



**JIMMA UNIVERSITY
JIMMA INSTITUTE OF TECHNOLOGY
SCHOOL OF GRADUATE STUDIES
FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
CONSTRUCTION ENGINEERING AND MANAGEMENT**

**ASSESSMENT OF OCCUPATIONAL SAFETY AND HEALTH
MANAGEMENT IN BUILDING CONSTRUCTION SITE: IN THE CASE OF
AGARO TOWN**

A Research submitted to School of Graduate Studies, Jimma University, Jimma Institute of Technology, Faculty of Civil and Environmental Engineering in Partial Fulfillment of the Requirements for the Degree Master of Science in Construction Engineering and Management

By

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May, 2023

Jimma, Ethiopia

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DECLARATION

I declare that this research entitled “Assessment of Occupational Safety and Health Management in Building Construction Site: The Case Study of Agaro Town” is my original work and has not been submitted as a requirement for the award of any degree in Jimma University or elsewhere.

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As research Adviser, I hereby certify that I have read and evaluated this thesis paper prepared under my guidance, by Kefiyalew Tiyare Geleta entitled “ASSESSMENT OF OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT IN BUILDING CONSTRUCTION SITE: IN THE CASE OF AGARO TOWN” and recommend and would be accepted as a fulfilling requirement for the Degree Master of Science in Construction Engineering and Management.

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ABSTRACT

The construction industry in Ethiopia is growing rapidly. While the way to manage occupational safety and health performance in construction projects has predominantly been recorded as unfair and very poor, for a construction project to be successful, ensuring the safety and health of workers is of the utmost importance. But it has been seen as one of the most hazardous industries because of its poor health and safety performance record compared to other industries. The objective of this research study was to assess the current practices of occupational health and safety management, identify the main causes of occupational accidents related to OSH, and determine the damage and accidents that occur related to the workplace in building construction projects at Agaro Town. Consequently, the survey research design was used to accomplish the objective of the study. Mainly, the questionnaire was distributed to contractors, consultants, clients, and other related employees of the companies that were working under construction on nine building construction projects in Agaro town. The survey questionnaire was distributed to 45 respondents who were selected purposefully; among them, 41 responded, which represented a response rate of 91.11%. The data gathered through the questionnaire and an interview was analyzed by Microsoft Excel, the Statistical Package for Social Science, and the Relative Importance Index.

Descriptive analysis is used to summarize and interpret the data. The research result indicated that the current practice of occupational safety and health management was assessed workers related to training, communication and company safety culture are ranked individually and in detail from that training on proper use of scaffoldings, going lift load capacity operation and the Culture of the company considers occupational safety and health during planning and execution of projects ranked as first rank for each scenario with relative importance index value of 0.537, 0.502 and 0.498 respectively with causes of work-related accident with related to Occupational Safety and Healthy management erection and dismantle of scaffoldings by unskilled labor from causes of work-related accident with related to falling from height, lack of training on key issues pertaining health and safety consciousness from causes of safety problems related to the human element, engaging incompetent safety personnel from causes of safety difficulty related to management, and failing to report unsafe methods from causes related to unsafe working methods were first ranked with relative importance index values of 0.741, 0.644, 0.678, and 0.605, respectively. Which leads to damage and accidents related to the workplace through the dismantling of formwork? According to the study, to have a safety increment in the construction industry, implementation of occupational health and safety management by controlling factors and applying mitigation methods is the best option. The study also recommended that training needs to be provided frequently to all levels of workers on construction; during the bid, the contractor should have incorporated a safety audit report for their qualification; and the Ministry of Labor and Social Affairs should implement the labor proclamations on health and safety to reduce their occurrence.

Keywords: Accident, Health, OSH, Safety management, Safety practices.

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ACRONOMYS

CD-RW	Re- Writeable Disc
ETB	Ethiopian Birr
GB	Giga Bit
GDP	Gross Domestic Product
H & S	Health and Safety
ILO	International Labor Organization
ITC	International Training Center
Mo FED	Ministry of Finance and Economic Development
MOLSA	Ministry of Labor and Social Affairs
MS	Multiple Sclerosis
OHS	Occupational Health and Safety
OS	Occupational Safety
OSH	Occupational Safety and Health
RII	Relative Importance Index
SHC	Safety and Health Commission
SHE	Safety and Healthy Executives
SPSS	Statistical Package for the Social Sciences
U.S	United State
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The construction industry was one of the most vital economic sectors and was mainly considered the backbone of the development of all nations. As well as one of the world's major industries, accounting for a sizeable proportion of most countries' GDP (ILO, 1999). This sector was the largest industrial employer in most countries, accounting for around 7% of total employment worldwide. Horta *et al.* (2012) in developed and developing parts of the world, the construction industry is the hub of social and economic development and plays a leading role in improving people's quality of life. A considerable number of workers with various professional backgrounds (Vitharana *et al.*, 2015) are involved, and people spend more than one-third of each day at work (Roberto, 2006). It has been an important field of interest for industries, especially in developing countries, to improve occupational health and safety (OHS) and the productivity of employees. Ramazan (2016) in construction activities. However, the sector is globally recognized as one of the most dangerous industries in which to work. ILO (1999); The State of Queensland (2011); Phoya (2012) In addition to those, approximately 60,000 fatal accidents occur on construction sites each year, accounting for 17% of all fatal workplace accidents, according to the ILO (2017). Lingard & Rowlinson (2005) reported that, for many workers, involvement in the construction industry leads to unimaginable pain, accidental death, and countless incidences of injury, absenteeism, and huge compensation and replacement costs resulting from accidents. Occupational safety and health (OSH) is generally defined as the science of the anticipation, recognition, evaluation, and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment. Alli (2008).

The domain of occupational health and safety has always been vast, encompassing a large number of disciplines and numerous workplaces. A wide range of structures, skills, knowledge, and analytical capacities are needed to coordinate and implement all of the "building blocks" that make up national OHS systems so that protection has been extended to both workers and the working environment. Alli, (2008). Occupational injuries pose a major public health and development problem that could be prevented by implementing appropriate occupational safety and health practices. Out of the total 3 billion workers in the world, over 85% of them work and live in

Condition with no access to proper and effective occupational safety and health services and facilities Rantanen, (2012). It is commonly known that accidents have serious implications for the construction industry, both in financial and humanitarian terms. Construction accidents may cause many problems, such as demonization of workers, disruption of site activities, delay of project progress, and adversely affect the overall cost, productivity, and reputation of the construction industry. Health and safety risks need to be identified, assessed, and mitigated. Certain actions are needed to eliminate or minimize their probability of occurrence. In order to reduce the accident or incident level and subsequently cut losses, it is important to ensure that safe working practices are being observed. Radhlinah (2000). In addition to that, the industry provides high employment opportunities, probably only second to agriculture (Ofori 2006, cited by Abadir 2011). Similarly, in Ethiopia, public construction projects shared an average annual rate of 58.2% of the capital budget between 1997/98 and 2001/02. Wubshet (2004). Moreover, industry (including construction) and value added (% of GDP) in the country was reported at 23.11% in 2020, according to the World Bank collection of development indicators, compiled from officially recognized sources by the Bank on June 20, 2022.

For the last two decades, the number of occupational accidents and related injuries has increased in most developing nations (Kadiri, 2016), such as sub-Saharan countries and Ethiopia, from year to year (MOLSA, 2019). Even though all countries are in a better position to tackle their particular problems because there are model actions of progress being made both by governments and individual companies in many countries around the world, the ILO is playing a leading role in encouraging them to improve their health and safety records by developing national systems and programs. The Ethiopian Constitution is the foundation for the governance of OSH. It has numerous articles that ensure the protection of citizens and workers from environmental and work-related hazards with established labor proclamations and provisions of OSH in workplaces. The proclamation clearly indicates the duties and responsibilities of the three parties: employer, employee, and government inspectors as stakeholders. There are OSH directives and guidelines used by OSH inspectors and safety officers to ensure the protection of workers. Despite the greater availability of data sources on health and safety at work, the available research remains incomplete, obscure, or uncertain for many relevant topics. The harmonization and international comparability of appropriately designed occupational health and safety indicators in terms of comparable definitions, data collection methodologies, and quality remain one of the major challenges of future research. Pouliakas and Theodossiou (2010) although it is difficult to obtain accurate statistics in an industry in which many accidents go undetected and unreported, in many

Countries known fatal accidents, and those involving loss of working time, frequently exceed those in any other manufacturing industry. Contributing to the high rate of accidents are those characteristics of the industry which distinguish it from the rest of the manufacturing sector. These are high proportion of small firms and of self-employed workers, variety and comparatively short life of construction sites, the high turnover of workers, large numbers of seasonal and migrant workers, many of whom are unfamiliar with construction processes, exposure to the weather and many different trades and occupations. In stark terms, this is equivalent to that of killing the entire population of a small country. According to the report of Karen (2009) the vast majority of these deaths are avoidable and preventable; which is also exceedingly unacceptable morally, politically, socially and economically. Most of these accidents significantly resulted in loss of human lives, damage of company's property; reduce organizational productivity and economic burden on the victimized workers, their families, community and the nation at large Frankiln (2013).

Consequently, the improvement of H&S in construction is still an essential goal for all contributors in the construction processes. Safety management has taking account of all risks and accidents that may believably be expected that put project employees at risk, to minimize such risks. It is thus important to identify appropriate safety actions and strategies to accommodate potential serious H&S problems SAEED (2017) Confronted by foreign workers in the Malaysian construction industry:

1.2. Statement of the Problem

The construction industry has a sector of the economy that transforms varies resources into construction physical economic and social infrastructure necessary for socioeconomic development. But it 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. Annually, throughout the world, an estimated number of 271 million people suffer with work-related injuries, and 2 million die as a consequence of these injuries. The estimated economic loss caused by work-related injuries and disease was equivalent to 4 % of the world's gross national product. (Eijkemans, 2003).

Despite the existence of various policies, regulations, rules and standards of work place safety and health promotion systems, in construction sites tend to persist the industry with lack of/ or few activities in action to mitigate the problems. Compared with other industries construction industry is unique and complex and it contains a wide range of construction materials and products, building services, manufactures, contractors, sub-contractors, operation, with the harmful

chemicals and substances, hazardous equipment and situations make the construction industry as one of the most hazardous industries that causes high rate of accidents Vitharana (2015). Construction industries particularly, the construction site poses many hazards that can cause injury to workers, from transport in the workplace, exposure to excessive noise and harmful substances, dangerous large equipment and plant, risk of slips from a wet working environment, manual handling and working unsafe machinery, risks of fire and explosions ILO (2006).

As a result, a dozen daily laborers get different serious injuries. Many, in fact, lose their lives. As has been stated in Ethiopia Hot (2012), in a recent scaffold collapse accident in Bahir Dar city, the capital of Amhara Region, it was witnessed that 18 young women daily laborers died while many others were seriously injured. From the International Labor Office, the Ethiopia Labor Inspection Audit described that, with the growth of the construction industry in Ethiopia, many fatal accidents are taking place, but most are not reported. Achenef Melaku 2013-04-01

The right to labor is declared with detailed obligations for employers in the Ethiopian Labor Proclamation No. 377-2003'. The proclamation explains that an employer must take appropriate steps ranging from instructing or notifying employees concerning the hazards of their respective occupations to providing workers with protective tools, clothing, and other safety equipment. But, unfortunately, this legal document, according to the existing working environment and situation of daily laborers, seems to have been just shelved at the Ministry of Social and Labor Affairs, justice bodies, and construction companies.

