

**ASSESSMENT OF EMPLOYEE SAFETY IN CONSTRUCTION
SECTOR: IN THE CASE OF ADDIS ABABA HOUSING
PROJECT**

*A Thesis Submitted to the School of Graduate Studies of Jimma University in
Partial Fulfillment of the Requirements for the Award of the Degree of Master of
Project Management (MA)*

By

NATANIM CHAKA

Under the Supervision of

MR. OSMAN R. (PhD Scholar)—Main advisor

&

MR.MESFIN M. (PhD Scholar)--- Co-advisor



**MA Program, Department Of Management, College Of Business and Economics, Jimma
University, Jimma, Ethiopia
July, 2020**

(email:natichaka22@gmail.com ,+2519264499142)

DECLARATION

I declare that the research Report entitled “**Assessment of employee safety in construction sector: in the case of Addis Ababa housing project**” submitted to Research and Postgraduate Studies’ Office of Business and Economics College is original and it has not been submitted previously in part or full to any university.

Date: _____

CERTIFICATE

We certify that the Research Report entitled

“ _____ ”

was done by Mr. _____ for the partial fulfilment of Masters Degree under our Supervision.

(Main Advisor)

(Co-Advisor)

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Abstract

The nature of the construction sector is a highly risk area for the workers with frequent accident rates and ill-health problems. This is because the industry has a poor safety performance record compared to other industries all over the world. This study therefore, aims to assess safety management practice in housing construction projects in the city of Addis Ababa, Ethiopia. In pursuing this objective, a descriptive case study research design was used. For this study the researcher selected 2 sites out of 7 which were under construction and 42 contractors at a place called “Koye Feche”. To gather information the researcher used both primary and secondary data. The researcher classified the main causes of accident in to three; management (contractor and consultant) related, government related and workers related. And also the researcher tried to identify the frequent accident type. As per the information gathered in the research process, the result showed that management related factors for the cause of accident was immense. Failure of the government to enforce the laws had contributed a lot for the causes of the accident. In addition, workers lack of awareness about safety was noticed in the research as a factor for the cause of accident. At the end, the researcher recommended that the government should play a vital role by enforcing the law to make sure that the contractors are adhering to the safety rules and regulation; and the contractor also should give due consideration on safety first. All stake holders should work harmoniously to minimize the current accident rate and create awareness on safety issues.

Keywords: Safety, PPE, Hazard, Accident, safety management and construction site

List of Acronyms

BLS	Bureau of Labor Statics
CII	construction industry institute
GDP	Growth Domestic production
GTP	Growth and Transformation Plan
GVP	Growth value product
HS	Health and safety
HSE	Health and Safety Excusive
ILO	International Labor Organization
MoH	Ministry of Health
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
Uk	United kingdom

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CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Construction industry is a massive and an important sector which is a cornerstone of the world economy. The construction industry employs a significant size of the population. The construction industry also contributes significantly to the generation of revenue for the government. In many developing countries, large construction activities account for 80 percent of the total capital asset as developing countries are considerably dependent on the growth and development of their physical infrastructures. Besides this, the industry provides high job opportunity for workers. (Mayer, Mohamed & El-Masri, 2007)

ILO recently estimated that globally about 2.2 million people die every year and some 2.3 million women and men around the world succumb to work related accidents or disease every year; this corresponds to over 6000 deaths every single day. The economic cost of work related to injury and illness varies between 1.8 and 6 percent of the GDP in a country and an average of 4 percent of the GDP globally in 2016. The impact of occupational health and safety hazards faced by construction workers in developing countries is 10 to 20 times higher than those in industrialized countries. (ILO, 2005).

Worldwide, there are around 340 million occupational accidents and 160 victims of work related accident from this almost 60 percent accident occur at construction sector. Construction industry is the most hazardous industry with fatal injury rate than the national average in this category for all industries (ILO, 2001). Most of these accidents are created due to unsafe behavior and unsafe conditions. Hence, health and safety problem in construction is a major and worldwide issue which needs strong consideration since it affects the life of the workman (man power).

In Ethiopia Construction industry has both a direct and an indirect impact on a given national economy. It contributes to the nation output and stimulates the growth of other sectors through a complex system of linkages. The building sector has seen double digit growth, expanding by 37

percent annually, and is ushering in a new phase of development for the country. According to the report of the Ethiopian economy association (2006/07), the share of construction in the GDP has been rising and has reached about 5.6 percent recently. The GVP of the construction sector has been increasing by more than 16 percent annually over time and has now reached nearly 30 billion Birr. The value added (at constant market price) that the construction industry generates has increased from Birr 2 Billion in 1995/96 to Birr 4.5 billion in 2005/06 depicting an average annual growth rate of 8.5 percent over the period. Within the construction industry the value added by the share of the residential construction, non-residential and other constructions are 42 percent, 30 percent and 28 percent, respectively. This shows the dominance of the residential construction in the industry.

The industry absorbs huge amount of labor force and create incomes for different participants. In Ethiopia, nearly 6.5million construction workers have been working in 252,000 construction sites. Besides this, the rate of death and injuries are the highest among all industries in the country. Many workers lost their lives and money others are exposed to high physical injury on sites due to lack of safety materials, improper use; negligence and lack of awareness are amongst the major causes. Prior literature shows that in Ethiopia accident occur frequently with little or no documentation. (EEA, 2008)

In Ethiopia building construction industries are the second leading causes of injury next to a traffic accident and the risk of fatality in the construction sector is five times higher than manufacturing industries. Prevalence of occupational injuries among construction workers was in Ethiopia varied between 38.3 and 84.7 percent. (EEA, 2008) Despite its importance, construction sites have been regarded as very risk areas where construction workers are subject to fatalities and ill health problems. Thus, in Ethiopia the concern for safety is very insignificant by all stake holders though there is an authorized government body assigned to enforce and follow up the implementation of safety rules and regulations at site.

The need of this paper is to assess safety management practice in Addis Ababa housing project at special area “Koye Feche” and also expected to contribute to the discussion of various strategies needed to revitalizing the construction industry’s approach to dealing with safety,

1.2. Background of the study area

The selected area of this study is Addis Ababa housing project because many local and international construction companies and consulting companies have been working in the city. The study is focused on special area called “koye Feche” because it is the biggest site which is administered under Addis Ababa housing project.

1.3. Statement of the problem

The researcher is motivated to conduct this research to assess the root cause of accidents which have been occurred in relation to the application of safety rules and regulation, safety management and safety practices in construction sector particularly at Addis Ababa Housing project special area “Koye Feche” site.

Prior literatures in Ethiopia were prepared by gathering data only from client, government and management; they exclude the most vulnerable workers/labors that frequently faced the problem as a source of information. To mention a few: Evaluation of Health and Safety practice in building construction a case study in Addis Ababa by (Fekete, Quezon and Macarubbo, 2016), Assessment of Construction Safety and Health Management in High Rise Building in Addis Ababa by (Argaw.F, jun.2017), Study of Health and Safety performance indicators on Ethiopia public (road & Building) construction project in case of Addis Ababa city by (Tariku, 2014).

Therefore, the researcher is intended to fill this gap by including workers/labors as a source of information for this research paper. The researcher also intended to give answer for the research question; ‘Which stakeholder contributes more to the major causes of accidents?’

1.4. Objective of the research

1.4.1 General objective

The main objective of this research is to assess safety management practice at “Koye Fetch” site.

1.4.2 Specific objectives

- To identify frequent site accidents at “ Koye Fech” site.
- To examine the current safety practices at Adiss Ababa Housing project special area “koye Fecch” site.
- To investigate the awareness of construction workers at” koye Fech” site.

1.5 Research questions

The research question this study answers are:

1. What are the types of accident frequently occur at Addis Ababa housing projects?
2. What are the causes of accident at Addis Ababa housing projects ?
3. How the constructions companies practices safety rules and regulation at work place?
4. How many workers knows about safety at the construction house?

1.6 Significance of the study

The purpose of this study is to assess safety management and practice at construction industry in respective to management (contractor & consultant), government and workers' practice. Besides these; as input for those policy makers and as a reference for the upcoming researchers . The researcher also asses what is perceived against actual safety practice on the selected site. The researcher examines how safety is contextually understood in comparison with the definition proposed in the academic literatures. In doing so, the study looks forward to analyze the opinion of government body about the safety practices in line with workers wellbeing and the challenges there on.

A few contractors integrate safety issues in their operation because safety issues needs due consideration and also has moral values in it. Although many researchers have studied different aspect of health and safety on construction site, there is no research conducted on the impact of safety management on the well being of the construction workers at “Koye Fech” site.

The study also intended to address the current gap of various stakeholders on the understanding of issues related to safety. The findings of the research fill up the knowledge gap regarding safety.

1.7 Scope of the study

The study covers the subject matter of safety and issues in the construction sector during its engagements. It also explores the concepts of safety in relation to various identifiable concerned bodies, workers and other stakeholders where a construction work operates. This study used

descriptive research method to investigate employee safety on Addis Ababa Housing Project special area "Koya Feche" site. It is not extended to other aspects of the construction.

1.8 Organization of the paper

The structure of the thesis is comprised of five sections: an introductory section; literature review; the research methodology; results of the research; discussion chapter; conclusions; and, recommendations for future research.

The structure of the thesis is described as follows:

The first section of the thesis is a general introductory chapter, chapter 1. This chapter contains background of the research, aim and objective and statement of the problem. It also presents the context of the study.

The third section presents the research design and methodology. This section presents the research strategy and research design which underpin the research. The data collection methods and sampling techniques employed in the study are discussed in this section. A description of how access was gained to study participants is also included. The research process adopted for the thesis is also presented.

The fourth section contains the results of the study and also, a discussion of the result. Present by ranking the factors and by using tables, frequency and percentage.

