SCHOOL OF POST GRADUATE STUDIES

DEPARTMENT OF PROJECT MANAGEMENT

A Thesis Submitted for the Partial Fulfillment of

MA Degree in Project Management

Assessment of Construction Safety Management: The Case Yohannes Haile Building Contractor in Addis Ababa Ethiopia.

By

Birhan Ayehu Admasu

Advisor

Abebaw Kassie (PhD)

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APPROVED BY BOARD OF EXAMINERS

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Internal Examiner	Signature & Date

Declaration

I, Birhan Ayehu, declare that this thesis is my own original work and that it has not been presented and will not be presented to other university for a similar or any other degree award**.**

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Birhan Ayehu Date

Letter of Certificate

This is to certify that Birhan Ayehu has conducted this project work entitled "Assessment of construction safety management in Yohannes Haile building contractor in the city of Addis Ababa'' is under my supervision .

This project work is original and suitable for the submission in partial fulfillment of the requirement for the award of Master of Arts Degree in Project Management

Abebaw Kassie (PHD)	----------	----------
Advisor	Signature	Date

Acknowledgements

First, thanks pass to my Lord Jesus, who gave me the commitment and patience to pass numerous obstacles and come to the achievement of this thesis in a situation of many challenges. I would like to thank my advisor Abebaw Kassie (Dr.), for arranging the research, for his guidance suggestions, critical comments and ideas as well as his valuable time in reviewing this work. I would also like to thank for his tolerance with great patience when I delay in the research work. My thanks also go to my colleagues and the entire staff of Yohannes Haile building construction I would like to acknowledges the support given by all respondents that made this research possible by responding the questionnaires and share ideas on research related issues.

Finally yet importantly, I express my thanks to my family and my friends for their co-operation, inspiration and tolerance without which this study would never have been accomplished.

Abbreviations

B.C:- Building Construction

E.C:- Ethiopian Calendar

GDP: - Gross Domestic Product

HS: - Health and Safety

HSE:-Health and Safety Executive

ICAO: - International Civil Aviation Organization

ILO: - International Labor Organization

NIOSH: - National Institute for Occupational Safety and Health

OHS: - Occupational Health and Safety

OSHA: - Occupational Safety and Health Administration

RII:-Relative Importance Index

SDS:-Safety Data Sheet

SMS:-Safety Management System

WHO: - World Health Organization

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Abstract

The nature of the construction industry is risky, hazardous and it needs special attention in safety management in to the whole procedure during construction. The study aimed in assessing construction safety management. To accomplish its objective descriptive research method and both primary data and secondary data source used. Structured questionnaire and non-structured interview as well, a questionnaire survey was conducted based on the literature and information collected through the document review of the project. To this respect, 42 questionnaires were distributed and 38 questionnaires were completed, which represented a response rate of 90.4%. Tables, percentages displayed the information, and the data was analyzed quantitatively using descriptive statics and relative importance index, to do so Microsoft Excel spreadsheet used. The study result revealed that there were mandatory protective clothing and equipment, subcontractors afford appropriate and suitable private safety tools, the company employed skilled trainer, give attention about insurance for workers and training about safety rule and regulations, those enhance safety practices of the company and decrease hazards. In addition, there were absence of safety and health boards, absence of project-specific training and regular safety meeting, low attention to work danger examines and communication. Besides, lack of Safety and health orientation training and regular worksite reviews, employee did not precede every safety guidelines and poor worker involvement in safety and evaluation. The study also recommended that in order to improve the safety management practices and to decrease the accident rate the government and engineering societies, contractors, clients, and all construction parties must contribute their rightful parts.

Keywords: construction safety, construction safety management, construction site

CHAPTER ONE

1 INTRODUCTION

1.1 Background of the study

Construction industry is one of the leaders in the world's economy and it is huge, multipart, explosive, dangerous, and requires large investment, which comprises a wide range of activities involving plans, design, builds, change, repair, maintenances and eventually defeats of building, civil engineering works, mechanical and electrical engineering and other similar works. (Vitharana, 2016). The industry plays a huge position for economic growth of the country and offers job opportunities to millions of citizens due to the fact the industry is very labor intensive (Lessing, Thurnell and Durdyev, 2017). Especially in growing countries, however it faces many challenges presently that result in an effect on project aim and constant boom of the economy.

Construction industry is one of the most dangerous enterprise sectors with many employees killed and severely injured every year. International occupational damage quotes in construction are large for all foremost industries (Lehtola, *et al*. 2008). Construction is continually volatile due to outside operations, work-at height, complex on-site plant machinery and equipment operation coupled with employee's attitudes and behaviors toward safety (Choudhry and Fang, 2007). The construction sector is frequently condemned for its poor performance (e.g. low productivity, waste, health and safety problems) (Hoonakker, *et al*. 2003). In order to conduct a successful research study in construction industry, it is important that the research focus on those segments of the industry that truly warrant it (Ramazan, 2016). Safety is one of the essential factors that cause a severe damage on employee and assets that have an effect on construction productivity. It had to be Studied and investigated for you to combine as an inherent lifestyle of every member of the construction project .Safety cannot be considered as extravagance. In contrast, it is a human necessity.

Construction safety management on project sites is of at most importance due to the nature of the construction industry. However, it is usually a secondary concern in a market-driven society where the main concern is completing projects at the required quality with minimum time and cost. Thus, safety issues are considered only after an accident occurs at a construction site with

follow up measures to improve working conditions, especially in developing countries (Toe & Chong, 2005). The construction business remains one of the few greatest labor-intensive industries in the emerging countries. It is therefore very important to understand the concept of construction safety management. Ethiopia is Africa's second most populous country and occupies a highly sensitive geopolitical position, and its economic performance does indeed deserve attention. The country has made spectacular leaps on multiple development fronts in recent years (Arkebe, 2015). The construction sector has added a substantial role in the economic development of Ethiopia. Ethiopia has released growth and transformation plans every five years. Mega projects of dam construction, street construction, railroad projects and urban development infrastructures are being implemented. As the emerging sectors of Ethiopian economy, the status of the construction workers, particularly their safety condition, should be given emphasis and the safety of the working environment should be maintained.

YOHANNES HAILE B.C .was granted license for Grade -1 building contractor (B.C-1) from ministry of urban development and construction plus Grade- 1 water work contractor from FDRE ministry, irrigation & energy that enables it to perform all civil work duties and water works.

YOHANNES HAILE SIRANO B.C. is a specialized, civil engineering contractor operating in Ethiopia, focusing mainly on the building. The company was established in 2008(2000 E.C) with the purpose of providing the Ethiopian market with dependable and quality construction service. Recently, the company has upgraded its class from Grade -3 to Grade -1 by incorporating the necessary machinery, equipment's and work force to meet the rapidly increasing demands of the construction industry.

1.2 Statement of the problem

Safety management matters do not seem to get adequate attention and employment of safety activities during construction is considered as a burden (Mbuya & Lema, 2004). In addition, absence of information and experience bound the interference process of improving healthy and safe employment situations in the construction site (Adan, 2004). However, it has been proved that, funding in construction health and protection genuinely boosts productiveness rates, boosting employee confidence and reducing attrition (Mohammed, 2003). In Addis Ababa most construction is constructed equivalent to the transportation, pedestrian and nearby living areas

and in most construction industries adequate measures of safety in the sites have not been put in place and also various challenges are encountered in the management of safety .

In Addis Ababa, a number of researches were conducted about the practices of construction safety management. Most of the researches conducted before are focuses on the evaluation of health and safety practice in building construction a case study Addis Ababa (Lucy Fekele, prof. Emer T. Quezon, Yolente C. Macrubbo, 2016), occupational safety and health management system development (Assegid, 2018). Therefore, this research paper would contribute a great value in assessment of construction safety management in grade on contractor. The driving factor behind this research is largely due to personal experience and observations that safety management issue did not given enough attention that it deserve in the construction sector. The research put forward a solution for problems stated related to safety management in Yohannnes Haile building contractor, which is located in Addis Ababa. In addition, it provides practical suggestion and recommendation in implementing effective safety management in construction projects and enhancing the knowledge in order to improve construction safety management.

1.3 Research questions

1 What are the safety programs related factors?
2 What are safety management practices in Yohannes Haile building contractor Addis Ababa Ethiopia?
3 What are the safety responsible persons/organizations related factors.
4 What are the major safety training and awareness related factors
5 What are the possible corrective measures to be taken to enhance safety management practices and to decrease the hazards in Yohannes Haile building construction?

1.4 Research objectives

1.4.1 General objective

The main objective is assessment of construction safety management in Yohannes Haile Building construction in a city of Addis Ababa Ethiopia

1.4.2 Specific objectives

1 To assess safety program related factors.

2 To assess personal protective clothing and safety equipment factors.

3 To assess safety design and budget related factors.

4 To assess safety training and awareness related factors

5 To assess safety responsible persons related factors.

1.5 Significance of the study

The conclusion that drawn from this study is substantial for the construction practitioners of Yohannes Haile Building contractor to take account construction safety management factors at an initial phase, by giving them a nice feedback how to deal with their job plan, over all excavation. Moreover, it can create awareness for contractors towards improving safety management practices, to minimize human injury, loss of life, to minimize time and cost overrun, and to enhance employee performance. The study also useful to junior researchers coming to undergo a study about the issue.

1.6 Scope of the study

The scope of this study is assessment of construction safety management. As we all know the existing development policy of Ethiopia is moving forward by giving a major attention to the infrastructure sector. Especially in Addis Ababa, there are many construction activities undertaken using the extensive source of human labor. In addition, those sources of human labor did not get good care by some contractors and under good care by some of the contractors.

Construction safety is so various that it will be impractical to cover it in one research paper. Among the various aspect of safety: - human safety environmental safety, equipment usage safety like, cranes, electric safety, and chemical usage safety in construction. To do research about safety management in construction, it needs wide range of time due to its huge characteristics but this paper conducted within a short period. Questionnaire and non-structured interview method were used for data collection, and analyzed by descriptive method.

The strategy is all over the country but what makes it different in Addis Ababa is since it is the capital city of Ethiopia, the destination of different countries embassy, excellent work place for investors all over the world and above all, we can consider the city as the center of different

African countries business and political destination zone. That is why the country is putting a lot of effort in to the city. The scope of the study area is in Ethiopia, Addis Ababa city selected Yohannes Haile Building contractor.