Since health and safety features are different. Industries are likely to be different; it is worth studying the health and safety status of the construction industry in Ethiopia. Furthermore, the findings of studies conducted in developed countries may not apply to a developing country like Ethiopia due to various factors associated with the level of economic development of the countries. In addition, almost all the existing limited studies in Ethiopia focus on identifying factors causing accidents in industries. Hence, they did not evaluate health and safety in the Ethiopian construction industry. Therefore, unlike prior research, this study aims at studying occupational health and safety management in the construction industry in Agaro town by comparing it with various health and safety standards, rules, directives, and proclamations.

1.3. Research Questions

The research questions to be addressed in this study are the following:

1. What are the current practices of OSH management in building construction projects at Agaro Town?
2. What are the main causes of occupational accidents related to OSH in the building construction project at Agaro Town?
3. What are the damages and accidents that occur at the workplace on building construction sites?

1.4. Objective of the Study

1.4.1. General Objectives

The main objective of the study is to assess occupational safety and health management in building construction project at Agaro Town

1.4.2. Specific Objectives

- To assess the current practices of occupational health and safety management in building construction projects at Agaro Town.
- To identify the main causes of occupational accidents related to OSH in the building construction project at Agaro Town.
- To determine the damage and accidents that occurs related to the workplace in building construction sites.

1.5. Scope of the Study

The scope of the research is limited to assessing occupational safety and health management in building construction projects which are constructed in Agaro town and projects located in Agaro, Jimma Zone, Ethiopia.

1.6. Significance of the Study

There is very little literature relating directly to safety on construction sites in developing countries like Ethiopia. Existing publications tend to suggest how accidents may be prevented but assume that strong regulatory bodies exist to enforce legislation. Therefore, this study contributes to the literature on safety and health in developing countries. In Ethiopia, it serves to reduce the number of fatalities and injuries on building construction sites by covering the general safety and health provisions and responsibilities of all participants from top to bottom through a clear understanding

of occupational health and safety requirements. The other significance of the study is related to measures that should be followed by all project participants to provide a comfortable and safe workplace, which helps to protect them from fatalities and accidents, and to ensure that there are well-organized safety and health standards within the governmental structure that help to increase safety and minimize injuries. In addition, this finding of the study intends to provide some information to the government about the status of occupational health and safety management practices in the construction sector so that it will allow the government to introduce worker rules and regulations in construction safety in Ethiopia.

1.7. Limitations of the Study

This research determines occupational health and safety mechanisms in the construction industry in Ethiopia. Because the construction industry has not been adequately researched, it may take time to collect all the data necessary about all stakeholders for the research. It was difficult to collect sufficient data that gave more empirical results, and the finding of the result may not represent a general representation of the construction industry. Because there are no more building construction projects in the study area, it has created a limitation on the number of samplings. To not go further, the research addresses only building construction projects that were constructed in Agaro town.

CHAPTER TWO

LITERATURE REVIEW

2.1. Safety and Health definitions

Before a detailed discussion of health and safety issues can take place, some basic occupational health and safety definitions are required as well as the legal framework for health and safety because it seems important to have a clear understanding of the nature and working conditions in the construction industry and safety organizations to develop an efficient tool for health and safety issues Cooney, (Nov 2016)

Safety: - The Oxford English Dictionary defines safety as the state of being safe; not being in danger, while the same dictionary defines danger as the chance that somebody or something may be hurt, killed, damaged, or something bad may happen. Others suggest safety is a state of protection and a condition not involving risk (Holt, 2010). Gardiner (2010) emphasizes that many more definitions might be given to safety, but the best point we have to agree on is that there is no absolute safety, as there is always a chance of something going wrong, however small that chance may be. The risk may be immediate or long-term, and it may affect an individual or groups of people. Safety is usually concerned with conditions that cause injury and hazards that lead to severe and sudden outcomes. OS aims to prevent people from getting harmed or becoming ill at work by taking the right precautions and providing a satisfactory working environment. Hassan, A.F. (2010) the borderline between health and safety is ill-defined, and the two words are normally used together to indicate concern for the physical and mental well-being of the individual at the place of work.

Health: - is the general condition of a person in mind, body, and spirit, usually meaning to be free from illness, injury, or pain. In 1946, the World Health Organization (WHO) defined health in its broader sense as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." WHO (2018).

An accident, as defined by the Safety and Health Executive (SHE) (2016), is any unplanned event that results in injury or ill health to people, damage or loss to property, plants, materials, or the environment, or a loss of a business opportunity. In the UK, the Safety and Health Executive (SHE) is responsible for the enforcement of the Safety and Health at Work (SHW) Act and carrying out the day-to-day work to enable the Safety and Health Commission (SHC) to carry out its functions. The HSC is responsible for the promotion of the SHW, encouraging research and training, and providing information and

advisory services. Other authorities define an accident more narrowly by excluding events that do not involve injury or ill health. However, this research will always use the Safety and Health Executive definition.

Incident: An incident is a form of accident or situation that does not necessarily result in injury to people. The term incident ‘can be defined as an undesired event that could (or does) result in loss’, or an undesired event that could (or does) downgrade the efficiency of the business operation’s ranks (2006).

2.2. Occupational Safety and Health (OSH)

In the 1950s, a common definition of occupational health was adopted by the Joint ILO/World Health Organization (WHO) Committee on Occupational Health at its first session, which was revised at its twelfth session in (2018) with the goal of all OSH programs to foster a safe work environment. OSH is a standard that is set in legislation and aims to eliminate and reduce hazards in the workplace. Occupational health and safety is an interdisciplinary area concerned with protecting the safety, health, and welfare of people engaged in work or employment. Reynolds (2011). Occupational health and safety places and maintains workers in an occupational environment adapted to their physiological and psychological capabilities. International Labor Organization (2017); World Health Organization (2017). The purpose of occupational health and safety programs in an organizational context is to upgrade the competency of the workforce. Brewer et al. (2010) The goal of occupational health and safety management programs is to promote and maintain the highest degree of physical, mental, and social well-being among workers in all occupations. Archer (2001). It aims at protecting workers in their employment from risks resulting from factors adverse to their health. The best way to reduce occupational accidents and diseases relies on the cooperation of both employers and employees. The employer has to maintain a healthy and safe workplace. Robens (1972).

2.2.1. Occupational Safety

Occupational Safety is the protection of employees from damages due to work-related accidents Benjamin (2011). Safety Management is about protecting against undesired outcomes and helps to prevent not just incidents and accidents, but financial inefficiencies and losses too. These accidents are unplanned and uncontrolled events, which can result in damage- to both human beings and property Berkowitz (1979). Since organizations provide the work and the physical plant, office, or establishment, they should be committed to doing everything within reason to protect the employee from risks associated with work.

2.2.2. Occupational Health

According to Kariuki (2017), "occupational health" is an employee's freedom from physical or emotional illness at the workplace. It is the protection of the health of workers by preventing and controlling occupational diseases and accidents, eliminating conditions hazardous to health at work, and developing and promoting healthy and safe work environments and work organizations. Health programs may include first aid and emergency dispensaries, a registered nurse and doctor or part-time services of a doctor, medical consulting facilities, and periodic medical examinations of all employees exposed to health hazards, facilities for voluntary periodic physical examinations for all employees, in- and out-patient schemes, and full or subsidized medical insurance cover, and medical insurance cover for immediate dependents. The focus in occupational health is on the maintenance and promotion of workers' health and working capacity, the improvement of the working environment and work to become conducive to health, and the development of work organizations and working cultures in a direction that supports health and safety at work. International Labour Organization (2022); World Health Organization (2022). Doing so promotes a positive social climate and smooth operation and may enhance the productivity of the undertakings, according to Reynolds (2011). Since organizations provide the work and the physical plant, office, or establishment, they should be committed to doing everything within reason to protect employees from the risks associated with spending their working days on those premises.

2.3. Importance of health and safety

The European Agency for Safety and Health at Work (1999) has seemingly highlighted and identified some of the possible benefits in this regard, while White and Benjamin (2003) have emphasized how implementing the standards would contribute towards greater prosperity within the organization and increase worker productivity since there would be a lower rate of absences due to injuries and illness. This can take the form of being protected from the event or from exposure to something that causes health or economic losses. It can include the protection of people or possessions of construction companies (wikipedia.org). On the other hand, Construction Site Safety Management is defined as the efficient and effective implementation of the policies and tasks necessary to satisfy the safety of a construction firm's employees and management. Construction safety management focuses on the careful management of the processes involved in the production and distribution of products and services within construction sites Bernold et al. (2018). His activities such as the management of purchases, the control of inventories, logistics, and evaluations are often related to construction site safety management. Therefore, construction

site safety management includes the analysis and management of internal processes. Health and safety are of profound importance, particularly in the construction industry. Because, as stated by International Labour Office ILO (2020) in many countries known fatal accidents, and those involving loss of working time in this industry, frequently exceed those in any other manufacturing industry. Contributing to the high rate of accidents are the characteristics of the industry that distinguish it from the rest of the manufacturing sector. These are:

- (1) the high proportion of small firms and self-employed workers;
- (2) the variety and comparatively short life of construction sites;
- (3) the high turnover of workers;
- (4) the large numbers of seasonal and migrant workers, many of whom are unfamiliar with construction processes;
- (5) exposure to the weather;
- (6) the many different trades and occupations.

On the other hand, Helander (2006) states that constructions work are much more hazardous than most other occupations. Most accidents involve falls of persons and occur during work on roofs, scaffolds, and ladders. The collapse of structures and falling materials also account for many fatalities. Many of these accidents can be avoided by the establishment of procedures and regulations to enhance safety. And often construction workers underestimate the hazards in their work. This affects the motivation for adopting safe work procedures. Helander (2006) further states that the cost of construction accidents amounts to about 6% of total building costs. There are hence forceful monetary incentives in construction safety. Consequently, these may encourage the industry as well as agencies to invest in this area. Accordingly, managing safety and health is not only good for purpose of safety; it also gives good financial benefits. Ignoring safety can result in accidents and ill health which not only reduces the profits but can also go to the extent of crippling the whole company. Similarly, Rozario (2004) maintains that to increase efficiency and reduce accidents, which not only benefits the individual construction company but also the whole nation, there should be a consistently high standard of performance throughout the construction industry.

2.4. Health and safety management

A health and safety management framework can be seen as a coordinated arrangement of work practices, beliefs, and techniques for observing and enhancing the health and safety of all parts of the operations of an organization. Civil Aviation Safety Authority, (2003) According to the European Union (1997), "the safety management system should include the part of the general management system that includes the organizational structure, responsibilities, practices,

procedures, processes, and resources for determining and implementing the major-accident prevention policy.” Safety Management exhibits the systematic application of management policies, procedures, and practices to the tasks of analyzing, evaluating, and controlling safety risks Papadakis and Amendola (1997). This also includes safety policy, initiatives, programs, training, campaigns, future research, etc. Occupational accidents are never intentional and can occur through risk being unidentified, incorrectly analyzed or the response being ineffective.