The fifth chapter presents the conclusions and lessons of the study, the contribution the study makes to knowledge and for improving safety practice at construction sites. The chapter also acknowledges the study's limitations and provides recommendations for further research.

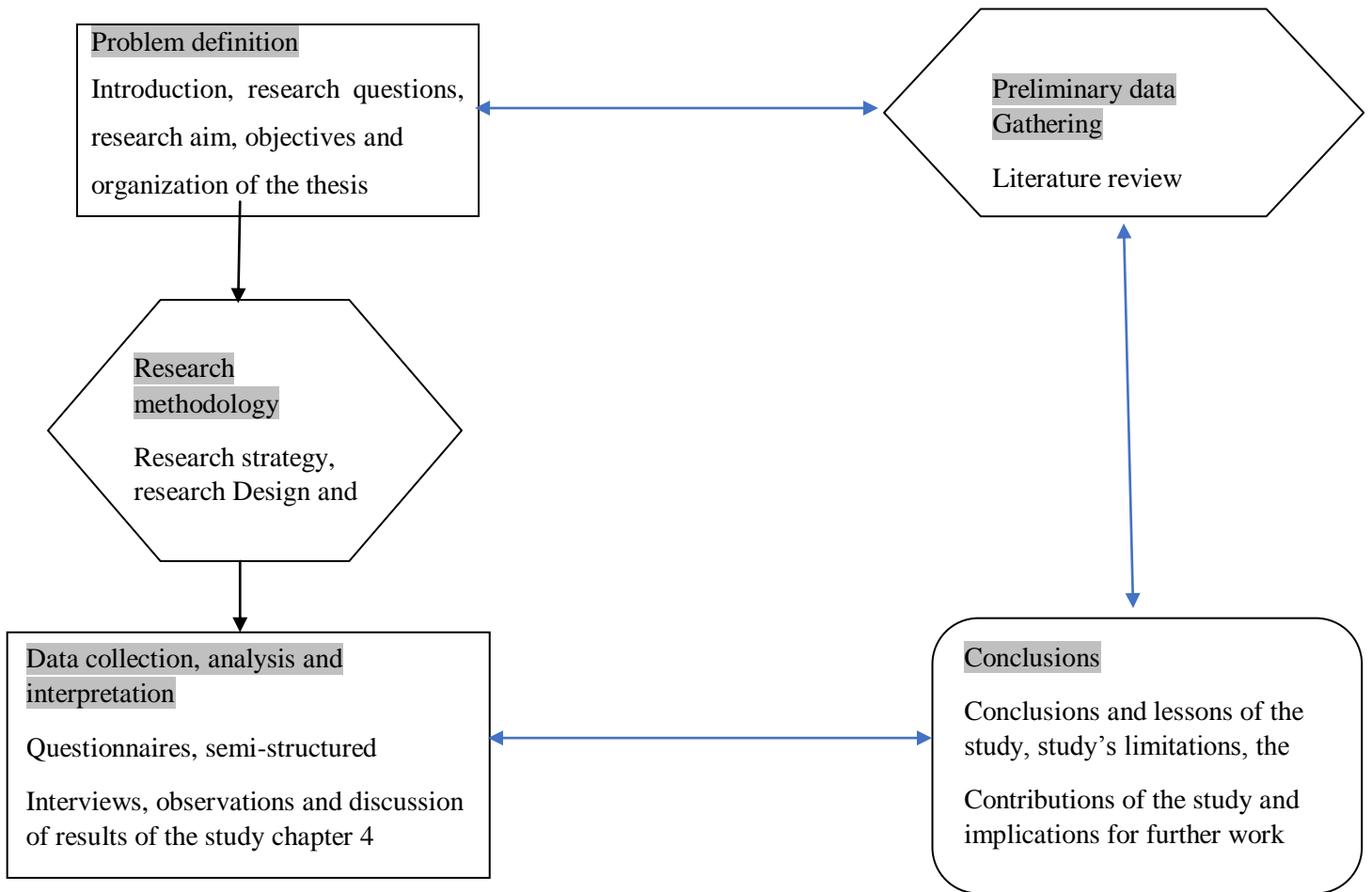


Figure 1.1 The research process adapted and modified from Kheni (1984)

CHAPTER TWO

REVIEW OF LITERATURES

2.1 INTRODUCTION

This chapter provides the theories used for this research. This review will look at and give a background to health and safety definitions, construction hazards, accidents and source of accidents has been used in this study to show the setup of construction projects on construction sites and the flow of construction safety having an impact on safety and health management. Construction projects have been guided by regulations and system which influences the safety performance of a project. In addition, some safety related aspects from prior studies are discussed in this chapter to give a richer context for understanding construction safety and health influence the performance of a project

2.2 THEORETICAL REVIEW

2.2.1. Safety and health

According to the definition ILO and WHO” Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental, and social wellbeing of workers in all occupations, the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational capabilities, and to summarize the adoption of work to men and of each man to his job”

National laws and regulations are often based upon international conventions, agreements; declarations and programs. Theses have been drawn up by different United Nation Organization including the International Labor Organization (ILO) and the World Health Organization (WHO). In 2013 the ILO adopted the safety and Health in construction convention (no. 167), and

its accompanying Recommendations (no 175) , which provide a foundation of law on which safe and healthy working condition of law on which safe and healthy working conditions can be built.

The standard of occupational health and safety available at any work place is the main determinant of workers' health. Workers all over the world, face dual occupational hazards, over the last few years. Rapid industrialization, technological advancement, globalization have been resulting into injuries, accidents, illnesses, disabilities and death. Occupational health and safety issues affect individuals, families and communities as a whole. All stakeholders including the state, the managers, the employers and the workers have certain responsibilities to take up medical, engineering and legislative interventions to make work environment safer.(Gomel journal,2016,vol14 n0 4 p 223-224)

According to Encyclopedia Britannica Safety is the activities that seek either to minimize or eliminate hazardous conditions that can cause bodily injured. Safety precautions fall under two principal headings, occupational safety and public safety. Occupational safety is concerned with risks encountered in areas where people work, offices, manufacturing plants, farms, construction sites, and commercial and retail facilities. Public health involves hazards met in the home, in travel and recreation, and other situation not falling within the scope of occupational safety. Safety was not considered to be a matter of public concern in ancient times, when accidents were regarded as inevitable or as the will of the gods. Modern notions of safety developed only in the 19th century as an outgrowth of the Industrial Revolution, when a terrible toll of factory accidents aroused humanitarian concern for their prevention. Today the concern of safety is worldwide and is the province of numerous governmental and private agencies at the local, national, and international levels.

According to The Oxford Dictionary 5th editions definition of Safety is “The condition of being protected from or unlikely to cause danger, risk or injury”

2.2.2 Health and Safety in the Work Place

Occupational health and safety has been defined by the International Labor Organization (ILO), 2001 as: *“The prevention and maintenance of the highest degree of physical, mental and social well-being, the prevention of ill-health among workers caused by their working conditions, The protection of workers from factors adverse to their health in their employment, and the placing*

and maintaining workers in occupational environments adapted to their individual and psychological conditions.” Health refers to the protection of bodies and minds of people from illness resulting from materials, processes or proceeding used in the work place whereas safety is protection of people from physical injury (Hughes and Ferret, 2008). Safety means a state in which no danger of a damage causing accident exists. Health level of occupational health and safety contributes to the achievement of material and economic objectives and provides high quality and performance in working life. In spite of this, conditions at work and in the work environment for many occupations and in many countries still involve a distinct and even severe hazard to health that reduces the well-being, working capacity and even the life span of working individuals.

According to the (ILO), 2008 270 million suffer from occupational injuries. More than 80% occupational disease or injuries occurs in developing countries, this shows tip of the iceberg as underreporting in developing countries is common workers and their families suffer from pain and misery, economic and job losses. Employers confront loss of production, reduction in the quality of work and negative image of the organization. And also this research reported that 337million occupational accident occur worldwide in every year and as a result of these accident 2million and 310 thousand people decease and 160million people get injured. The financial losses caused by occupational accidents are estimated at 1.2 trillion USD. There is an economic burden such as social security system and treatment costs on the back of society due to occupational accidents and disease.(Andreoni,2006) Costs caused by occupational accidents are well investigated in many different studies and they are subdivided into two categories as direct costs and indirect costs. Direct cost include first aid expenses, disability allowances, compensations, court expenses, the cost penal provisions of the accidents involve death. Indirect costs including workday loss, working time loss in workplace, time loss for investigating the accident and legal processes, pausing the production after the accident, delay in work flow and program, damage in working machines or stoppage to use these machines, low efficiency of workers, loss of reputation for the company, fine for late delivery. Thus, it is indicated that indirect costs are much higher than the direct costs in total. (Richardson, 2004; Schulze, 2014). The American Society of Safety Engineers, 2014)

2.2.3 Safety in construction

Construction is one of the most hazardous industries due to the nature of the complex and unsafe construction sites. Recent international safety literature suggests that the main factors affecting safety performance include safety awareness by top management, lack of training, poor safety awareness of project managers, reluctant to input resources in safety management, and reckless operations, also the government needs to play a more critical role in ensuring stricter legal enforcement and organizing safety training programs (Tan 2004)

The prevention of construction accident usually entails predicting future accidents and their nature under given circumstances. As making such predictions is based on knowledge about past accidents, clearly research and prudent safety practices are required to prevent construction accidents. The major causes of such accidents are related to the unique nature of the industry, human behavior, difficult work site conditions, and poor safety management which result in unsafe work methods and procedures (CII, 2009)

According to ILO, a great number of occupational accidents occur in construction sector, which takes an important place for employment in all over the world. In every year 60,000 workers die in construction sector. Construction sector is a high risk sector as a result of its production processes and labor intensive characteristics. Great financial losses occur due to these accident because the costs that caused by occupational accidents in construction sector aren't calculated, preventive measures can't be taken at a sufficient level. (ILO, 2001)

Hinze (2005), stated that in order to improve safety performance on construction sites, the construction firms must be structured and positioned to make changes when it is needed. He also stated that for the companies to be really up to the task in safety issues, they need adopt a safety approach which will not be based on monitoring injuries alone but rather also deal in measures/policies which can lead to better safety performance.

