as it is the most hazardous and risky sector due to the complex nature of job performance in the sector. Health and safety in construction is more than just a legal requirement or a box to tick, it plays a crucial role in protecting the well-being and lives of workers. Construction sites are inherently hazardous environments, with numerous potential risks and dangers lurking around every corner. According to ILO, a great number of occupational accidents occur in construction sector, which takes an important place for employment in all over the world. Each year, 60,000 workers die in construction sector. Great financial losses occur due to these accidents. Globally, occupational fatalities claim up to 20% of

the global mortality burden out of every 5000 deaths; thus, 1 in every 5 is occupationally related. The most common occupational fatal injuries from construction works are falls (33%), being struck by an object (11%), electrocution (9%) and being caught in or between objects (6%). For building construction workers, the prevalence of occupational injury was more than 32%, and musculoskeletal pain accounts for up to 44% of injuries. Furthermore, lower back (26%), wrist/hands (17%) and upper back (16%) were among commonly injured body parts. Because the costs incurred by occupational accidents in construction sector aren't properly calculated, preventive measures cannot be taken at a sufficient level (ILO, 1992; Takala, 1999; Rubio et al., 2008). Historically, the construction industry worldwide has contributed a disproportionate number of fatalities, injuries, diseases, and it presents several challenges. These challenges include separation of design and construction, multi-stakeholders influence, fragment contributions, unique project teams, exposure to elements, and transient and contract workforce (African Safety and Health Newsletter, 2013). Workers usually engaged in the sector are non-skilled, semi and skilled as well with various educational background and socio-economic status. With the situation of occupational safety and health in the sector in Ethiopia, the information depicting the exact situation concerning applying of the required safe and healthy practices, either are not available or contentious. (Tadesse, 2018; Kumie *et al.*, 2016).

Published information on the status of OSH in all industries, and particularly in construction sector, is very limited in

many countries across the globe. Even the limited amounts that are available are not comprehensive and updated to accommodate the dynamics of workplace exposures and the introduction and applied new technologies in the sector. Thus, periodic assessment of OSH services and evaluation of OSH practices is very important to learn the extent of services integration in the sector and also to identify and address the gaps in the implementation (Hämäläinen *et al.*, 2006).

Its importance emanates largely from the direct and indirect impact on all economic activities. Nowadays, Ethiopia also experiences different construction industries, like Public construction industry and private owned ones. The construction industry employs a large unskilled labor force. The employment often has a triangular scheme that involves subcontracting which makes the issue of responsibility for ensuring workers' rights in general, and maintaining safe and health at workplaces. Safety and health are very important in construction projects in order to promote construction sector development and increase the country income. In every construction it is important to know safety and health rules and regulations, to reduce the risk of injuries to workers during the construction process.

Concerning the situation of safety and health in the sector in Ethiopia, although policies exist, comprehensive evidence on the status of OSH services at work places remains largely lacking. The lack of comprehensive evidence is hindering the formulation of effective strategies and interventions to promote a culture of safety and health in the construction sector as well (Kumie *et al.*, 2013; Kumie *et al.*, 2016).

Recognizing the poor safety and health conditions in construction, and how the trade union is involved in the proper intervention to rectify the problems there in, the Ethiopian Construction, Wood, Metal, Cement, and other Trade Unions Industrial Federation designed this study to evaluate and identify the OSH status and practices in selected construction enterprises in Addis Ababa. The aim of the evaluation is to generate precise information that can serve as baseline to craft interventions to improve the current poor state of OSH in the sector. The information from this work would also serve the Federation, the Confederation of Ethiopian Trade Unions, Ministry of Labor and Skills (MLS) and other concerned bodies to develop relevant strategies to create and ensure a safe work environment for the sector in Addis Ababa in particular, and in Ethiopia in general.

2.
Review of related literature

Occupational health and safety (OHS) is commonly referred to as occupational health, or occupational safety and is a multidisciplinary field that is concerned with the health, safety, and welfare of people across all occupations. Due to the high number of accidents and exposure agents that occur in all kinds of workplaces and the consequences this has for workers, organizations, society, and countries; occupational safety and health has become a very important issue for stakeholders to take care of the human resources. Occupational health and safety is a specialized branch of medicine that focuses on the physical and mental wellbeing of the employees in the workplace. Exposure to environmental hazards such as chemical, physical and biological affect coworkers and leads to occupational illnesses or occupational diseases including cancer, hearing loss, asthma, and musculoskeletal disorders, etc. Occupational safety and health programs help to ensure the mental, physical and emotional wellbeing of the employees and keeping the workplace environment relatively free from actual or potential hazards that could injure employees (Suparna & Jaiswal, 2021).

2.1. Safety and health hazards in construction sites: types with different trades

Construction workers are exposed to a wide variety of health hazards on the job. Exposure differs from trade to trade, from job to job, by the day, even by the hour. Exposure to any one hazard is typically intermittent and of short duration, but is likely to recur. A worker may not only encounter the *primary hazards* of his or her own job, but may also be exposed as a *bystander* to hazards produced by those who work nearby or upwind. This pattern of exposure is a consequence of having many employers with jobs of relatively short duration and working alongside workers in other trades that generate other hazards. The severity of each hazard depends on the concentration and duration of exposure for that particular job. Bystander exposures can be approximated if one knows the trade of workers nearby.

Workplace health and safety (WHS) in construction is a set of principles and practices that demonstrate how to manage the health and safety risks that workers, customers, and the public (visitors, suppliers, etc.) might face in the construction workplace. In the construction sector, these practices aim to eliminate risks on construction sites such as:

- Fire and explosions
- Skin hazards
- Handling heavy objects
- Handling chemical substances
- Defective equipment

- Electric shock
- Falls from heights
- Dust inhalation
- Faulty equipment
- Elevated noise levels
- and many others

In the high-risk environment of the construction industry, it is essential to create a strong health and safety culture that will ensure safe working conditions for everyone involved.

Each trade is listed below with an indication of the primary hazards to which a worker in that trade might be exposed. Exposure may occur to either supervisors or to wage earners. Hazards that are common to nearly all construction-heat, risk factors for musculoskeletal disorders and stress are not listed.

The classifications of construction trades used here are those used in the United States. It includes the construction trades as classified in the Standard Occupational Classification system developed by the US Department of Commerce. This system classifies the trades by the principal skills inherent in the trade.

As in other jobs, hazards for construction workers are typically of four classes: chemical, physical, biological and social.

Table 1: Occupations and possible hazards

Occupations	*Hazards*
Brick masons	Cement dermatitis, awkward postures, heavy loads
Stonemasons	Cement dermatitis, awkward postures, heavy loads
Hard tile setters	Vapour from bonding agents, dermatitis, awkward postures
Carpenters	Wood dust, heavy loads, repetitive motion
Drywall installers	Plaster dust, walking on stilts, heavy loads, awkward postures
Electricians	Heavy metals in solder fumes, awkward posture, heavy loads, asbestos dust
Electrical power installers and repairers	Heavy metals in solder fumes, heavy loads, asbestos dust
Painters	Solvent vapours, toxic metals in pigments, paint additives
Paperhangers	Vapours from glue, awkward postures
Plasterers	Dermatitis, awkward postures
Plumbers	Lead fumes and particles, welding fumes
Pipefitters	Lead fumes and particles, welding fumes, asbestos dust
Steamfitters	Welding fumes, asbestos dust
Carpet layers	Knee trauma, awkward postures, glue and glue vapour
Soft tile installers	Bonding agents
Concrete and terrazzo finishers	Awkward postures
Glaziers	Awkward postures
Insulation workers	Asbestos, synthetic fibers, awkward postures
Paving, surfacing and tamping equipment operators	Asphalt emissions, gasoline and diesel engine exhaust, heat
Rail- and track-laying equipment operators	Silica dust, heat
Roofers	Roofing tar, heat, working at heights
Sheetmetal duct installers	Awkward postures, heavy loads, noise
Structural metal installers	Awkward postures, heavy loads, working at heights
Welders	Welding emissions
Solderers	Metal fumes, lead, cadmium
Drillers, earth, rock	Silica dust, whole-body vibration, noise
Air hammer operators	Noise, whole-body vibration, silica dust
Pile driving operators	Noise, whole-body vibration
Hoist and winch operators	Noise, lubricating oil
Crane and tower operators	Stress, isolation
Excavating and loading machine operators	Silica dust, histoplasmosis, whole-body vibration, heat stress, noise
Grader, dozer and scraper operators	Silica dust, whole-body vibration, heat noise
Highway and street construction workers	Asphalt emissions, heat, diesel engine exhaust
Truck and tractor equipment operators	Whole-body vibration, diesel engine exhaust
Demolition workers	Asbestos, lead, dust, noise
Hazardous waste workers	Heat, stress

2.1.1. Chemical hazards

Chemical hazards are often airborne and can appear as dusts, fumes, mists, vapours or gases; thus, exposure usually occurs by inhalation, although some airborne hazards may settle on and be absorbed through the intact skin (e.g., pesticides and some organic solvents). Chemical hazards also occur in a liquid or a semi-liquid state (e.g., glues or adhesives, tar) or as powders (e.g., dry cement). Skin contact with chemicals in this state can occur in addition to possible inhalation of vapour resulting in systemic poisoning or contact dermatitis. Chemicals might also be ingested with food or water, or might be inhaled by smoking.

Several illnesses have been linked to the construction trades, among them:

- silicosis among sand blasters, tunnel builders and rock drill operators
- asbestosis (and other diseases caused by asbestos) among asbestos insulation workers, steam pipe fitters, building demolition workers and others
- bronchitis among welders
- skin allergies among masons and others who work with cement
- neurologic disorders among painters and others exposed to organic solvents and lead.

Elevated death rates from cancer of the lung and respiratory tree have been found among asbestos insulation workers,

roofers, welders and some woodworkers. Lead poisoning occurs among bridge rehabilitation workers and painters, and heat stress (from wearing full-body protective suits) among hazardous-waste clean-up workers and roofers. White finger (Raynaud's syndrome) appears among some jackhammer operators and other workers who use vibrating drills (e.g., stopper drills among tunnellers).

2.1.2. Physical hazards

Physical hazards are present in every construction project. These hazards include noise, heat and cold, radiation, vibration and barometric pressure. Construction work often must be done in extreme heat or cold, in windy, rainy, snowy, or foggy weather or at night. Ionizing and non-ionizing radiation are encountered, as are extremes of barometric pressure.

The machines that have transformed construction into an increasingly mechanized activity have also made it increasingly noisy. The sources of noise are engines of all kinds (e.g., on vehicles, air compressors and cranes), winches, rivet guns, nail guns, paint guns, pneumatic hammers, power saws, sanders, routers, planers, explosives and many more. Noise is present on demolition projects by the very activity of demolition. It affects not only the person operating a noise-making machine, but all those close-by and not only causes noise-induced hearing loss, but also masks other sounds that are important for communication and for safety.

Pneumatic hammers, many hand tools and earth-moving

and other large mobile machines also subject workers to segmental and whole-body vibration.

Heat and cold hazards arise primarily because a large portion of construction work is conducted while exposed to the weather, the principal source of heat and cold hazards. Roofers are exposed to the sun, often with no protection, and often must heat pots of tar, thus receiving both heavy radiant and convective heat loads in addition to metabolic heat from physical labour. Heavy equipment operators may sit beside a hot engine and work in an enclosed cab with windows and without ventilation. Those who work in an open cab with no roof have no protection from the sun. Workers in protective gear, such as that needed for removal of hazardous waste, may generate metabolic heat from hard physical labour and get little relief since they may be in an air-tight suit. A shortage of potable water or shade contributes to heat stress as well. Construction workers also work in especially cold conditions during the winter, with danger of frostbite and hypothermia and risk of slipping on ice.

The principal sources of non-ionizing ultraviolet (UV) radiation are the sun and electric arc welding. Exposure to ionizing radiation is less common, but can occur with x-ray inspection of welds, for example, or it may occur with instruments such as flow meters that use radioactive isotopes. Lasers are becoming more common and may cause injury, especially to the eyes, if the beam is intercepted.

Those who work under water or in pressurized tunnels, in caissons or as divers are exposed to high barometric pressure.