2.5. Characterization of the construction industry

The construction industry is one of the biggest industrial employers in many countries around the world. The ILO (2009) estimates the number of construction workers in the world at more than 110 million (usually, between 5 and 10% of the world’s workforce). The construction industry plays an important role in the economy, and the activities of the industry are also vital to the achievement of national socio-economic development goals of providing shelter, infrastructure, and employment. It is clear that construction activities affect nearly every aspect of the economy and that the industry is vital to the continued growth of the economy. The Confederation of International Contractors ‘Associations (CICA) estimates the world production by the construction industry at 3 to 4 billion Euros. The American construction industry, responsible for nearly 4% of the nation's Gross Domestic Product, directly employs over five million people and provides millions of additional support jobs in related fields Gerald (2016). The ILO estimates the number of fatal occupational accidents in the construction industry at about 60,000 every year with about 64% in the Asia and Pacific region, 17% in the Americas, 10% in Africa, and 9% in Europe ITC-ILO, (2009). The role the construction industry plays in socioeconomic development is significant. The industry is a distinct sector of the economy, which makes its direct contributions to economic growth. Infrastructure is indispensable to achieve the main development targets such as urbanization, industrialization, equitable income distribution, and sustainable economic development. Many of the decisions are sequentially developed throughout the construction process by different decision-makers. In a typical public construction project, the employer (public body), the engineer (consultant) in charge of contract administration, and the general contractor are the major stakeholders. Public employers invest capital and provide economic power. The engineer acting as the employer’s representative maintains efficient progress on a project. The contractor provides service, skills, and knowledge towards achieving a successful project, that is, a project completed on time, on budget, and of the best or specified quality.

2.6. Accidents in the Construction Industry

Accidents can be defined as any avoidable action by personnel or any failure of equipment, tools, or other device that interrupts production and has the potential to injure people or damage property (Oglesby et al., 2011). Accidents in construction projects in many countries are an important issue to handle. The phenomena make the construction industry a big image of the risky place of accidents in Sawacha et.al. (1999) Shi, (2009). The nature of the construction project itself has potential hazards of accidents since its uniqueness, open space, exposure to weather, involving many unskilled labors, the tight schedule of short targeted project duration, workers turn over and working at height, confined space, and psychologically and physically vulnerably working environment Imriyas et al. (2020) Some of the most common types of construction accidents include construction site falls, crane accidents, scaffolding accidents, workers being run-over by operating equipment, electrical accidents, trench collapses, fires and explosions, and welding accidents

Construction Site Falls

Common construction site falls include roof-related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects. Proper protection equipment and safety precautions are necessary to protect the lives of workers. Imriyas et al. (2020)

Crane Accidents

Crane accident deaths can arise from many factors, including lightning, high winds, Defective cranes, falls, electrocution, and other hazards associated with construction at heights. Many crane accidents can be avoided with proper training and safety procedures. seifedin sormolo (2014)

Scaffolding Accidents

Scaffolding is a temporary structure used to support people and materials in the construction or repair of buildings and other large structures. It is estimated that 65 percent of the construction industry works on scaffolds frequently. The use of scaffolding is necessary for the construction industry. Some of the most dramatic structures that have been built by humans relied on scaffolds to get the job done. Many construction workers injured in scaffold accidents connected the event with planking or supports giving way or the employee slipping or being struck by a falling object. seifedin sormolo (2014) .Most scaffolding accidents can be avoided through proper training and preventative measures.

Run Over by Operating Equipment

The construction site is an extremely busy work environment with movement of workers and vehicles. There are circumstances when construction workers are run-over or injured by operating

equipment. Accidents such as this can occur at any worksite, but risks are increased when working on highways or near busy roads with heavy equipment. In these environments workers must be vigilant and meticulous when practicing safety standards. Pratt, S.G., D.E. Fosbroke, and S.M. Marsh. 2001. Building Safer Work Zones: Measures to Prevent Worker Injuries From Vehicles and Equipment.

Electrical Accidents on Construction Sites

It is estimated by OSHA that nearly 350 construction workers die every year from electrical accidents. A few causes of these fatalities include electric shock, electrocutions, steam accidents, and power line contact. The risks of these hazards are heightened for workers who perform their jobs on scaffolding or in cranes near overhead power lines. . Central New York COSH, 2007, Construction Safety & Health Electrocutation hazards Grantee module, Grant Number SH-16586-07-06-F-36 from OSHA

Trench Collapses

The building of trenches is necessary for many construction tasks. They are present wherever buried utilities are constructed or repaired. A trench is narrow in length with its depth greater than its width. When trenches are constructed they must have safeguards in place to protect workers inside the trench from a collapse. When a trench collapses workers may easily become crushed under the weight of heavy soil from above. It is absolutely imperative that appropriate safety measures are taken during the building process to ensure the safety of all workers involved. On Behalf of Baehman Law | Dec 2, 2021 | Workplace Accidents

Fires and Explosions in Construction Site

The Occupational Safety and Health Administration have determined that workplace fires and explosions kill 200 and injure more than 5,000 workers each year. For these reasons, special safety guidelines have been established to prevent construction accidents arising from fires and explosions. A fire plan should exist at construction sites so that workers can be safely evacuated in the event of fires and explosions. These accidents can result in a great number of injuries, including burns that can result in extensive pain and even death. Fires and explosions are perhaps the most dynamic and tragic construction accidents that can occur. Joye Law Firm North Charleston, SC 29406 (843) 554-3100

Unsafe/Dangerous Construction Equipment Accidents

The size and power of the machines and equipment used in the construction industry can be responsible for some of the most grievous injuries if not used carefully and professionally. Construction equipment, like every other type of machinery, can experience mishap and failure

particularly if it is overused or improperly maintained. Everything from cranes to forklifts to scaffolding and ladders can cause potentially fatal accidents with the failure of a manufacturer to provide safe equipment or with the negligence of those responsible for repair and maintenance. . Pratt, S.G., D.E. Fosbroke, and S.M. Marsh. 2001. *Building Safer Work Zones: Measures to Prevent Worker Injuries From Vehicles and Equipment*.

Structure Failure on construction site

By definition, a structure failure takes place when a building or other structure breaks in such a way that it cannot carry as great a load as it could before failure. Structure failures can be catastrophic and result in major injury and loss of life. Safety of the public is compromised for financial gain or time constraints, the designer and the contractor should be responsible for the works they produce. Feld J.: *Lessons from Failure of Concrete Structures*, American Concrete Institute, Monograph Series No. 1, 1964, 179 p.

2.7. The Role of Design in OHS in the Construction Industry

The key role design plays in OHS has been identified in numerous studies. The study carried out by Rechnitzer (2000) identified the priority injury risks related to falls from height, manual handling and contact with power tools and other equipment. A conclusion reached in regard to reducing injury risk, related to the key role of designers and architects: —Lack of Designer & Architect OSH consideration (and accountability) for erection and maintenance, and downstream risks. Many risks to which construction workers are exposed to are in part dictated to by the design of the particular project. These risks can be overcome or reduced by rethinking designs to take into account OSH considerations. In other words, there is a lack of accountability for injury risk by system designers. That is, architects and engineers are not required (typically) to consider constructability or operation and maintenance in terms of OSH risk. A holistic view needs to be developed whereby due consideration is given to downstream consequence of any design:

- exposure to injury risk during construction
- exposure to injury risk during operation
- exposure to injury risk during maintenance
- exposure to injury risk during refurbishment/ demolition

The tendering process can also lead to separation of the design from the construction process, thereby further removing the scope for construction personnel to reduce injury risk during construction, by design changes. Rechnitzer (2000)

2.8. A conceptual framework of the safety culture in construction projects

Glendon and McKenna (2011) stated that effective safety management is both functional (involving management control, monitoring, executive and communication subsystems) and human (involving leadership, political and has safety culture sub-systems paramount to safety culture). This is so, because the Concept of safety culture has emerged from the earlier ideas of organizational climate, organizational culture and safety climate. They described safety culture as the embodiment of a set of principles, which loosely defines what organization is like in terms of health and safety. Creating a culture of safety means that the employees are constantly aware of hazards in the workplace, including the ones that they create themselves. It becomes second nature to the employees to take steps to improve safety. The responsibility is on everyone, not just the management. However, this is a long Process to get to that point (Dilley and Kleiner, 2018). Safety and health culture within a company is closely linked to the workforce's attitudes in respect to safety. They share the company's risk, accidents and incidents. The role of management and the involvement of all employees as important key players in safety and health culture are important to cultivate the positive beliefs, practices, norms and attitudes among all in the company. Glendon and McKenna 2011) also identified four critical indicators of safety culture. They are:

- I. Effective communication, which leads to commonly understood goals and means to achieve them at all level
- II. Good organizational learning, whereby organizations are able to identify and respond appropriately to changes.
- III. Organizational focus upon health and safety, that is, how much time and attention is essentially paid to health and safety.
- IV. External factors, including the financial health of the organization, the prevailing economic climate and impact of regulation and how well these are managed.

2.8.1. Safety Culture in Construction Industry

For a long time, the construction industry has been labeled with poor occupational safety and health culture. Efforts to improve occupational safety and health performance will not be effective until the occupational safety and health culture is improved (Misnan and Mohammed, 2007b). As a result, there is a need for a major paradigm shift regarding attitudes on occupational safety and health in construction sites. Widening the understanding of behavior increases insights into possible targets for improvements, for example better planning, more effective job design, or more comfortable personal protection. The influence human behavior on safety performance is

enormous. Therefore, this root problem must be solved effectively. The elements that influence the development of safety culture are (Misnan and Mohammed, 2007d; Misnan et al., 2008):

- I. Leadership - Improved safety culture can be achieved through close cooperation between leaders and the workers;
- II. Involvement - An important indicator to a positive safety culture in an organization is the involvement of the leaders and the workers in safety management.
- III. Recognition systems and acknowledgement - The recognition received would only be effective if it is meaningful and given as an acknowledgement to the work produced.;
- IV. Training - Training has always been a high priority, and the effectiveness of safety training has been proven to increase knowledge and awareness of workers on safe working culture;
- V. Communication - Communication involves all aspects of work in an organization and is able to connect all entities at all levels on safety aspects;
- VI. Teamwork - Team members are involved in conveying their opinions on works that they do and strategies to solve problems;
- VII. Motivation - Leaders that consider the ideas of the workers and sensitive to their needs will be able to elevate the motivation level of the workers to produce work of better quality;
- VIII. Healthy and Safety Committee - Functions to improve certain aspect of the work environment and develop safety values in everyday work practice, and establishing safety as the main goal to be achieved by the committee;
- IX. Work environment - The work environment should conform to the standard of safety and health at all times;
- X. Policy and safety planning - Policy pertains to the principle that supports behavior towards safety, as in making safety policies as a marketing advantage for the organization.

The development of safety culture as depicted in the framework views that both individual and groups are responsible for developing the total value of safety culture which in turn supports the organizational culture. Everyone must play a part in the Organizational culture to ensure correct understanding of the importance of safety and changing the attitude and behavior through the intrinsic and extrinsic element of the culture. Organizational culture has been transmitted to all organization activities which involved intrinsic and extrinsic elements of the organization. This has in turn be transmitted to every member in the organization. All intrinsic and extrinsic elements of culture will affect the organization culture throughout the development of safety culture.

Consequently, it makes the concept of safety culture more acceptable to wider attention. It does not mean that the safety system, nowadays, is not relevant for practices, but this system will function well when the organization has developed safety culture (Misnan and Mohammed, 2007d; Misnan et al., 2008). The reason could be seen from different respective but the barriers in implementing the safety system he organization develops a strong safety culture.

2.9. Causes Accidents in Construction

Various circumstances cause accidents in construction. Negligence, unsafe work conditions, failure to provide adequate safety equipment, improper use of equipment or tools, and lack of safety precautions are common examples of what causes accidents in construction. Construction work can be an unsafe and dangerous industry. For people who work in construction, the likelihood of getting injured is higher than in other professions. As reported by the **Occupational Safety & Health Administration (OSHA)**, in 2018, 21.1 percent of work fatalities in the private sector occurred because of construction accidents.