Molenaar et al (2002) advocated that construction safety plans must not stop at the levels of drafting them, rather they should go beyond that and ensure creation of adequate safety culture, although Farooqi (2008) are of the perception of a good and efficient implementation of health and safety measures in developing countries. Virtually all construction sites in developing countries are faced with unsafe conditions exposing the laborers to a wide range of hazards.

These hazards are unfortunately not pointed out to the workers, most of which are usually novice in construction activities. The main goal of contractors in these countries is the profit they make from executing such projects; hence they try as much as possible to maximize profit.

Records relating to safety in construction industry still remain the poorest despite the dramatic improvement recorded in recent times (Foad, 2011). Okoye (2010) suggested that accidents in the construction industry are poorer than that of the manufacturing industry and factories because the working condition in these factories and industries are controlled; the personnel usually remain stable whereas that of the construction industry is largely dynamic in nature. The workers are frequently changing hence control of working condition is difficult, if a set of workers are enlightened the enlightenment leaves with them when they stop working on that site hence the process needs to be repeated when new set of workers are employed. Compared to other industries, accident rates in construction are high. Thus, construction and project management need to be fully prepared to deal with accidents when they occur, undertaking proper investigations and reporting procedures afterwards. Accident statistics represent not only terrible human tragedies but also substantial economic costs. This is because accidents cause damage to plant equipment, and the loss of productive work time until the normal site working rhythm and morale are restored. Accidents can also cause work disruption and reduce the work rate (Hinze, 2003)

2.2.4 Global construction industry safety outlook

According to construction industry institute globally 55,000 fatalities occur at construction industry every year. These means approximately one fatality occur in one minute.

With the recent breakthroughs in technology, the construction industry has benefitted positively. However, these growths have led to unsafe work environments (Farooqui, 2008). Findings from researches have revealed that individuals who spend their lives engaged on construction sites have 1 in 300 chances of being killed on these sites. Revealed further was the likelihood of being inflicted with injuries or serious illness is much higher if compared to other available industries. The workers are expected to at some certain point in time/days be unavailable for work as a result of the injuries or illnesses they might have sustained from working on these sites (Foad, 2011).

According to Foad (2011) being hit by falling objects and falling at ground level were the commonest reasons for occurrence of accidents. Zeng et al (2008) also revealed that falling from height and being hit by falling materials were the most predominant reasons for accident occurrence in the Chinese construction industry. Likewise a study conducted in the year 2000 in China by Huang et al cited in Farooqui (2008) showed that 3000 workers lose their lives in work related accidents in construction sites, Hong Kong recorded about 275 incidences per every 1000 worker in each year. The case of United Kingdom is about 50 per every 1000 worker each year (Foad, 2011).

The case of Pakistan as reported by Farooqui (2008), he highlighted the labour intensive nature of the industry; the workers were largely unskilled and migrate in a group wise manner leaving behind their families. They further revealed that a major divide existed between the large scale contractors and small ones. The large scale contractors had existing safety policies which were unfortunately not being implemented as their employees were basically ignorant of the existence of these policies. These workers were generally faced with lack of medical facilities, poor housing and poor sanitation problems. Okeola (2009) was of the view that in Canada, company practices had an impact on safety performance. Projects where a Safety Officer was employed had better safety performance records.

2.2.5 Trends in developing countries workers skills

This sector of every Nations economy is referred to as a labour-intensive sector (it used number of workers per unit of output than other sectors). The laborers in the construction industry account for about 75-80% of total work force in the industry (Habitat International, 1983). The International labour organizations 2001 report confirmed the labour-Intensive nature of most developing countries construction industry, it stated that “despite mechanization, the industry is still largely labour-intensive especially in developing countries...” this might perhaps not be unconnected with the high illiteracy rate among workers in these countries which Nigeria is also part of and above all financial constraints making the acquisition of such machines look challenging and impossible in some cases.

The workers are classified into three (3) groups, with respect to their skills, they are: unskilled, semi-skilled and skilled workers though majority of workers in the construction industry are unskilled (John, 2004). Construction work usually serves as an alternative to farmers who

usually jump into it without prior skills/adequate training (ILO, 2001). In Brazil around 1960-1980, an estimated 30 Million people left the Rural areas for Urban areas, most of this population ended up joining the construction industry without acquiring adequate skills (ILO, 2001). Similarly in India, about 670 unskilled workers on 11 construction sites in Delhi migrated from rural towns to urban centres, with the major reasons behind their actions being poverty and unemployment (Anand, 2000).

In China, the growth of the construction industry also attracts excess labour from rural areas. Most of the urban construction sites rely mainly on the labour provided by the rural workers. In 1996 Beijing construction industry employed a total of 424,000 workers from 60 different provinces (Lu and Fox, 2001). This trend in employing such rural migrant workers by construction firms in most developing countries might perhaps be because of the cheap labour they provide, neglecting their level of education and training. This translates into the high number of illiterate workers in most construction sites across developing countries

2.2.6 Construction safety in developing countries

Construction sector is in the first place in terms of death rates in developing countries, the workers of construction sector face with the risk of death 3 times and injury 2 times more (Mohamed, 2002, Levitt and Samuelsson, 1993, Rivera and Thompson, 2000.)

Accidents frequently occur on building construction sites. These accidents could be in the form of Workers falling from heights, exaction accidents, the risk of falling debris or equipments etc. Researchers have shown that accidents and injuries in developing countries are generally high when compared to other European countries (Idoro, 2007). Some of these accidents could be attributed to the fact that work takes place in unsuitable site conditions. It is worthy of mentioning that safety is not giving consideration during construction project delivery process in most developing nations, it is deemed to be an unnecessary aspect of the process. (Mbuya and Lema, 1996). Ibrahim (2014) stated that the building construction industry is made up of several personnel with different trades, these personnel are assembled on the sites at various stages of the construction process. This single factor adds more complexity to construction process, control of activities and personnel is usually not easy as they come from different backgrounds with unique characteristics special to them.

Koehn et al (2000) revealed that accidents are usually not reported in developing countries, the employers usually provide some cash compensations to these workers for injuries sustained while working on site. These compensations are usually regarded to be generosity from the employer as they can do without making such payments. Samuel et al (2010) revealed that there was a serious lack of structures and procedures regarding worker safety at all levels of construction chain in Ghana. Bruno et al (2012) also suggested that about 81.1% of Nigerian construction Site workers do not wear personal protective equipments (PPE) provided by the contractors, there reasons for these being that the protective equipments are either oversized/undersized or heavy. These lapses result in serious injuries when accidents occur. Dawit (2006) stated that there is high under reporting of accident in Ethiopia. The accidents are reported only from around 10% of the undertakings that are covered by the legislation. Accidents that occurred and reported during the years 1993-2004 for 11 years is total sum of 44903 non-fatal and 101 fatal accidents were reported during these years (Dawit, 2006).

2.2.7 Legal aspect of safety and health management

2.2.7.1 Developed country

The industry control environment in developed countries has incorporated OHS as an integral part in the regulatory framework. In the U.S.A. for instance, the workers compensation rates are a function of the loss experience of a contractor, and each labor hour is affected through the reflection of those losses in the experience modification rating (EMR) (Farooqui,2008). On one hand, a safe contractor can create a substantial competitive advantage through superior safe experience while, on the other hand, an unsafe contractor can be liable to pay huge penalties in terms of insurance. Safety, therefore, and the effects of its absence accidents is now a key cost driver for construction firms in such countries. Safe work experience is also becoming a business survival issue for them, as more and more owners are reluctant to permit contractors to bid work without acceptable EMRs (Farooqui,2008). Thus, the most important step in controlling costs for contractors in these countries is to run safe construction projects. Hence the contractors are compelled to implement safety as their business strategy, which has led to recent improvements in global construction safety records (Farooqui, 2008).

2.2.7.2 Developing countries

Construction processes in developing countries share similar characteristics in terms of the adoption of technology, construction methods, cultural environments and regulations, (Thomas,2002). These aspects of the industry in developing countries make the management of construction projects including health and safety a difficult one (Jaselskis, 1999).

In many developing countries, the legislation governing Occupational Health and Safety (OHS) is significantly limited when compared with that in the UK (Enshassi, 2008). Previously, (Lee, 2003) found that in many countries that have safety legislation, the regulatory authority is weak or non-existent and employers support regulations only superficially.

2.2.8 Safety rules and regulation in ethiopia

The Ethiopian Government sign many international law that have different concerns, amongst the laws which are practically in effect is ILO” Labor proclamation”. According to Labor Proclamation No 377/2003 sub article 92 now, therefore, in accordance with part seven occupational Safeties, Health and Working environment indicate that preventive measures that should be taken by the employee and employer.

Obligation of an Employer

An employer shall take the necessary measure to safeguard adequately the health and safety of the workers; he shall in particular:

- 1/ comply with the occupational health and safety requirements provided for in this proclamation;
- 2/ take appropriate steps to ensure that workers are properly instructed and notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health; ensure that directive are given and also assign safety officer; establish an occupational safety and health committee of which the committee’s establishment, shall be determined by a directive issued by the Minister;
- 3/ provide workers with protective equipment, clothing and other materials and instruct them of its use;

4/ register employment accident and occupational disease and notify the labor inspection of same;

5/ arrange, according to the nature of the work, at his own expenses for the medical examination of newly employed workers and for those workers engaged in hazardous work, as may be necessary.