Such workers are at risk of developing a variety of conditions associated with high pressure: decompression sickness, inert gas narcosis, aseptic bone necrosis and other disorders.

Strains and sprains are among the most common injuries among construction workers. These, and many chronically disabling musculoskeletal disorders (such as tendinitis, carpal tunnel syndrome and low-back pain) occur as a result of either traumatic injury, repetitive forceful movements, awkward postures or overexertion Falls due to unstable footing, unguarded holes and slips off scaffolding and ladders are very common.

2.1.3. Biological hazards

Biological hazards include exposure to infectious micro-organisms, to toxic substances of biological origin or animal attacks. Excavation workers, for example, can develop histoplasmosis, an infection of the lung caused by a common soil fungus. Since there is constant change in the composition of the labour force on any one project, individual workers come in contact with other workers and, as a consequence, may become infected with contagious diseases—influenza or tuberculosis, for example. Workers may also be at risk of malaria, yellow fever or Lyme disease if work is conducted in areas where these organisms and their insect vectors are prevalent.

Toxic substances of plant origin come from poison ivy, poison oak, poison sumac and nettles, all of which can cause skin eruptions. Some wood dusts are carcinogenic, and some (e.g., western red cedar) are allergenic.

Attacks by animals are rare but may occur whenever a construction project disturbs them or encroaches on their habitat. Examples include wasps, hornets, fire ants, snakes and many others. Underwater workers may be at risk from attack by sharks or other fish.

2.1.4. Social hazards

Social hazards stem from the social organization of the industry. Employment is intermittent and constantly changing, and control over many aspects of employment is limited because construction activity is dependent on many factors over which construction workers have no control, such as the state of an economy or the weather. Because of the same factors, there can be intense pressure to become more productive. Since the workforce is constantly changing, and with it the hours and location of work, and many projects require living in work camps away from home and family, as a consequence construction workers may lack stable and dependable networks of social support. Features of construction work such as heavy workload, limited control and limited social support are the very factors associated with increased stress in other industries. These hazards are not unique to any trade, but are common to all construction workers in one way or another.

2.2. Construction health and safety rules and regulations

Safe and healthy working conditions do not happen by chance. Employers need a written safety policy for their enterprise that outlines safety and health standards aimed at creating safe working conditions. The policy should name the senior executive who is responsible for seeing that the standards are achieved, and who has the authority to allocate responsibilities to management and supervisors at all levels and to see they are carried out.

Nearly 6.5 million people work at approximately 252,000 construction sites across the United States of America (USA) are operating on any given day. The fatal injury rate for the construction industry is higher than the national average in this category for all industries. Potential hazards for workers in construction include scaffold collapse, falls (from heights), trench collapse, electric shock and arc flash/arc blast, and failure to use proper personal protective equipment and repetitive motion injuries.

2.3. Construction health and safety rules in Ethiopia

The fundamental law of the state which is the Constitution of the Federal Democratic Republic of Ethiopia, the Civil Code (Proclamation No. 165/1960) together with the Labor Code (Proclamation No. 1156/2011) are the general legal basis for health and safety rules in Ethiopia. Numerous arti-

cles/provisions are provided under these general laws regarding health and safety of people.

Labor Code/law ensures worker-employer relations and enables workers and employers to maintain industrial peace. It strengthens and defines the powers and duties of the organ charged with the responsibility of inspecting labor administration, particularly labor conditions, occupational safety, health and environment. The following provisions are set: Article 92 clearly spells out the fundamental obligations of an employer with regard to putting in place all the necessary measures in order to ensure, workplaces are safe, healthy and free of any danger to well being of workers. In the same article the employer is obliged to take, in particular the following measures to safeguard the health and safety of the workers:

- To comply with the occupational safety and health requirements provided for in the proclamation; take appropriate steps to ensure that workers are properly instructed and notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health;
- Ensure that directives are given and also assign safety officer, establishes an occupational, safety and health committee, provides workers with protective equipment, clothing and other materials and instruct them of its use;
- Obliged to register and notify to the nearest labor inspection services occupational accident and diseases;
- Arrange according to the nature of the work at his/her own expense, for the medical examination of newly employed

workers, and for those workers engaged in hazardous work as may be required;

- take appropriate pre-executions to ensure that all processes of work shall not be a source or cause of physical, chemical, biological, ergonomical and psychological hazards to the health and safety of the workers.

Article 93 provides the obligations of workers pertaining to the required co-operation and putting into practice of the regulations and instructions given by the employer in order to ensure safety, health, and working conditions at work places. The law has clearly stipulated occupational injuries and corresponding compensation with all other related provisions in its articles 95-112.

The same law is also accompanied with subsidiary directives which complement the implementation of its relevant provisions related to OSH and improvement of working conditions including the comprehensive OSH Directive of 2008. The directive to determine working Conditions of Women Workers and hazardous work which is prohibited for young workers with age range of 15-18 years old and establishment of Safety Committee of 2020.

2.4. General duties of competent/responsible authorities in health and safety practice

2.4.1. Contractors

In terms of effectiveness, safe working conditions at construction Jobsites are best achieved when the prime or general contractor assumes their rightful leadership role and takes the responsibility to (a) establish, (b) coordinate, (c) monitor and (d) generally manage the overall basic safety program content and structure for all parties and persons at his job site. Undefined authority among the parties involved related to jobsite safety is not a workable arrangement for such an important matter that literally affects the life and limb of each and every worker on the jobsite.

2.4.2. Safety officer/manager

Every construction company of any size should appoint a properly qualified person (or persons) whose special and main responsibility is the promotion of safety and health. Proactive companies may establish a safety committee composed of the management, representative of workers to be from Trade Unions (Tus or elected from workers, safety supervisors, and operational staff to continually discuss and review safety performance). Whoever is appointed as safety committee should have direct access to an executive director of the company. To carry out the functions, the safety officer should have

experience of the industry and should be properly trained and qualified and, where such exists, should be a member of a recognized professional safety and health body.

2.4.3. Consultants/Supervisors

Good planning and organization at each work site and the assignment of clear responsibility to of supervisors are fundamental to safety in construction. Each supervisor requires the direct support of site management and should seek to assure within his or her field of competence that: working conditions and equipment are safe; workplace safety is regularly inspected; workers have been adequately trained for the job they are expected to do; workplace safety measures are implemented. The best solutions are adopted using available resources and skills; and necessary personal protective equipment is available and used. Making the work site will require regular inspection and provision of the means for taking remedial measures. The training of workers enables them to recognize the risks involved and how they can overcome them. Workers should be shown the safe way of getting a job done.

2.4.4. Client

The client is the sole duty holder, responsible for ensuring that the construction project is carried out properly, as it concerns their own property. Legal instruments put responsibility on the client to safeguard adequately the health and safety of

workers on construction. It should work with the contractor to take the necessary measures to prevent and protect workers from occupational risks and injuries. It is required to develop a proper mechanism which helps to follow that any construction site complies to the minimum standards and legal requirements. All in all, it should develop contractual agreements which explicitly specify that the contract is responsible for putting in place the minimum standard legally required for occupational safety and health program and services (Charles *et al.*, 2008).

Communication, as part of Occupational Safety and health Management System, is a key feature in achieving client-led safety initiatives and for driving a top-down approach to safety. This is a more intensive approach to communication which means communicating safety messages for the overall project direction or directly with personnel on-site. Further, the client's involvement (or that of a client's representative) with on-site activities including inductions, safety meetings, inspections and safety walks was perceived as contributing to safety best practice. Available information shows that client representatives were involved with activities on-site maintaining frequent communication with the contractor and closely monitoring safety. In some cases, client-appointed external facilitators reported directly to the client. In many construction projects, the facilitator representing clients worked through safety goals and objectives and communicate effectively and openly with contractor and other stakeholders.

2.4.5. Safety committees

Safety committees are one entity which are responsible to complement the practice of both promoting and developing safety and health at work places including construction sites through the participation of workers. In many countries, the establishment of safety and health committees at work places is provided by legal instruments. In Ethiopia, the labour law Proclamation No. 1156/2019 stipulates that employers are obliged to establish OSH Committee at work places.

An active safety committee is a great spur to safety. Its primary purpose is to enable management and workers to work together to monitor the site safety plan so as to prevent accidents and improve working conditions on site. Its size and membership will depend on the size and nature of the site and upon differing legal and social conditions in the countries concerned, but it should always be an action-oriented group of people in which both management and workers are represented. The safety committee carrying out a site inspection together raises the level of safety consciousness at the site.

2.4.6. Outside agencies

2.4.6.1. Government intervention

In many countries there are laws and regulations governing the conditions of work in the construction industry. These are usually enforced by factory or labor inspectors who are often also able and willing to provide advice on compliance.

However, even in the best-regulated countries the number of inspectors is too few to provide day-to-day surveillance on site, even where it is their job to do so. In a government setup there are also other bodies responsible for regulating the working conditions of construction companies and check for the integration of OSH issues in business.

2.4.6.2. International agreements/Labour standards

National laws and regulations are often based upon international conventions, agreements, declarations and programs. These have been drawn up by different United Nation Organizations including the International Labour Organization (ILO) and the World Health Organization (WHO). In 1988 the ILO adopted the Safety and Health in Construction Convention (No.167), and its accompanying Recommendation (No.175), which provides a foundation of law on which safe and healthy working conditions can be built. There are also relevant conventions such as Convention No. 155/1981 and Convention No.187/2006 which deals about safety and health at work places.

2.4.7. Workers

Every worker is under a moral, and often also a legal, duty to take the maximum care for his or her own safety and that of fellow workers. There are various ways of involving workers directly in site conditions, such as:

- "Toolbox briefing", a five- to ten-minute session with the

supervisor just prior to starting a task give the workers and the supervisor a chance to talk about safety problems likely to be encountered and potential solutions to those problems. This activity is simple to implement and it may prevent a serious accident;

- "Safety check", a check by workers that the environment is safe before starting an operation may allow them to take remedial action to correct an unsafe situation that could later endanger them or another worker.

2.4.8. Factors that affect health and safety performance of laborers

Table 2: Factors that affect health and safety performance of laborers

N.o	*Factors that affect health and safety performance of laborers*
1	Safety awareness of company's top management
2	Availability of a clear company health and safety policy
3	Project cost
4	Project duration
5	Weather condition
6	Reward and punishment system
7	Conducting Safety and Health Training and orientation
8	Employee experience
9	Safety investment on Personal Protective Equipment (PPE)
10	Inadequate enforcement of the existing building rules and regulations
11	Recording and reporting of daily safety issues (safety audit)
12	Age of workers

2.4.9. Selection of qualified contractor for safety

Pre-qualification and Tender Requirements: Most consistently, safety, pre-qualification and tender specifications that included safety criteria were mentioned as a valuable contribution to safety best practices. The pre-construction or tender phase proved to be a critical stage for setting the foundations for safety practices. In some cases, only prequalified constructors with a proven safety record were invited to tender by the client. This approach was adopted in the Cobram Barooga Bridge project, where all potential principal contractors had to be pre-registered and meet certain safety criteria. Once a pre-qualified contractor was selected, in most cases, they were required to submit a safety plan, such as in the case of Basslink and Cobram Barooga Bridge.

2.5. Safety and health management: adherence to OSH standards

An Occupational Safety Health Management System (OSH-MS) is a means to assist organizations to develop a favorable working environment at the workplace. The outcomes are legal compliance and in tandem improve Occupational Safety and Health (OSH) performance. Currently, there are a variety of OSH-MS in place which have various focus of meeting/achieving of an objective of meeting quality, safety, and health standards, such as OHSAS 18001 (Occupational Health and Safety Assessment Series), BS EN ISO 14001 Environmental mana-

gement system, BS 8800 British Standard Occupational Health and Safety management System, HSG65 - Successful Health And Safety Management and the International Labor Office ILO-OSH 2001 Guideline on Occupational Safety and Health Management System, which organizations can select and apply in their organizations. Conversely, the subsequent most important point in implementing OSH-MS in an organization is getting the system to be certified by a certification body. Currently like other industrial sectors, in construction, enterprises are advised to implement the aforementioned OSH-MS due to the benefit inherent with it.