Types of Accidents Often Seen in Construction

In construction, there are several ways workers can be injured. However, among the many dangers and hazards in the field, the majority of injuries and fatalities fall into one of the “Fatal Four,” as stated by OSHA. The “Fatal Four” are notorious because they involve a variety of factors that cause accidents in construction.

These types of accidents include:

Falls

Falls can be dangerous in construction, as they cause hundreds of deaths every year. These kinds of accidents can occur when a worker is not provided with the proper safety equipment such as harnesses or lifelines or are provided with defective or broken ladders or scaffolds. These accidents can also happen in stairwells if there are dangerous conditions such as debris present or there are no handrails present.

With great heights, anyone who falls is likely to experience severe injuries or even death. In construction-related fall accidents that result in death, the death might have occurred because there was little to no protection to prevent the fall.

Struck by Object Accidents

Workers being struck by falling objects are one of the most common and deadly types of accidents on construction sites. These accidents involve workers being hit by objects, which can cause tremendous injury due to the force and impact. It has been determined that many of these accidents

result from a lack of training in the job, failure to provide adequate safety equipment, and improper use of equipment and machinery.

Caught in or Between Equipment

These types of accidents occur when construction workers are caught between two pieces of heavy equipment or between the equipment and an unmovable object, such as a wall. They can result in dangerous situations and severe injuries. Some types of accidents in this regard include cave-ins, collapses, machinery rollovers, or getting caught in the moving parts of machinery. Body parts can become caught, crushed, compressed, or pinched.

Electrocutions

Workers can be severely injured and killed due to accidents involving electricity. Electrocution happens when a person, a piece of equipment, or a tool interacts with power lines or another electrical source and becomes electrified. These accidents can cause severe injury. In many cases, the individual who got harmed was unaware of the danger. The energized power sources might have been conducting electricity from above ground or underground power lines, creating a hazard that was not apparent until the damage was done.

Other common types of accidents in construction include:

- Scaffolding accidents
- Ladder accidents
- Falling object accidents
- Trip and fall accidents
- Slip and fall accidents
- Vehicle accidents
- Power tool and heavy machinery accidents

2.10. Global Scenario of Health and Safety in the Construction Industry

OSH risks are always critical concerns for both practitioners and researchers all over the world Phoya, (2012). At least 60,000 fatal accidents happen in a year on construction sites around the world, which is one every ten minutes. One of six fatal work related accidents happen in construction sites ILO (2005). In the same vein, OSH statistics presented by different researchers and organizations indicated that, in most of the countries, the injury and fatality rate in construction projects is very high in comparison with other industrial sectors. Farooqui *et al* (2008) stated that; in the developed countries, though there is advancement in technology which has contributed positively to the productivity of the construction industry, it has created a more challenging and unsafe work environment. Construction accidents and the associated damages are

causes to the employees, property, equipment and morale which have Performance Study of OSH Management in Building Construction Sites of Bahir Dar City MSc Thesis by Yoseph Zelalem generated negative effects on the industry profitability in large and to some extent on its productivity. In contrast, developing countries have limitations to recent technological improvements. Despite the lack of recent technology, developing countries could not have safer construction sites, because a larger share of construction work being performed by human resources has led to increased number of site accidents. In Great Britain, over the period 2009/10 to 2011/12 alone, 74,000 people whose current or most recent job in the last year was in construction, had suffered from an illness which was caused or made worse by this job SHE (2013). In the United States of America, where nearly 6.5 million people work at about 252,000 construction sites all over the nation each day, the fatal injury rate for the construction industry is higher than the national average of all industries (U.S. Department of Labor (2005). Construction is not seen as decent work in most of the countries of the world. In countries where workers have alternatives, construction is not attractive for new entrants. Lack of appropriate training and skill formation for the workers contributes much to the unattractiveness of a career in construction. Hence, difficulties are experienced in recruiting young and educated workers both in developed and developing countries ILO (2001). The failure of the industry to attract workers and invest in training them has serious effects for the productivity and quality of construction products. The contractors are also facing challenges to satisfy the needs of their clients. The issues of health and safety are therefore, a concern to both employers and workers. Shortages of skilled labor can be confronted by replacing labor by machines, through prefabrication or mechanization, but it in turn affects the potential of the construction industry to generate employment opportunities.

2.11. Construction Safety and Health in Ethiopian Context

Construction in developing countries, like Ethiopia, is more labor intensive than that in the developed world, many of them are unskilled. Without a significant difference between large and small contractors found in Ethiopia, almost all of them do not have a safety policy. For the majority of contractors, however, maximizing profit is the prime concern. Unsafe conditions exist on many sites, both large and small, and laborers are subjected to numerous hazards. On many sites, no training programs for the staff and workers exist; therefore, no orientation for new staff or workers is conducted, hazards are not pointed out, and no safety meetings are held. Employees are required to learn from their own mistakes or experience. In addition, lack of medical facilities, shanty housing, and substandard sanitation. Workers undertake a risk while at work and the following problem areas are common:

1. While excavating in deep trenches (with no proper shoring or bracing)
2. Concreting is done mainly by laborers, and cements burns due to the unavailability of Protective gloves and boots are common.
3. Workers fall from heights due to weak scaffolding and the unavailability of safety bite
4. Workers sustain injuries on the head, fingers, eyes, feet, and face due to absence of Personal protection equipment. Seifedin Sermolo January (2014)

Condition of work of construction workers in Ethiopia is found to be poor. This is mainly due to the poor employment relationships and lack of safety measures. Safety measures are nonexistent in the construction sites; therefore, workers are exposed to different kinds of work related hazards. Most of the injured workers did not receive compensation because of triangular employment arrangements between the building contractors, sub-contractors and sub-contractors which obscure lines of liability Limenih (2010).

Injuries generally are unreported; however, if necessary, a laborer might receive first aid or preliminary medical care. In most cases, specialized medical treatment or compensation is Unavailable. Workers themselves consider accidents as due to their own negligence, and accept that construction is a dangerous occupation. Nevertheless, major accidents involving the death of a worker may be reported due to the financial expenses and litigation that could be involved. Some informal assessments identified a few major reasons for safety non-performance which included: lack of development of construction sector in the shape of mechanization and industrialization; lack of professional construction management practices, inadequate safety provisions laid by the existing regulatory environment which has failed to establish safety as a major industry objective, insufficient and incentive-less insurance mechanisms which have failed to establish safety as a business survival issue, and unfavorable business environment which has led to adversarial business relationships among stakeholders resulting in controversies, conflicts, claims and litigation and hence diverting the focus away from issues like safety Farooqui et al.(2007). . The researcher was tried to get data from Addis Ababa University, Ministry of labour and Social Affairs and Ministry of Works and Urban Development concerning health and safety in Ethiopian construction industry, but the researcher found nothing except health and safety manual prepared by Ministry of Labour and Social Affairs.

CHAPTER THREE

RESEARCH METHODOLOGY

In this chapter, the research design and methodology followed to achieve the ultimate goal of the research which is specified at the beginning will be discussed. In addition; data and information sources, research design, sample size, and method of analysis are presented. It seeks to develop a clear understanding of how occupational safety and health are being managed at building construction sites. It also explores the kind of risk factors that are associated with the occurrence of occupational accidents to workers in building construction sites. The study aims to paint a picture of the performance of OSH management and the factors influencing it.

3.1. Study Area

The research was carried out in Agaro town, found in southwestern Ethiopia. Located in the Jimma Zone of the Oromia Region, it sits at a latitude and longitude of 7°51' N and 36°35' E and an elevation of 1560 meters above sea level. The research will be concerned with the assessment of occupational safety and health management in building construction sites: a case study of Agaro town.

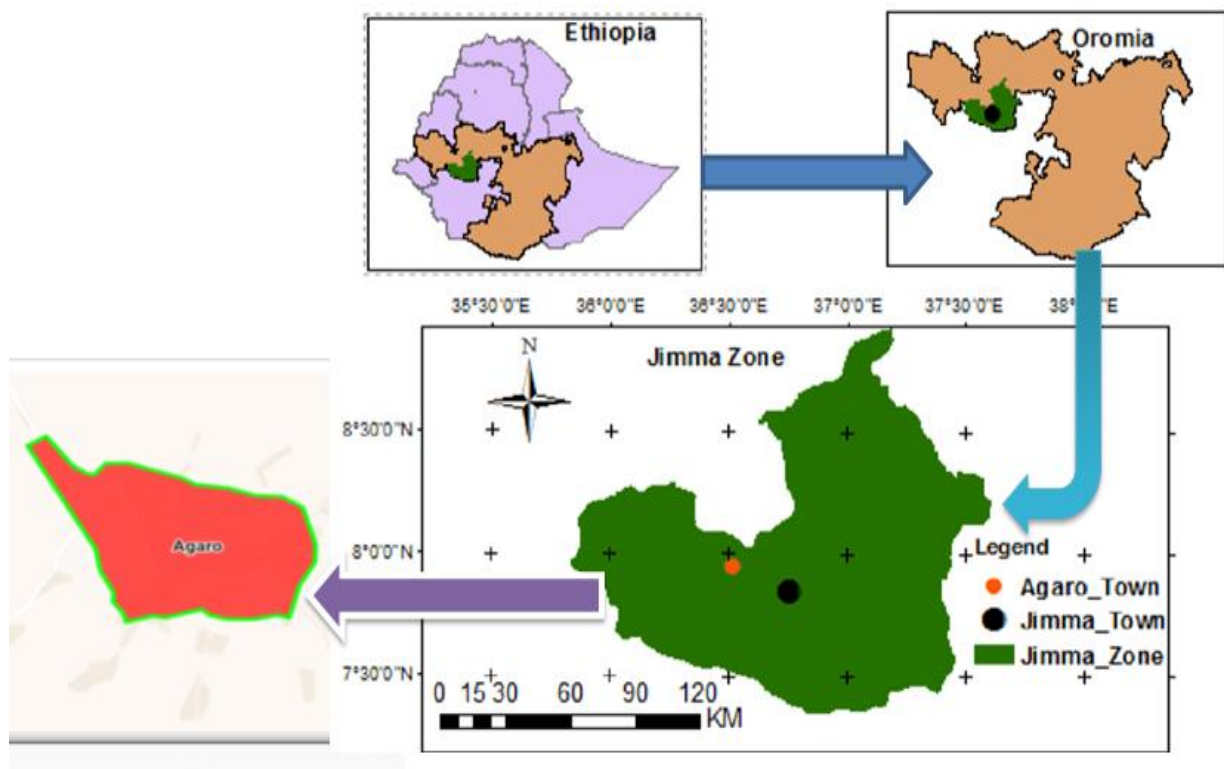


FIGURE 3.1 RESEARCH LOCATION MAP

3.2. Study Design

This study preferred and employed the descriptive research method, which qualifies and makes use of qualitative data since the method enables it to easily be an instrument to analyze, tabulate, and describe the context. The study adopted a mixed research approach, both qualitative and quantitative. According to Mark (2009), mixing qualitative and quantitative approaches gives the potential to cover each method's weaknesses with strengths from the other method. The prepared questionnaires are self-administered by the respondents to collect the relevant data. Additionally, site visits and direct observation are also mechanisms to identify tasks, accidents, the working environment, and other additional information. While describing the data collected, use visual aids such as graphs and charts to make the reader understand the data.

3.3. Study Variables

3.3.1. Dependent variable

- Occupational Safety and Health Management in Building Construction Site

3.3.2 Independent variables

- Practices of OSH Management
- Cause of occupational accident
- Damages and accident

3.4 .Population and Sampling Method

3.4.1 Population

The population size of this study comprises 45 employees of the company that engaged in building construction projects (PM, safety officer, construction engineers, site engineer, Forman, supervisor, and others) with related engineering educational backgrounds.