6/ ensure that the work place and premises do not cause danger to the health and safety of the workers;

7/ take appropriate pre executions to insure that all the processes of work shall not be a source or cause of physical, chemical, biological, ergonomically and psychological hazards to the health and safety of the workers;

8/ implement the directives issued by the appropriate authority in accordance with this proclamation.

Obligation of the workers

Workers shall:-

1/ co-operate in the formulation of work rules to safeguarded the workers' health and safety, and

Implement them;

2/ inform forth with to the employer any defect related to the appliances used and injury to health and safety of the workers that the discovers in the undertaking;

3/ report to the employer any situation which he may have reason to believe could present a hazard and which he cannot avoid on his own any accident or injury to health which arises in the course of or in connection with work;

4/ make proper use of all safeguards, safety devices and other appliance furnished for the protection of his health or safety and for the protection of the health and safety of others; and

5/ obey all health and safety instructions issued by the employers or by the competent authority.

The fundamental law of the state which is the construction of the Federal Democratic Republic of Ethiopia, the civil code (proclamation no 165/1960) together with the Labor Code

(proclamation no 377/2003) are the general legal basis for health and safety rule in Ethiopia. Numerous articles/provisions are provided under these general laws regarding health and safety of people.

Labor code ensures worker employer relation and enables workers' employers to maintain industrial peace. It strengthens and defines the powers and duties of the organs charged with the responsibilities of inspecting labor administration, particularly labor condition, occupational safety, health and, environment. Article 92 clearly spells out the fundamental obligation of an employer with regard to putting in place of all the necessary measures in order to ensure, workplace is safe, healthy and free of any danger to the well being of workers. In the same article the employer is obliged to take in particularly the following measures to safeguard the health and safety of the workers.

Article 93 provide the obligations of workers pertaining to the required co-operation and putting into practice of the regulation and instruction given by the employer in order to ensure safety health and working conditions at work places. The law has clearly stipulated about occupational injuries with all other related provision

2.2.9 Construction accident at site

Construction accidents happen on site, however, leads to much social costs which harm the society. The adverse outcomes create the need for accident prevention that requires knowledge of accident causal factors, how these factors contribute to accident causation and the extent to which causal factors contribute to accident (Manu 2012).

There are many causes which lead to accidents. Generally speaking, we can classify construction accident into two categories: direct (immediate) and indirect (distance) causes. The direct causes refer to causes which have immediate effect on workers' safety condition, e.g., structural failures and insufficient PPE. Nevertheless, what gives room for these unsafe conditions exists on sites depends on indirect causes such as poor organization and economic concerns (Man and Wah, 2013)

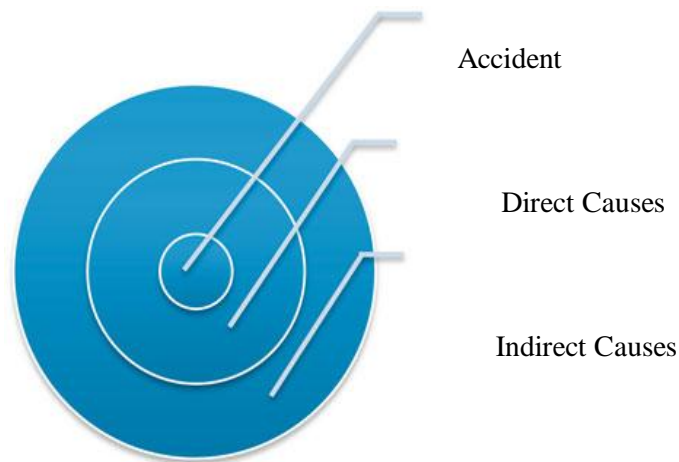


Figure 2.1 Causes of construction accident

Most of the construction companies do not have written safety policy, safety officer, health and safety committee, hazard identification and reporting program, and properly placed safety signs (Mayer, 2007)

2.2.10 Types of health and hazard in construction site

Various researchers have divided health and safety hazards into two categories, namely the physical injury hazards and the ill-health hazards (Davies & Tomasin, 1996; HSE, 1998; Murie, 2007). Hazard of physical injury include death consequences. Hazard of ill-health can only be notified after a long period and shall cause sickness or death after a certain period of time (Murie, 2007). The following are common hazards on construction sites irrespective of the physical injury or ill-health problems.

The main hazards associated with working at height are people and objects falling onto people below. Falls from height have been viewed as the one of the most frequent killers of the workers on construction sites. Statistics indicate that nearly 1,000 construction workers are killed each year at their work places. Of these, one-third or over 300 deaths are a result of construction site falls (ILO, 2005). The study from different countries for example, New Zealand, indicates that, falls from heights are the leading cause of occupational injuries on construction sites (Bentley et al., 2006). In China's construction industry, falls account for approximately 51% of injuries

(Yung, 2009). In Hong Kong, work-related falls from heights represented more than 47% of all fatal incidents (Chan, 2008). Chi and Wu (2004) reported that more than 30% of fatalities in Taiwan can be attributed to falls. As a result, falls are the most costly occupational hazard in many countries. Common construction site falls include roof-related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects. These may occur as a result of inadequate edge protection, or from objects in storage being poorly secured. Workers at risk of falling from a height include painters, masons, decorators and window cleaners and those who undertake one-off jobs without proper training, planning or equipment (Murie, 2007).

2.2.11 Health and safety measures in construction

2.2.11.1 Site layout and planning

A badly planned and untidy site is the underlying cause of many accidents. These result from falls of material and collisions between workers and plant or equipment. Space constraints, particularly in urban work sites, are nearly always the biggest limiting factor and a layout which caters best for the safety and health of workers may appear to be difficult to reconcile with productivity. Proper planning by management is an essential part of preparation and budgeting for the safe and efficient running of a construction operation. There are many accidents due to tripping, slipping or falling over materials and equipment which have been left lying around, and stepping on nails which have been left projecting from timber. (HSE, 2005)

2.2.11.2 Personal protective clothing (PPE)

Personal protective equipment (PPE) refers to protective clothing, helmets, goggles, or other garment or equipment designed to protect the wearer's body from injury by blunt impacts, electrical hazards, heat, chemicals, and infection, for job-related occupational health and safety purposes. OSHA (2007) requires the use of personal protective equipment (PPE) to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. If PPE is to be used, a level of occupational health and safety contributes to the achievement of material and economic objectives and provides high quality and performance in working life. In spite of this, conditions at work and in the work environment for many occupations and in many countries still involve a

distinct and even severe hazard to health that reduces the well-being working capacity and even the life span of working individuals. PPE program should be implemented. This program should address the hazards present; the selection, maintenance, and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness. The PPE required in the construction sites include; eye protection and face protection, hearing protection, respiratory protection, hand and arm protection, foot and leg protection, head protection and body and fall protection mechanisms

2.2.11.3 First aid kits and accident reporting

Construction sites are dangerous places, and first aid and rescue equipment should always be available. What is needed depends on the size of the site and the numbers employed, but there should be a blanket and a stretcher. On large sites with more than 200 people are employed, there should be a properly equipped first aid room. On any construction site of that size, at least one person on every shift should have been trained in first aid to a nationally recognized standard. On day -to-day works procedures, an accident register book should be kept at the site, in which all types of minor injury such as bruises, to major accidents like imputing disability and fatal should be recorded. (Muiruri, 2014)

2.2.11.4 Health and safety warning signs

Safety Signs and Signals are one of the main means of communicating health and safety information. This includes the use of illuminated signs, hand and acoustic signals (e.g. fire alarms), spoken communication and the marking of pipe work containing dangerous substances. Traditional signboards, such as prohibition and warning signs, signs for fire exits, fire action plan notices (fire drills) and fire-fighting equipment are also considered to be Safety Signs. It is critical that all Safety Signs and Signals can be easily understood. Where signboards are used in a workplace they should be sufficiently large and clear so that they can be easily seen and understood. Signboards also need to be durable, securely fastened and properly maintained to ensure they remain visible. Care must be taken to avoid using too many signboards in close proximity, signboards are only effective if they can be seen and understood. If too many signs are placed together there is a danger of confusion or of important information being overlooked (HSE 2009).

2.2.11.5 Safety policy

Site managers should have a written safety policy for their enterprise setting out the safety and health standards which it is their objective to achieve. The policy should name the senior executive who is responsible for seeing that the standards are achieved, and who has authority to allocate responsibilities to management and supervisors at all levels and to see they are carried out. Construction safety policy therefore is something that must be developed by each manager and operating company prior to starting any construction job. Once developed the development safety plan should be placed into a training program that's needed to be participated in by every site worker previous to partaking in any job found on the positioning irrespective of the roles simplicity. The absence of site meetings as established in this survey implies that workers are not given a forum learn about various risks on the sites and supervisors equally do not have opportunities to communicate important health and safety matters to the workers. Site meetings are one of the ways of sensitizing workers on their health and safety in the site and should therefore be held frequently.(OHSA,2005)

2.2.11.6 Health and safety training in construction sites

With regard to Occupational Safety and Health, training consist of instruction in hazard recognition and control measures, learning safe work practices and proper use of personal protective equipment, and acquiring knowledge of emergency procedures and preventive actions. Training also provide workers with ways to obtain added information about potential hazards and their control; they could gain skills to assume a more active role in implementing hazard control programs or to effect organizational changes that would enhance worksite protection. Employees must therefore be given health and safety induction training when they start work, which should cover basics such as first aid and fire safety. There should also be job specific health and safety training. Training must also be provided if risks change, and refresher training when skills are not frequently used.(HSE,2009)

2.2.11.7 Working environment

According to ILO (1999), chemical Substances are a major health hazards since there are many chemicals used in the construction industry, which include insecticides, adhesives, cleaning agents, wood preservatives, fungicides, and paints among others. Many of these chemicals are hazardous, with a potential to cause poisoning. Toxic substances can cause both acute and chronic effects resulting from exposure for a long period. Dusts from many sources are also a prominent hazard in construction. Silica and asbestos dust can permanently damage the lung tissue, whilst lead in dust is absorbed into lungs and enters the blood stream causing poisoning. Cement mixes is also a well known cause of skin disease. Lead is found in electricity cables, pipes gutters and lead sheet roofs. Excessive lead absorption causes constipation, abdominal pain, anemia, weak muscles and kidney failure

2.3 Empirical literature review

The major causes of OHS failures were inadequate safety education, inadequate instruction, poor housekeeping and ‘willful transgression’.(Nishgaki.S,Vavrin.N,Kano.T, 2007)

Management focused strategies for safety are effective in terms of reducing accident and improving safety performance.(Levitt,R.,H.Parker,2001)

According to Nishgaki et al. (2007), regular inspections of construction sites by safety patrols are beneficial and thus may be viewed as a central component of hazard management. Likewise, Hinze and Raboud (2003) observed that frequent site visits by upper management results in improved site safety.