Guldenmund (2010) points out the need to integrate the current academic, analytical and pragmatic approaches and suggests that developments of safety management systems will provide a future focus and framework for people to give meaning and direction to their safety actions. In particular, high risk industries understand the importance of effective systems to manage risk (Sarah, 2022)

Accidents are one of the important factors that play a profound role in the project lifetime and in the cost of construction firm/enterprise. So, for a good project management, safety should be incorporated. Generally, the need for safety management in all industries including construction industries comes from:

- Economic reasons: an economic minded management pays a greater attention to health and safety management, because each unit of cost invested in the program leads to a corresponding accident reduction and increasing return. Analysis shows that investment cost for safety program is

always less than unexpected Costs due to accidents (National safety council 2nd edition).

- Social reason: accidents may result in permanent bodily impairment of workers and/or others so that they must always live with it and no amount of personal compensation will actually offset the loss. On the other hand, accidents may also result in death of socially important workers and/or others, which affect their family in particular and the community in general.
- Legislation/law: management must meet legal obligations because now a days many countries and territories have laws and regulations requiring the employer not only to pay compensation for death and injuries suffered by their workers due to accidents but also to conform to a reasonable standard of safety in their operation. Contract and Safety With increasing frequency, contracts for the construction of public projects include required Safety standards that must be maintained on the job. Internationally used conditions of contracts like FIDIC incorporate safety as one of the contractor's responsibilities. International donors like World Bank also put safety requirements in contracts implemented with their fund. On the other hand, labor agreements may also impose contractual safety requirements on the contractor. The National Labor Relations Board has ruled that safety regulations, as an essential part of employees' terms and conditions of employment, are mandatory subjects of bargaining whenever either party places the issue on the bargaining.

The author cited above also indicate that it is necessary to integrate OSH in to the current academic, analytical and pragmatic approaches and suggests that developments of safety management systems will provide a future focus and framework for people to give meaning and direction to their safety actions. In particular, high risk industries understand the importance of effective systems to manage risk (Sarah, 2015).

Occupational health and safety legislation is an essential part of the process to manage organizations and companies. However, there are criticisms that the regulation of occupational health and safety could be restricting the impulses of innovation and industrial development. This has led to proposals to repeal regulations to reduce the regulatory burden when possible. This work aims to delve into the difficulties that organizations encounter in their attempts to comply with occupational health and safety legislation and manage the process effectively. A systematic review was conducted of published studies that have analyzed the relationship between occupational health and safety (OHS) management and compliance with legislation, regulations and rule.

Business organizations must comply with the safety and health standards as stated in the national Occupational Safety and Health legislations and notable ILO labour standards on Occupational Safety and health and working environment. Business organization must implement OSH programme at the workplace so as to ensure a conducive working environment. These are some of the basic requirements imposed by the government on employers including esta-

blish basic occupational services delivered through well defined system.

Managing safety and health is an integral part of managing a business. Businesses need to do a risk assessment to find out about the hazards and risks in their workplace(s) and put measures in place to effectively control them to ensure these hazards and risks cannot cause harm to workers.

However, in academic circles, there have been criticisms that occupational health and safety regulation could be restricting impulses of innovation and industrial development and in turn, fueling a bureaucratic aversion culture (Hale *et al.*, 2015). In several countries, proposals have been presented to repeal the regulations and thus reduce the regulatory burden where possible (Audiffren *et al.*, 2013). Even so, international institutions such as the World Bank and the OECD defend that regulations and their enforcement are crucial for economic development, showing important benefits for productivity and long-term growth (Blanc, 2018). Moreover, as they explain Rinfret et al. (2014) companies, as stakeholders, must participate in the regulatory process from the beginning. Therefore, regulators are not necessarily adversaries to the regulated community.

Particularly in small and medium-sized enterprises (SMEs), management of legal compliance in terms of health and safety has become a complicated task (Hasle and Limborg, 2006). Small companies are organized differently than large companies. Results-based regulations are adapted to small enterprises only when the results are easy to measure, and the

business has the authority to decide how to attain these objectives.

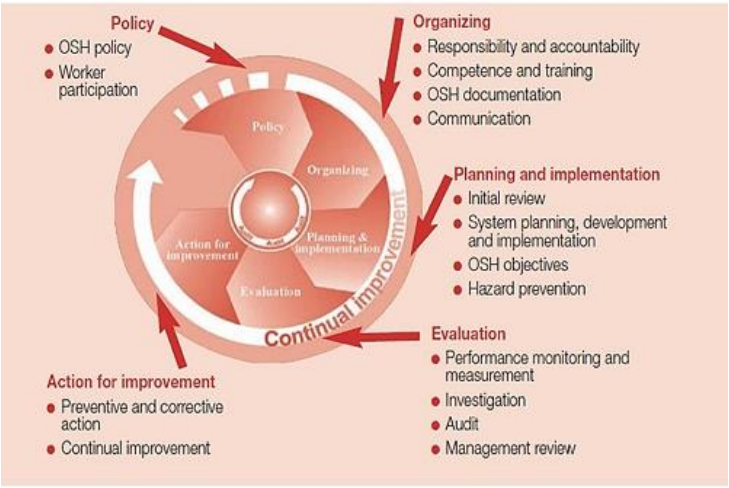
It is in small and medium-sized enterprises across most industries, including construction, that most of these problems exist (Cagno *et al.*, 2013). The European Agency (EU-OSHA, 2011a) recognizes that the "old" EU-15 member states have almost 19 million SMEs that employ around 75 million people. It is in these SMEs where around 82% of all work-related injuries and up to 90% of fatal accidents take place.

The ILO has produced guidelines on the development of occupational safety and health management systems which is tantamount to International Standards Organization related standards on quality and Business operation. These guidelines were designed as a practical tool for assisting organizations (a company, operation firm, undertaking establishment, enterprise, institution or association, or part of it, whether incorporated or not, public or private, that has its own functions and administration) and competent institutions as a means of achieving continual improvement in occupational safety and health (OSH) performance. The guidelines have been developed according to internationally agreed principles defined by the ILO's tripartite constituents. The practical recommendations of these guidelines are intended for use by all those who have responsibility for OSH management.

Occupational safety and health, including compliance with the OSH requirements pursuant to national laws and regulations, is the responsibility and duty of the employer. The employer should show strong leadership and commitment to

OSH activities in the organization, and make appropriate arrangements for the establishment of an OSH management system. The system should contain the main elements of policy, organizing, planning and implementation, evaluation and action for improvement, as shown in figure below.

Figure 1: showing Main elements of the OSH management system



Based on available scanty information and limited studies in the area, the situation OSH Management and compliance with legal requirement in Construction sectors in developing countries is below satisfactory. Understanding and giving due consideration to the importance of occupational safety and health management system and adherence to safety legislation by different stakeholders is still at infant stage. There is serious

awareness problem among principal and subcontracting and other regulatory bodies.

2.6. Health and safety management policy

A health and safety policy sets out how health and safety is managed within an organization and demonstrates a commitment to the health and safety of staff and others.

All employers have a duty of care to protect their employees and others from harm arising from work activities Many legislations of countries including ours state that all organizations should have a health and safety policy.

The policy should cover all aspects of the organization and be relevant to the employees. It is only required to address health and safety matters relating to employees, however, employers also have a duty to protect others from risks arising out of their work activities and so it is best practice to consider the safety of people whose health and safety might be affected by the organization, such as volunteers, contractors, the general public and so on.

It is important that all employees are aware of, and understand the health and safety policy and have access to a copy of it. This means that it should be clear and easy to understand. In smaller organizations, it is possible to provide each individual with a copy. In a larger organization, copies could be posted on notice boards or in other appropriate locations.

In the construction industry it is common to require that

organizations submit their health and safety policy as part of the tender documentation when bidding for work..

A typical structure for a health and safety policy could include:

- A statement setting out general policy on health and safety which details the commitment to effective management of health and safety and the overall aims.
- A responsibility section which explains who is responsible for specific actions.
- An arrangements section which describes the methods that will be adopted to achieve the commitments made in the statement section. Information should also be included about how risks and hazards in the workplace will be eliminated or reduced. According to the Health and Safety Executive, a hazard is something that could cause harm to people such as electricity, chemicals and working at height. A risk is the chance (however large or small) that a hazard could cause harm.

It is vital that the policy is monitored and evaluated to ensure that it is still effective. Monitoring can be undertaken in many ways, for example by undertaking spot checks or safety inspections using checklists. In a more formal situation, audits and the review of management reports and accident investigations can be undertaken.

The Construction (Design and Management) Regulations place additional requirements on the construction industry to strengthen the implementation of safety and health policy due to the risks that can be involved. Amongst other things, this involves preparing a specific construction phase plan which

records arrangements for managing significant health and safety risks associated with the construction of the project. In addition, a health and safety file is required which gives details of health and safety risks that will have to be managed during maintenance, repairs, renovation and demolition (HSE, 2018).

It is our policy to ensure the health and safety of our employees and anyone else that may be affected by our work activities. The minimum standard we will adopt will be compliance with legal requirements and appropriate codes, and we aim to achieve best practices. We will assess the risk for our work activities and will operate according to the procedures that best promote health and safety at work.

We accept our responsibilities for health and safety and are committed to giving health and safety equal importance with other business matters. We will ensure that the resources necessary to achieve the objectives of this policy are available. We look for the cooperation of all employees, subcontractors and company stake holders to enable us to fulfill our legal duties and objectives of this policy. It is the duty of everyone involved with the company both permanently and temporarily to follow standards and procedures as high performance can only be achieved through the continued commitment of all employees. We both believe health and safety is personal as well as a corporate priority.

To help achieve our objectives of preventing injuries and damage, to health we look to establish and maintain practices that enable work to be performed safely and create a safe working environment for all staff. We require all who carry

out work on behalf of and/or under instructions for us to adopt a similar view regarding safety. Health and the environment to take the actions needed to achieve the objectives.

We are committed to promoting and maintaining safe working practices and achieving high health and safety standards on projects under our control.

Plant machinery and equipment that enable tasks to be carried out safely will be provided and will be maintained to ensure their safe operation. Any training and instruction necessary to work safely will also be provided. Where exposure to hazards cannot be prevented by any other means appropriate personal protective equipment will be provided and instruction in its use and maintenance given.

Plant materials and equipment will be stored in a safe manner. Safe access to and egress from our premises will be maintained as will arrangements to obtain first aid.

The managing director will oversee an annual review and this policy and associated procedures to ensure their continued effectiveness. Where necessary to ensure legal compliance and promote continuous improvement, the policy and associated procedures will be amended. Any amendments will be brought to attention of all person who need to know. The same will also set out the exclusive responsibilities of the managing directors, the middle managers and the workers responsibilities regarding safety and health at each construction sites (total Concrete Ltd, 2018).

The effectiveness of safety policy is dependent on the people responsible for ensuring all aspects of work whether in the

office or on site, are carried out with due consideration for safety and minimum risk to health. Ultimate responsibility lies on with the managing director but specific duties are delegated to others according to their experience and training. Company Directors and senior management, both individually and collectively, will ensure that this policy is applied throughout the whole company and that those employed by the company are kept fully informed of its content. Contract managers will ensure that this policy is adopted by all employees, subcontractors and visitors to any specific sites. Each individual person has a duty of care to themselves as well as to all those they may come into contact with during any part of the working day, to assist the company in fulfilling its duties and obligations, where required an in-house competent person /or external safety consultancy will be appointed to provide health safety advice and assistance to the management and employees. The contact details of this person will be clearly displayed on the company notice board.

The policy should also clearly indicate about the whole aspect of arrangement regarding how safety and health is managed including who reports to whom, the information flow indicating the necessity of how information are maintained, recorded and reported at each level. These include information related to accident and incident reporting procedures, incident recording, accident investigation, reports to the enforcing authority including major accidents and dangerous occurrences, reportable diseases, investigations and sub-contractor arrangements.

2.7. Management commitment and support to health and safety

Consequently, as one of the key aspects for implementing safety interventions, the management commitment to safety should be given acknowledgement and emphasis in enhancing the safety of a workplace (Abdullah *et al.*, 2015).