3.4.2. Sampling Techniques

Since there are eleven building construction projects in the area where the study is conducted, nine of them are under construction, and two of them have no working activities. Focused on accordingly that go with the research idea and selected nine (9) under-construction projects from the eleven. In terms of sampling, the researcher used purposive sampling techniques. This sampling method was chosen because it allowed the researcher to focus on a limited number of informants that were selected for interview and discussion purposefully from nine selected under-construction projects to get the required information to carry out the study and get optimal insight. The survey questionnaire distributed 45 questionnaires and 7 related interview papers to those parties, like contractors, consultants, clients, and regulatory bodies.

3.5. Sources of Data

The study used both primary and secondary data and obtained sufficient and relevant data that answered the research questions and achieved the research objectives. Both quantitative and qualitative data were collected from different primary and secondary sources. The primary data sources were questionnaires and the researcher's observations when visiting sites and offices. The sources of secondary data were the unpublished documents of the company (from the company's document review) and published documents such as related books, research papers, journal articles, and reports of projects that are both in progress and already completed from recognized websites for references, and thesis documents.

3.6. Data Collection Procedure

The survey method was chosen by the researcher because of its popularity as a means of gathering data cost-effectively. Therefore, semi-structured interviews and questionnaires were administered as survey instruments to the project managers, owners, and consultants.

The main tools used to gather the primary data from the primary sources mainly include questionnaires, interview guides, and the experiences of the researcher. Regarding the questionnaire, the preliminary questionnaire, which consisted of a few simple questions about their health and safety awareness and practice, was collected using closed-ended questions.

To collect relevant data for this study, the above-mentioned major instruments were applied. Accordingly, the researcher has chosen to analyze the data, assuming that this is cost- and time-effective since similar questions were distributed to each respondent.

Secondly, interviews are considered a preferred instrument in cases where respondents misunderstand relevant questionnaires. The first phase of data collection is the establishment of the study framework, which includes the survey and secondary data. The survey framework includes the identification of all relevant documentation and the formulation of questions for the interviews and questionnaires. The second phase pilot test was done on the questioners by distributing questions to verify the clarity and include any comments before distributing to the total target.

The final version of the questionnaire is distributed to respondents and finally collects the data. Likewise, interviews were used to gather more in-depth qualitative data from the key informant of the project.

3.7. Validity and Reliability

3.7.1. Validity

Validity refers to the ability of the instrument to measure what it is designed to measure. It is the accuracy and meaningfulness of inferences based on research results that matter. The question of validity, therefore, is whether an instrument is on target in measuring what is expected to be measured. A pilot study will be carried out before distributing the questionnaire. The process involves giving the questionnaire to a number of respondents who know that area to give comments on it.

3.7.2. Reliability

Reliability is the extent to which the same finding will be obtained if the research is repeated at another time by another researcher. If the same finding can be obtained again, the instrument is consistent or reliable. Cronbach's alpha instrument is one of the most commonly used for accepted measures of reliability. Cronbach's alpha is a coefficient represented as a number between 0 and 1. The internal consistency reliability is higher if Cronbach's alpha is closer to 1. The minimum level for reliability when using Cronbach's alpha coefficient is 0.7, and any value below this indicates that the variables are inconsistent and unreliable (Fellows & Liu, 2008).

Table 3.1 Cronbach's alpha and internal consistency (Prabhala, 2011)

Item No	Cronbach's alpha	Internal consistency
1	$\alpha \geq 0.9$	Excellent
2	$0.9 > \alpha \geq 0.8$	Good
3	$0.8 > \alpha \geq 0.7$	Acceptable
4	$0.7 > \alpha \geq 0.6$	Questionable
5	$0.6 > \alpha \geq 0.5$	Poor
6	$0.5 > \alpha$	Not acceptable

In this study, this coefficient was used to measure the reliability of the questionnaire. As shown in the table above, the alpha coefficient was calculated for each scaled group factors and the entire questionnaire. As the result indicated the result of each group were greater than 0.70, which is the minimum level for reliability. Therefore, it can be concluded that the questionnaire survey is reliable and consistent. After obtaining these values, the researcher proceeded to the data analysis step.

3.8. Data processing and Analysis

This research used two types of data analysis methods to analyze the sample data. Descriptive statistical analysis was used to analyze the means of the data collected through the closed-ended questions of the questionnaire. The data collected using semi-structured interviews was analyzed using qualitative data analysis techniques together with the results of the descriptive statistics to supplement one by the other. Finally, descriptive statistics is the major technique of statistical analysis through the use of Microsoft Excel spreadsheets, and SPSS software will be used to analyze and present the data obtained from the questionnaires in a tabular form as follows:

- Frequencies and percentages.
- Correlation coefficients to measure the validity of the questionnaire.

1. The relative importance index (Sample data analysis).

Relative importance index is used to show the importance of each factor that causes of work-related injuries by weighting them and summing up the scores that each person gave to the issues. After calculating the RII value, the factors were ranked based on their respective values.

The following formula was used to calculate the RII according to L. Muhwezi et.al, (2014):

Relative importance index = $RII = \frac{\sum W}{(A * N)}$

$$(0 \leq RII \leq 1)$$

Where:

RII – Relative Importance Index

W – The weight given to each factor

A – The highest weight (i.e., 5 in this case), and;

N – The total number of respondents.

From the result, the researcher analyzed all assessment of occupational safety and health management for building construction site.

3.9. Ethical considerations

In this research work, ethical considerations of confidentiality and privacy of all participants were addressed. The responsible persons from each firm were requested to participate voluntarily. The assigned respondents by the firm were well informed as to the purpose of the study and consented verbally. The respondents were made free to respond to the questionnaire to ensure the respect, dignity and freedom of each individual participating and to assure confidentiality in the study. Moreover, participants were aware that the information about their firm they provide would be kept confidential and would not be disclosed to anyone else including anyone in the company. The data gathered from each firm was interpreted as it is without prefabrication, falsification or modification. The research work was carefully and critically examined to avoid negligence and errors. The name of respondents is not stated in any of the study parts and their responses were confidential.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Results

This chapter of the study presents result and discusses that the data collected to answer the research questions derived from objectives of the study set to achieve. The result of the study was discussed by triangulating of the data collected through the questionnaire, interview and document review results. The process of data imputed analysis was into the Statistical Package for Social Scientists version 20 (SPSS) for descriptive statistical analysis.

The descriptive analysis and statistical calculation was done in order to interpret raw data into useful information. Descriptive data was analyzed using frequencies and percentages to find the views of the respondents on assessment of occupational safety and health management in building construction projects. The result of the analysis was presented in tables, graph and charts.

Moreover, this chapter elaborates on the profile of the respondents and the surveyed projects, the general background of the projects. The study further assessed the current practice of occupational safety and health management and identify the main cause of work -related accident with respective to OSH management process in the construction of public building projects. The last section also determined the different types of damage and accidents occurred related to work in building construction projects. Generally those all analysis and interpretation of the data results which helps to reach to conclusion and forward recommendation towards occupational health and safety management assessments for building construction projects.

4.2. Response rate

Total of 45 questionnaires were distributed to PM, office engineers, construction engineer, site engineers, Forman, safety officer, supervisor and others supportive professional staff that were involved in the project management team of construction building project in Jimma zone, Agaro town. The returned questionnaires and interviews from respondents from the 45 questionnaires, about 41 questionnaires were filled out and returned representing 91.11% response rate. Despite several follow ups 8.11% failed to respond. A response rate of 50% was deemed adequate for analysis and reporting, response rate of 60% was good and a response rate of 70% and over was considered very good (Mugenda & Mugenda,2003). Thus, the study returned a very good response rate at 91.11% and was considered adequate for analysis and reporting. Table 4.1 below shows the percentage of both distributed and received questionnaires:

Table 4-1 Questionnaires and related Interview

Questionnaires and related Interview		
Questionnaires	Respondents	Percentage (%)
Returned	41	91.11
Un-returned	4	8.89
Total	45	100

4.3. General Information of Respondents

4.3.1 .Positions of Respondents

The below Figure 4.2 are it indicated the response rates of respondents among the groups of contracting companies, these rates are Project Manager 9(22.0%), Office Engineer 4(9.80%), Construction Engineer 2(4.9%), Site Engineer, 9(22.0%), Forman 9(22.0%), Safety Officer 1(2.4%), Supervisor 4(9.8%) and other professions 3(7.3%). The result indicates that show us the majority frequency of the respondent positions were project manager ,Site Engineer and construction Forman, this indication was shown by those who more has an approach to the details of the study information. But in contrary that: the position of the safety office is at most none in all construction sites, This shows, almost no safety and health officer were present on the site during the questioners were distributed, which indicates that the majority of the project do not care about what happens to workers because of their work, except for daily work benefit. Therefore, the respondents are not likely to have reasonable knowledge of the situation of OHS in the construction sector.

Table 4-2 Positions of Respondents

Positions of respondents		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Project Manager	9	22.0	22.0	22.0
	Office Engineer	4	9.8	9.8	31.7
	Construction Engineer	2	4.9	4.9	36.6
	Site Engineer	9	22.0	22.0	58.5
	Forman	9	22.0	22.0	80.5
	Safety Officer	1	2.4	2.4	82.9
	Supervisor	4	9.8	9.8	92.7
	Others	3	7.3	7.3	100.00
	Total	41	100.00	100.00	

4.3.2. Experience of Respondents

From 8(19.51%) of the respondents have an experience of fifteen and above years in the construction industry,9(21.95%) have 11 up to 15 Years of experience,11(26.83%) have 6 up to 10 years of experience and 13(31.71%) have 1 up to 5years of experience in the construction industry and implies that respondents involve in the study have significant work experience in the area, which implies that the information forwarded could be realistic as required in the study.