1.7 Limitation of the study

In Addis Ababa, there are many building contractors, which their work ranges from working on high-rise buildings to residential buildings. This makes the need for a great attention for construction safety management inevitable. However, this study was conducted only on Yohannes Haile Building contractor due to unfavorable circumstances created by Covid-19 pandemic and not having company's willingness to provide necessary data. Because of the fore mentioned reasons, gathering necessary information's became difficult. Therefore, the findings of the study may not show a general picture in construction industry.

1.8 Organization of the paper

This thesis is composed of five chapters. The first chapter deals with introduction, background of the study statement of the problem, objective of the study and other relevant introductory issues .The second chapter focuses on relevant literature review .several books, journals, articles were reread to base the study on existing literature, deliberate significant issues to build understanding of the subject matter .

The third chapter deals with the research methodology including, research design, target population, sampling and sampling techniques, source and approaches used throughout the data collection and analysis process. Chapter four presents the results and discussion. Chapter five presents the conclusions and recommendations. Finally, the references used in the study are listed at the end. Questionnaire use is also included in the Appendix part.

CHAPTER TWO

2 LITERATURE REVIEW

2.1. Introduction

This chapter contains both theoretical and empirical reviews about safety, safety management, safety management related factors and the impact of safety management in construction site and related aspects from prior studies are discussed to give a richer context for understanding construction safety management used for this research.

2.2. Theoretical review

2.2.1. Safety and safety management system

Safety in general means to identify and become aware of possible hazards that can be preventable before they happen .Risk of human life, losses of prosperity, the environment including fauna, flora and biodiversity are among the things exposed for risks and concern of safety (NIOSH, 2016).

Safety culture: - an organization's culture will have a large impact on safety results because of the safety management system. Protection of life is a subsection of the general organizational or firm culture. Several firms have a conversation about protection of life whilst discussing the inclination of their workers to conform to regulations or act protection or harm (HSE, 2015).

Safety Management: - can be defined as the management purposes related with the carrying on of a manufacturing understanding that relate to the safety of personnel in the understanding comprising.

a) The planning and developing ,organizing and implementing of a safety program ;and
b) The measuring, auditing or reviewing of the performance of those functions.

Safety management system means a system, which provides safety management in an industrial understanding .**SMS** is one example of a system safety method. ICAO (2009) defines SMS as an organized approach to managing safety, to include the necessary organizational structures,

accountabilities, policies, and procedures. The four pillars of SMS are: 1) Safety Policy, 2) Risk Management, 3) Safety Assurance, and 4) Safety Promotion (Velazquez and Bier, 2015).

Construction safety: - means freedom from hazard, risk, and harm to the workers involved in construction activities and taking protections actions to protect the lives of labors against deadly harms and death and the consequence of safety in construction is internal and instant. Construction work is a hazardous work. Certain construction site works comprise building houses, roads, workplaces, repair, and maintain infrastructures. This activity contains numerous hazardous tasks and situations such as working with height, excavation, noise, dust, power tools and equipment. Construction work has been increasing in developing and undeveloped countries over the past few years. With an increase in this type of work, occupational fatalities have increased. Work-related mortalities are persons that die while on the occupation or execution work connected tasks. Within the field of construction, it is important to have harmless construction sites (NIOSH, 2016)

Hazard: - is anything, which has the potential to reason injury to workers on construction site.

Hazard is any source of potential injury, damage or varied health effects on some thing or someone under certain conditions at work (HSE, 2004).

Hazards in Construction Sites: According to OSHA (Occupational Safety and Health Administration), 2005, potential hazards for employees in construction include:

• Falls (from heights)

• Trench collapse

• Scaffold collapse

• Electric shock and arc flash/arc blast

• Failure to use proper personal protective equipment and

• Repetitive motion injuries (OSHA, 2005).

2.2.2. Construction and construction safety in Ethiopia

One of the quickest developing and most important contributors to Ethiopian economy is the construction sector. According to (Adane, Gelaye, Sharma, Yalew WW,2013) studies developing countries like Ethiopia are struggling tough to advance their basic facilities by building ,schools, hospitals ,housing complexes, shops ,offices ,highways, power plants industries ,bridges and so many infrastructures. However, unskilled employee forces at lower priced rates do all of these construction activities. Occupational injuries and accidents amongst those employees are excessive because of illiteracy, poverty, lack of health and safety training and records on dangers and risks at the workplace. Such workers are recognized to stand swiftly converting the workplace, a high degree of competition and assaults of unemployment.

Unfortunately, Ethiopian's construction sector experiences poor safety and health surroundings, nonetheless. In spite of the substantial rate of raise in the industry over the past decades, only few studies have been conducted to investigate the occupational safety and health status of workforces employed in the construction industry (Hanna Mersha, Seid Tiku Mereta and Lamessa Dube, 2016). In light of the fact that Ethiopia has chosen the construction sector as its main driving force of development, significant portion of its annual budget is being pumped in this sector, so many construction projects; dams, roads, railroads are being built. No one denies that modern construction is new practice to Ethiopia. Lack of experience, knowledge and expertise will be the big challenge to meet the required aspiration of the nation. Safety should be major concern to minimize wastage, protect environmental from degradation and the public safety

Therefore, in developing countries the occupational health and safety hazards faced by construction employees are more than those in developed countries, Since Ethiopia has relatively low experience for construction, the cost of learning could be high. The country's budget comes partly from foreign loans and proper use of this financial resource will support nation's capacity to pay its debts. Safe construction will contribute developmental programs and in order projects to become successful. The effect is also 10 to 20 times greater in these countries, where the highest concentration of the world's workers is located (Dong, 2005). The dangers faced by construction employees are alarming. Although many accidents and ill-health problems remain unreported in Ethiopia, there is concern that the existing situation is alarming.

2.3. Empirical Review

2.3.1. Safety management in construction

Safety management in construction is a structured method of knowing dangers and managing risks relating to the construction workplace. Risk management procedures keep risk from hazards down to acceptable levels. Safety management is predicted to take account of all dangers and injuries that can probably be anticipated that place challenge workers at risk. The health and safety (H&S) of any workplace is very significant to reduce such risks, legally and ethically, however in particularly risky contexts such as the construction industry HS takes on perilous importance, as day-by-day activities of the industry are highly unsafe. Its miles for that reason are critical to pick out suitable safety activities and strategy, accommodating capacity severe H&S problem's (Twort & Rees, 2011).

The nature of the construction work is hazardous and unsafe which make safety matters to be considered and encouraged, the idea that safety of peoples are no extravagance however a need, (Tam, et al., 2004). Accident is the key issue to consider in any productions, in the lack of the precise safety management in construction places, chances will remain to occur and can result in severe damages. Studies show accident degrees closely relate to the level of activity within the industry, showing that when workload is high, safety management tends to receive less attention however; it requires the same attention like the budget and the schedule matter for the successes of every project in construction.

Administration of protection refers to the definite activities, functions and roles that are connected with lasting harm (Kirwan, 1998: 72). Vinodkumar and Bhasi (2011: 499) suppose, "Management of safety is viewed as a sub-structure of the overall organizational administration, and it is frequently done through an organization's protection administration method with the help of several protection administration applications". Protection administration methods were planned for diverse worksite in diverse country. The protection elements involved in such structures vary from one country to the other, in particular due to the cultural dissimilarities in the construction businesses (Ismail, Doostdar & Harun, 2012: 418; Ali, Abdullah & Subramaniam, Acta Structilia 2018: 25(2)2009; Aksorn & Hadikusumo, 2008: 416; Fang, Xie, Huang & Li, 2004: 45; Wokutch & VanSandt, 2000: 370). Within the GCI (gross commission income), powerful protection administration methods are regularly made up of performs that

conform to work-related health and protection necessities stipulated by the International Labor Organization (ILO) (Yankah, 2012: 56).

The examination conducted by Toole's (2002) suggested that construction security remains the alarm of all persons and organizations associated in construction tasks and that everyone who attends to a construction tasks has to talk about their expectations of site protection responsibilities through the assignment's period. His investigation determined that the capability of architects/engineers, overall contractors and sub-contractors to persuade onsite construction security varies consistent with the corresponding occupations. Toole (2002) observed that, beneath the old-style plan-tender-assemble venture structure, wherein subcontractors seriously motivated the foundation reasons of fates, overall contractors reserved a modest capacity to affect doings onsite. On the further point, architects/engineers work out slight impacts over the foundations of fates. According to Toole (2002) site security, prospects must not simply be applied in nature and imitate the powerful capacities of every construction gathering, additionally have to project and firm definite. He similarly highlighted the significance of every of the diverse construction gatherings with respect to finding accurate and common prospects about the protection responsibility that every being can achieve. Common prospects of protection results and practices are similarly contended to support in the avoidance of onsite construction fates.

2.4. Factors in successful construction safety management practice

2.4.1. Construction safety programs

According to (Abdelhamid & Everett, 2000: 54; Al Haadir & Panuwatwanich, 2011: 89) the important objective of adopting and applying numerous construction safety program is to keep away from unacceptable behavior that could purpose injuries on site; to find out and record any uncommon behavior which could propose injuries , and to make sure that accidents are suggested and dealt with properly. Henshaw (2004) not that effective safety programs have trifold advantages such as protection of human life, cost reduction, and boost of employee morale and drive. Studies conducted by (Wachter & Yorio, 2014: 118; Ismail, Doostdar & Harun, 2012: 420) reveals that 'written safety policies', 'accident exploration and report', 'safety records', 'safety guides', 'safety lists', 'accident statistical analysis', 'prescribed safety administrative structure', 'safe inspection'. And 'safety teaching scheme', 'safe work practices',

'safety assemblies', 'safety audit', 'safe promotion', 'safety teams at project sites', and 'safety team at company' level are amongst the safety management packages and practices that are put in place on construction sites . (Olutuase, 2014) suggest that construction industries implement safety management packages that seek to prevent the occurrence of accidents rather than basically managing such accidents in order to reduce the disturbances caused by accidents on sites. In overall, construction companies that implement and follow the techniques set out in these programs are predicted to have highly safe construction sites and improved project performance (Ismail, Doostdar & Harun, 2012: 419; Olutuase, 2014). The findings by Hinze and Gambatese (2003: 162) and, Smith, Kress, Petty & Enoch (2004) reveal that outstanding safety performance is closely related to construction projects where an operational safety program is established, carried out and maintained. Studies conducted by Bottani, Monica and Vignali (2009: 157) suggests that, even though safety management packages are discovered to enhance protection overall performance on construction sites, the majority of projects do now no longer set up such structures on site. In line with Cheng *et al.* (2012), insufficient dedication to such safety management programs on construction sites tends to decrease safety attention amongst employees at the site. Safety management programs to be effective, able safety employees must be made answerable for figuring out and executing the specified protective actions (Olutuase, 2014).