Management commitment to safety and health can be defined as "the extent to which management is perceived to place a high priority on safety and communicate and act on safety issues effectively. However, previous studies have vaguely used the occupational "management" term because of the existence of various management categories starting from the Chief Executive Officer (CEO) to the first-line supervisor. Therefore, the importance of clarifying the management position being assessed due to many different levels and roles of managers in safety management is crucial. According to Cooper, the management commitment can be generally measured in two ways; through direct approach of questioning managers and through monitoring of their commitment behavior. By applying either one or both of these approaches and by determining the level of management being assessed, researchers can discover various positive outcomes of MCS. Among them are increased safety climate, reduced turnover, improved safety behavior by 40 percent, reduced lost time injuries by 82.2 percent and minor injuries by 35 percent, more productive employees, decreased employers costs due to the reduction of health claims, lower inpatient and outpatient hospital costs, reduced worker absenteeism and life insurance costs, continuous improvement of

safety program and eventually, greater overall success. These benefits are gained only by the organizations that are committed at various management levels in the safety and health endeavor which positively influence their safety performance. (Abudayyeh *et al.*, 2006).

Nonetheless, the issue of lack of safety commitment among the construction sector players is a cause for concern. Lack of safety commitment can be seen from lack of appropriate attitude toward safety and lack of effective leadership within the organization and management. In addition, the management seems to focus more on gaining profits than securing safety. Furthermore, the importance of management commitment to safety and health for instilling safety culture into the organization was only merely being highly expected and believed by the organization senior management after seeing their actual and indifferent conducts for safety practices. A lack of safety commitment can also be caused by the management not having keen interest in addressing safety issues and they are not complying with the existing act/law provision. This lack of safety commitment by the management can be a barrier to workers' behavior change and engagement. Moreover, it leads to poor inspection programs, poor safety policies, incomprehensive accident prevention policies and insufficient education programs (Ismail *et al.*, 2012).

The influence of management must be apparent in the safety policies it sets, the degree to which those policies are observed, and the concern with which it treats any violation. Managers must leave no doubts in the mind of employees that

they are concerned about accident prevention. This concern to prevent injury and damage must be sustained continually, rather than intermittently or only temporarily being presented with an accident report. Management commitment provides the motivating force and the resources for organizing and controlling activities within an organization. In an effective program, management regards workers safety and health as a fundamental value of the organization and applies its commitment to safety and health protection with as much power as to other organizational purposes. Safety and health goals and objectives are also included to assist the company with establishing workplace goals and objectives that demonstrate the company's commitment to safety. An enforcement policy is provided to outline disciplinary procedures for violations of the company's safety and health program. This enforcement policy should be communicated to everyone at the company. A safety and health program should contain the following to demonstrate management commitment and leadership:

- Policy statement with written goals established, issued, and communicated to employees.
- Annual program revisions.
- Participation in safety meetings and inspections.
- Safety items addressed in meetings.
- Adequate commitment of resources in the form of budgeted dollars.
- Safety rules and procedures are incorporated into job site operations.
- Safety rules monitoring and enforcement.

The management commitment is demonstrated also by putting in place of workable safety and health program of construction enterprises. Concerning assigning responsibilities, for a safety program to be successful, every employee in the company, from management to workers, must recognize their responsibilities and role in the safety process. Responsibility may be defined as an individual's obligation to carry out assigned duties. To fulfill these responsibilities, individuals must know what their responsibilities are, have sufficient authority to carry them out, and have the required knowledge to do so effectively (Reese and Eidson, 1999).

2.8. The role of trade union in promoting safety and health

Workplace health and safety is one of the most important aspects for workers. An organization has a responsibility to meet the minimum health and safety standards set by international and national laws. In many instances, protecting the health and safety of their member is among the cardinal mandates of trade unions. Labour unions have a great role in the achievement of the minimum health and safety standards in the work place. Unions have a responsibility in protecting worker from threats to health and safety in an organization. Labour unions can also bargain with companies on the standards of health and safety to be practiced and controlled (Takele and Mengesha, 2006).

Their role or involvement originates from their organiza-

tional constitution and from the obligation and rights of workers stipulated in policies, legal instruments pertaining to safety and health.

Labour Unions participate in the development and application of health and safety procedures. Workers need safety training; thus, an organization has to offer training in a way that workers recognize. In addition, workers are responsible to utilize the safety materials provided by employers and they should adhere to the safety cautions and procedures set (Takele and Mengesha, 2006).

A 1995 World Bank report showed that labour unions have a significant role in implementing health and safety standards. However, it is difficult for workers by themselves to enforce the employer to implement safety and health standards (Takele and Mengesha, 2006).

Trade unions in many developing countries have huge obligations to fulfill in all labour relation including workers safety and health. But due to limited capacity, they are usually supported by international trade union organizations with which they are affiliated. Trade union in Africa, Asia, and Latin America for example, have been supported by International Federation of Building and Wood Workers (IFBWW) in building the capacity to enable them to make health and safety standards of worker in construction and wood work area as their main program (Labour Education, 2001/2).

Reviewing experiences of countries shows that labour unions show that are involved in various activities related to ensuring safety and health at workplaces. Labour unions in

Benin have a great role in protecting workers' interest. The function of Unions is to bargain with employers, give training and education to upgrade the capacity of worker, and to overcome economic problems by providing loan with low interest credit. But their service in many cases does not give sufficient consideration to the safety and health of workers. Though union in Benin is helpful for employees in rendering service and benefiting them, the services are still not as sufficient as expected because of lack of democracy within the labour unions and other organizational problems (Kalusopa *et al.*, 2012).

Labour union in Botswana, like Benin, focuses on their role of bargaining, representation & complaint treatment, education, training and/or capacity building. Botswana's Labour Unions represent their members at disciplinary trials, conciliation and arbitration. But their involvement the promotion of safety and health is very minimal (Kalusopa *et al.*, 2012).).

In Ghana, a country which has a relatively long time history of trade unionism, trade unions are mainly involved in collective bargaining, dispute settlement, labour education and capacity building. Though the issue of safety and health is one title in the labour education, but other aspect of managing safety and health is not yet the focus of trade union duties (Kalusopa *et al.*, 2012).

Like those countries stated above, trade unions in Ethiopia, in general, and construction face many challenges in appropriately fulfilling their role of promoting safety and health at work place including awareness and attitudinal problems, absence of due concern for affairs of OSH compared to other

duties of trade unions, lack of support and willingness to involve trade unions in affairs of safety and health by the management, low and absence of advisory and enforcement services for trade unions from competent authorities, to mention a few (Kumie *et al.*, 2013).

A study undertaken in construction sites in Addis Ababa by the Addis Ababa Labour and Social Affairs Bureau has shown that trade unions involvement in Occupational safety is very minimal compared to their normal duties related to labour relations. Their involvement, in many cases, focuses on the provision of personal protective devices in the collective agreement. As many construction sites do not establish bipartite OSH Committees, the trade unions are not actively participating in safety and health services of the construction sites.

2.9. Prevention, inspection, and reporting of hazards

The recognition that the construction industry is a highly hazardous industry cannot justify its poor OSH record. In fact, the management of OSH risks and compliance with OSH laws in the construction industry are two of the main issues that need more attention.

Those involved in the construction industry know the construction processes. They select the most appropriate one for each case, taking into account productivity and, in more and more cases, OSH. In fact, construction professionals in general, know the hazards involved in each construction process

and they also propose the prevention measures to be taken. In spite of this, occupational accidents and diseases continue to happen, and so there is a failure in the management of OSH risks.

Compliance with OSH laws is very poor in many countries. The explanations for this are many, including the high number of existing laws and regulations on OSH that need to be obeyed (sometimes wide-ranging and very prescriptive, making it hard to apply them), and all the technical standards, specifications and codes of practice related to the construction industry.

Construction site inspections play a vital role in ensuring the safety and quality of any working environment. These inspections are not merely routine procedures; they are a critical component of maintaining a construction site that is free from hazards and conducive to optimal performance. Effective construction site inspections are the cornerstone of identifying potential risks, addressing safety issues, and enhancing the overall quality of operations within an organization.

Construction site inspections are essential in ensuring the safety and quality of any work environment. These systematic and critical assessments serve to identify potential hazards, assess compliance with regulations, and enhance overall operational efficiency which paves way to develop prevention and control interventions. Definition and significance of construction site inspections, exploring their goals, objectives, and their pivotal role in identifying and recording hazards for corrective action are of paramount

importance in the OSH management in construction industries.

Construction projects are complex endeavors that demand careful oversight to ensure safety, quality, and compliance with regulations. Various types of construction site inspections play a pivotal role in achieving these objectives of inspection of construction sites.

Moreover, monitoring compliance with these laws and regulations is sometimes overlooked by enterprises (internal control) and by labour inspectorates (external control) for reasons including limited human resources (not enough well qualified safety experts and inspectors in proportion to the high number of enterprises and sites and their range of economic activities).

While enterprises have a duty to equip themselves with all the resources needed to perform their jobs in a safe and healthy workplace, labour inspectorates cannot have an inspector on each construction site to force compliance with the laws and regulations. Accordingly, there is a need to prioritize OSH inspections of construction enterprises and sites. For instance, a study made by WB to assess the situation in the sector showed that to meet the ILO benchmark for the number of labour inspectors in less-developed countries, Ethiopia needs to recruit an additional on over what exist over 1,000 inspectors i.e., the number of inspectors needs to rise to 1,314 now, and to 1,800 by 2030. Only 11 percent of labour inspectors have a university-level qualification in OSH. (World Bank, 2020).

A system for supervising the implementation of the labour standards into the workplaces is also necessary. The inspec-

tion of OSH in the construction industry has many common issues with the OSH inspection in other industries, but there are also many specific sectoral issues.

Labour inspectorates and other bodies involved in inspecting and monitoring hazards at construction have a mandate to properly identify risks and hazards to prevent and control occupational accidents and health impairments. Their duties seek to inform them on key concepts and OSH issues of the construction industry as well as to upgrade some specific competences that they both will require in order to fulfil their functions: mainly managing an OSH inspection program in the construction sector in the case of the managers, and performing on-site OSH inspection visits in the case of field inspectors. Equally true is that as self- OSH management system, Construction safety Officer and Safety committee need to undertake work place risk assessment in order to identify hazards to propose correct way of both prevention and control as part of OSH management System. In order to do this, they need to be provided adequate training on risk assessment and management of hazards at workplaces.

2.10. Challenges in managing health and safety in construction sites

The construction industry worldwide confronts a notable obstacle in ensuring safety at construction sites, mainly attributed to the inherent risks associated with the work, leading to a significant number of fatalities. Likewise, developing

countries face significant challenges in ensuring construction site safety.

The biggest challenge in the construction industry is to ensure that human lives are not affected by the various activities and tasks that form part of construction. Being a labour-intensive industry it is imperative that a large number of people must be deployed on the work site to deliver the project. The tasks that a person employed at site undertakes put his health at risk and in some cases, life is also at risk when working in hazardous and high-risk areas like working at heights, deep excavations, confined spaces and even underwater. The term "accident" is associated with construction related as much as with traffic accidents since the reach of this business sector is far and wide.

Challenges such as inadequate inspections, limited resources, insufficient training facilities, high labor turnover, weak regulations, workers and low awareness towards recognizing the importance of safety and health, a lack of personal protective equipment (PPE) compliance, a lack of commitment from regulatory agencies to enhancing safety performance and workers' unsafe conduct and acts are among the notable ones (Giri, 2020).

Another study has identified several challenges that contribute to major injuries in construction work, including poor site housekeeping, lack of proper asbestos awareness, equipment damage, electrical and fire hazards, and working at heights, among others.

According to a study conducted in Tanzania, it was found that the problem is not that the hazards and risks are unknown,

it is that they are difficult to control in constantly changing work. Inspection of construction sites over many years in the country revealed that amongst other short falls noted, the situation, provision and use of safety gear during construction works was appalling. Furthermore, key players that include clients, consultants and contractors ignore inclusion of safety provision during inception stage through tendering, where all elements related to safety measures are disregarded in order to cut costs. The majority of local and few foreign are not taking the issue health and safety and provision of PPEs seriously. On other hand, other scholars in the sector have identified that skewed perception of risks, unavoidable environmental hazards, high labour turnover, lack of proper communications, states of mind and absences of the right safety culture are among the most common observed challenges in construction enterprises (Muiruri & Mulinge, 2014).