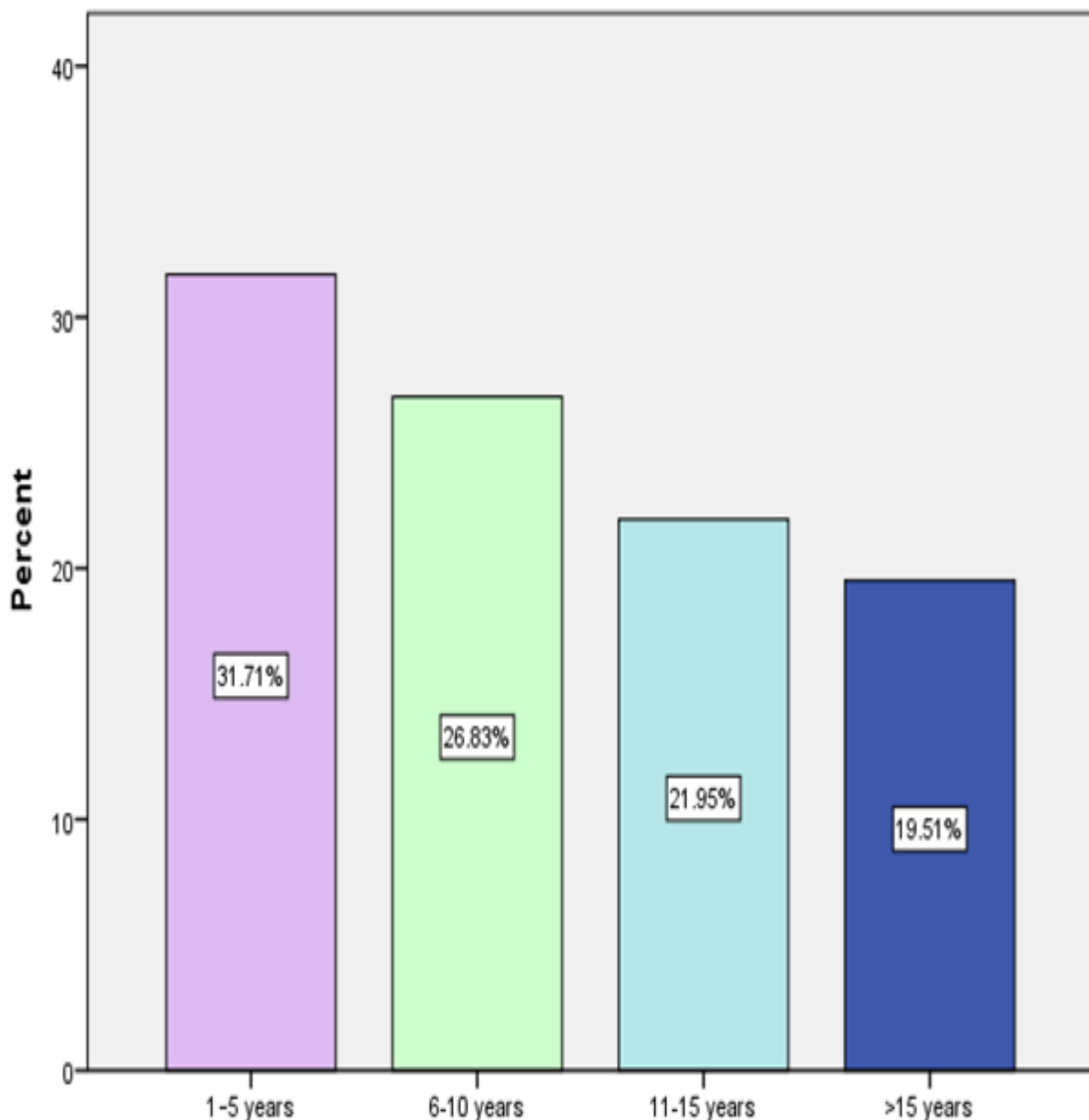


FIGURE 4.1 Experiences of Respondents

4.3.3. Educational Qualification

As shown in Table 4.3 below, 20(48.8%) of the respondents were Bachelor’s Degree holders, 5(12.2%) were Master’s Degree holders, 9(22.0%) were Normal/Advanced Diploma holders, 7(17.1%) were different TVT level holders. It can be seen that the construction industry has space for every education level. Since the presence of more in number professionals with Master’s Degrees and above they contribute the knowledge of OHS well here and they could share their own experiences so that workers would not be harmed at work.

Table 4-3 Educational Qualification of Respondents

Educational qualification		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	TVET Level	7	17.1	17.1	17.1
	Diploma (Normal/Advance	9	22.0	22.0	39.0
	Bachelor’s Degree	20	48.8	48.8	87.8
	Master’s Degree	5	12.2	12.2	100
	Total	41	100.00	100.00	

4.4. Content validity of the questionnaire test

Content validity test was conducted the respondents to consulting by the division of three section within their sub topics to estimate the content of the Questionnaires. In general, they discussed that the questionnaire is acceptable to achieve the goals of the study. Just as shown in Table 4.4 for the questionnaire groups, the p-values were less than 0.05 or 0.01 and for this reason; the correlation coefficients of all the groups were significant at $\alpha = 0.01$ or $\alpha = 0.05$. It could be said that the groups were consistent and valid to quantify. This helped achieving the main aim of the study.

Table 4-4 P-Value test

Group Division	Description	No. of items	P- value
Section-B	Asses current practices of OSH management		
A	Related to Training	6	0.001
B	Related to Awareness	5	0.024
C	Related to Communication	4	0.012
D	Related to company safety culture	11	0.029
Section-C	Identify the main causes of work-related accident		
A	Related to Falling from height	6	0.001
B	Related to Collapse	5	0.000
C	Related to Human element	7	0.008
D	Related to Management	5	0.038
E	Related to Electric Hazards	5	0.000
F	Related to Unsafe working methods	5	0.007
Section-D	Determined type of Damage & accident occurs		
A	Height-Related Accidents	3	0.00
B	Dismantling and Demolition Related Accidents	3	0.012
C	Trip and Falls/ Slip and Falls Related Accidents	3	0.000
D	Fires & Explosions Related Accidents	2	0.000
E	Equipment Related Accidents	3	0.000

4.5. Reliability of the research

4.5.1 Cronbach's alpha coefficient

This procedure was used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. Cronbach's alpha was a measure of internal consistency that was, how closely related a set of items are as a group. A "high" value of alpha was often used as evidence that the items measure an underlying (or latent) construct (UCLA, 2011).

Table 4-5 Results of reliability analysis

Group Division	Description	Mean	Std. Deviation	No. of items	Cronbach's Alpha coefficient
Section-B	Asses current practices of OSH management				
A	Related to Training	14.56	5.848	6	0.890
B	Related to Awareness	12.20	4.797	5	0.824
C	Relate to Communication	9.71	3.523	4	0.744
D	Related to company safety culture	26.12	10.065	11	0.926
Section-C	Identify the main causes of work-related accident				
A	Related to Falling from height	18.32	4.693	6	0.710
B	Related to Collapse	12.63	5.549	5	0.949
C	Related to Human element	19.59	6.041	7	0.816
D	Related to Management	15.95	4.695	5	0.826
E	Related to Electric Hazards	13.51	7.423	5	0.972
F	Related to Unsafe working methods	13.85	5.107	5	0.818
Section-D	Determine the type of Damage and accident occurs				
A	Height-Related Accidents	9.29	3.172	3	0.816
B	Dismantling and Demolition Related Accidents	9.44	2.846	3	0.724
C	Trip and Falls/ Slip and Falls Related Accidents	7.17	2.949	3	0.813
D	Fires & Explosions Related Accidents	4.83	2.448	2	0.906
E	Equipment Related Accidents	7.80	3.341	3	0.904

As showed above in Table 4.6 the Cronbach's coefficient alpha was calculated for the eleven groups of assessments of occupational safety and health management of building construction projects are the results were in the range from 0.710 to 0.972 which were between $0.9 \supset \alpha \supset 0.7$. This range was considered high and closed to the full value, which was +1.0. These results made sure the reliability of the questionnaire

4.6. Assessed current practices of OSH management in building construction.

This section of the questionnaire was designed to obtain data about the work-related practices of OSH in building construction projects. In order to obtain that, a list of assessing work-related practices of training were identified from literature review and modified based on the feedbacks collected from the pilot study. After that, a list of 21 work-related practices of occupational safety and health management training were selected and grouped in three groups as practice of worker related to training, communication with safety officer and company safety culture working practices.

The rank of the three categories and each workers related to training were analyzed using descriptive statistics and ranked using Relative Importance Index (RII) value. According to the obtained results the categories were ranked as follows.

4.6.1. Practices of workers related to Training

Safety training for construction employer is a key factor to decrease the level of the injury before reaching to the maximum level hence giving awareness for each and individual about safety and health issues, how can protect themselves from hazards and how to use personal protective equipment effectively and so on. As shown on Table 4.7 relativity importance index (RII) is calculated for each category of major practices of work-related training were agreed by the respondents. The 1st ranked as attained by training on proper use of scaffoldings, going lift load capacity operation (0.537), the 2nd ranked practices of worker training was scored by training on safety use work place tools, machinery, and equipment (0.493) and the 3rd ranked practices of worker training scored by training on personal protective equipment (PPE) (0.488) .From the collected data the result shows us the majority of them doesn't take any safety training and doesn't know in this time .Due to lack of essential training a lot of people suffered to occupational safety and health hazards related issue.

Table 4-6 Asses current Practices of workers related to training

Item No	Asses current practices of workers related to Training	RII= $\Sigma W / (A * N)$	Ranks
1	Training of new staff on safety practices on deep excavation	0.439	6
2	Training on proper use of scaffoldings, going lift load capacity operation.	0.537	1
3	Training on safety use work place tools, machinery, and equipment.	0.493	2
4	Training on safety fire, electric shock and emergency procedures.	0.473	5
5	Training on personal protective equipment (PPE).	0.488	3
6	Training on going lift operation welfare facilities	0.483	4

4.6.2. Practices of safety officer related to workers Communication

The best safety officer procedures are worthless unless all workers at all levels within the company communication effectively about potential hazards and work as a team to remove them. As an effective leader you are aware that workers have a distinct advantage in highlighting work hazards and providing essential and valuable input in to effectual safety procedures and policies due to their knowledge of the work place and every day practices .it is important to maintain communication between officer, advisors, manager and workers around occupational safety and health. This creates a powerful communication from everyone, on all levels, to implement safety decision and practices, in addition to developing trust and cooperation within the company.

Based on the results obtained from survey on table 4.9, respondents 1st ranked effective use of pictures and sign on safety practices (0.502), the 2nd ranked in this category was holding regular meeting on safety practices (0.493) and the 3rd ranked was availability of safety communication gadgets on site (0.483). This result indicated that during construction basically workers fail and expose to accident due to improper, Effective use of pictures and sign on safety communication practices, so to control the accidents it's good to develop and create a good communication system for the workers regarding to safety management in the workplace.

Table 4-7 Asses current Practices of safety officer related to workers Communication.

Item No	Asses current practices of safety officer related to workers Communication	RII= $\Sigma W / (A * N)$	Ranks
1	Availability of safety communication gadgets on site.	0.483	3
2	Recording and reporting of safety practices.	0.463	4
3	Effective use of pictures and sign on safety practices	0.502	1
4	Holding regular meeting on safety practices.	0.493	2

4.6.3. Practices of workers related to company safety culture

A safety culture is an organizational culture that places a high level of importance on safety beliefs, values and attitudes and these are shared by the majority of people within the company or workplace. It can be characterized as ‘the way we do things around here’. A positive safety culture can result in improved workplace health and safety (WHS) and organizational performance. For a long time, the construction industry has been labeled with poor Occupational safety and health culture. Efforts to improve occupational safety and health performance will not be effective until the occupational safety and health culture is improved. As a result, there is a need for a major paradigm shift regarding attitudes on occupational safety and health in construction sites. Widening the understanding of behavior increases insights into possible targets for improvements, for example better planning, more effective job design, or more comfortable personal protection. The influence human behavior on safety performance is enormous. Therefore, this root problem must be solved effectively.

Based on the results obtained from survey the workers-related company safety cultures, respondents ranked the company considers occupational safety and health during planning and execution of projects (0.498), making health and safety clearance/certificate a requirement (0.494) and Planning on issues relating to health and safety (0.493) from 1st up to 3rd respectively. This indicated the practices of occupational safety and health management of the company as a culture has no implement plan to care about the workers safety and health.

Generally related to the OSH standard the practices of OSH management in building construction provide information from the center for diseases control (CDC) for job safety and health. They include safety and prevention programs, total worker health, a list of workplace safety and health topics, training, and a workplace development section.

- National institute for occupational safety and health through developing a National Initiative on Prevention through Design (PTD) to minimize occupational safety hazards and risks by addressing health and safety needs early on in the project design and planning stages.
- Total worker health
- Workplace safety and health.

The sectors control the practice through providing information about workplace safety, climates and cultures. It includes developing of checklist of what leadership and supervisors can do to strengthen safety culture and climate.