Unfortunately falling from a height appears to be the major cause of construction injuries and fatalities. Poor accident records and reporting systems hide the extent of the construction safety problem there. Additionally, many people at management level are unaware of the accident-related costs and the effectiveness of a safety program in reducing project costs (Kartam & Bouz 2000). The most important construction workplace safety management factors were prioritized as follows: foreman related, worker related, crew related, manager related and safety training related. Such a priority of list key factors can be referred to when limited safety resources are allocated on a construction site to achieve the best workplace safety outcome (Fang, 2002).

Fundamental to construction safety management is hazard identification; unidentified hazards present the most unmanageable risks (Carter & Smith 2006). It appears that an individual's associations between hazards and tasks are based upon their knowledge, experience and training. For this reason, the task-hazard relationships must accurately define the hazards relevant to particular tasks. In turn, such an approach would help safety managers to improve site safety by focusing the organization's limited resources on implementing control measures to reduce the risks associated with these safety-significant tasks (Carter & Smith 2001). Effective planning for safety is thus essential if projects are to be delivered on time, without cost overruns, and without experiencing accidents or damaging the health of site personnel. The lack of planning leads to project uncertainties such as late changes being realized at the construction stage, along with incurring extra time and monetary costs; and an increase in the likelihood of accidents (Hare 2004).

Site safety expectation should not only be practical in nature and reflect the influential ability of each construction party, but also be project and company specific. Toole,T.(2002)

There is relationship exist between management commitment to safety and frequency of construction-related injuries and illness. Abudayyeh,O,T.Fredericks,S.Butt and A.Shaar.(2006)

Toole,(2002) site safety expectation should not only be practical in nature and reflect the influential abilities of each construction party, but also should be project and company specific.

Lingard,(2013)studied the construction sector in industrial countries which employed between 6 and 10% of the workforce but accounts for between 25 and 40% of work related accident.

Xingu Huang and Jimmie Hinze, (2003) analyzed the construction worker fall accidents and the result shows that most fall accidents take place at elevations of less than 9.15m (30 ft) occurring primarily on new construction projects of commercial buildings and residential projects of relatively low construction cost.

Edward.J, (2007) had done safely related research, which tends to be more qualitative in nature, addressing “what” factors are important for success as opposed to “how much” is appropriate to achieve successful safety outcomes.

Osama Ahmed Jannadi and Mohammed S.Bu-khamsin,(2002) had conducted a questionnaire survey, which was distributed among industrial contractors in the Eastern province of Saudi

Arabia and formal interviews were taken with the contractors, officials responsible for construction safety. 72% of the companies participated in this survey were the general building construction companies. The paper identifies 20 main factors and 85 sub-factors and determines their level of importance based on the survey results and the analysis.

Pheng and Shiua, (2000) emphasized that quality and safety should be integrated to achieve better co-ordination and utilization of resources.

Wilson and Koehn, (2000) suggested that safety practices vary with construction sites. All construction sites have unique aspects of safety to be considered. Larger construction projects are better organized to manage safety aspects. The larger construction firms have one person responsible for keeping the team members informed about possible safety problems. Small to medium firms do not have an adequate safety program or person to oversee safety criteria. Implementation of their safety management is with project superintendent.

Kumar and Bansal, (2012) conclude in their project that while completing high quality work within specified time and cost, safety of workers requires a significant attention. The paper sensitizes construction professionals regarding the importance of safety aspects and their consequences. The review suggests that there is a lack of responsive tools and resources to assist designers in addressing construction safety. Unsafe acts, unsafe conditions, and failure of management to anticipate hazardous situations are the main causes of accidents

Seifedin.S(2014) concludes that “poor working conditions and environment, and lack of personal protective equipment are the main causes of accidents in construction sector. On the other hand, foot and hand injuries, and falling from heights are the more frequently occurring types of accidents in the industries.

2.4 Conceptual framework

Conceptual frameworks are abstract representations, connected to the research's goal that directs the collection and analysis of data. Carroll's (1991) cited in the works of Moharana (2013) had described the fundamental model which could be argued to reflect the outcome of the discussion. After reviewing numerous empirical findings the following conceptual framework is developed for this research.

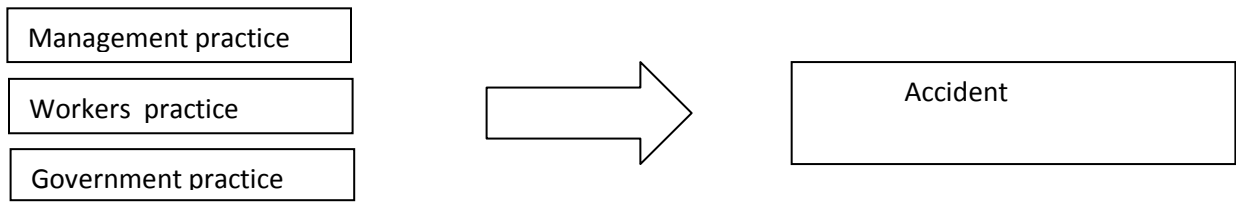


Figure 2.2 Conceptual framework of the implication of government, management and workers on causes of accident. (Author's view)

CHAPTER THREE

METHODOLOGY

This part discuss the research design, source of data and data collection techniques, target population and sampling method and method of data analysis and presentation, sample and sampling technique, sources, tools and procedures of data collection and method of data analysis employed for the study.

3.1 Research Design

Research design is a blue print which indicate how data relating to a given problem should be collected and analyzed (Sekaran, 2000). This study used survey questionnaire to gather data and descriptive design was used to analyze the data gathered. The survey technique was found suitable in gathering information from site supervisors, contractors and the workers on the construction sites by use of questionnaires and/or interviews. Survey research involves acquiring information about one or more groups of people perhaps about their characteristics, opinion, attitude or previous experience by asking them questions and tabulating their answers. The ultimate goal is to learn a large population by surveying a sample of the population (Paul and Jeanne, 2014).

In addition to survey questionnaire direct observation was used to gather data, which involved site visits to construction sites to directly observe and document the identified hazards, tasks, job site organization, work practices, equipment and tools being used.

According to Gathuthi, Kosgei and Ng'ang'a (2009), in descriptive study designs, the researcher describes or presents a picture of a phenomenon or phenomena under investigation. Descriptive survey involves the collection of data in order to answer questions concerning the current status of the problem. The possible approaches include participant respondents to complete the questionnaires themselves. Therefore, descriptive research was used for this study.

3.2 Source of data and data collection techniques

Mainly Primary data collection method used in order to collect useful data which was in relation to the topic under discussion.

Since quantitative approach is used to gather factual data and to study relationships between facts and how such facts and relationships related with theories and findings of any research executed previously; this research adopted this approach, in order to achieve the objective of the study.

Primary data collected by distributing close ended structured questionnaires. Closed-ended questionnaires are easily answered by respondents and are also easily analyzed by researchers (Glasow, 2005). The questionnaire formulated by screening and comprehending the relevant literatures in the area of safety practice in building construction and targeting stakeholders like contractors, clients and consultants. The questionnaire contains three parts the first part contains demography of the respondent, the second part contains types and frequent accident and the last part is about cuses of construction accident at site.

Structured interviews held with labour as secondary sources of collecting primary data. Direct observation was also used which involved guided work site visits to construction sites were performed to directly observe and document the identified hazards and to check the availability of protective equipments at site.

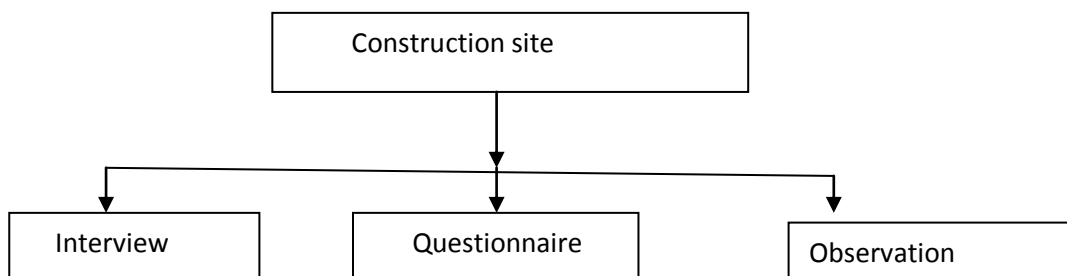


Figure 3.1 Data collection techniques (author's view)

3.3 Target population and sampling techniques

.3.1. Target population

A population is the total collection of elements about which we wish to make some inferences. The collection of all possible observations of specified characteristics of interest is called a population, while a collection of observations representing only a portion of the population is called sample. (Creswell,2003)

The study population was based on the data acquired from Addis Ababa city administration municipality office. The selected site comprises 103 contractors, 3 consulting offices and one client representative office. Among these, this study comprises 103 Engineer from contractor side,10 Inspectors from consultant side and 8 supervisors from client side. As result, the total population under study is 121.The population of the study comprises the stakeholders of building construction projects such as owners (client), contractors, consultants who were involved in the housing projects taken under Addis Ababa city.