Study assessing the situation in Ethiopia, particularly among construction enterprises in Addis Ababa**,** found that health and safety management in high rising building construction sites is not satisfactory. The major predicaments and challenges facing the high rising building construction sector health and safety management are inadequate health and safety orientation and training, low enforcement of existing rules and regulations issued related to construction safety and health management in the country, lack of top management commitment and support to health and safety management in construction sector and complexity of buildings design and structure. (Belachew and Fiktor, 2020).

3.
Research methodology

3.1. Study area

This research was conducted in Addis Ababa, the capital of Ethiopia, to examine the present status of OSH services in construction sites. The study was conducted during the entirety and the latter half of April 2024. With a population of approximately 5 million, Addis Ababa serves as a significant center for construction companies and ongoing construction projects. Although Addis Ababa is believed to have relatively higher safety and security standards compared to other regions, this is not the case in reality, making it an attractive destination for both local and international construction firms to invest in various projects. The city plays a pivotal role in attracting considerable investments in construction activities due to its infrastructure development initiatives and favorable business environment. Notably, Addis Ababa contributes significantly to national housing construction endeavors, as evidenced by recent governmental reports indicates that the city accounts for over 80% of all housing construction projects in

Ethiopia. Equally clear is that, with flourishing of Construction project, there are a lot of occupational injuries which are both fatal and no fatal, resulting in a significant injury burden that affects health and wellbeing of workers.

3.2. Data sources

We employed multiple data sources to triangulate evidence, enhancing the validity and comprehensiveness of the study. These sources comprised a review of existing reports and studies (secondary data source), surveys conducted at 20 selected unionized and non-unionized construction sites (primary data source), and interviews with stakeholders from the construction industry. These stakeholders included OSH experts from professional associations, representatives from the Ministry of Labor and Social Affairs (MOLSA) and Ministry of Health (MOH) at regional and federal levels, as well as relevant non-governmental organizations (NGOs) involved in the sector.

3.3. Study design

We adopted a convergent-parallel mixed research method to achieve the study's objectives. This approach combines quantitative and qualitative study designs along with a systematic review of literature to provide a comprehensive under-

standing of occupational safety and health (OSH) services in the construction industry of Addis Ababa. The quantitative aspect will employ a cross-sectional survey design to assess current OSH practices and the occurrence of accidents. For qualitative insights, we will conduct key informant interviews and observations to explore stakeholder views and opinions on OSH services. Additionally, a systematic review and narrative synthesis of existing literature on OSH will be conducted.

3.4. Study population

The study population comprised construction companies, trade unions operating within construction companies at different organizational levels, and OSH experts from stakeholder organizations, both regulatory and enforcement entities (such as MLSA at the federal and regional levels, MOH, professional associations, labor unions, and NGOs). Identifying an appropriate sample size was crucial for ensuring the reliability and credibility of the survey.

3.5. Sample size and sampling method: quantitative part

The quantitative study (survey) utilized a purposive sampling method to select a representative sample size of construction companies in Addis Ababa, encompassing both unionized and non-unionized entities. The sample size com-

prised 20 companies, chosen to ensure adequate representation across various sectors. Data collection was facilitated through a meticulously designed questionnaire containing a mix of open-ended and closed-ended questions.

3.6. Sample size and sampling method: qualitative part

In the qualitative exploration, a purposive sampling strategy guided the selection of participants. A total of 7 key informant interviews were conducted to enrich the qualitative aspect of the study. This includes representatives from various stakeholders: 2 individuals from MoLS at the regional level, 1 individual from MoLS at the federal level, 2 individuals from OSH professional associations, 1 individual from the Construction Federation, and 1 individual from MoH at the federal level.

3.7. Data management and analysis

The quantitative data collected from sample respondents working in selected construction sites were analyzed using frequency distributions and percentage calculations. These methods were applied to describe socio-demographic characteristics and to assess the magnitude of occupational injuries. Microsoft Excel was used to calculate importance indices in order to identify and rank the factors affecting Occupational

Health and Safety (OHS) practices. Tables and figures were employed as data presentation tools. Observed data and information gathered from document review were analyzed separately but presented in combination with the quantitative findings. Additionally, to determine the relative ranking of influencing factors, the scores were converted into importance indices using a specific formula:

Relative Importance Index (RII) $=\Sigma w/AN=(5n5+4n4+3n3+2n2+1n1)/5n$

Where:

W is the weighting given to each factor by the respondent, ranging from 1 to 5,

n1 = number of respondents for very high,

n2 = number of respondents for high,

n3 = number of respondents for average,

n4 = number of respondents for low,

n5 = number of respondents for very low,

A is the highest (i.e. 5 in the study) and

N is the total number of samples.

The relative importance index ranges from 0 to 1. Thus, the questions are in a standardized format and sequence. A descriptive method has been used for the analysis of the data which provides a general overview of the results in order to make interpretations and discussions based on the results.

3.8. Reliability and validity

Neuman (2007) emphasizes that reliability and validity are important in establishing the truthfulness, credibility, or believability of findings. Reliability refers to the extent to which the same answers can be obtained using the same instruments more than one time. Reliability is a concern every time a single observer is the source of data, because we have no certain guard against the impact of that observer's subjectivity (Babbie, 2009, p. 189). "Validity, on the other hand, refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. In Neuman's (2007) words, it refers to how well an idea about reality fits with actual reality".

In an effort to avoid/minimize problems related to reliability and validity, previously designed questionnaires and successively were be used in surveys that directly and indirectly relate to safety and health evaluation were carefully be examined and adopted. In this regard, North Carolina State University (NC State 2015), KPMG (2013), Zhao, Hwang and Low (2015) and Deloitte and Touche (2014) are to be mentioned. Moreover, contents and structure of the questionnaire were discussed with practitioners in the construction industry prior to the finalization and administration of the questionnaire in order to test the relevance of the sections outlined in the questionnaire. To test the internal reliability of the questionnaire, Cronbach's alpha test was used and found to be 0.78 which is higher than 0.7, thus the construct has been believed to have adequate reliability.

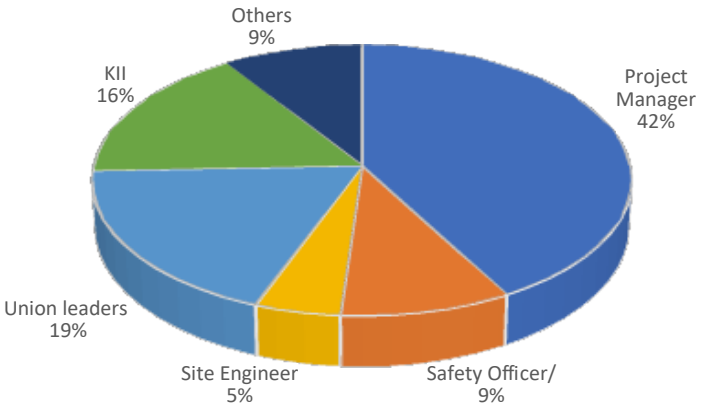
4.
Results and discussion

4.1. Company and current project information

This section delineates the profile of the respondents who engaged in this study. Data obtained from the questionnaire reveals that a total of 18 companies took part in the study, comprising 8 government-affiliated and 10 private enterprises, with an equal split between 8 unionized and 10 non-unionized entities. These companies were situated in Addis Ababa, the capital city. The subsequent segments delve/examines into the specifics of the respondents' attributes, encompassing factors such as the classification of the companies, their cumulative experience in the industry, as well as the scale or magnitude of each company.

The data presented in the figure indicates that a mere 8.3% of the respondents hailed/responded that they are from the safety departments within their respective companies. Conversely, the vast majority of respondents, comprising 91.7%, did not originate/are from/those who from enterprises that do not have safety departments within their organizations.

Figure 2: Job title of respondents

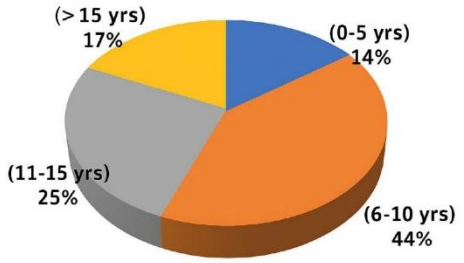


4.1.1. Work experience of the organization and respondents' professional experience in the construction industry

The measurement of working experience in terms of the number of years spent within the construction industry is essential for assessing competence and potential. Both organizational and individual tenure within the construction sector contribute significantly to skill enhancement and overall performance. Over 55.5% of the surveyed organizations responded that they have over a decade of experience, underscoring a wealth of industry knowledge and proficiency. Conversely, approximately 44.5% of the organizations have less than ten years of experience in the construction domain. This distribution indicates that a majority of the addressed construction companies possess extensive expertise in the field.

Moreover, respondents' years of experience correlate with higher confidence levels in the quality and reliability of their responses, further enhancing the credibility of the findings.

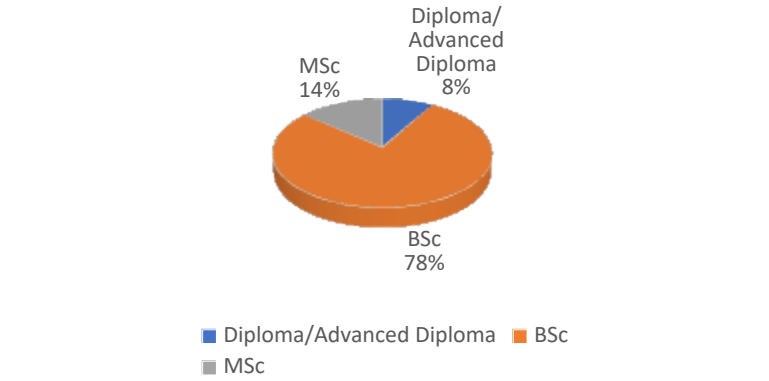
Figure 3: Work experience of the organization in the construction industry



4.1.2. Educational status of respondents

The educational background of the respondents played a crucial role in their ability to comprehend the questionnaire effectively and grasp the distinctions of health and safety issues within the construction industry. An overwhelming majority, comprising 92%, held a Bachelor of Science degree or higher, indicating a robust educational foundation among the respondents. Conversely, a mere 8% reported educational attainment below the Bachelor's level. This distribution highlights the respondents' substantial knowledge and educational background, suggesting a high level of competence in understanding and appreciating the significance of safety and health considerations in construction site environments.

Figure 4: Educational status of respondents



4.2. Scope of health and safety implementation

The practical situation of health and safety practice in construction sites was assessed as follows in percentage.

Table 3: extent of health and safety application

	Frequency	*Percentage*
First aid and occupational health service	18	50 %
PPE (Safety shoe, helmet, goggles, welding masks, face shield, hearing protection, respirator protection)	19	54%
Provide training and instruction regarding health and safety to every worker	18	49%
Checklist for safety at height, scaffolding, crane	10	27.9%
Scaffolding and Ladders inspection at regular intervals	17	48%
Guardrails, handrails provision and covers for opening installed	15	41%

Only a meager 50% of contractors prioritize the establishment of first aid and occupational health services, highlighting a concerning gap in ensuring the well-being of construction workers. Similarly, the provision of essential personal protective equipment (PPE), including safety shoes, helmets, goggles, welding masks, face shields, hearing protection, and respirator protection, stands at a mere 54%, suggesting a failure to comprehensively address safety measures on-site. Training and instruction regarding health and safety, essential for every worker's awareness and preparedness, are provided by a dismal 49% of contractors, leaving a significant portion of the workforce inadequately equipped to handle potential hazards. Moreover, critical safety measures such as scaffolding and ladder inspections at regular intervals, adhering to guardrail and handrail provisions, and installing covers for openings where employees are at risk, are only undertaken by 48% and 41% of contractors, respectively. These activities, crucial for averting major accidents, remain neglected by a substantial portion of contractors, further exacerbating risks to worker safety. Alarmingly, a mere 25.8% of respondents reported the existence of safety checklists for tasks involving height, scaffolding, and crane operations, indicating a widespread lack of basic safety protocols and preparedness before commencing work. This collective failure to prioritize and implement comprehensive safety measures underscores the urgent need for heightened awareness and stringent adherence to health and safety standards within the construction industry.