Components of construction safety programs

The studies conducted by López-Arquillos *et al* .(2015) and Hallowell (2010) approves that construction safety programs are made from sure of key safety factors which includes top management support, worker involvement in safety and evaluation, elements abuse programs written and complete safety and health designs, project-specific training and regular safety meeting. Additionally subcontractor choice and management, work danger examines and communication, record keeping and accident analyses, emergency response planning, safety and health boards, safety supervisor on site, safety and health orientation training, and regular worksite reviews. For the motive of this study, those factors can be set as the important safety factors examined in safety programs of collaborating construction industries.

2.4.2. Personal protective clothing and safety tools

To lessen the danger of on-site hazards, defensive apparel wearing and using private shielding equipment could be very essential. The workers must (through law) offer safety equipment and protective apparel for all workers; Likewise, personnel have an obligation to guard their personal H&S (Davies &Tomasin, 1990). Moreover, workforces on the construction site must (via way of means of law) supervised by certified H&S managers to guarantee that the workers comply with the safety instruction to put on defensive apparel to maintain employees safer (Zin and Ismail: 2012).

Lin and Mills (2001) contend that the wearing of protective apparel and the use of safety equipment is crucial to decrease onsite injuries. In comparable fashion, Harper (1998) and Holmes *et al.* (1999) recommend that, even though safety equipment is typically provided, personnel are regularly unwilling to apply. Accordingly, the delivery of safety equipment only now no longer implies powerful OHS practice. In view of this, management dedication is mandatory with respect to putting in force the wearing of safety equipment in addition to the creation of a corporate culture that inspires such practices.

Accordingly Irizarry *et al.* (2005) the perception on several construction sites is that the use of safety equipment raises task duration, which thus causes numerous employees to disregard using safety equipment. Moreover, in order to inspire the use of personal protective equipment on construction sites, project supervisors should evaluate the custom wherein they organize work to accomplish the effective and efficient use of safety equipment.

Criteria's of personal protective equipment

The protective clothing should be chose depending on the effect of its material to resist penetration, the capability of its design and the situation of environment wherein it should be Tatty Davies & Tomasin (1990).

A study by Joyston-Bechal and Grice (2004) stated that employers should make sure that they offer appropriate apparel/tools for the workforces, and protection apparel have to be suitable for the H&S dangers involved. In providing protective clothing and safety equipment, employers need to discover risks earlier than beginning any construction work. Tell and seek advice from

personnel. Take away risks wherein possible. Offer practice instruction and schooling on a way to use equipment Davies and Tomasin (1990).

Mandatory protective clothing and equipment

Davies and Tomasin (1990) suggested that in the UK, every employer must (by law) offer enough and desirable protective clothing and equipment for workers (Construction (Health and Safety) Rule, 1966).

Hard hates (Construction (Head Protection) Rule, 1989). Protection helmets to keep the head from hurt as a result of dropping or hovering materials , or being hit on with materials or objects " (Labor, 2017). Eye & face protection: Several eye injuries happen because of hovering objects, dirt or warmth. A number of those hazards may be eliminated permanently via means of right gadget guarding, exhaust ventilation or work design. For lots of dangers, for instance, stone cutting or dressing, individual eye protection (protection glasses or shields) is the best realistic solution (Labor, 2017).

Safety Shoes: The sort of protection footwear or boots for use will rely upon the character of the work (e.g.the presence of floor water on construction sites), however all protection foot put on have to have an impenetrable sole and uppers with a metal toe-cap (*Ibid* 2017).

Hand protection: Hands are the most likely to be exposed to the chance of being attacked or harmed to unintentional harm, and in construction more hurts happen to hands and wrists than to every other part of the body. Open cuts, scratches, breaks, dislocations, strains, amputations and burns occur.

Gloves are one of the most inexpensive and noticeable objects, but they could assist a significant role. However, numerous employees are not furnished with gloves in order that they should work with their naked hands (Labor, 2017).

2.4.3. Designing for Safety

At the design period of construction, protection through design seems to be crucial to improving OHS performance. Designers have to work and interconnect with the major parties of a construction project for instance supervisors or clients, and make sure that; Site remedy action and systems; Providing of facilities/amenities. In addition, Site safety/access; Diggings;

Acceptable ground situations and type of control medium; Silica content; Machinery types finest prepared to alleviate dust and Steady constructions throughout deconstruction or rebuilding are reflected in site plans and designs.

According to Behm (2005), design experts have the supreme powerful position reference to creating selections, which have the capability to enhance protection performance. In spite of this capacity for twist of fate and harm prevention, the construction firms has been sluggish to undertake safety by design as trendy practice .Behm (2005) indicates that safety-through-design concepts may be used to boom the safety of construction employees at some point of initial construction work and all through next maintenance, preservation and restore phases. Behm (2005) additionally found that the safety-through-design idea makes contributions to decreasing danger throughout the whole styles of construction tasks and that architects would have a helpful effect on construction safety in comparison to electrical, mechanical and civil engineers.

Advantages of Safety by Design

- Decrease site dangers
- Reduced hurts and mortalities
- decreased employees payment bonuses
- Improved productivity
- Reduced delays caused by injuries when construction permit nonstop effort on excellence
- Inspires contractor-designer teamwork (Toole, 2014)

2.4.4. Safety Training & awareness

Safety education needs to be particular to the hassle regions and safety conditions that regularly get up inside a construction project. Hence, an accepted model of safety teaching is unworkable and needless, regardless of this education to offer a top-level view of basic OHS principle and emergency treatment measures. Training tools must also embrace the indirect, private and emotional expenditures of accidents, the criticality of proper safety performance, the safety aims of the organization, lawful duties, and the contractual relations with clients. Personnel must be prepared with safety capabilities and awareness, which allows them to work securely and inspire others to do the same. Safety teaching and education arm personnel by those abilities and

awareness .Employees education initiatives have to consciousness on progressed danger and risk recognition, the enforcement of using fall safety structures, the normal examination, and the trying out of safety structures and tools. Employee schooling has to be carried out earlier than the origination of onsite work.

Davis and Tomasin (1999) advocate that operational training in the construction business includes a lone method to enhance safety. Energetic firm administration is similarly considered required with respect to decreasing the amount of harms and mortalities, whereas firm program statements system additional means of safeguarding that safety values are upheld. These program statements show the firm's situation on OHS by drawing administration's OHS accountabilities and the supervisor's vow to give that safety info, education and guidance to workers (Lin and Mills 2001). Absence of H&S teaching and little scholastic level of construction staff associates leads to accidents as confirmed by Cheng *et al*. (2004). Schaufelberger and Lin (2014) acknowledged certain samples of accident reasons, for instance: -employee notices a hazardous situation however he/she does not do anything to correct it (e.g. use of not operational tools such as a ladder). Individuals carrying out the work in defective methods or insecure behavior caused by absence of appropriate education. Employees might disrespect the safety situations then an accident might happen.

Insurance for workers

Work-related safety and health investigation and observation are important for the anticipation and controller of harms, sicknesses and dangers that arise from the site. Investigations and observation can fill gaps in understanding about where dangers occur and what interferences are operational at avoiding site harms, sicknesses and mortalities. Employees' compensation insurance records are a reserve used for these key anticipation purposes. Besides, employees' compensation records might be used for primary detection of health consequences in populations of employees, which is a portion of minor anticipation. They might be used to support finding effective medicinal handling, which is part of tertiary anticipation (Utterback, 2015).

First aid at site

Records of harms, sicknesses, 'nearly a hit' events and other information that has already existed to help in monitoring risks at the site will be useful to make suitable conclusions about first aid

(Practice, 2015). Safety data sheets (SDS) ought to test any dangerous substances that are held, used or deposited at site.

When defining your first aid necessities the distance between the workstation and ambulance facilities, hospital and health centers have to be considered. Such as, if life-threatening hurts or illnesses might happen and immediate contact to emergency facilities cannot be guaranteed, an individual educated in better progressive first aid methods (for instance the providing of oxygen) will be necessary (Practice, 2015).

2.4.5. Duties of responsible persons

According to (construction-association,2005) the real estate inventors association of Hong Kong and the Hong Kong construction association handbook explains that; a effective corporate protection package must embrace a sharp declaration of rule by the client or owner, specifically presenting management provision for achieving the aim of safety and the participation of diverse shareholders in the management method.

Safety officer

A safety officer observes site activities to make sure that employees obey with organization rules and government safety guidelines. The responsibilities of this occupation differ by company; however, safety generals normally have duties pertaining to program development, safety reviews, safety education and amenability with the central Occupational Safety & Health Administration, commonly known as OSHA. Particular safety officers, for instance persons in the construction business, necessarily have numerous years of field familiarity to be suitable for this kind of work (Morgan, 2010).

Client

(Bluff 2003, 10-11) found that the European Union's Construction Site instruction concerns the client as being accountable for safety. If the client has employed a 'project supervisor' to organize a project, this party then shoulders accountability for establishing safety techniques and related activities.

Huang and Hinze (2006a) stated that clients as owners and the responsibilities of owner in construction safety is

"… To oversee and support safety administration on the project" not essentially take on a "leadership responsibility for project safety management" but upholding auspicious safety approaches and establishing physical participation in safety to positively affect the "safety performance of over-all contractors and subcontractors."

As well, the client/owner responsibilities supported by Huang and Hinze (2006b), Hislop (1999) claims that the client necessity forms safety as an fundamental project constituent before starting work on the construction site. And Hislop (1999) recommends that every contractor and sub-contractor have to build safety policies at the tendering period of setup and that clients must observe the execution of these policies after the inauguration of work on the construction site .

Contractor /subcontractor

Contractors have to design for disaster ways and departures, transportation paths, hazard parts, packing havens, inclines, etc. they have to make sure delivery of safe work kit, with due care to their suitability, choice. Safety structures, teaching, info, review and repairs are also essential. Bulldozers want safe working inclines. To avoid rollover or overturn plan and anchor fork-lift trucks and dump trucks are vital. Contractors should as well afford appropriate safety symbols and caution signs. Private safety tools, such as reflective wear that must be appropriate, comfy and accurately upheld. Workstation would be free from dangers and suitable communication and information will help workers in what way to defend themselves from dangers. Piloting steady jobsite safety assessments and allocate skilled first aid personnel on site and/or set in place an emergency reaction method (Ibid 2005). Subcontractors are accountable for giving their personnel and associates of the community in workplace that is free from safety and health dangers. Overall contractors regularly depend on the unusual skill of subcontractors, having more knowledge about the dangers of the specific is helpful to execute well. Generally, it is approved that reviewing safety execution of subcontractors against safety policy is very important for achievement.