3.3.2 Sampling method

This study used purposive and random sampling method.

Addis Ababa is the city having large construction projects among other cities in the country. Many private and government project have been undertaken in the city. Despite the fact that there are huge housing projects being undertaken in the city,70% out of 10 million population living in the city according to the current statistical data, don't have their own house. City administration of Addis Ababa has taken housing as the most important issue to crave this problem. Therefore, To get sufficient and reliable information the researchers target housing project which was under Addis Ababa Housing project special area "koye Fech" site .There are 7 sites at koye feche housing project. The researchers select randomly two sites which are active and having large number of manpower. The researcher selected 42 engineers from 103 contractors, all of the 10 inspectors from consultant side and all of the 8 supervisors from client representative side.

3.3.3. Sample Size

This sample size that represents the targeted population was determined from following equation formula was used by some researchers like (Hassanein & Hanna, 2008; Zekri, 2013; Argaw, 2017)

$$n = n' / (1 + n'/N) \dots\dots\dots \text{Equation 1}$$

Where; n' is the sample size from infinite population, which can be calculated from following formula, $n' = s^2 v^2 \dots\dots\dots \text{Equation 2}$

Where: n is sample size from finite population.

N : Total population (103 contractors' engineer, 10 consultants' inspectors and 8 supervisors from client side)

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

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

The sample size for the population can be calculated from the previous equations as follows:

$$n' = S^2 V^2 = (0.5)^2 (0.05)^2 = 100$$

The size of the sample was calculated by using $n = n' / (1 + n'/N) \dots\dots\dots \text{Equation 1}$, over-all then the sample size of projects was 60. $n = 100 / (1 + (100/121)) = 55$

Out of 75 distributed questionnaires 65 questionnaires were returned but 5 of them weren't clear.

This shows that the response rate of the questionnaire was good

3.4 Method of data analysis and presentation

This paper is based on a quantitative approach comprising two parts. based on a combination of a literature review and consultations with experts from different construction projects concerning construction safety, a total of 5 frequent accident and 16 factors were identified. Extensive use was made of ordinal scale measure for eliciting data on respondents' perceptions. The respondents were asked to rate their agreement or disagreement with the nature of safety problems and safety causes on a five-point Likert scale. Sixty questionnaires were distributed to the respondents (owner, consultant and contractors).

The collected data analysis was undertaken by using Statistical package for social science (SPSS) and Excel spreadsheet. The analysis includes factor analysis, reliability testing, Pearson correlation.

Relative Importance Index

To determine the ranking of the different problems facing construction safety and the factors causing construction accidents, the "Relative Importance Index" (RII) was adopted. This method transforms the five-point Likert scale to help determine the ranking of each factor, using the following expression:

The relative importance index is computed as (Cheung, 2004; Iyer and Jha, 2005; Ugwu and Haupt, 2007)

To determine the relative ranking of the factors, these scores were then transformed to importance indices based on the formula: Relative Importance Index (RII) = $\frac{\sum w}{AN} = \frac{(5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1)}{5N}$

Where: w is the weighting given to each factor by the respondent, ranging from 1 to 5, A is the highest (i.e. 5 in the study) and N is the total number of samples.

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

While ranking the RII values, the item with the highest RII value is ranked 1st, it takes this order till the least item. According to (Mbamali, 2012) RII values are interpreted as follows:

RII < 0.60: Implies item has low rating.

0.60 ≤ RII ≤ 0.8: Implies item has high rating.

RII ≥ 0.80: Implies item has very high rating

In this study, the data analyzed by using Microsoft Excel spreadsheet and presented by using tables as percentage and frequencies.

Pearson Correlation

Pearson correlation usually denoted as (r), it is used to determine if a positive or negative relationship exist between variables. Its values range from -1 to +1 i.e. perfect negative to perfect positive correlations.

If $r > 0$: Positive relationship

$r < 0$: Negative relationship

$r = 0$: No relationship

Table 1 Correlation values range Bruce(2000)

R	Strength of relationship
-1.0 to -0.5 or 1.0 to 0.5	Strong
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.3 to -0.1 or 0.1 to 0.3	Weak
-0.1 to 0.1	None or very weak

3.5 Validity and Reliability

Validity and reliability of data collection instruments is essentially to minimize bias in the study findings.

While validity concerns measuring what one intended to measure as well as trustworthiness and generalization of the conclusions drawn from a study, reliability concerns the consistency, as in the possibility to redo the study and get the same result (Fowler, 2008). For quantitative survey research, Buckingham and Saunders (2004) discuss validity in terms of face, content, construct, and external validity. To ensure validity of the data acquired and to give added depth the questionnaire the researcher formulated simple and easy questions whose answers had a critical bearing to the variables under investigation so to guide the study achieve its purpose.

Reliability of data collection instruments refers to the accuracy and precision of the measuring procedures. In order to ensure reliability of the data collection instruments, the researcher carried out pre test by randomly selecting a few building construction firms 10 in number, administered

the questionnaire and observed the response to note if the questions were understood, and if the answers given were relevant to the study. Observed weaknesses in the data collection instrument were and noted corrections made.

Chronbach's coefficient alpha (George and Mallery, 2003) is designed as a measure of internal consistency, that is, do all items within the instrument measure the same thing? Chronbach's alpha is used here to measure the reliability of the questionnaire between each field. The normal range of Chronbach's coefficient alpha value between 0.0 and + 1.0. The closer the Alpha is to 1, the greater the internal consistency of items in the instrument being assumed. In this research the test found to be 0.86 which is higher than 0.7, thus the construct has been believed to have adequate reliability.

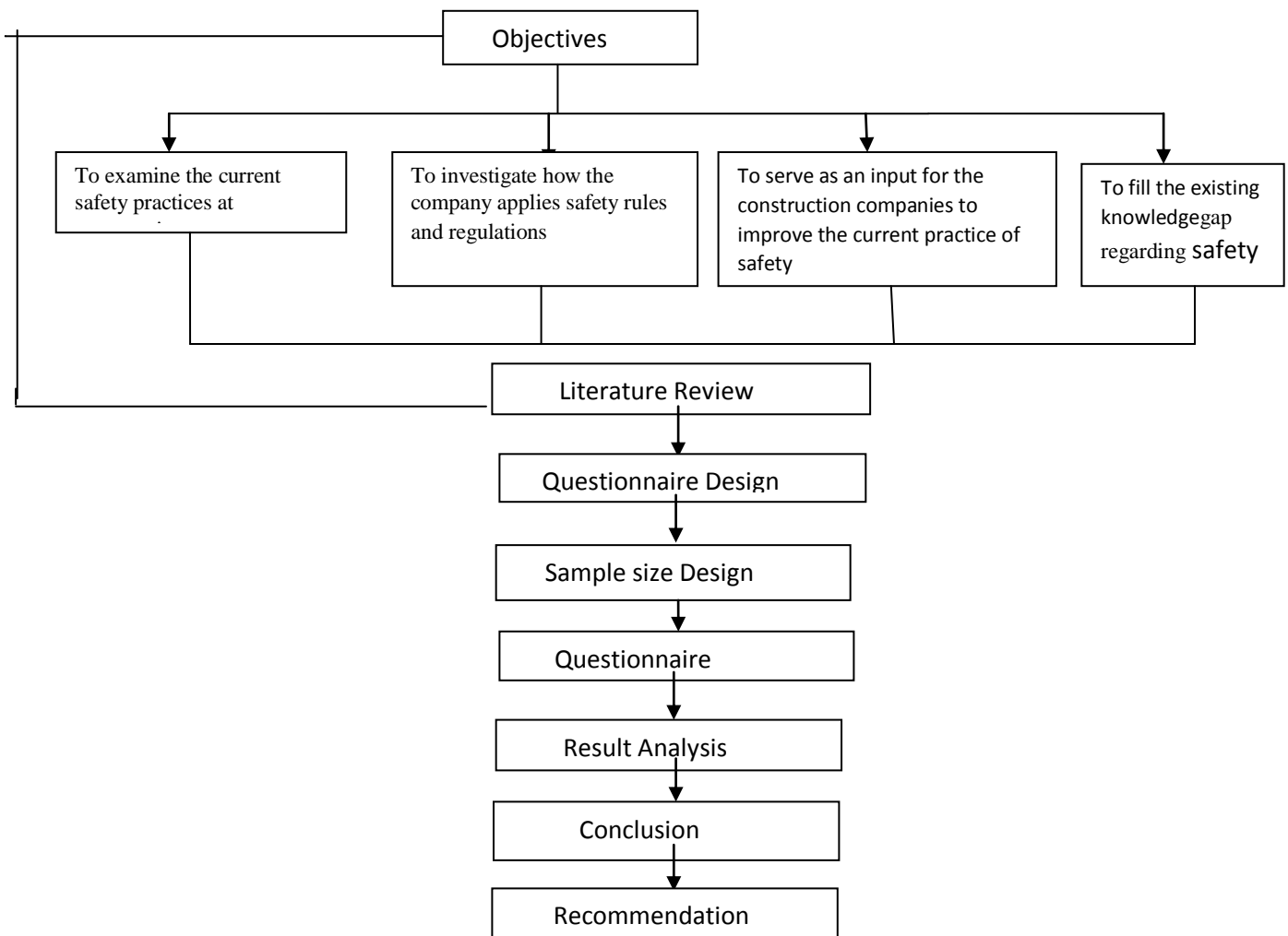


Figure 3.2 Summary of methodology used in this research (author's view)

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Introduction

This part of the thesis analyses the result of the collected data which were collected from questionnaire, interview and observation. The response of the respondents are presented, analyzed, interpreted and evaluated. The data's have been collected and processed according to the research methodology described in the previous chapter and address the research problems posed in the first chapter of this study. The methods of analyzing are by using average and percentage. Tables are used, as it provides easier understanding and clear picture of information to be delivered.