4.2.1. Causes of injury

Fatal accidents resulting from construction site incidents are a haunting concern for construction companies, representing their worst nightmares. When surveying respondents about the causes of injuries experienced by crews on construction sites within the past two years, a clear pattern emerged. Falling from heights emerged as the leading cause of injury, underscoring the absence of adequate horizontal protection measures for high-rise buildings. Following closely behind is scaffold collapse, attributed to the use of eucalyptus tree scaffolding, which can deteriorate over time. The failure to utilize personal protective equipment (PPE) ranks third among injury causes. While PPE equipment is designed to shield against skin injuries, its underutilization stems from contractors' insufficient investment in such equipment and workers' discomfort with its use. Trench collapse ranks fourth due to inadequate trench excavation methodologies and a lack of bracing. Additionally, being struck by objects, equipment defects/misuse, electric shocks, and other miscellaneous factors occupy the fifth to eighth positions, respectively. These findings highlight the urgent need for enhanced safety protocols and investment in protective measures to mitigate the prevalence of construction site injuries.

When the respondents were asked about the reason of the injuries reported over the past two years, several factors were identified, including:

- Lack of Proper Training: One of the primary causes of

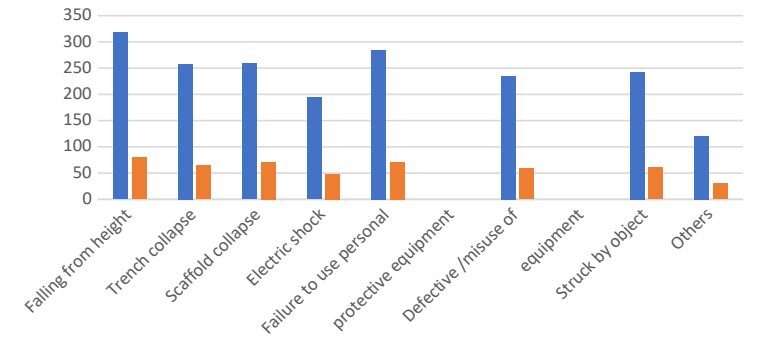
injuries is a lack of proper training for workers. Without adequate training on safety procedures, equipment operation, and hazard recognition, workers may be more prone to accidents.

- Unsafe Working Conditions: Unsafe working conditions, such as cluttered work areas, poor lighting, and inadequate ventilation, can increase the risk of accidents and injuries. Failure to address these hazards can lead to slips, trips, falls, and other incidents.
- Lack of Personal Protective Equipment (PPE): Failure to provide and enforce the use of appropriate personal protective equipment (PPE) can result in injuries from falls, impacts, or exposure to hazardous substances.
- Equipment Malfunction or Failure: Accidents can occur due to equipment malfunction or failure, including faulty machinery, defective tools, or inadequate maintenance of equipment. This can result in struck-by accidents, caught-in or between incidents, or electrical injuries.
- Unsafe Work Practices: Workers engaging in unsafe work practices, such as bypassing safety procedures, taking shortcuts, or disregarding warning signs, increase the risk of accidents and injuries.
- Lack of Risk Assessment and Hazard Control: Failure to conduct thorough risk assessments and implement appropriate hazard control measures can leave workers vulnerable to known hazards in the workplace.
- Inadequate Supervision and Oversight: Lack of supervision or oversight of work activities can contribute to accidents,

as workers may not receive guidance or correction when engaging in unsafe behaviors.

- Fatigue and Stress: Fatigue and stress can impair judgment and reaction time, increasing the likelihood of accidents and injuries. Long hours, tight deadlines, and high-pressure work environments can exacerbate fatigue and stress levels among workers.

Figure 5: Causes of injury



4.2.2. Integration of OSH

A substantial majority, comprising 85% of the respondents, concur with the observation that enterprises fail to adequately integrate occupational safety and health (OSH) practices into their construction works and operational systems. This failure stems from a myriad of challenges that impede the seamless integration of OSH principles. These challenges may include

inadequate awareness and understanding of OSH requirements, resource constraints limiting investment in safety measures, organizational cultures that prioritize productivity over safety, and difficulties in complying with OSH regulations and standards due to a lack of clarity or enforcement mechanisms. As a result, the integration of OSH practices into construction activities becomes a complex endeavor requiring concerted efforts to address these multifaceted challenges effectively.

Table 4: Integration of occupational safety and health

	Frequency	*Percentage*
Lack of Awareness and Training	17	46%
Resource Constraints:	15	43%
Complacency	14	39%
Regulatory Compliance Issues	13	37%
Resistance to Change	12	33%

The findings suggest that one of the primary reasons for lapses in Occupational Safety and Health (OSH) within construction works, identified by 46% of respondents, stems from a fundamental lack of awareness among both management and workers regarding the critical importance of OSH protocols. This deficit in awareness may lead to a diminished understanding of potential hazards and appropriate safety procedures.

Another significant factor contributing to OSH deficien-

cies, as highlighted by 43% of respondents, is resource constraints faced by enterprises. These constraints encompass budgetary limitations and a scarcity of adequately qualified personnel, which consequently impede the organization's capacity to allocate sufficient resources towards OSH initiatives. As a result, there may be shortcomings in the provision of essential safety equipment, training programs, and on-site supervision within construction environments.

Furthermore, a notable observation from the study indicates that 39% of enterprises exhibit a culture of complacency towards safety practices. This complacency manifests as a tendency to prioritize project deadlines and cost objectives over safety considerations. Such an attitude may arise from a lack of commitment to prioritizing OSH at the leadership level, thereby fostering an environment where safety concerns are not adequately addressed or are outright disregarded.

The fourth factor contributing to Occupational Safety and Health (OSH) challenges within enterprises, identified by 37% of respondents, pertains to difficulties in complying with OSH regulations and standards. This struggle often stems from a lack of comprehensive understanding regarding the legal requirements or from inadequacies in the enforcement mechanisms in place. Consequently, organizations may find themselves vulnerable to non-compliance penalties and legal liabilities, which can have significant repercussions on both their reputation and financial stability.

The fifth factor highlighted in the study underscores the presence of resistance to change within organizations, parti-

cularly concerning deeply ingrained attitudes and practices that prioritize productivity over safety considerations. This resistance, cited by 33% of respondents, poses a formidable barrier to the effective integration of Occupational Safety and Health (OSH) principles into construction works and operational systems. Such entrenched attitudes may impede efforts to implement necessary safety measures and protocols, thereby compromising the overall safety culture within the organization.

4.3. Roles of the client, consultant and contractor in health and safety consideration

Clients' involvement in determining timeframes and budget allocation for health and safety provisions was observed in only 55% of construction projects in Addis Ababa. This indicates that additional time and budget are often not allocated for safety and health considerations in building constructions. Furthermore, clients' responsibility to ensure that contractors are competent and have adequately provisions for health and safety measures received similar attention at 55%. However, the competency of contractors in terms of health and safety provisions was predominantly considered for mega projects and selected projects, with health and safety audit reports not consistently included in contractor selection processes. Additionally, clients' role in ensuring that appointed consultants possess the necessary health and safety knowledge and

experience for the project was practiced at a lower rate of 52%. This highlights a discrepancy, as consultant selection often prioritizes design aesthetic over health and safety expertise.

The consultant's responsibility to verify whether the contract document prepared for tender includes guidelines for health and safety regulations, and facilitates the enforcement of rules and regulations to minimize health and safety issues, was observed in 52% of cases. This aligns with the client's duty to ensure that the appointed consultant possesses the necessary health and safety knowledge and experience for the project. Although health and safety issues are typically addressed in the contract document's general conditions, this alone does not empower the contractor to enforce regulations specified by bodies like the OSH and labor Inspection services, Occupational or other governmental entities. Additionally, consultants lack the authority to mandate that contractors implement a safety checklist for each activity.

Contractors' responsibility for providing essential safety equipment such as safety shoes, helmets, gloves, belts, and glasses was observed in 57% of cases. However, in some building construction projects, safety gear was either absent altogether or limited to top management and key personnel, with only a minority providing for all workers, including guests. Additionally, while it is imperative for contractors to train all workers directly or indirectly involved in the project on health and safety protocols, such training was conducted at construction sites with a frequency of 56%.

Furthermore, it is expected that contractors would establish monthly health and safety performance reports, yet only 54% of contractors had mechanisms in place to monitor such performance, including reports, audits, and inspections. Coordination among subcontractors concerning safety is crucial, and it was encouraging to note that in 59% of cases, main contractors ensured such coordination, indicating a high level of applicability. However, the role of main contractors in obtaining and reviewing site-specific safety plans from subcontractors was less prominent, with only 45% compliance. It is vital that subcontractors submit site-specific health and safety plans before commencing work, aligning with the interests of main contractors.

4.4. Factors that affect health and safety performance of workers

The questionnaire includes the list of factors affecting safety and health performance of laborers in the construction industry. It contains twelve factors which had been discussed in the literature review.

The findings highlight that the predominant factor influencing the safety and health performance of laborers within Addis Ababa's construction industry is the presence of a well-defined company health and safety policy, ranking first with an RII of 0.82. Such a policy serves as a proactive measure in accident prevention, ensuring that safety considerations are integrated across all facets of the company's operations. A clear health and safety policy fosters a culture of adherence to

safe work practices among employees, underpinned by a shared understanding of the company's safety protocols. Supervisors play a pivotal role in enforcing health and safety practices in alignment with the company's policy directives. Conversely, the absence of a clear company health and safety policy correlates with subpar performance among laborers in adhering to health and safety practices. Without clear guidelines and expectations outlined in the policy framework, employees may struggle to prioritize safety, thereby increasing the risk of accidents and injuries on construction sites.

Table 5: Factors that affect health and safety performance of laborers

Factors	*Total*	*Relative Importance Index (RII)*	*Rank*
Safety awareness of company's top management	142	0.79	3
Availability of a clear company Health and safety policy	148	0.82	1
Reward and punishment system	131	0.73	8
Project duration	129	0.71	10
Inadequate enforcement of the existing building rules and regulations	144	0.80	2
Age of workers	133	0.74	7
Recording and reporting of daily safety issues (safety audit)	135	0.75	6
Conducting Safety and Health Training and orientation	140	0.78	4
Employee experience	126	0.70	11
Safety investment on Personal Protective Equipment	139	0.77	5
Project cost	130	0.72	9
Weather condition	112	0.62	12

The second significant factor identified pertains to the inadequate enforcement of existing building rules and regulations,

which received an RII of 0.80. It is observed that the prevailing building regulations concerning health and safety are not effectively implemented across construction projects. Without robust enforcement mechanisms, the health and safety performance of laborers remains compromised. Adherence to established regulations is paramount for ensuring a safe working environment, yet the lax enforcement of these rules undermines efforts to mitigate risks and prevent accidents.

Ranked third is the safety awareness of the company's top management, scoring an RII of 0.79. The cultivation of safety consciousness within a construction site should ideally originate from senior management, setting the tone for a culture of safety that permeates throughout the workforce. However, insufficient awareness among top management regarding health and safety practices can detrimentally impact laborers' safety performance. A lack of emphasis on safety as a core organizational value may result in complacency and inadequate safety measures, ultimately jeopardizing the well-being of workers.

In the fourth position is the conduction of safety and health training and orientation, with an RII of 0.78. Training plays a vital role in improving the safety and health performance of workers by equipping them with the necessary knowledge and skills to identify and mitigate workplace hazards effectively. Typically, training begins with orientation sessions for new workers and continues as an ongoing process to educate workers about specific aspects of their tasks. Ensuring that newly hired workers are informed about every new activity can further enhance their performance in maintaining health and safety standards.

Ranked fifth is the investment in Personal Protective Equipment (PPE), achieving an RII of 0.77. Proper provision of PPE, including safety helmets and footwear, is imperative for safeguarding workers on construction sites. Adequate protective gear not only shields against physical hazards but also enhances overall safety. Failure to invest in PPE or provide appropriate gear can leave laborers vulnerable to various occupational risks, thereby compromising their ability to protect themselves from potential hazards.

Ranked sixth is the recording and reporting of daily safety issues, as indicated by an RII of 0.75. It is imperative that all incidents affecting worker safety, including those resulting in serious injury or loss of life, be promptly documented and reported in accordance with national regulations. Failure to maintain accurate records and report safety issues can undermine efforts to address hazards and mitigate risks, consequently compromising the overall health and safety performance of laborers.