According to Teo, *et al* .(2005), (Lee & Jaafar, 2012) reward and punishment System (Incentives):- Monetary and non-monetary are forms of reward, which accomplished to increase protection and health enactment as it inspires employees to monitor their own protection behavior .so contractors should give reward for workers .

Employee

Workers proceed with every safety guidelines confirm that every safety structure and tools installed are working accurately. They must substitute injured or dismal hand utensils instantly. Avoid boisterousness or additional actions that generate a danger and medical checkup must be conducted on workers for drug habit, liquor drinking and for other things. If employees did not follow those things and have not capable physical look to do activities, they must not be included at work. Moreover, workers Fulfilled by individual and family difficulties, the possibility of disaster happening is high. The private and family difficulties not simply create dangers but then reduce employee's productivity since the spiritual occupation and consciousness distribution (Hinze, 2003) .Workers have to report every dangerous activity at work and every damage or fate for site supervisor.

Project managers

Senior site management: - Notify employees of the dangers existent and the essential managing actions. Assess dangers that cannot be prevented and fight dangers on basis. Set up emergency Actions with the aid of making sure suitable education is given to keep away from all dangers to employees.

Consistent with Saurin *et al*. (2004) the responsibility of project managers with respect to protection is concerned with developing a solid management dedication to protection and vigorously demonstrating this dedication to assistants. Even though designing and manipulating faults were recognized as the main root reasons of protection inability, it is far diagnosed that management dedication to protection dictates protection achievement.

Architects, structural engineers, and other designers

According to (Construction-Association, 2005) architects, structural engineers, and different designers must talk and decide about the protection and health Expressions with owners. They may additionally design for protection and health in format and layout sketches, with due honor to form capacity, coming renovation and maintenance. They should offer records about the protection and health danger of the layout once the customer has determined on which

contractor(s) to use. Episodic examinations and type out line issues with exclusive contractors, confirm contractor's assertions for protection fee, and accomplish the last balance sheet.

Safety professionals and foreman's

Protection experts and foreman's discover dangers within the workplace via means of giving recommendations and advising alternatives for fixing protection or health difficulties. In addition, they propose special forms of assistance accessible, along with professionals in chemical, electrical and mechanical engineering protection to type out problems at stake. Accidents/incidents corrective actions ought to be explored for reference. Episodic examinations are done and record furnished through summarizing the results. Moreover, powerful protection and health packages are significant, such as teaching personnel (Construction-Association, 2005). Field observation is the principal device with the aid of which the damage avoidance strategy and measures are executed. The mindset of employees towards a damage avoidance strategy is reliant on the mindset of their supervisor. The supervisor's activities in guiding the work are the crucial hyperlink in bringing achievement. If supervisors are set strong duties for workplace protection, and clasp responsible via overall execution evaluation, the probability of injuries can be decreased to attain better construction productivity and employee protection.

In the US, Toole (2002) showed phone and on paper studies of architects, engineers, overall contractors and subcontractors as a way to make clear the responsibility of planners and construction experts with respect to protection on construction sites.

Government and Engineering Societies

Fang, *et al*. (2004), Teo, *et al*. (2005) suggest that the engineering societies shall help to extend engineering awareness by developing the consciousness of protection and health matters among engineers. In emerging nations, there are no tough employee unions as if developed nations have, which own the power to defend on their employees and to impose contractors to offer safe occupied situations and protection equipment to their employees.

2.5. Summary of construction safety management factors and their impact

Jannadi and Bu-Khamsin (2002) establish that the supreme significant elements affecting protection execution are: (1) administration participation; (2) individual safety tools; and (3)

disaster/emergency design and planning. Among the usual difficulties in emerging and Arabic areas is that laborers and engineers get nearly no protection education and are typically unaware about the firm's protection policies or guidelines (Kartam, et al. 2000). The lack of a secure lay of protection guidelines harmfully influences the execution of protection in the workplace. And according to Wild (2005, 24) the low protection presentation of the Australian building and construction business is "not an outcome of period, financial plan, rivalry matters" on the other hand is imputable to "an absence of dedication on protection.

According to tam et al.(2004) the reasons of accidents contains poor protection awareness amongst upper administrators, absence of suitable guidelines, low information movement ,absence of precise practical regulation, absence of trained ability, employment insecure kit ,absence of emergency treatment actions, absence of cooperation moods and absence of organizational dedication .

2.5.1. Impact of poor construction safety management practices

falling from height:- Communal construction site falls include roof-related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects (ILO, 2005), (Bentley et al., 2006), (Yung, 2009). (Chan et al.2008). Chi and Wu (1997), (Murie, 2007)

Slips and Trips:-According to (Hughes and Ferret, 2011), (HSE, 2004), (HSE, 1998) Slips and trips are initiated when materials are scattered everywhere randomly, the floor is wet or greasy, unsuitable footwear is damaged, mostly by casual workers and guests, something big or weighty is being carried, decreasing one's stability, and when the lighting is low.

Noise:-NOHSC National Code of Practice (2004) shows Noise originates from the operation of plant, machinery and power tools, the movement of vehicles and deliveries of materials (HSE, 1998).

Electric shock: - Greatest harms and deaths from electricity are because of, using poorly repaired electrical tools, occupied close above in height tension lines or local electricity deliveries, contact with underground power cables through diggings work and occupied without suitable protection equipment's (Huges and Ferrett, 2011).

Equipment, Machinery, Tools and Transport: - several people are hurt due to being hewed and cuts by materials and hand – held operational equipment's such as chisels, screwdrivers, knives, saws, harmers, nails and drilling machines. The greatest dangers posed by hand apparatuses effects from distorted and indecorous repairs (HSE, 2004).

Fire:-Fires on site could triggered by braising work carried out by plumbers, gas lines for underground work, power lines, power leads and tools, machinery-needing petrol and dangerous substances (HSE, 2000).

The difficulties originate on or after diverse approaches of the place of work surroundings in engineering areas. Alli (2008) and WHO recorded out certain of numerous harms of work-related security and wellbeing difficulties as inner anxiety of workers, bodily form injuries, social and economic factors frustration, assets loss, household illness and serious injuries.

In Sub-Saharan African nations, nearly 54,000 deadly and about 42 million work-related injuries occur per annum that causes at minimum 3 days absenteeism from the job of each employee. In Ethiopia, the deadly work-related injuries degree is 5,596 annually with a mortality amount of 21.5/100,000 employees and an injuries degree of 16,426/100,000 labors (Takala, 1999).

In the United States to the Bureau of employee data, 13,502 construction employees pass away by occupational harms since 1992 whereas 2003 the construction business reports 19 percent of all place of work accidents and mortalities .severe occupational accidents price firms nearly $1billion per week in 2002 in expenses to hurt employees and their health caution .

The worldwide employee association projected that, internationally, nearly 2.2 million human binges pass away per annum from work-related injuries and illnesses whereas certain 270 million hurt severe non-mortal hurts and extra 160 million drop sickness for smaller or lengthier times from occupational reasons. This signifies a huge peal of distress for labors and their relative's .additionally, the ILO projected that the overall expenses of such injuries and hard wellbeing volume to nearly four percent of the worldwide GDP. Supplementary association have projected that nearby five percent of the load of illnesses and dangers in well-known market financial prudence can be assigned to job, which agrees approximately to ILO's symbol. It is similarly value stating new research by the European directive, which approximates that, the expenses of

work-related injuries in the EU15 (15 European Union Member States) in the year, 2000 was €55billion a year (ILO, 2006)

Rendering to OHSA, one from ten construction workers bears a hurt annually .And consistent with nationwide protection association job related injuries caused organizations to miss a whole of 104,000,000 manufacture day in 2017. Consequently, you need to set budget in to an influential protection policy and train your workers nearly your firm's protection techniques and systems rising nearly protection will receive the obtaining exact with your workers. Upgrade their confidence regarding the protection tools they are usage of and power your productivity scopes even greater. Furthermore, with the aid of using maintaining the accident rates low, you will keep away from delays and additionally expenses with the employees injured at work provides, growing to $46.1billion in 2001 (Blotzer, 2005).

Industrialized countries like North American, European, and Australia are scheduling and making financial arrangements for place of work security and health protection superior to other countries in the world. Totally, approximately 1million employees will undergo a place of work injuries and on an annual basis, a whole of 2.4 million societies killed because of risky or unwholesome place of work surroundings. Universally, this condition causes a financial harm of 4% of worldwide GDP (ILO, 2010; ILO, 2014). Infrequently stated is the occurrence in advanced nations of a political device that arbitrates the version of logical results into rules and guidelines that are imposed by dedicated organizations.

At a meeting by government sections and offices in Kenya intended at avoiding construction workplace injuries that damage survives and causes to mortal damages, Lonyangapuo (enduring administrator in the Organization of Community jobs) supposed, 'harmless job is about defensive methods', highlighting the real that construction workplace injuries are avoidable if satisfactory protection actions are takes place. He brought that placing in region methods to spread protection and health activities in construction business and dependence on in depth design, hard execution of methods, techniques and education and powerful tracking could significantly help in decreasing injuries in construction workplace (Ministry of Public Works, 2011).

Enshassi (2003) convinced that harms not only causes in great pain and discomfort but also diminish production, superiority, time, and destructively upset the surroundings and as a result increase the budget of construction.Whole construction job harms regularly occurred that possess great influence on employee production. Several coincidences happen in the workplace besides by a twist of fate causing death and resulting in real job stopping for a number of times.

Harms that cause a hurt man or women to be attended to effects in a piece lowers of the crew for which the hurt worker functioned. Minor harms resulting from nails and metallic wires can halt activity and, consequently, decrease production. Offering protection tools and hiring a protection representative support employee to distinguish the essential protection guidelines and to recognize them that might diminish the extensive diversity of harms.

According to (Holt, 2005; Reese & Eidson, 2006), focus the necessity to last refining protection accomplishment in construction.