4.2 Demographic Profile of the Respondents

This section describes the demographics characteristics of the sampled respondents. The questions asked sort to determine their years of experience in the building construction industries, position in the companies, age group, types of work, educational qualification and occupation. Table 4.1, 4.2, 4.3, 4.4 and 4.5 discuss the results of demographic data of respondents selected from the respondents selected for the study.

4.2.1 Distribution of respondent by gender

Table 2 Distrbution of respondent by gender

Gender	No of respondent	Percentage (%)
Female	14	23.3%
Male	46	76.7%

The results presented in Table 4.1 were based on the data collected from the questionnaires issued to 60 workers during the time of the study. The results showed that 14 out of 60

respondents representing 23.3 % were female whereas 46 respondents representing 76.7% % were males. The results indicate that more males participated in the survey than females during the time of the study.

4.2.2 Level of Educational Status of the Respondents

Table 4.3 displays the level of educational qualifications of respondents sampled for the study

Table 3 Respondent’s level of education

Education status of respondent	No of respondent	Percentage (%)
Msc	5	8.3%
Degree	40	66.7%
Diploma	15	25%

The respondents’ educational status was important that the respondents can understand the questionnaire well and also have a better understanding of safety issues through their education. Out of 60 respondent 75% have bachelor degree 25% have diploma. From this percentage it implies that the respondents have enough knowledge and education to understand the depth of importance of safety consideration in a construction site.

4.2.3 Working experience

Table 4 Respondent working experience

Respondent work experience	Number of respondent	Percentage
1-5	11	18.30%
5-10	10	16.70%
10-15	25	41.70%
>15	14	23.40%

The majority of respondent had a good deal of working experience. Out of 41.7% had experience 10-15yrs, 23.4% had more than 15 yrs, 18.3% had 1-5 yrs and 16.7% had 5-10 yrs construction experience.

4.2.4 Types of job

Table 5 Respondent types of job

Types of Work	No of respondent	Percentage (%)
full time	50	83.4%
part time	10	16.6%

Out of 60 respondent 50(83.4%) are full time workers and 10(16.6%) respondent works in contract base.

4.3 Types, Frequency and Causal factors of accident at the Study Area

4.3.1 Types, Frequency and Causal factors of accident at the Study Area

The following table indicates the type and frequency of accidents at the study area

Table 6 Accident type and frequency at the study area

Item	Very frequent	Highly frequent	Neutral	Slightly frequent	Not frequent	Total respondents (N)	RII	Rank
death of person	2	4	4	22	28	60	0.367	6
Skin infection	8	2	43	5	2	60	0.630	4
Losses of body parts	2	4	32	22	0	60	0.553	5
Body fracture	9	2	43	6	0	60	0.647	3
falling from height	14	10	30	6	0	60	0.707	1
hit by falling objects	10	6	41	3	0	60	0.677	2

When the respondents were asked to rate each accident which occur frequently at site, it is found that falling from height is the leading most frequent accident with (RII=0.707). This result shows there is lack of safe scaffolding, lack of safety harness belt and unsafe site condition.

Hit by falling object is the 2nd with (RII=0.677). This shows that there is lack of dropped object prevention and protection net/mat and personal protective equipment like (helmet, head pan) at site.

Body fracture is the 3rd frequent accident occurs at site and skin infection, Losses of body parts with (RII=0.553) and death of person with (RII=0.367) respectively.

Helander(2002) states that, construction work is much more hazardous than most other occupations. Most accidents involve falls of persons and occur during work on roofs, scaffolds and ladders. Collapse of structures and falling materials also account for many fatalities. Many of these accidents can be avoided by the establishment of procedures and regulations to enhance safety. And often construction workers underestimate the hazards in their own work. this affects the motivation for adopting safe work procedures.

4.3.2 Factors that causes accident at the study area

The following table indicates the factors that causes accident at the study area

Table 7 Causes of accident at the study area

	highly agree "5"	agree "4"	Neutral "3"	Highly disagree "2"	Disagree "1"	RII	Rank
Management related Factors for the accident							
Appropriate personal safety procedures were not applicable	50	4	6	0	0	0.947	2
Correct tools were not used for the specific task	22	15	7	8	8	0.717	12
Lack of supervision and control on workers adherence to wear safety items	32	20	0	6	2	0.846	8
failure to implement safety policy and procedures	43	17	0	0	0	0.943	3
No safety personnel at site	32	16	6	6	1	0.836	9
Safety items were not available on site	41	19	0	0	0	0.937	4
lack of training program to create awareness about safety	23	25	10	2	0	0.830	10
No written/known procedure for the assigned job is available	36	21	0	2	1	0.897	7
workers related factors for the accident							
Failure to follow safety rule of the company	20	26	9	3	2	0.797	11
reckless operation	17	21	3	5	14	0.673	13
overconfidence of the workers	15	13	2	19	11	0.607	16
overloaded work condition	6	26	3	16	9	0.613	15
government related factors for the accident							
lack of assessing recorded data	21	14	2	9	14	0.663	14
lack enforcement of the law	52	8	0	0	0	0.973	1
lack of random site safety inspection	45	12	1	0	2	0.926	6
lack of safety assessment for major activities in construction sector	43	14	3	0	0	0.933	5

The respondent ranked the factors of causes of accident in relation to management, government and worker.

A discussion of the results from the survey is presented below, among 16 major causes of accident at site “Ineffective government law enforcement ranked 1st with (RII=0.973).This shows that the assigned respective government body was not able to discharge his/ her responsibility to enforce the rule and regulation of government accordingly.

Appropriate personal safety procedures were not applicable ranked 2nd with (RII=0.947).This shows that activities were not being executed following proper safety procedures by assigned responsible persons involving in the project site.

Failure to implement safety policy and regulations ranked 3rd with (RII=0.943) .From the result we understand that Contractors or site engineers didn’t give due attention for safety issues because there is no adequate follow up and monitoring system from government side.

Safety items were not available at site ranked 4th with (RII=0.937).This shows that the contractor was not providing required safety materials and equipments which made the workers to be exposed for accident.

Lack of safety assessment for major activities in construction sector ranked 5th with(RII=0.933).This shows that there was no pre-planned method of statement which include risk and hazard assessment ;and pre caution measures to be taken prior to execution of major activities.

Lack of random safety inspection ranked 6th with (RII=0.926).The result indicates that there is no regular random safety inspection at site by government.

No written/known procedure for the assigned job ranked 7th with (RII=0.897). As a principle it is management duties and responsibility to prepare a clear guide line for each activity before commencing operation to avoid work overlaps and unnecessary mess that create accident but management failed to meet this requirement.

Lack of supervision and control on workers adherence to wear safety items rank 8th with (RII=0.846).The result indicates that there was lack of management strict follow up on ensuring that workers were using PPE.

No safety personnel at site ranked 9th with (RII=0.836).The result shows that management was not hiring the required safety personnel to reduce the cost of paying salary and lenience of government to enforce the law.

Lack of training programs to create awareness about safety ranked 10th with (RII=0.830). This shows that management didn't discharged its responsibility by conducting appropriate safety rules and regulation training before assigned workers on site.

Failure to follow safety rule of the company ranked 11th with (RII=0.797).This shows that the company was not in a position to make sure that its safety policy was applicable on the ground by implementing strict supervision.

Right tools were not used for the specific task ranked 12th with (RII=0.717).The result shows that contractors were not providing right tools or equipments on site either due to lack of knowledge or due to desire of saving cost of expense.

Reckless operation ranked 13th with (RII=0.673). The result shows that a few workers were irresponsible and not liable for what he/ she was done.

Lack of recorded data ranked 14th with (RII=0.663). The result indicate that Government didn't discharged the responsibility to laid down reporting system that enable to collect accurate data from contractors' and concerned body periodically to know the status of accident rate occurred at site.

Overconfidence of the workers ranked 15th with (RII=0.613).The result shows that a few workers shows over confidence at site because of long experience and age.

Overloaded work condition ranked last with RII=0.607).The result shows that some contractors forced the worker to do multiple task at a time.

Management related factors

To summarize the collected data from respondent shows that out of 16 factors, 7 major causes of accident fail in to management related categories i.e.it contribute a lot for the accident occurred. This result indicates that management didn't discharge their responsibility properly. Due to these many workers injured and lose their life during operation on site. It had creates long term

economical, social, and psychological problems on the families of decease directly and indirectly.

Government related factors

To summarize the collected data from respondent shows that out of 16 factors, 3 factors fail in to government related category i.e. it contribute a lot for the accident occurred .It is clear that government role was immense and un substitutable. These indicate that government couldn't discharge its responsibility properly for the well being of the citizens.

Workers related factors

The collected data from respondent shows that out of 16 factors, 3 factors fail in to workers' related category. The result shows that even workers contribute a lot for accident at site knowingly and unknowingly.

4.4 The Current Safety Practices at the Study Area

4.4.1 Result of the Interview with workers

An interview was conducted with daily laborers at site and 15 men and 5women were selected according to their direct exposure to accident. It was found that;

Table 8 Respondents' age

Respondent age	Number of respondent	Percentage
18-25	9	45 %
25-35	6	30%
35-45	4	20%
>45	1	5 %

- More than 85% of the respondent age is between of 18-40 years old. This shows that construction sector absorb huge number of productive force and also the sector contribute a lot to crave unemployment rate.