The age of workers occupies the seventh position, with an RII of 0.74. While individuals as young as 16 or 17 may be employed in the construction industry, certain tasks pose significant risks that are unsuitable for inexperienced or underage workers. Similarly, advanced age can also impact the ability of workers to perform safely, underscoring the importance of age considerations in promoting a safe working environment.

The eighth-ranked factor pertains to the implementation of a reward and punishment system, with an RII of 0.73. Incentives play a crucial role in motivating workers to adhere to

safety protocols and regulations on construction sites. Rewards serve to encourage workers to uphold safety standards and take proactive measures to mitigate risks. Conversely, the prospect of punishment serves as a deterrent against unsafe behavior, fostering a culture of accountability and prioritizing safety and health considerations among laborers.

Ranked ninth is project cost, with an RII of 0.72, indicating its influence on the health and safety performance of laborers. Large-scale projects that are inadequately budgeted tend to experience higher accident rates compared to those with sufficient investment in health and safety measures. Insufficient funding for safety initiatives can compromise worker safety and increase the likelihood of workplace incidents.

Tenth on the list is project duration, with an RII of 0.71. Tight project schedules often impede the implementation of comprehensive health and safety measures. The compressed timeline of such projects may limit the ability of laborers to prioritize safety practices, potentially exposing them to greater risks due to time constraints.

Employee experience occupies the eleventh position, with an RII of 0.7. Inexperienced workers, including those who are unskilled, semi-skilled, or temporarily employed, typically demonstrate lower levels of productivity and may lack the necessary skills to identify and mitigate safety hazards effectively. This lack of experience can undermine the overall health and safety performance of laborers, posing risks to both individuals and project outcomes.

Weather conditions are positioned twelfth on the list, with

an RII of 0.62. This factor ranks lowest as it has minimal impact on the health and safety performance of laborers in our country, particularly in Addis Ababa. Unlike other factors, weather conditions are less influential in determining workplace safety, making it a less significant consideration in comparison to other factors addressed in the study.

4.5. Roles of trade union in OSH

In the research discussion, it was found that the majority of respondents, accounting for 65%, perceived that trade unions did not play a significant role in promoting safety and health in the workplace. This perspective stemmed from the observation that trade unions often prioritized 'activities related to workers' rights violations over occupational safety and health (OSH) concerns. In other words, the focus of trade unions seemed to be more on addressing issues related to labor rights rather than actively advocating for safety measures in the workplace. This lack of emphasis on OSH by trade unions might have been attributed to various factors, such as limited resources, competing priorities, or a lack of awareness about the importance of workplace safety.

Conversely, 35% of respondents held the view that trade unions did have a significant role in promoting the health and safety of workers in the workplace. According to this perspective, trade unions actively engaged in communication with management teams to address safety concerns and establish

safety committees. This proactive approach by trade unions was seen as instrumental in advocating for the implementation of safety measures and ensuring that workers' safety needs were addressed effectively.

The differing opinions among respondents regarding the role of trade unions in promoting workplace safety highlight the complexity of the relationship between labor organizations and OSH initiatives. While some respondents perceived trade unions as not prioritizing OSH concerns, others recognized their efforts in advocating for safer working conditions. This diversity of perspectives underscores the importance of understanding the dynamics between trade unions and workplace safety practices, as well as the need for collaboration between labor organizations, management, and regulatory authorities to ensure comprehensive OSH strategy.

4.6. Result from key informant

4.6.1. Key informants response analysis

4.6.1.1. Selection Criteria

As per the TOR, key informants were selected to gather broader ideas regarding pertinent issues that determine national practice including identifying the situation of OSH practice in Construction enterprises and identifying what are the outstanding challenges and the corresponding measures to properly address them from distinguished personalities

who, one way or another, were involved in safety and health services in the sector in concern and others as well as trade union activities in the field, were selected and interviewed. These distinguished personalities were from:

- Law Expert serving of A.A. City Administration Labour and Skill Bureau
- Private OSH service provider
- Experts of OSH serving in Labour Inspection Services of Federal Labour Skill Ministry and regional Labour and Skill Bureaus
- Legal Advisor of Addis Ababa City Administration Labour and Skill Bureau
- Expert serving in Environmental and OSH unit of Ministry of Health
- Staff of International Labour Office
- National OSH Professional Association member

All together eight distinguished experts who has profound experiences and knowledge in Occupational Safety and Health services in general and in construction sector in particular were covered by the assessment survey.

4.6.1.2. Key informants' particulars

Regarding the gender distribution of the respondents, all are male except for one female respondent (1 female and 7 males).

As for age categories, one participant falls within the 18–29 age group (12.5%), four participants are aged 30–40 (50%),

two are in the 41–55 range (25%), and one is over 55 years old (12.5%).

In terms of educational background, 3 respondents (37.5%) hold a first degree, while the remaining 5 (62.5%) possess a master's degree, primarily in Occupational Safety and Health (OSH), Environmental Sciences, and Project Management.

With respect to professional background, half of the respondents (4 out of 8) are professionals in Occupational Safety and Health. The others include a chemist, a lawyer, a management scientist, and a laboratory scientist.

Regarding institutional affiliation, 2 respondents are employed at the Addis Ababa Labour and Skills Bureau, 1 works at Ethiopian Airlines, 1 at the Federal Ministry of Health, 1 at the Federal Ministry of Labour and Skills, and 1 at the Oromia Labour and Social Affairs Bureau. The remaining 2 are employed in consultancy and training services and at the International Labour Organization (ILO), respectively.

In terms of work experience, all respondents have substantial backgrounds in labour administration, particularly in Occupational Safety and Health and the improvement of working conditions. One respondent has over 20 years of experience, three have between 11 and 15 years, two have between 6 and 10 years, and two have between 0 and 5 years of experience.

4.6.2. Opinion and remarks by key informants on the situation of OSH practice in construction enterprises

The study considered very important to assess the opinion

of the key informant which have profound experience in OSH and Labour Administration in order to triangulate it with other findings of the same. Based on this, the respondents were requested to provide their assessment of the situation of OSH at national level in general and the practice in construction enterprises.

Based on this, they responded as follows.

4.6.2.1. National level situation

All Key Informants involved in the study affirmed that national situation of OSH is not yet developed and is at premature stage and there are many gaps and challenges that account for such state of affairs including:

- Laws and practice have never been commensurate with each other;
- Laws are not enforced properly;
- Work places are full of occupational hazards and risks;
- The burden of Occupational accidents and health impairments is very high except lack of information that depicts or revel this;
- The machinery established to take care of OSH and ensure that OSH services are in place is of low capacity and not strong enough to support interventions to prevent and control OSH problems at work places;
- The services are not broad based and not include all workers regardless of their employment type;
- The OSH service as it stands is weak and of low outreach and with very small accessibility;

- Employers do not give due recognition for OSH services and workers safety, health and well-being as they attach the services to be cost incurring, whereas it is an investment;
- Workers have widespread awareness problems regarding safety and health at work and considers as simple affairs and many case attach it with benefits and welfare;
- Unions are not yet actively involved in affairs of OSH as one of their cardinal mandates of safeguarding the rights, safety and wellbeing of workers.

4.6.2.2. Construction sector level

The problems that contributed to unavailability of proper OSH practices in construction sector, according to the respondents' view, are:

- The safety and health services in the sector have not yet received the right consideration in spite the fact that it is hazardous and full of major risk of occupational injuries;
- Construction, due to its peculiar nature, dominated by triangular employment relationships and a prevalence of casual workers, is used as an excuse by employers to be reluctant at establishing and providing basic OSH services at Construction sites;
- OSH, as a required part of construction business, are not well considered in all life cycle of projects i.e. design bidding, implementation, monitoring and evaluation etc. Commonly involved bodies in construction works i.e. designers, clients. Contractors, advisors and project managers are not complying and fulfill their OSH related responsibilities

which are specified by relevant laws and there is no system that enable ensure that their compliance to what the law respectively requires from them;

- The sector is characterized by project-based work where workers lack permanent employment relationships, leading employers to avoid establishing OSH services as an integral part of the work. They rather resort to shortcuts in fulfilling their obligation to ensure workers' safety and health by merely purchasing basic workers' compensation for occupational injuries;
- Lack of adequate and pertinent OSH standards manuals and procedures on how safety and health are managed in construction sector and shortage of trained manpower in the field.
- Absence of permissible exposure limits of occupational hazards and workplaces are not monitored regularly to evaluated for the risks and hazards using scientific hazard measuring equipment.
- The sector is not regularly inspected and checked for compliance by the competent authority i.e. the labour Inspection services and scrupulous employers are not penalized for their breach of laws and regulations.
- The majority of workers—particularly casual and day laborers—are not covered by the injury compensation and benefit system, under the mere pretext that their employment is not fixed, i.e., not considered permanent.
- Absence of recording and notification of occupational injuries and other related information.

4.6.2.3. Enterprise/undertaking level

The respondents gave their opinion that safety and health practices at enterprise level are not well maintained and adequately managed and there are no safety and health services tailored to the nature of the operations and the dangers that may arise from the working conditions of the industries. Moreover, they pointed to the following as visible characteristics of the situation at the enterprise level:

- The are no OSH services or OSH management systems in many construction enterprises. Even in a few of them, where there are they are either weak or not appropriately functioning and are not providing the necessary services for the workers;
- There is a widespread awareness problem regarding the importance of OSH and its positive contribution of the entire progress of the business of the enterprises by the employers and workers;
- There is also a shortage of PPEs supply for workers. Due to the irregular nature of the work, there is no formal unionization. There is no formal contract for both short term and daily workers. Hence, workers are not informed about their rights and obligations;
- There is no cooperation and dialogue forum for the management and workers where issues of OSH is treated on bipartite cooperation mechanism, OSH committee or social dialogue and workplace cooperation etc.;
- Management/Enterprises do not usually organize and provide awareness creation on how workers take necessary

precaution towards working by following safety rules and procedures at workplaces. No induction training or toolbox talks are conducted at each site or project. Safety signs and posters illustrating risks, dangers, and the corresponding precautions to prevent and control accidents and health impairments are also absent.

4.6.3. Associated gaps and limitations

The key informants involved in the study were requested to provide their opinion on the general assertion that states that OSH practice in construction enterprise are poor. All of them agree with this statement.

They substantiated their assertion by giving the following reasons:

- Employers, Workers, Government and relevant stakeholders do not give appropriate attention to OSH and the benefits it delivers;
- The working conditions of most construction sites are poor, with uncontrolled work layouts, human behavior safety culture are nonexistent or unsatisfactory, work dynamics due to continuous industrial expansion, employment of daily laborers (usually untrained), complacent or being over confidence to accomplish specific task by workers, lack of training, weak enforcement mechanisms, and ignoring safety procedures etc.;
- Absence of short or long term OSH training in tertiary education in our country;

- Employers do not give due recognition to safety and health and ignore providing the right services at work places;
- Workers, as a result of an awareness problem, do not give attention to their obligation in respecting safety measures and procedures at work places;
- The responsible government is not well organized and lacks the proper structures and manpower to deliver its regulatory function and access work places;
- Hazardous working conditions and unsafe acts at construction sites are exposing serious and fatal accidents in most work places of construction center;
- Absence of social dialogue and work place cooperation on issues of OSH among Government, employers' and workers' organization at national, industrial, and undertaking levels;
- Limited or no periodic studies are being conducted to observe changing trends in OSH conditions in the construction sector at national scale;
- The burden of death in the sector is not clearly known, while there are evident cases of injuries and death on many occasions.

4.6.4. Strength and Weakness

The key informants were requested as it exist now to pinpoint the strengths and weakness of OSH practices in construction sector of our country and they responded the following:

4.6.4.1. Strengths

- The slow increase in awareness about OSH among workers and employers;
- The availability of institutional arrangements and structures that ensure safety and health at work places including enforcement of relevant legal instruments and standards to maintain decent work and social justice in the sector;
- Though not enforced properly, the availability of policy, legislation, regulations, and directives pertaining to governing OSH and working conditions of construction enterprises;
- Though limited, the involvement of trade unions in promoting and bargaining on improvement of working conditions and OSH in the sector's workplaces. Trade unions are the voice of workers. So, workers can feel represented, heard and trusted to cast their OSH concerns if there are strong and freely elected trade unions. Workers can openly and freely communicate their OSH agenda when trade unions are present. Workers' OSH concerns can be presented, discussed and solutions can be found if a conducive platform is created for social dialogue at workplace level.