Table 4-8 Asses current Practices of safety workers related to company safety culture

Item No	Asses current practices of workers related to company safety culture	RII= $\Sigma W/(A * N)$	Ranks
1	Provision of First aid and welfare facilities	0.488	4
2	Planning on issues relating to health and safety	0.493	3
3	Setting safety guidelines into the body of conditions of contract	0.473	8
4	Establishment of health and safety department	0.487	5
5	Proper waste management on site.	0.454	9
6	Use of safety net where the height of building exceeds two story	0.439	11
7	Construction risk insurance for the project' staff and site operatives	0.455	10
8	Making health and safety clearance/ certificate a requirement.	0.494	2
9	The company has a function/office that manage occupational safety and health issues	0.474	7
10	The frequency of accidents in the project sites is very low	0.486	6
11	The company considers occupational safety and health during planning and execution of projects	0.498	1

4.7. Main causes of work-related accident with related to OSH management

Accidents can happen any time obviously they're not intentional, and there are infinite possibilities for something to go wrong. You can avoid many accidents, however, by taking certain precautions to ensure that the most likely mishaps will not occur.

4.7.1. Causes of work-related accident with related to falling from height

Most literature studies confirm this factor as a leading cause of work-related injuries. For instance, Lucy et al. (2016) ranked this factor 1st cause of work-related injury. The reason behind this problem is that there is no horizontal protection made to high rise building. Similarly, Mohd Nasrun et al. (2016) ranked falling from height at construction sites as first by 22%. The study was based on statistics of the number of fatality and disability due to falling from height in Malaysia construction sites. Six work-related causes were selected under the category of falling from height. Respondents were asked to indicate their level of agreement on the listed work-related injury causing factors. Based on the received responses the factors were ranked as indicated in the table below are results obtained from survey of respondents on causes of work-related under falling from height accident factor are “*Erection and dismantle of scaffoldings by unskilled or inexperienced labor*” (0.741), “*Overload scaffoldings*” (0.707) and “*Unprotected openings and fragile roofs* (0.610) ranked as 1st, 2nd and 3rd respectively. As the result indicated that the same to worldwide cause work-related under falling from height accident factor occur at Agaro town building construction.

Table 4-9. Causes related to Falling from height

Item No	Causes related to Falling from height	RII= $\Sigma W / (A * N)$	Ranks
1	Unprotected openings and fragile roofs	0.610	3
2	Insufficient and unsuitable scaffoldings	0.551	4
3	Overbalanced ladder	0.541	5
4	Missing or broken rungs of ladder	0.512	6
5	Overload scaffoldings	0.707	2
6	Erection and dismantle of scaffoldings by unskilled or un experienced labor	0.741	1

4.7.2. Causes of safety problem related to Human element

Some of the studies reviewed indicated that the human elements or factor such as the negligence of the workers in doing their works will also lead to the work-related injuries. The results of Abdul Hamid et al. (2008) ranked human element as the third major cause for work-related injury. Whereas, Shakil et al. (2018) determined human elements as the fourth highest contributor to the cause of work-related injury among other fourteen group of causes.

Seven work-related injuries were selected under the human element category. Respondents were asked to indicate their level of agreement on the listed work-related injury causing factors. Based on the received responses the factors were ranked as indicated in the table below. Based on the results obtained from survey, respondents ranked 1st causes of work-related under human elements safety problem accident factor are “*Lack of training on key issues pertaining health and safety consciousness*” (0.644). The causes of work-related accident factor from human elements ranked 2nd in this category was “*Ineffective communication between safety personnel and workers*” (0.610) and the causes of work-related human safety problems element factor ranked 3rd by the respondents in the work-related under human elements safety category was “*Workers’ negligence*” (0.595) from overall causes factors.

Table 4-10 Causes of safety problem related to Human element

Item No	Causes of safety problem related to Human element	$R_{II} = \Sigma W / (A * N)$	Rank
1	Inappropriate use of personal protective equipment's	0.551	4
2	Ineffective communication between safety personnel and workers	0.610	2
3	Workers' negligence	0.595	3
4	Lack of training on key issues pertaining health and safety consciousness	0.644	1
5	Unsafe practices of worker due to religious assertions	0.546	5
6	Horseplay in workplace	0.498	7
7	Perception that safety wears is not comfortable to work with.	0.512	6

4.7.3. Causes of safety difficulty related to Management

Five work-related causes of accident were selected under the category of management. Respondents were asked to indicate their level of agreement on the listed work-related accident causing factors. Based on the received responses the factors were ranked as indicated in the table 4.9 below.

Studies which are carried out in this area indicated the causes of construction accidents on average are mainly attributed to the management by 29.2% such as poor programs, poor safety policies and lack of safety education programs (Abdul Hamid et al. 2008). Abdul Hamid et al. (2008) ranked causes related to management as the 1st major cause for work-related injury. Whereas, Shakil et al. (2018) determined management related causes as the 12th highest contributor to the cause of work-related injury among other fourteen group of causes. Based on the results obtained from survey, respondents ranked 1st causing of work-related accident under safety difficulty to management factor are “*Engaging incompetent safety personnel*” (0.678) .The casing of work-related safety difficulty accident factor ranked 2nd in this category was “*Poor safety programs and policies*” (0.654) and the 3rd ranked causing of work-related safety difficulty accident factor by the respondents in the failing from management category was “*Failed to provide safety resources*” (0.610) from causes of safety difficulty to managements

Table 4-11 Causes of safety difficulty related to Management

Item No	Causes of safety difficulty related to Management	RII= $\Sigma W / (A * N)$	Ranks
1	Poor safety programs and policies	0.654	2
2	Unclear employee accountability and responsibility for workplace health and safety	0.649	4
3	Failed to provide safety resources	0.610	3
4	Lack of providing safety education training for workers	0.600	5
5	Engaging incompetent safety personnel	0.678	1

4.7.4. Causes related to Unsafe working methods

From the selected five causes of work-related injury were under the category of unsafe working methods are respondents were asked to indicate their level of agreement on the listed causing work-related factors. Based on the received responses the factors were ranked as indicated in the table 4.13 below the study, Abdul Hamid et al. (2008) ranked causes related to unsafe working methods by 26.4% as second major cause of work-related injury mostly related to incorrect work procedures. The ranking given is exactly the same with this study.

In addition to this, Shakil et al. (2018) stated this factor as equipment and tools related and ranked this factor as 9th from overall fourteen categories. Respondents ranked based on the results obtained from survey 1st causing of work-related accident factor under unsafe working methods are “*Fail to report unsafe methods*” (0.605) .The casing of work-related accident under unsafe working method factor ranked 2nd in this category was “*Fail to report unsafe methods*” (0.598) and the 3rd ranked causing of work-related accident under unsafe working method factor by the respondents in the failing from management category was “*Low knowledge of using tools*” (0.590) from causes of unsafe working method to managements.

Generally related to the OSH standard Work-related accidents can often be avoided and many times are caused by human error. Regardless of the cause, workplace accidents can be serious and deadly. There are many benefits to implementing ISO 45001 no matter the size of your organization. Organizations are better able to comprehend the interests of their employees when they have a greater understanding of the significance of workplace Occupational Health and Safety.

The system's implementation offers a number of advantages, Reduce absenteeism and staff turnover including decreased incident costs, Reduce the cost of insurance premiums, increased company effectiveness, increased employee productivity, and more. In terms of service delivery, workplace safety and health should not be neglected. The motivation and job satisfaction of employees, which affect productivity and retention, are significantly influenced by their health and well-being. Overall, ISO 45001 the international standard for Occupational Health and Safety aims to provide a safe, healthy workplace and prevent the likelihood of injuries and ill-health arising. By consulting with employees and letting them engage, performance at work should be improved.

Table 4-12 Causes related to unsafe working methods

Item No	Causes related to Unsafe working methods	RII= $\Sigma W / (A * N)$	Ranks
1	Incorrect usage of working procedures	0.541	4
2	Low knowledge of using tools	0.590	3
3	Fail to obey work procedures	0.598	2
4	Leaving working tools exposed to accidents	0.537	5
5	Fail to report unsafe methods	0.605	1

4.8. Damage and accident related to workplace.

Safety measures at construction sites helps to prevent unforeseen damage and accidents. Accidents at construction sites may lead to loss of life and involve huge cost. Accident can be defined as an unforeseen circumstance or event which happens abruptly to cause damages to property and injury to the persons involved. Any of such occurrences that may interrupt or interfere with the orderly progress of activities in a construction site can therefore be termed as an accident. Else so work is an important component of an individual daily life. A major proportion of an individual life is spent as the “workplace”, where he or she is expected to display their commitment and sincerely in performing various tasks .in contemporary times, workplaces demand a high degree of expertise and competency from its workers in every task they perform. This means that a worker’s time and quality of work both play key roles in determining their performance and in ensuring the output produced. There for the question that needs to be asked is that are workplace only emphasizing on the listed below parameter of the tasks been shown towards protecting or restoring the well beings of the workers in construction projects. This would mean addressing concerns like a workers’ health safety measure with the workplace, a pleasant and secure working environment, policies or systems contributing to an employee’s physical, social, psychological well-being .Thus, approaching the workplace or an occupation from the perspective of occupational safety and health are crucial requirement and are the very basis of OSH.

From the selected eleven damage and accident occurs related to work place injury were under the category of those are respondents were asked to indicate their level of agreement on the listed occurrence of work-related damage and accident factors. Based on the received responses the factors were ranked as indicated in the table 4.11 below. Based on the results obtained from survey, respondents 1st ranked due to dismantling and demolishing of form works broken bones, loss of teeth and loss of eye (0.678), the 2nd ranked in Height-Related Accidents category was Labor and Material falling from height with (0.649) and Collapse of scaffolding (0.620).

Generally According to the Occupational Safety and Health Administration (OSHA), 1 out of 10 construction workers get injured yearly. Due to the growing casualties, it is essential to monitor construction safety from the design phase to the construction phase. Construction work can be an unsafe and dangerous industry. For people who work in construction, the likelihood of getting injured is higher than in other professions. As reported by the Occupational Safety & Health Administration (OSHA), in 2018. Various circumstances cause accidents in construction. Negligence, unsafe work conditions, failure to provide adequate safety equipment, improper use of equipment or tools, and lack of safety precautions are common examples of what causes accidents in construction. Some workers may have health issues like respiratory problems, phobia from heights, photophobia, etc. Inadequate supervision of such workers by the project managers can lead to accidents.

Table 4-13 Determine Damage and accident occurs related to work place

Item No	Damage and accident occurs related to work place	RII= $\Sigma W / (A * N)$	Rank
A. Height-Related Accidents			
1	Labor and Material falling from height	0.649	2
2	Collapse of scaffolding	0.620	3
3	Collapse or unstable of going lift	0.600	5

B. Dismantling and Demolition Related Accidents			
1	Traumatic Brain Injury	0.610	4
2	Broken Bones, lose of teeth and lose of eye	0.678	1
3	Paralysis And Fatality	0.599	6
C. Trip and Falls/ Slip and Falls Related Accidents			
1	Broken legs and sprained ankles, Paralysis	0.473	13
2	Soft tissue injuries and laceration,	0.478	12
3	Traumatic Brain Injury	0.483	11
D. Fires & Explosions Related Accidents			
1	Burns and Disfigurement	0.493	10
2	Illnesses related to smoke inhalation and lung problems	0.472	14
E. Equipment Related Accidents			
1	Colliding with another piece of equipment	0.532	8
2	Pinning workers b/n the equipment and stationary objects	0.534	7
3	Disability and Death	0.498	9

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusions

Occupational safety and health in the workplace is a vast discipline that consists of various aspects of human life and is considered fundamental for a healthier and more sustainable lifestyle. The purpose of this study was to assess occupational safety and health management on a building construction site. The survey methods were used as a guideline for answering the research questions and fulfilling this objective. Indeed, the construction industry is working very hard to improve its safety and health record. Based on the analysis, this paper concluded that:

Regarding to the practices of OSH management in building construction from the observation methods Training on proper use of scaffoldings, going lift load capacity operation (0.537), Effective use of pictures and sign on safety practices (0.502) and The company considers occupational safety and health during planning and execution of projects (0.498) which indicates that the construction industry boldly in needed training of proper use of tools.