1. Governments all over the worldwide need rules and satisfactory management, that necessitates construction industries to offer harmless job circumstances. Absence of protection, and so, might lead to claim or prosecution, which leads to the cause of additional fees and opposing advertising.

2. Absence of protection enhances the chance of dangers that causes people sorrowing, ill health and mortality.

3. The confidence of employees is declining if there are dangers in workplace. However, fate anticipation growth power confidence and increases workplace efficiency.

4. A harmless action in the site is reflected as an ethical duty by the existing civilization;

5. A security running policy donates to the monetary health of construction business by assisting them evade related with dangers .dangers/injuries experiences including direct and indirect prices in addition to assured and not assured prices.

Gap identified

Even though sufficient procedures of workplace safety and health management are existing in economically advanced nations, there are limited studies efficiently accompanied in most of

African countries, like in Ethiopia. Specially, presented studies mostly targeted the manufacturing and leather industry sector.

According to the result of literature review in this study, the construction sector in both industrialized and developing countries are suffering from enormous consequences and impacts of unsafe construction activities and hazardous nature of the project site. Among the major factors affecting safety practices of the construction sector are: - lack of training and awareness, poor commitment of employers and management on safety and health concern of the workers, lack of personal protective tools, low attention about design for safety, budget for safety. Additionally low implementation of safety policy, lack of unique and responsibly established safety and health committee with strong enforcement measure and procedures for promoting safer workplace and keeping the work healthier, is also contributing for unsafe situations on the sites.

In general, those few studies conducted in Ethiopia on construction safety and health related issues mainly focused on the investigation of evaluation of health and safety in high-rise building construction a case study Addis Ababa, occupational safety and health management system development, accidents and injuries related to construction activities. None of these studies dealt with assessment of safety management practices in grade one contractor.

CHAPTER THREE

3 RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is the systematic procedure used to determine a solution to a particular problem. The methodology adopted in this research provides the procedures that are necessary for obtaining the information needed to structure the research questionnaire, collect data, analyze the collected data, and interpret and present the results. The methodologies followed in this survey are outlined in research design, population and sampling method, sources and tools/instruments of data collection, data analysis method.

3.2. Research Approach and design

The research was descriptive type of research method .These types of research method help the researcher describe the assessment of construction safety management in building construction project that are under construction by Yohannes Haile building contractor. In addition, the researcher adopted both qualitative and quantitative approach.

3.3. Target population and unit of analysis

The target population for the research includes-

1. Higher officials of the company at the head office
2. Staff members at the construction site and office
3. Skilled laborers at the construction site
4. Unskilled and daily laborers at the project site.

In Yohannes Haile building contactor with 42 permanent and 135 daily labor workers, this gives a total population of 177.

3.4. Sample size and sampling techniques

Yohannes Haile building construction currently has a total population of 177. The researcher used purposive sampling technique. Purposive sampling technique is very useful to reach a targeted sample quickly and with purposive sample, the study unlikely to get the opinions of the researchers with a sample that is highly representable of the targeted population being studied.

The researcher use only the permanent workers as a sample size, Ss=42. The reason was the permanent workers were the targeted population for the research needed: - supervisors, site engineers office engineers, managers and foreman's , and daily labors were not sure, even after giving orientation on the confidentiality issue of their responses with how to respond the questionnaire, about such concern.

3.5. Source and tools of data collection

This study used both primary data sources and secondary data source ,primary data source is collected from employees who are working in one grade one contractor .primary source of data includes close ended questionnaire in that respondents' level of agreement about extent construction safety management factors and their effect in Yohannes Haile building contractor . In addition, secondary data source was obtained through review of literatures, journals, articles, reference materials, different researches, various books, websites, other published and unpublished sources and relevant documents.

3.6. Method of data collection

The research evidence was gathered by using close-ended questionnaires, non-structured interview was used to collect data from team leaders, project managers and other workers on site. A questionnaire survey was designed based on the objectives of the study. The questionnaire were structured based on five main factors(safety program,Lopez-Arquillos *et al.*(2015)and Hallowell(2010:28), personal protective clothing and safety tools, safety training and awareness (Davies & Tomasin,1990), Lin & Mills (2001),Design for safety,Behm(2005),duties of responsible persons/organizations (construction-association,2005). Questionnaires were distributed to manager; site engineer, supervisors, office engineers, foreman's and other specify who are located in Yohannes Haile Building Contractor. The type of data collected for the study is both quantitative and qualitative data. In this research, ordinal scale was used since the research designed at rating the data gathered from respondents. Five point likert scales was used. The likert scale was chosen in order to expand the way the respondents would replay.

Table 3.1 Ordinal scale used for measuring of the level of extent

Category	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Rating	5	4	3	2	1

3.7. Method of data analysis

The component parts of descriptive statistics was used while assessing and grading the different construction safety management related factors to do so, the study used Microsoft Excel spreadsheet, which the most appropriate for descriptive statistics and quantitative analysis. The ranking was based on the Relative Importance Index (RII). RII is a regularly used method in construction to obtain significance rankings of traits and it is mainly useful where a structured questionnaire is used to ask measurements that are personal in nature (Cheung, et al. 2000). The data analysis is determined to form the relative importance of different factors that contribute to construction safety management. Analysis of data consists of calculating the Relative Importance Index (RII) and Ranking of factors in each category based on the Relative Importance Index.

$$\text{(RII) } RII = \frac{1\,n1 + 2n2 + 3n3 + 4n4 + 5n5}{A * N}$$

Where RII= Relative Importance Index n1, n2, n3, n4, n5 = Number of respondents answer each factor 1, 2, 3, 4, 5 = weight given for each factor (ranging from 1 to 5) A = highest weight (i.e. 5 in our case) N = total number of respondents.

The importance index was calculated for safety management related factors, ranked according to the level of extent in the company.

3.8.Validity and Reliability of Research Instrument

In any study outcomes, the matter of validity and reliability are vital assurance methods. Validity and reliability are essential techniques by which any investigation tools were estimated before being undertaken to the field for data collection.

3.8.1. Validity

Validity is the supreme significant standard and specifies the extent to which a tool degrees what it is thought to degree. Depending on Paton (2000), validity is the superiority qualified to degrees to the measure to which they obey to recognized awareness or fact. Validity states to the capability of the tool to degree what it is intended to degree. Kumar, (2005) as quoted by Ndegwa, (2013) describes validity as the amount to which the investigator has measured what he set out to degree. It is the correctness and significance of implications, which are depend on

study finding. Validity therefore is whether an apparatus is on objective in quantifying what is predictable to degree. To check the validity of the tool the investigator operated with the mentor as the expert and decided whether the apparatus was valid or not.

3.8.2. Reliability Test

Reliability is the degree to which a similar discovery found if the study was reiterated by another investigator at another time. If the identical discovery can be developed again, the tool is reliable or consistent. The Cronbach's alpha mechanism is one of the greatest frequently used for conventional measures of consistency. It degrees the internal reliability of the data in a scale. It shows that the degree to which the data in a questionnaire are correlated to one another (Fubara and Mguni, 2005). The standard range of Cronbach's coefficient alpha scale ranges between 0-1 and the greater values reflects a greater degree of internal reliability. Diverse writers agree diverse standards of this examination in order to attain internal consistency, however acceptable scale is necessary to be greater than 0.6 for the measure to be consistent (Sekaran, 2003 as quoted by Mariam Sirbel, 2012).

Table 3.2 Cronbach's alpha result

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	208.2082	37	5.627248	3.003812	5.7E-09	1.418041
Columns	370.8222	44	8.427778	4.498729	6.47E-20	1.382351
Error	3049.844	1628	1.873369			
Total	3628.875	1709				

Source: Survey data (2021)

The Cronbach's alpha found to be *Cronbach's Alpha*= 0.66709= 0.7, which is higher than 0.6, thus the hypothesis has been supposed to have acceptable reliability.

3.9. Ethical Consideration

The study effort was taking place when receiving the will of the specified organization. Interviewees were visibly talked about the aim of the study before they requested to offer their response .The investigator confirms the value and honesty of this research. The privacy and confidentiality of the volunteer interviewee was also assured. This individualistic and neutral research was careful not to reason injury to interviewees. Consequently, the investigator optimally reflects all the ethical perceptions.

CHAPTER FOUR

4 DATA ANALYSIS AND DISCUSSIONS

4.1. Introduction

This chapter presents the data analysis and discussions based on the questionnaire survey, interview and literatures. It discussed the questionnaire response rate, overall information of respondents about construction safety management in the case of Yohannes Haile building contractor. The collected data were analyzed using the method as mentioned in Chapter Three and the results drawn based on specific objectives of the study. A total of 45 construction safety management related factors that were selected from former researches and grouped in five categories:- safety program related factors, personal protective clothing and Safety equipment's related, safety design /safety budget, safety training and awareness, responsible persons /organization related factors. Respondents were asked to rank the extent construction safety management related factors in Yohannes Haile building contractor in a five-point scale range from 1 to 5 based on the level of extent.

A total of forty-two set of survey questionnaire was distributed and used in order to identify the degree of construction safety management factors .The survey questionnaires were distributed to the managers, office engineers, site Engineers , site supervisors and foreman's that work in one in Yohannes Haile building contractors in Addis Ababa. Out of forty-two questionnaires, four questionnaires are incomplete and not filled by respondents because due to temporary abandonment of sites and works are temporary suspended, respondent absence and hectic. There for 38 questionnaires were successfully filled, which makes the response, rate 90.4%.

4.2. Demographic Characteristics of Respondents

Demographic characteristics of the respondents of this research include respondent's level of experience, educational level, Designation in the company and at building construction.

Table 4.1 Respondent work experience

Respondent's experience	Frequency	Percentage
1– 5years	11	28 .9
6 – 10 years	18	47.4
11 and above	9	23.7

Source: survey data (2021

Based on the table 4.1, 47.4% of the respondents have an experience of with 6-10 years' in construction industry, 28.9% of respondents have 1-5 years' experience and 23.7% have experience greater than 11 years.

Table 4.2 respondent's educational level

Level of education	**Frequency**	**Percentage**
Diploma	1	2.6
First degree	18	47.4
Second degree	17	44.7
PhD	2	5.3

Source: survey data (2021)

From the table above, 47.4% of respondents have first degree, 44.7% have master's degree, 5.3% of respondents PhD holders and the remaining 2.6% are diploma holders.