4.6.4.2. Weaknesses

- The role of trade unions is not as much influential in improving OSH and safety and health at work places;
- The capacity of the competent authority to ensure safety and health at work places of construction sector is weak and does not properly discharge its regulatory mandate;

- Absence of research and studies related to OSH and its practice in the construction site;
- Lack of adequate system of recording and reporting of occupational injuries at work places of the sector;
- Absence of safety culture among workers and employers in construction sector;
- Considering OSH as a mere cost by employers;
- The use of old and unsafe equipment and technology by the construction sector increases workers' exposure to risks and dangers. Low involvement of trade unions in OSH and most trade unions do not pay attention to OSH at work places, apart focusing more from wages and other benefits;
- Absence of proactive measures taken by trade unions on OSH issues; not representing OSH officers and/or workers who are dealing with hazardous work processes in the trade union; not properly OSH issues to the management and securing enough commitment of the top leadership;
- Employment and its pattern are changing with dynamics accompanied by globalization i.e. permanent types of work are becoming less common and not having OSH program and strategy that address this change dynamics;
- Trade unions are not meeting the ever-increasing demands for healthy and safe working place of their members;
- The low enforcement of laws and regulations for non-compliance;
- A Substantial number of workers working in decentralized and under multiple processes which exposes workers to multiple risks and occupational hazards.

4.6.5. Challenges

The study has addressed queries to the informants to provide their opinion on the existing challenges faced by the OSH practice in construction sector from the institutional point of view, policy/legal, capacity/competency, partnership and cooperation, attitudes of employers and managers' behavior and similar factors.

All of the key informants have attempted this query and their responses highlighted the following challenges faced by the practice of OSH in the sector under each factor.

4.6.5.1. Challenges related to institutional and organizational factors

Proper institutions or organizations are a key factor in ensuring effective and targeted OSH practices to prevent and control work-related risks and hazards, thereby safeguarding the safety, health, and welfare of workers in the construction sector. This issue must be addressed to encourage workers to exercise their fundamental right to work in safe and healthy conditions and environments. In light of this, from the perspective of the study, key informants expressed their views that the following are major challenges to OSH practices in construction enterprises related to institutional and organizational factors.

They stated that the following are worth to be mentioned as challenges related to institutional/organizational factors related to the affairs in concern:

- Lack of adequate finance and human resources to create

awareness and bring about attitudinal change on issues of safety and health at construction sites;

- Absence of structures and machinery established to fully address and take care of safety, health and working condition in construction sectors, and those which are meant for this are few in number and are not adequately supported to properly handle the issue;
- Trade unions have no specific structure or organizational unit to deal with issues of safety and health at work in the sector;
- Having limited outreach and access at lower administration level, where there are many construction works and projects take place;
- Lack of trust and understanding among different parts, especially between workers;
- Lack of commitment among government and employers towards promoting safety and health or the improvement of working conditions in the sector.

4.6.5.2. Challenges regarding policy and legal framework

Policy and legal frameworks are instrumental and serve as instruments to ensure proper safety and health services to be in place at work places. In view of this, the key informants covered by the study have been approached to provide challenges related to policy and legal framework related to OSH practices in construction enterprises. In response to this, all of the key informants replied that more or less the available policy and legal instruments can ascertain safe and health practices to be maintained in construction workplaces. They boldly affirmed

that rather it is the weak implementation of available legal policy instruments, which accounted for the existing poor OSH practices in the construction enterprises. One notable gap in this aspect is absence of sector specific OSH directives, regulations or acts on the construction sector.

4.6.5.3. Challenges related to capacity and competency

The capacity/competency of the labour administration institutions are among the determining factor for putting in place the proper safety and health services acceptable and adequate OSH practices in the sector. In view of this, the study included in the query for the key informants what kind of challenges attribute to the existing poor OSH practices. They replied accordingly that the following are the factors which are contributing as challenges regarding to capacity and competency:

- The limitation to provide appropriate OSH services to construction workers that address the prevention and control of sector specific risks and hazards;
- Lack of the capacity/competency to conduct relevant research of the specific sector which will generate information and scientific approach and establish and implement OSH management system in the sector;
- Limited services outreach of both regulatory and enforcement bodies pertaining to safety and health at work in construction enterprises;
- Not providing researched evidence-based scientific inputs concerning OSH practice and services that align with ever growing dynamics in the sector.

4.6.5.4. Challenges regarding partnership and cooperation

Studies and research conducted elsewhere on safety and health at work places have demonstrated that partnership and cooperation among tripartite partners is a driving force for maintaining and establishing OSH system and services in all work places including the construction sites. In this connection, the assessment survey asked the key informants to provide their opinion about the existing challenges regarding partnership and cooperation among the tripartite partners. Accordingly, they responded the following as the notable ones:

- The relationship between the bipartite partners being more of confrontational than cooperation in entertaining all labour relations including safety and health at workplaces;
- Absence of wide range cooperation and partnership to address systemic OSH related challenges and problems at national, sectoral and enterprise levels;
- Absence of the necessary system and platforms for cooperation and partnership.

4.6.5.5. Challenges related to attitudes of employers and managers

In construction sites or workplaces where employers have positive attitude towards safety and health, OSH practices and services are established and maintained well. Employers and managers should consider safety and health as an integral part of the business and strive to promote and maintain it. They should consider workers should be consulted and actively involved in the issue of safety and health at work places partners and enable them believe and act as they have indispensable

responsible to promote and maintain OSH services and programs. In view of this, the key informants covered by the assessment provided their opinion regarding the prevailing attitudes of employers and managers as follows:

- Limited knowledge to understand and respect the workers' rights to healthy and safe work places and environment;
- Lack of awareness on understanding and accepting the duty of employer on safety of workers and limited legal knowledge on OSH;
- Employers attitude to OSH in many cases is not positive, often seeing from the cost perspective mainly, and not being able to link it with productivity;
- Employers and managers focus more on other business' operations rather than giving due consideration to safety and health at work places;
- Wide perception among employers or managers not to view OSH as having a considerable contribution and playing an important role in the sustained improvement and growth of the business.

4.6.5.6. Challenges pertaining to workers' behavior

Workers' behavior is among the factors towards promoting and maintain safety and health at workplaces. Studies have shown that where there are positive and encouraging behavior of workers towards safety and health, work places are safer and few incidents and occupational accidents and injuries are occurring, and enterprises are productive and competitive.

In this respect, the assessment survey requested the key

informants to provide their opinion on the existing challenges related to workers toward safety and health at workplaces and they accordingly forwarded the following:

- Not considering safety and health at work is an important engagement towards saving life and limb in the work place;
- Not considering that adhering to respecting safety and health rules and regulation is important to save them from occupational injuries and health impairment;
- Do not give attention to vital indispensable role trade unions have in promoting and maintaining safety and health at work places;
- Not fulfill their respective obligation of properly utilizing safety and health protective measures and devices and refrain from abusing of them and considering personal protective devices as mere benefit to compensate low wage and earnings;
- Culture of safety is not well understood by workers, but also limited knowledge and skills of the work, workers are not aware of their rights and mainly focus on daily gains and not recognizing the risks involved.

4.6.6. Recommended measures to improve OSH practice in the construction sector

As part of crafting silent recommendations to improve the existing OSH practice in construction enterprises, the assessment survey requested the key informants to propose what they consider as a remedy for improvement of the existing state of affairs. In view of this, they proposed the following re-

commendations based on their knowledge and experience in general, and OSH practice and of construction enterprises in particular. In doing so, they stated that there is no one standalone measure to address the problem. It requires thoroughly and critical investigation and mapping out each contributing factor:

- Undertake continuous awareness creation programs for workers, employers and government bodies concerning the promotion of safety and health and the improvement of working condition in construction workplaces through developing training packages and manuals on safety and health in construction sector;
- Formulating and issuing of OSH legislations and regulations and related standards and properly implement them accordingly through establishing strong and effective regulatory enforcement system;
- Establishing OSH management System tailored to the nature of Construction workplaces and industries;
- Improving OSH practices through designing mechanisms which clearly set the obligation and responsibilities of designers, clients, contractors project managers and workers of construction and made them deliver these accordingly;
- Developing new system of inspection and auditing of construction workplaces in order to identify risks and hazards to safety and health of workplaces at construction sites;
- Establishing OSH institutions and laboratory which are equipped with necessary facilities, including workplace monitoring and hazard identification equipment, to sup-

port the services of OSH in the sector by scientific innovation and development;

- Conduct regular research and studies to generate up-to-date findings and information that helps the improvement of OSH practices in construction enterprises;
- Developing preventive safety culture among all parties concerned bodies of the sector i.e. designers, clients, contractors, project managers and the majority workers of the enterprises in order to properly mitigate the existing wrong attitudes and behavior and acts which induces risks and injuries at work places;
- Establishing strong and effective coordination and cooperation mechanisms and platforms among tripartite partners, government, employers, and workers, where safety and health practices at construction is treated with consultation and cooperation of the concerned parties;
- Promoting standardization through certifications and enhancing the areas through PPT (People, Process & Technology) at national, sectoral and enterprise levels of construction industries;
- Developing and putting in practices systems of recording, maintaining and notification of all OSH related information and occupational injuries in construction workplaces;
- Formalizing the informal operations in the construction sector to address key OSH issues;
- Put in place a workable system of certification and recognition, and provide licenses with a focus on safety procedures.

5.
Conclusion and recommendations

Conclusion

The research findings shed light on several critical aspects of safety and health practices within the surveyed companies. Despite a significant portion (56.1%) having over a decade of experience in the local market, only a small fraction (8.3%) reported having dedicated safety departments. This disparity underscores the need for greater emphasis on safety management structures within organizations, as these departments play a pivotal role in ensuring the well-being of workers.

Furthermore, the satisfaction levels among workers regarding the company's expenditures on safety and health initiatives are notably low, with less than 50% expressing contentment across various parameters. These include the availability of first aid and occupational health services on-site, provision of personal protective equipment (PPE), training and instruction on health and safety, and regular inspection of scaffolding and ladders, among others.

The analysis of injury data revealed that falling from height

emerged as the leading cause of injuries, followed by scaffold collapse, failure to use personal protective equipment, trench collapse, and incidents involving being struck by objects or defective equipment. This underscores the urgent need for robust safety measures and enhanced supervision practices to mitigate such risks effectively.

In the research findings, it was found that the majority of respondents, accounting for 65%, perceived that trade unions did not play a significant role in promoting safety and health in the workplaces. This perspective stemmed from the observation that trade unions often prioritized other activities related to workers' rights violations over occupational safety and health (OSH) concerns.

Moreover, there was a widespread consensus among respondents regarding the inadequacy of site supervision, which was identified as a primary contributing factor to accidents. Addressing this issue through improved supervision protocols and training initiatives should be a priority for companies seeking to enhance their safety performance and protect their workforce.

The research highlights significant gaps and challenges in safety and health practices within the surveyed companies. Addressing these issues will require concerted efforts from both management and frontline workers to foster a culture of safety and prioritize the well-being of all employees.

Recommendations

Based on the findings of the study, the following recommendations are proposed to enhance health and safety practices in building construction:

1. Strengthen Supervision: Construction companies should prioritize increasing the quality and quantity of safety and health supervisors. Poor supervision has been identified as a significant factor contributing to accidents on construction sites. Each company should develop and implement its own safety and health policy to ensure comprehensive oversight.
2. Enhance Awareness and Training: Efforts should be intensified to improve awareness and training programs for construction workers. Both construction companies and relevant authorities should collaborate to enhance workforce education on safety and health practices. Furthermore, construction contracts should specify an adequate budget for safety and health provisions with safety considerations explicitly outlined as a contractual requirement.
3. Incorporate Safety Monitoring Mechanisms: Contractors should incorporate monitoring mechanisms for health and safety performance as part of the bidding process. This could include the submission of safety audit reports as a qualification requirement. Additionally, contract documents prepared for tender should include guidelines for health and safety regulations, facilitating the enforcement of rules and regulations to minimize health and safety risks.

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