The result indicated that for this study through the most significant factors or challenge causing of work-related accident factor under unsafe working methods (0.605), The casing of work-related accident under unsafe working method factor ranked 2nd in this category *and* the 3rd ranked causing of work-related accident under unsafe working method factor (0.590) from causes of unsafe working method to managements. So work-related accidents can often be avoided and many times are caused by human error. Regardless of the cause, workplace accidents can be serious and deadly.

The most common construction site accidents include slips, falls from heights (these are the deadliest), burns, explosions, falling objects, electrocutions, getting trapped, heavy machinery-related injuries, scaffolding collapses, being hit by moving objects or vehicles, unprotected exposure to toxic substances, and more. One of the essential jobs in the country is construction work. Though many people gloss over this profession, in reality, it provides us all with growing communities, safe housing, and up-to-code buildings. Without construction work, our society would not be as advanced as we are today.

Generally, a framework for the successful implementation of OSH in construction especially can greatly enhance increment of the project administration and delivery process. This research made a significant contribution to the body of knowledge and industry, especially on construction by developing an implementation framework to facilitate and provide guidance for OSH systems implementation by the stakeholders.

5.2. Recommendation

The building construction industry is very complex and risky in its nature all the characteristics performance can be affected directly or indirectly with this entire safety project factor. In this research paper through literature review, survey questionnaire and interview there are a lot of identified problems that causes injury which are an implication of poor health and safety practices as well as non-compliance to occupational health and safety rules in the building projects. In general a strong several recommendations are suggested here to reduce the number of injuries and to increase safety.

- The construction project should take the responsibility of protecting their employers and work places. One of the tools for safe work environment is standards, so the construction firms should use the standards and follow the requirements stated in this standard which is specifically developed and enforced to building construction sector.
- To monitor health and safety performance (such as reports, audits and inspections) during bid the contractor should have incorporate safety audit report for their qualification. The contract document prepared for tender should have guidelines for health and safety regulation and enables the enforcement of rules and regulations for health and safety problem minimization.
- The Ministry of Labor and Social Affairs and other concerned government bodies should monitor the implementation of the labor proclamations on health and safety in the construction sector through frequent site inspection by increasing its capacity like sufficient and competent staff.
- Regular health and safety training and orientation should be given to employees by construction companies; the ministry of labor should also give training to representatives (e.g. safety officers) of construction companies and certify them. The safety officers" intern will train workers in their respective companies and inspect the site regularly.
- Occupational safety and health education should be given by colleges/ universities to student who will be working in the construction section when they graduate.
- An adequate budget for safety and health provision should be stated in all construction contracts which should be approved by all parties. Safety as a pay item in contract document is suggested to be included.
- Finally all parties in construction project must contribute their rightful parts towards making construction sites healthy and safe.

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APPENDIX I
JIMMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
DEPARTMENT OF CIVIL AND ENVIRONMENTAL
ENGINEERING CONSTRUCTION ENGINEERING
MANAGEMENT
POSTGRADUATE M.Sc. PROGRAM

QUESTIONNAIRE

Dear Respondent

This questionnaire is designed to Assess Occupational Safety & Health Management in building construction site in Agaro Town. The main objective will be to assess the current occupational safety and health management in building construction sites. The research was conducted to fulfill the requirements for the degree of MSc in Construction Engineering and Management at Jimma University

The information obtained will be used for academic research under consideration; all information and feedbacks will be kept strictly confidential. Your experience and educational background in the construction industry will greatly contribute to the success of my study and I believe this kind of study will be an input for the development of Ethiopian construction industry. So, I am kindly requesting you to respond each and every question.

Thank you for giving your spent time and your kind cooperation for the research.

Sincerely Yours

Contact Address

Kefiyalew Tiyare

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SECTION A: GENERAL INFORMATION

Please put (√) in the appropriate box (s) and fill in the blanks as appropriate.

1. Name of your Organization /Project _____

2. What is ownership of your construction company?

[1] Privet

[2] Public

[3] Enterprise

[4] Government authority

[5] Other, please specify _____

3. Gender

[1] Male

[2] Female

4. What is your current position in the company / project?

[1] Project Manager

[2] Office Engineer

[3] Construction Engineer

[4] Site Engineer

[5] Forman

[6] Safety Officer

[7] Supervisor

[8] Other, please specify _____

5. How many years have you worked in the construction industry?

[1] 1–5 years

[2] 6-10 years

[3] 11-15 years

[4] >15 years

6. Your educational profession:

[1] Engineering Related

[2] Construction Management related

[3] Safety Officer related

[4] Health related

[5] Administration/financing related

[6] Other, please specify: _____

7. Your Education Qualification?

[1] TEVT Level

[2] Diploma (Normal/Advance)

[3] Bachelor's Degree

[4] Master's Degree

[5] PhD

[7] Other, please specify _____

8. The status of your representative in a Construction Company/project?

[1] Client side

[2] Contractor side

[3] Consultant side

[4] Other, please specify _____

SECTION B: ASSES THE CURRENT PRACTICES OF OSH MANAGEMENT IN CONSTRUCTION PROJECTS

1. Below are the select idea that might be to determine the practices of occupational safety and health management with work-related in construction projects. Please indicate your level of agreement on the following statements regarding to your project.

A. Asses current practices of workers related to Training		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
1	Training of new staff on safety practices on deep excavation					
2	Training on proper use of scaffoldings, going lift load capacity operation.					
3	Training on safety use work place tools, machinery, and equipment.					
4	Training on safety fire, electric shock and emergency procedures.					
5	Training on the of personal protective equipment (PPE).					
6	Training on going lift operation welfare facilities					
B. Asses current practices of workers related to Awareness						
7	Safety consciousness on site by unskilled workers.					
8	Positive safety attitude and behavior by workers					
9	Workers are willing to follow guidelines and procedures in the work site					
10	Motivation of workers on the use of personal protective equipment.					
11	People responsibility for safety in the workplace					

C. Asses current practices of safety officer related to workers Communication		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
12	Availability of safety communication gadgets on site.					
13	Recording and reporting of safety practices.					
14	Effective use of pictures and sign on safety practices					
15	Holding regular meeting on safety practices.					
D. Asses current practices of workers related to company safety culture						
16	Provision of First aid and welfare facilities					
17	Planning on issues relating to health and safety					
18	Setting safety guidelines into the body of conditions of contract					
19	Establishment of health and safety department					
20	Proper waste management on site.					
21	Use of safety net where the height of building exceeds two story					
22	Construction risk insurance for the project' staff and site operatives					
23	Making health and safety clearance/certificate a requirement.					
23	The company has a function/office that manage occupational safety and health issues					
24	The frequency of accidents in the project sites is very low					
25	The company considers occupational safety and health during planning and execution of projects					

SECTION C: IDENTIFY THE MAIN CAUSES OF WORK-RELATE ACCIDENT WITH RELETED TO OSH IN CONSTRUCTION PROJECTS

2. The following are work-related accident that might be select to determine the causes of accident related to OSH in construction projects. Please indicate your level of agreement on the following statements regarding to your project.

A. Causes related to Falling from height		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
1	Unprotected openings and fragile roofs					
2	Insufficient and unsuitable scaffoldings					
3	Overbalanced ladder					
4	Missing or broken rungs of ladder					
5	Overload scaffoldings					
6	Erection and dismantle of scaffoldings by unskilled or un experienced labor					
B. Causes related to Collapse						
7	Unprotected sides and leading edges					
8	Unprotected excavations with barricade and fence					
9	Movement too close edges of excavations					
10	Improperly displayed warning notices					
11	Working excavations in restricted areas					

C. Causes of safety problem related to Human element		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
12	Inappropriate use of personal protective equipment's					
13	Ineffective communication between safety personnel and workers					
14	Workers' negligence					
15	Lack of training on key issues pertaining health and safety consciousness					
16	Unsafe practices of worker due to religious assertions					
17	Horseplay in workplace					
18	Perception that safety wears is not comfortable to work with.					
D. Causes of safety difficulty related to Management						
19	Poor safety programs and policies					
20	Unclear employee accountability and responsibility for workplace health and safety					
21	Failed to provide safety resources					
22	Lack of providing safety education training for workers					
23	Engaging incompetent safety personnel					

E. Causes related to Electric Hazards		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
24	Using poorly maintained electrical equipment's					
25	Working near overhead high tension lines					
26	Inappropriate cable protection systems					
27	Contact with underground power cables during excavation work					
28	Using wires that have not been grounded properly					
F. Causes related to Unsafe working methods						
29	Incorrect usage of working procedures					
30	Low knowledge of using tools					
31	Fail to obey work procedures					
32	Leaving working tools exposed to accidents					
33	Fail to report unsafe methods					

SECTION C: TO DETERMINE THE DAMEGE AND ACCIDENT OCURRED RELATED TO WORK PLACE IN CONSTRUCTION PROJECTS

3. The following below are the list to determine of the types of damage and accident occurred in construction projects. Please indicate your level of agreement on the following statements regarding to your project.

Determine Damage and accident occurs to work place		Very High (5)	High (4)	Medium (3)	Low (2)	Very low (1)
A. Height-Related Accidents						
1	Labor and Material falling from height					
2	Collapse of scaffolding					
3	Collapse or unstable of going lift					
B. Dismantling and Demolition Related Accidents						
1	Traumatic Brain Injury					
2	Broken Bones, lose of teeth and lose of eye					
3	Paralysis And Fatality					
C. Trip and Falls/ Slip and Falls Related Accidents						
1	Broken legs and sprained ankles, Paralysis					
2	Soft tissue injuries and laceration,					
3	Traumatic Brain Injury					
D. Fires & Explosions Related Accidents						
1	Burns and Disfigurement					
2	Illnesses related to smoke inhalation and lung problems					
E. Equipment Related Accidents						
1	Colliding with another piece of equipment					
2	Pinning workers b/n the equipment and stationary objects					
3	Disability and Death					

KEY INFORMATION INTERVIEW

Organization /Project Name_____

Position of respondent in the company_____

1. What is the health and safety tools practices you personally use on this site?

2. Have you ever take a health and safety training in this site? How Often?

3. What kind of tools and facilities are there for health and safety management system?

4. What kind of damage and accident has happened in this site during your stay? What were the Main causes? What are the frequencies of the occurrence of the damages?

4. Do the all the workers on the site know their duties and responsibilities for implementing proper safety practices?

6. Do the type and causes of accident occurring in the site have record? Do you have any? Safety audit?

7. Does the company provide medical service for work-related injuries? .In what form?

Thank you!!!

The pictures below were taken in construction sites located in Agaro town during the Questionnaire survey



Figure-1 Twisting of wooden Scaffolding



Figure-2 Un proper usage of ladder and dismantling of sold slab form work



Figure-3 Un proper usage of construction materials mobilization and plastering works

The above figures were taken from building construction sites located in Agaro town. According to international occupational safety and health standards construction work should be fenced off to protect people from site dangers. However, these contractors were executed their works without any safety rules barrier.