Table 4.3 respondent's designation

Designation	Frequency	Percentage
Manager	2	5.3
Site engineer	11	28.9
Office engineer	12	31.6
Supervisor	8	21.1
Foreman	2	5.3
Other specify	3	7.9

Source: survey data (2021)

Based on table 4.3, 31.6% of respondents are office Engineers, 28.9% are site Engineers, 21.1% are supervisors , 5.3 % are managers ,7.9% other specify and 5.3% are foreman's which is most of them have the basic information about the projects.

The majorities of respondent were well experienced and educated which implies that the respondents involved in the study have deep understanding and familiar about the nature of study area, which implies that the information forwarded could be important as required in the study.

4.3. Construction safety management

The objective of conducting the analysis for this section is to establish the factors under the groups of safety management identified from the literature review and the ranking according to their extent (based on affordability, implementation and absence or presence) of factors in Yohannes Haile building contractor.

The higher the value of RII the more extent implies that implementable or affordable factor and the lower value of RII the lower extent factor it implies the lowest implementable or affordable factor in the organization.

Table 4.4 Evaluation safety program related factors

Safety program related factors	RII	Rank
Worker involvement in safety and evaluation	0.547	6
Written and complete safety and health designs	0.742	1
project-specific training and regular safety meeting	0.531	9
Subcontractor choice and management	0.674	2
Work danger examines and communication	0.537	8
Record keeping and accident analyses	0.6	4
Safety supervisor on site	0.622	3
Safety and health boards	0.467	10
Emergency response planning	0.574	5
Safety and health orientation training, and regular worksite reviews	0.542	7

Source: survey data (2021)

Table 4.4 shows that respondent's opinion level towards the extent of safety program related factors in Yohahnnes Haile building contractor.

Written and complete safety and health design was ranked first with RII=0.742, Subcontractor choice and management with RII=0.674 was considered as the second implemented safety program related factor in the company, safety supervisor on site with RII =0.622 is the third highly extent safety program related factor, record keeping and accident analyses with RII =0.6. In addition, emergency response planning with RII=0.574, worker involvement in safety and

health evaluation with RII =0.547, safety and health orientation training and regular worksite reviews (RII=0.542), work danger examination and communication (RII=0.537), project specific training and regular safety meeting with RII=0.531. Safety and health boards with RII=0.467 was ranked as list implementable factor in descending order. Therefore, in relation with safety program related factor the company is better to implement written and complete safety and health design and then good for Subcontractor choice and management. The implementation of those factors decreases the hazard rate.

Table 4.5 Evaluation of Personal Protective Clothing and Safety Equipment related factors

Personal Protective Clothing /Equipment's related factors	**RII**	**Rank**
Attention and delivering sufficient safety equipment	0.788	3
Mandatory protective clothing and equipment	0.842	1
Supervision weather employee use safety kits properly or not	0.773	4
Perception of construction sites about the use of safety equipment's	0.742	6
Appropriate and suitable protective clothing and safety equipment	0.795	2
Implementation of rule and regulations about safety tools	0.763	5

Source: survey data (2021)

As shown on the table 4.5 mandatory protective clothing and equipment was ranked first with RII=0.842, Appropriate and suitable protective clothing and safety equipment (RII=0.795) was ranked as the second personal protective clothing and safety equipment's related factor

Attention and delivering sufficient safety equipment (RII=0.788), Supervision weather employee use safety kits properly or not (RII=0.773), Implementation of rule and regulations about safety tools (RII=0.763) and Perception of construction sites about the use of safety equipment's RII=0.742 were in ranked consequently based on the level of extent in the company. Mandatory protective clothing and equipment are affordable to prevent workers from danger.

Table 4.6 Evaluation of Safety Design /safety budget factors

Safety Design /safety budget factors	RII	Rank
Certified safety designer	0.784	2
Interconnection between safety designer with supervisor and client	0.716	4
Attention about insurance for workers	0.8	1
Budget for safety for site remedy actions	0.747	3

Source: survey data (2021)

According to the table 4.6 the respondent's perception level towards attention about insurance for workers was ranked first with RII= 0.8 this implies attention about insurance for workers in Yohannes Haile building enterprise was good, Certified safety designer (RII=0.784) ranked as the second safety design related factor. Besides Budget for safety for site remedy actions with RII=0.747 and Interconnection between safety designer with supervisor and client with RII=0.716 ranked the least in order to be implemented well. Therefore, as the respondent's opinion, the insurance issue was good in the company and these increase workers moral.

Table 4.7 Evaluation of Safety Training and Awareness related factors

Safety Training and Awareness factors	RII	Rank
Training for workers on safety obstacles and how to avoid them	0.736	5
Safety teaching and education habit	0.763	3
Training about safety rule and regulations	0.795	2
Skilled trainer	0.826	1
Budget for training	0.743	4
Training for workers how to use safety tools	0.653	6

Source: survey data (2021)

Table above 4.7 shows the extent of safety training and awareness related factors. According to the respondents opinion skilled trainer was ranked as first with RII=0.826, training about safety rule and regulations with RII=0.795 was ranked second.

Safety teaching and education habit (RII=0.763) was ranked the third, Budget for training with RII=0.743, training for workers on safety obstacles and how to avoid them with RII=0.736 and training for workers how to use safety tools with RII=0.653 were ranked as the 4th, 5th and the 6th factors consequently based on their degree of implementation. As the respondent's opinion the company have skilled trainer to train safety rule and regulations, this helped the employees to protect them from accident and enhance the safety management practices.

Table 4.8 Evaluation of responsible Persons/organizations related factors

Responsible Persons /organization related factors	**RII**	**Rank**
Safety officer observe site activities	0.715	7
Client form safety as a fundamental project constituent before starting work	0.684	12
Client observing the execution of contractors and sub-contractors safety polices	0.658	13
Client employed project supervisor	0.685	10
Employee proceed every safety guidelines	0.547	18
Employee wear personal protective tools	0.6	17
Employee medical check-up for drug use and their physical capability	0.642	15
Workers of interest to take safety trainings	0.7	8
Safety professionals use incidents corrective actions ought to explored for reference	0.636	16
Safety professionals set strong safety duties for work	0.789	2
subcontractor afford appropriate safety symbols and caution signs	0.768	3
subcontractors afford appropriate and suitable Private safety tools	0.837	1
Subcontractors suitable communication and information with workers	0.731	5
Contractors reviewing safety execution of subcontractors against safety policy	0.689	9
Subcontractors design for disaster ways and departures, transportation paths, hazard parts	0.7	8
Project manager develop a solid management dedication	0.753	4
Project manager notify employee about existence of danger and essential managing actions	0.726	6
Reward and Punishment System (Incentives) for employee	0.652	14
Role of Government and Engineering Societies	0.621	11

Source: survey data (2021)

According to table 4.8 above the most extent responsible persons/ organizations related factors in Yohannes Haile building construction enterprise are Contractors /subcontractors afford appropriate and suitable Private safety tools ranked first with RII= 0.837, Safety professionals set strong safety duties for work with RII= 0.789, Contractor /subcontractor afford appropriate safety symbols and caution signs with RII=0.768. In addition, Project manager develop a solid management dedication with RII= 0.753, contractors/ subcontractors suitable communication and information with workers with RII= 0.731, Project manager notify employee about existence of danger and essential managing actions (RII= 0.726) were ranked as the 2^{nd}, 3^{rd}, 4^{th}, 5^{th} and ^{6th} most affordable and implementable responsible persons/organization related factors.

However, most of respondents tend to agree that safety officer observe site activities, contractors/ subcontractors design for disaster ways and departures, transportation paths, hazard parts and workers of interest to take safety trainings, contractors reviewing safety execution of subcontractors against safety policy, client employed project supervisor, client form safety as a fundamental project constituent before starting work.

Besides client observing the execution of contractors and sub-contractors safety polices, reward and punishment system (Incentives) for employee, employee medical check-up for drug use and their physical capability are very poor. Also safety professionals use incidents corrective actions ought to explored for reference, role of government and engineering societies, employee wear personal protective tools and employee proceed every safety guidelines were ranked as the least extent factors to be implemented in in Yohannes Haile building contractor.

4.4. Discussion

4.4.1 Discussion on top five highly extent safety management practices in Yohannes Haile building contractor.

Table 4.9 Top 5 highly degree factors

Top 5 highly degree factors	RII	Related to
Mandatory protective clothing and equipment	0.842	Personal protective clothing
Contractors /subcontractors afford appropriate and suitable Private safety tools	0.837	Responsible persons
Skilled trainer	0.826	Training
Attention about insurance for workers	0.8	Budget
Training about safety rule and regulations, Appropriate and suitable protective clothing and safety equipment	0.795	Training

Source: survey data (2021)

The table above 4.9 shows five most extent factors of safety management practices as ranked by respondents in Yohannes Haile building contractor were summarized and presented.

1. Mandatory protective clothing and equipment

Mandatory protective clothing and equipment with RII=0.842 proposed as the most extent safety management factor. Most respondents agree with the degree of availability of mandatory protective clothing and equipment's is high, this implies that mandatory protective clothing and equipment's like insulation boots, gloves for electricians, hard hats, safety shoes and hand protection are affordable, because it is obligatory to afford at least mandatory safety equipment weather the workers use it properly or not . Availability of mandatory equipment increases the confidence of workers and decreased accidents. This result agrees with the finding Lin and Mills (2001). Workers must wear at least mandatory safety equipment to enhance the execution of construction safety management and to reduce hazards on site.

2. Subcontractors afford appropriate and suitable Private safety tools (RII=0.837)

Subcontractors afford appropriate and suitable Private safety tools with RII=0.837, is the second highly ranked extent safety management practices. Contractors and sub-contractors were afford appropriate and suitable private safety tools such as reflective wear that the most appropriate, comfy and accurately upheld before started their work ,subcontractors are accountable for giving their personal free from safety and health danger. Over all contractors often, depend on the sub-contractors knowledge about safety issue and dangers so it was mandatory to afford appropriate and suitable private safety tools for subcontractors in order to be involved in the project.

3. Skilled trainer (RII=0.826)

Skilled trainer ranked the third. To train employee about safety rule and regulation, how to use safety tools and other safety management matters, the skilled trainer are very significant, as the respondent's opinion the organization hired skilled trainer. Safety teaching and education arm personnel by those capacities and awareness is very important for the improvement of safety management practices. Employee training initiatives have to consciousness on progressed danger risk recognition and employee training has to be carried out earlier than the origination of construction site work. Therefore, the need for skilled trainer in the company is mandatory.

4. Attention about insurance for workers with RII=0.8

Attention about insurance for workers ranked as the fourth highly extent. Employees benefit records might be used for main gratitude of health consequences in populations of workers, which is a portion of minor anticipation. This building contractor was affording insurance for workers as the respondent's opinion. Insurance for workers improve safety management practice this increases workers moral, decrease their fear, decrease turnover and it increase their performance.

5. Training about safety rule and regulations (RII=0.795)

Training about safety rule and regulations is ranked as the fifth highly extent factor. According to the respondents, there is trainings about safety rule and regulations of the company weather the employee follow it or not. Safety instructions of the contractor, such as how to use safety material and what happened if the employee did not follow the instructions were included in the training. It is very significant factor in order to execute the construction safety management well and to enhance safety in the construction site. Besides it decreases the amount of harms and mortalities, this result agrees with the finding of Lin and Mills (2001).

4.4.2 Discussion on top 10 least extent of construction safety management factors

Table 4.10 Top ten lowest extent safety management factors

Top ten lowest extent safety management factors	RII	Related to
Safety and health boards	0.467	Safety program
project-specific training and regular safety meeting	0.531	Safety program
Work danger examines and communication	0.537	Safety program
Safety and health orientation training, and regular worksite reviews	0.542	Safety program
Employee interest to proceed every safety guidelines	0.547	Responsible persons
Emergency response planning	0.574	Safety program
Employee interest to wear personal protective tools, Record keeping and accident analyses	0.6	Responsible persons
Role of Government and Engineering Societies	0.621	Responsible organizations
Safety professionals use incidents corrective actions ought to explored for reference	0.636	Responsible persons
Employee medical check-up for drug use and their physical capability	0.642	Responsible persons

Source: Survey data (2021)

The table above 4.10 shows ten lowest extent factors of safety management practices as ranked by respondents in Yohannes Haile building contractor were summarized and presented.

1. Safety and health boards with RII=0.467

With site safety and health boards, construction sites can provide clear communication to everyone on site about the key safety massages need to follow and it is the main safety program related factor to improve safety management practices but the study result shows the safety and health boards were not given sufficient attention by contractor. They did not form safety and health boards. Due to absence of safety and health boards, there is no clear communication about the main safety massages between workers on site, thus reason different accidents on employee, assets and affect the overall execution of safety management of the company. Because the study

conducted by Lopez-Aruillos (2015) and Hallowell (2010) approves safety and health, boards are among safety program related factors to prevent the occurrence of accidents rather than managing such accidents in order to reduce disturbances cause by accidents on site and it is important safety factor.

2. project-specific training and regular safety meeting with RII=0.531

This was ranked as the second lowest implementable factor. Project specific training for construction societies about the safety practices, which implemented on construction site. In addition, specifically for site supervisor and employee that work on dangers areas of the site. Regular safety meeting is important to discuss about general safety errors; workplace pressure, and workplace injuries, violence at the work place is needed. The study result shows project specific training and regular safety meeting were very poor in the company, and had very high impact on safety management and increase the safeness of workers.

3. Work danger examines and communication (RII=0.537)

Implementation of work danger examination and communication is very low in Yohannes Haile building contractor. Work danger examination is important to identify the hazards, to decide who might be injured and in what way, assess the danger and managing the risk and strong working communication is vigorous to construct trust among employees. Build confidence and it helps to work without disagreement, therefore, lack of work examination and communication is the most significant factor to affect safety management practices, increase construction site accidents and affect overall performance of the project.

4. Safety and health orientation training, and regular worksite reviews with RII=0.542

Safety and health orientation training is safety information about tasks, workplace hazards ,offers chance to learn about the company and their coworkers, ask questions and to clarify new or confusing information and regular worksite review used to identify existing and potential hazards, cause of hazards and recommend corrective actions, those, are helpful for the successful construction safety management practice. However, it was implementable poorly as the research result indicates. Even if the company hired skilled trainer implementation of orientation, training does not get attention.

5 Employee interest to proceed every safety guidelines with RII=0.547 and Worker involvement in safety and evaluation with RII=0.547

Respondent indicated that employee did not precede every safety guidelines due to law awareness about safety and hazards, lack of sufficient training about how to precede safety guidelines and absence of strong rule and regulations, therefore this factor affected the safety management execution of company, increase the accident rate, and affect overall management. Worker involvement in safety and evaluation is among the lowest extent factor. Worker involvement in safety and evaluation aids to emerging efficient methods of defending employees, construction sites in which employees vigorously provide to health and safety frequently have lesser working danger rate and hazard level because they regularly recognize the most about critical dangers related with their occupation but it is less implementable in Yohannes Haile building contractor.

6. Emergency response planning with RII=0.574

Is about danger identification, communication system, disaster resources, and management of the plan, emergency response technique, and interrogation and post-traumatic hassle procedure, response plan forms procedures and structures for response to emergencies. A good construction emergency action plan will support persons take speedy and efficient actions in the result of hazards. It will help in enabling the harshness of the condition and bounds the consequences. The research result indicates Yohannes Haile B.C have low emergency response planning. Absence of emergency response planning increases workers suffering and financial losses in the company.

7. Employee interest to wear personal protective tools with RII= 0.6

The extent of employee interest to wearing personal protective clothing/tools was very low (unwilling to apply). This result agrees with the Harper (1998) and Holmes et al. (1999). According to the respondent's opinion, the reason why employee did not wear the safety kits:- employee had no enough knowledge about protective tools and dangers on site and they feel uncomfortable when they wear safety kits. Besides, the company did not follow weather employee wear their safety kits or not because the perception of construction sites is that, the use of safety equipment's raises task duration. This result agrees with the finding by Irizarry et al.

(2005) .However, it is significant factor to improve construction safety management practices and crucial to decrease on site injuries. As the result, many hazards happened.

8. Role of Government and Engineering Societies (RII=0.621)

Role of government and engineering societies should play a crucial role to apply the safety and health rules by approving criteria's and codes to guard the employees and assets. These procedures should be formally forcing the enterprises to follow them with appropriate firm fines for non-compliance. According to the respondents suggestions the role of government and engineering societies was low in the construction. Even if it has great role to improve construction safety management by creating engineering awareness and defending employee and impose contractors to offer safe occupied situations. This result agrees with the finding of Fang, *et al*. (2004), Teo, *et al*. (2005).

9 Safety professionals use incidents corrective actions ought to explored for reference (RII=0.636)

Corrective activities are occupied to avoid the reoccurrence of incidents and it can be recognized once the root cause (s) of the accident has been recognized. The research result indicated that safety professionals were weak to take incident corrective action. Due to carelessness of safety professional the company did not get sufficient incident information to use as a reference for future work this causes the reputation of similar accidents on employees.

10. Employee medical check-up for drug use and their physical capability

Respondents ranked employee medical check-up for drug habit, liquor drinking and for other things was considered as a burden by most of the employee even the contractor itself didn't give attention for medical check-up. However, it must be conducted by employee to decrease the accident rate in the site, employee did not follow those things and have not capable physical look to do activities must not be involved at work.

CHAPTER FIVE

5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter focuses on the analysis and interpretation given in chapter four. Many findings developed from the study following the presentation of data. Therefore, summary of findings, conclusion and recommendations are based on the objectives of this study as well as the recommendations of the researcher.

5.2. Summary of Major Findings

The key objective of the research is to assess the extent of safety program related factor, personal protective clothing/equipment's factors, safety design/budget related factors, training and awareness related factors ,responsible persons/ organization related factors of construction safety management in Yohannes Haile building contractor .

In general implantation of all identified (45) safety management factors are very important for the enhancement of safety management, to decrease the hazard rate that happened on employee and on assets, and to improve overall management of the project. As the respondent's opinion the company is good to afforded mandatory protective clothing and equipment, subcontractors afford appropriate and suitable private safety tools, the company employed skilled trainer, give attention about insurance for workers, training about safety rule and regulations, and those enhance safety practices of the company.

Additionally, most of respondents decided the leading elements that impact the enactment of construction safety management were absence of safety and health boards, absence of project-specific training and regular safety meeting, low attention to work danger examines and communication.

In addition, lack of Safety and health orientation training, and regular worksite reviews with, employee did not precede every safety guidelines, poor worker involvement in safety and evaluation, absence of emergency response planning, employee did not wear personal protective tools. Besides, absence of role of Government and Engineering Societies, safety professionals

did not use incidents corrective actions and employees did not do medical check-up for drug use and their physical capability. Among the list extent factors most of them are safety program related factors and responsible persons/organizations related factors, it implies that safety program gotten the lowest attention in this enterprise and responsible persons around constructions are carless or have no sufficient skill about safety management practices and its impact on construction site.

5.3. Conclusion

According to (Dadzie, 2013) the construction business performs unwell in work-related health and safety .In spite of several OHS movements and enterprises, the indicators disclose that construction workers continue to be killed or damaged at work every year. Based on the aims of the investigation indicated, the following conclusions were made in relation to the finding.

- There is a serious absence of health and safety boards; they have no project-specific training and regular safety meeting, work danger examines and communication policy, Safety and health orientation training, and regular worksite reviews and do not have emergency response planning, there is no mechanism of record keeping and accident analyses and reporting of accidents.
- Safety professionals did not use incidents corrective actions ought to explore for reference.
- Even though there are mandatory protective clothing and equipment, subcontractors afford appropriate and suitable Private safety tools, but employee did not wear personal protective tools well.
- There are role of government and engineering societies but there is lack of enforcement of regulations from government & regulatory bodies accountable for safeguarding obedience are not appropriately resourced to perform their authorized accountabilities.
- They employed skilled trainer but did not work very well on specific training and orientation training.
- There is training about safety rule and regulations but employee and responsible persons did not precede every safety guidelines around the construction site
- The company did not do regular worksite review whether the employee did follow the rule and regulations or not.

- There is poor employee medical check-up for drug use and their physical capability.
- There is poor worker involvement in safety and evaluation
- Generally, due to low performance of safety management practices there are high accident on site and lose resources in the company.

5.4. Recommendations

As we know construction, industry is dangerous, complex and risky in nature it can be said that the construction safety matter affects and influence the performance of the projects. Based on the research findings, the following recommendations should be placed into practice for the construction company who aims to enhance safety management practices and decrease hazards.

Recommendations are suggested here on the role of each party involved in construction projects, including the clients, the consultants, the contractors and all societies in construction project.

Contractors

- The contractor should make sure that all the employees wear the personal protection equipment and make sure that weather they follow the safety rule and regulations.
- Contractors should implement anticipatory and continuous education tactics to accomplish construction safety practices of the workforces.
- Construction enterprises are accountable to give sufficient training for their employees and enhancing their understanding about the reasons and effects of site accidents on themselves, relatives, the work execution and the public.
- Contractors should as well afford appropriate safety symbols and caution signs.
- Contractors should involve workers in safety and evaluation for better safety program implementation.
- Contractors should be compelled to draw up safety responsibilities and authority structure, which should be available in every site to inform all a party as to their responsibilities as far as health and safety, is concerned.
- Construction firms ought to give main concern to elements having a great impact on safety management enactment of the construction.

- Contractors should give reward and punishment System (Incentives) for employees, reward for employee following the rules and regulations and punish the workers who make safety violation.
- Construction enterprises had better proceeds an extra pre-emptive method in the direction of executing the safety management plans on site through incorporating health and safety management events into general project management plans.
- Construction corporations have to assign safety officers to constantly asses and estimate the Weaknesses of their health and safety management plans and re-establish new occupied clarifications.
- Contractors should confirm that their workforce is accurately educated for their particular responsibilities. This will initiate them to train their co-workers.
- Contractors would think of the financial, societal, political advantage of executing safety program management on their overall construction phases.
- The contractors must educate the employees, stimulate the safety habit for employees and teach them on by what method to escape the danger and use the safety tools accurately in the construction site.
- In addition, contractors should constantly clear their workforces to uphold appropriate safety techniques on view and this can be attained by doing continuous training.
- Contractors should formulate the steady safety meeting throughout the execution of tasks in the construction site.
- Contractors should make sure that weather workers conduct medical check-up for drug use and their physical capability.
- Contractors should make keep records of all kind of accidents that happened construction site, from minor damages to main and fatal accidents, and submit reports to Executive of Professional Health and safety services. Every worker must be take health and safety induction teaching before starting activities, which would include essentials such as emergency treatment (first aid) and fire protection. Training necessarily additionally be delivered if dangers convert, and stimulant training when knowledge are not regularly implemented.
- Contractors must constitute provision for safety management practices when formulating tenders. The delivery for safety and health need be prepared cooperative

with the objective to strive with other tenderers and to escape economic damage. Expenditures for Personal defensive tools events must be discovered and clearly be portion of bidding and costing for the project execution.

- Site regulatory teams ought to be alerted with safety management matters and should exchange that skill with colleague. The supervisors should integrate safety generals to create guidelines, cautionary symbols and other methods leading the activities. The guidelines should put on to everybody on site and should be in inscription and be carried to the consideration of all those who might be impacted.

The Consultants

- The consultants should follow the construction site in order to be assured every safety equipment's used in the construction site are secure.
- The consultants ought to identify the elements that reason harms in the construction site such as the weak use framework and steps and decrease them throughout the construction phases.
- Safety and health management plans must be carefully evaluated at bidding phase by all shareholders as this possibly will reduce hazards around site thus decreasing the expenditures.
- To monitor health and safety management enactment during tender the contractors should have to unite Safety audit report for their requirement. The agreement paper arranged for tender should have procedures for health and safety guideline
- The consultant has to put procedures for health and safety guideline and allows imposing procedures and rules for health and safety problem minimization in formulating the agreement document.

The Clients , Employee, Safety professionals

- Employee and responsible persons in the construction site should implement the rule and regulations set by the contractors in order to save themselves from accident and to avoid extravagance that will happen.
- Employee should do medical check-up for drug use and their physical capability before starting work.
- Safety professionals should set strong safety duties for work.

- A safety officer should observe site activities to make sure that employees obey with organization rules and government safety guidelines.
- Project supervisors should evaluate the habit in which they organize work to achieve the effective and efficient use of safety equipment in order to inspire the use of personal protective equipment.
- Architects, structural engineers, and different designers must talk and decide about the protection and health Expressions with owners.
- Employee should wear mandatory personal protective equipment's without carelessness.
- Client should hired project supervisor observing the implementation of contractors and subcontractors safety management policy.
- The owners should regulate and counselor the contractors and consultants by offering safety teaching to employees, encouraging safety values, habits in the construction site.
- Owners should deliver appropriate safety programs that are reliable with nationwide Rules and Guidelines to confirm the health and safety of employees. This embraces keeping a workstation that has insignificant dangers and fortunes that can cause in damage or death. As well, they make sure that a capable person reviews the construction activities at appropriate period to safeguard safety rules are implementable.
- Owners must do an evaluation of the health and safety dangers to which workforces and others are vulnerable on construction sites.
- Sufficient financial plan for safety and health management delivery must be specified in every construction agreements, which must be ratified by all gatherings
- Safety designers have to work and communicate with the main parties of a construction project for instance supervisors or clients
- Construction project necessarily bring their rightful parts towards making construction sites healthy and safe.
- Lastly, all construction parties must contribute their rightful parts towards making construction workplace healthy and safe by improving safety management practices According to Toole (2002) site security, prospects must not simply be applied in nature and imitate the powerful capacities of every construction gathering, additionally have to project and firm definite. He similarly highlighted the significance of every diverse construction gatherings with respect to finding accurate and common prospects about the

protection responsibility that every being can achieve. Common prospects of protection results and practices are similarly contended to support in the avoidance of onsite construction fates.

Recommendations for future work

- Study can be accompanied to assess the existing practice of safety management performance on construction projects, in view of all members, contractor, client, and consultant, and government, insurance company in case of Addis Ababa or all over the country.
- Investigation can be accompanied by relating the extent of construction safety management practice and enactment with other industries like production and farming trades in Ethiopia.
- Study can be investigated out to measure the degree hazards which result in without carry out of Health and Safety management practices in the construction Industry.
- The study can be accompanied to further construction segments like Dams, Roads, Airport fields, Railways, repairs understand the responsibility of the client and the consultants to escape or alleviate the dangers in construction sites.

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APPENDIX A

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St. Mary's University, Ethiopia

DEPARTMENT OF PROJECT MANAGEMENT

Research Questionnaire on Assessment of Construction Safety Management; the Case of Yohannes Haile Building Contractor in Addis Ababa Ethiopia

Dear Respondent

My name is Birhan Ayehu. I am currently doing my MA in project management at St. Mary`s University School of graduate studies. I am conducting a research about the assessment construction safety management; the case of Yohannes Haile building contractor in Addis Ababa Ethiopia. The focus of the study is at Addis Ababa city one grade one contractor. I believe that your experience and knowledge related to construction projects will help me acquire valuable information on the assessment construction safety management. I kindly invite you to help me in completing the attached questionnaire as honestly as possible. I guarantee that your identity will be kept confidential and the information will only be used for academic purposes. Your kind assistance in this aspect is highly appreciated. Thank you for sharing your precious time.

Note: Writing your name is not necessary.

Yours sincerely

Birhan Ayehu

Graduate Student, Project Management

Email: birhanayehu4@gmail.com

Advisor: Abebaw kassie (PHD)

SECTION A : General Information

Please thick on the answer which describes you

1. Gender

1.Male ☐ 2. Female ☐

2. Age

1. 18-30 yrs ☐
2.31-40 yrs ☐
3. 41-50 yrs ☐
4 1-60 yrs ☐
5. Over 60 yrs ☐

3.Responsibility of Respondent

1. Manager ☐
2.Site engineer ☐
3 .supervisor☐
4 .Office Engineer ☐
5 .foreman ☐
6. Other, specify _____

4. Level of Education

1 .Diploma ☐
2 .1st Degree ☐
3.2nd Degree ☐
4.PHD ☐

5. Relevant working Experience (years)

1.1-5 Years ☐
2.6-10 years ☐
3.11-15 years ☐

SECTION B: Assessment of construction safety management in the case of Yohannes Haile building contractor.

6. Rate the extent of construction safety management in your organization according to the following attribute

From your experience, rate the construction safety management practices please mark from 1-5, in the table below: -

Category	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Rating	5	4	3	2	1

N	Construction Safety Management practices	S.A=5	A=4	N=3	D=2	S.D=1
1	**Safety Program related factors**					
1	Worker involvement in safety and evaluation					
2	Written and complete safety and health designs					
3	Project -specific training and regular safety meeting					
4	Subcontractor choice and management					
5	Work danger examines and communication					
6	Record keeping and accident analyses					
7	Safety supervisor on site					
8	Safety and health boards					
9	Emergency response planning					
10	Safety and health orientation training, and regular worksite reviews					
2	**Personal Protective Clothing and Safety Equipment's related factors**					
11	Attention and delivering safety equipment					
12	Mandatory protective clothing and equipment					
13	supervision weather employee use safety kits properly or not					
14	Perception of construction sites about the use of safety equipment's					
15	Appropriate and suitable protective clothing and safety equipment					
16	Implementation of rule and regulations about safety tools					

3	**Safety Design /safety budget related factors**					
17	Certified safety designer					
18	Interconnection between safety designer with supervisor and client					
19	Attention about insurance for workers					
20	Budget for safety and for site remedy actions					
4	**Safety Training and Awareness related factors**					
21	Training for workers on safety obstacles and how to avoid them					
22	Safety teaching and education habit					
23	Training about safety rule and regulations					
24	Skilled trainer					
25	Budget for training					
26	Training for workers how to use safety tools					
5	**Responsible Persons/organizations related factors**					
27	Safety officer observing site activities					
28	Client form safety as a fundamental project constituent before starting work					
29	Client observing the execution of contractors and sub-contractors safety polices					
30	Client employed project supervisor					
31	Employee interest to proceed every safety guidelines					
32	Employee interest to wear personal protective tools					
33	Employee medical check-up for drug use and their physical capability					
34	Employee interest to take safety trainings					
35	Safety professionals use incidents corrective actions ought to explored for reference					
36	Safety professionals set safety duties for work place					
37	Contractor /subcontractor afford safety symbols and					

	caution signs					
38	subcontractor afford Private safety tools					
39	Contractor /subcontractor communication and information with workers					
40	Contractor reviewing safety execution of subcontractors against safety policy					
41	Contractor /subcontractor design for disaster ways and departures, transportation paths, hazard parts					
42	Project managers management commitment					
43	Project managers notify employee about existence of danger					
44	Contractors Reward and Punishment System (Incentives)					
45	Role of Government and Engineering Societies					

7 .The major consequences happened due to poor construction safety management practice

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SECTION C:Mitigation Measures

Please suggest your recommendation to enhance safety management practices and to decrease construction hazards.

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Thank you