Table 9 Respondent working experience

Respondent work experience	Number of respondent	Percentage
1-4	4	20%
4-8	12	60%
8-12	1	5 %
>12	3	15%

- More than 60 % of the respondent is between 4th grade and 8th grade. This shows that most construction workers are illiterate. It is a barrier to exercise their rights and to act accordingly.

Table 10 Respondent working experience

Respondent work experience	Number of respondent	Percentage
1-5	6	30%
5-10	8	40%
10-15	6	30%

- 70 % of the respondent work experience is more than 5 years. Even though they are working in the construction industry so long they do not have awareness about safety rule and regulation.

Responses	Yes	No
➤ Do you have any safety training in construction site?	-	100%
➤ Do the companies provide first aid?	-	100%
➤ Do you know the company safety rules and regulations?	-	100%
➤ Do the companies provide PPE?	4%	96%
➤ Does the employer provides you health insurance provision and you know you have the right to be insured?	-	100%

- For the question about safety training all the respondent(100%) confirmed they have not got any training. This shows that workers were assigned without training. However, lack of training aggravates the number of death and injuries.
- For the question about the availability of first aid service the entire respondents (100%) confirmed that it is not available on site. This shows that the companies are not fulfilling the minimum and basic requirements of safety practice; and moreover, this implies that the government is not playing its role of supervision.
- For the question about the provision of health insurance, the entire respondent(100%) select No. This shows that the employer don't insured the workers.
- For the question about their knowledge of the company's safety policy all the respondents (100%) select "No". This shows that the company is not communicating its policy to the laborers.
- For the question about the provision of proper equipments the 4% of the respondent confirmed that there is some provision of equipments with defective and do not meet the right quality and the remaining 96 % of the respondent confirmed that there is no provision of equipment. This shows that the company doesn't provide the required equipment to the worker.

Overall, the result of the interview is a supplement to the result of the questioner. It shows that there is poor safety practice at the study area.

4.4.2 The observation result

Direct observation was used in this research as a mechanism to collect data, the researcher present physically at "Koye Feche" to observe the site under construction. The reasearcher observed 5% of the site under construction.that means out of 415 blocks only select 20 blocks.The researcher witnessed the following major situations.

- No sign post for hazardous areas.
- Workers (labours) who had PPE
- Unsafe scaffolding which was made from wood materials.
- Lack of enough working space
- No safety engineer at site
- No Fire extinguisher at site

From the observation checklist the result shows that 100% minimum requirement were not fulfilled

In summary, Researcher's observation shows that there is no proper safety practice and provision of safety materials and equipment for laborers. In addition, the researcher observed that there is no safety personnel and supervision.

4.5 The awareness of construction workers at the study area

According to the researcher interview with the workers, the awareness level of the workers is very low, especially the labors. The labors don't have awareness about their rights of getting safety materials and equipment from the employer and working under safe and properly managed hazardous areas as well as technically their awareness how to use PPE, safety harness on high level and precautions to be taken for hazardous conditions is also low. In addition, most of the workers' awareness about being medically insured is very less. The researcher noticed, the low level of awareness is due to lack of training and supervision given by the contractors on regular and integrated ways.

Overall, the awareness level of the labors about safety practices is low implying lack of trainings and supervision on site.

4.6 Results of Correlation analysis

Pearson correlation is a test of the strength of linear relationship between two given variables. When this relationship is not linear it implies the correlation coefficients do not really represent the strength of the relationship that exists between these variables (David, 2004).

Pearson's Correlation analysis was employed to determine if certain relationships either positive or negative existed among factors. The following were tested for

4.6.1 Management and government factors

Table 11 Correlation analysis between management related and government related

		Mm	Mg
Mm	Pearson Correlation	1	.677**
	Sig. (2-tailed)		.010
	N	60	60
Mg	Pearson Correlation	.677**	1
	Sig. (2-tailed)	.000	
	N	60	60

As seen from Table 4.6.1 above, the correlation coefficient r has a value of 0.677, this implies a positive correlation. It is strong correlation. This means the two factors are dependent of each others.

4.6.2 workers and management factors

Table 12 correlation analysis between management and workers

		Mm	Mw
Mm	Pearson Correlation	1	.922**
	Sig. (2-tailed)		.000
	N	60	60
Mw	Pearson Correlation	.922**	1
	Sig. (2-tailed)	.000	
	N	60	60

From the above table, it is seen that the relationship has a positive correlation coefficient value of 0.922; this shows that there is strong correlation between the factors.

4.6.3 Workers and government factors

From the Table below, the coefficient of correlation value of 0.612 signifies a very strong correlation between the variables, this shows that strong relation exist between the factors.

Table 13 correlation analysis between government and workers

Correlations		
	mw	Mg
Mw	Pearson Correlation	.612**
	Sig. (2-tailed)	.000
	N	60
Mg	Pearson Correlation	.612**
	Sig. (2-tailed)	.000
	N	60

From the above tables, it is seen that the relationship has a positive correlation with positive coefficient value; this shows that there is strong correlation between the factors.

CHAPTER FIVE

SUMMARY, CONCLUSION & RECOMMENDATION

5.1 Summary

The construction industry is playing a vital role in the economic growth of the country directly and indirectly. It absorbs a huge number of labour forces. On the contrary, it is a sector which registered with high fatality and injury rate next to car accident in Ethiopia. Thus the researchers motivated to conduct this research to know the root causes of the accident. To meet its objective the researcher followed standard research methodology that enabled to collect reliable and sufficient data. Survey and descriptive research design method was used and data were collected by using close ended questioner, interview and observation.

Based on the data collected, the researcher tried to investigate causes of accident in relation with government, workers, and management. 16 factors as causes of accident were selected for this research. Among 16; 8 of them were factors related to management, 4 of them related to government and the remaining related to workers. According to the rank given by the respondent 7 out of the 10 top ranked factors fall under Management this shows that the contribution of the management is very immense.

From the questionnaires, the researcher tried to find out the most frequently occurring accident; as result, falling from height is first ranked.

The researcher tried to assess the safety awareness level of the workers/labours and the data gathered shows that there is low self awareness due to lack of training and supervision.

5.2 Conclusion

Recently Ethiopia construction industry has experienced considerable growth in construction activities especially in Addis Ababa city. The ever increase of urbanization has increase the number of construction activities in all corner of the city. This creates a wide employment opportunity for many skilled and unskilled laborers.

From the research findings we conclude that the major causes of accidents were management, government and workers related respectively.

From government perspective:-Ineffective enforcement of the law, lack of recorded data, no safety inspection, and lack of safety assessment for major activities in construction sector.

From workers perspectives:-Failure to follow safety rule of the company, reckless operation, overconfidence of the workers, and overloaded work condition.

From management (contractor & consultant) perspectives:-Appropriate personal safety procedures were not applicable; right tools were not used for the specific task; lack of supervision and control on workers adherence to wear safety items; failure to implement safety policy and procedures; no safety personnel at site; safety items were not available on site; lack of training program to create awareness about safety; and no written/known procedure for the assigned job is available.

However; from the above, we conclude that 10 out of 15 factors that cause accident were from management perspectives. Its contribution was immense. Government stand 2nd and its contribution were high next to management. Workers contribution was last but not least. It also contributes a lot.

The safety awareness level of the workers/labours is found very low in the research as result of lack of training program from contractor side and strict supervision from consultant/government. Among the accidents occurring on construction site such as death, loss of body part, body fracture, falling from height, hit by falling objects and skin infection, falling from height is the most frequently occurring accident.

5.3 Recommendation

The result of research shows that many workers lose their life and health due to lack of proper safety management practice by concerned body i.e. government; management (contractor & consultant), and workers. The accident occurred at site create economical, social and psychological problem on the diseased family and the country as a whole. However; the researcher tries to forward the following recommendations to minimize the accident at site:-

- Government should play its' part strictly to enforce the law and regulation for the implementation of safety by all stakeholders
- Site engineers or safety personnel should strictly adhere to safety rules and regulation
- Contractors should fulfill the necessary materials to protect workers from damage
- Continuous assessment and sudden field audit should be conducted by government body who assigned to work
- Management or contractors should prepare proper safety procedures for each activities and give training before they commence operation
- To minimize accident at work responsible safety engineer should be assigned to supervise and follow up the accident beforehand
- Contractor should be forced to fulfill the necessary safety materials according to the criterion stated on contract agreement
- Site engineers/safety engineer should control reckless operation at work and take necessary disciplinary actions if necessary
- Data should be gathered and recorded properly by all stakeholders on timely based.
- Continuous training and awareness should be created by government on the issue of safety for all concerned body
- Government should accountable those who violet the rule and regulation
- Employee and contractors should provide suitable programs that are consistent with national laws and regulations to ensure safety of the workers

5.4 Limitation of the study

- The researcher only limited at Addis Ababa housing construction project especial area "Koye Feche".The reasercher not included other construction sectors. It was difficult to collect sufficient and reliable data since there is lack of recorded data and difficulty to get responsible person who is willing to give reliable information and cooperate in the process. As a result, it was difficult to give more empirical results and finding of result may not represent as a general representation in the construction industry.

5.5 Future studies

- Research can be conducted to evaluate how health and safety issues are addressed in the contract documents along with the assessment on the impact it has on the cost of the project to be allocated by client.
- Research can be conducted comparing domestic contractors and international contractors in terms of health and safety performance and how knowledge transfer can be achieved.
- Research can be conducted on the social, economical and psychological impact of accidents occurring in the construction projects on the victims and their families in particular; and on the companies.

REFERENCES

- Abudayyeh,O., T. Fredericks, S. Butt and A. Shaar.(2006). ‘An Investigation of Management’s Commitment to Construction Safety’;International Journal of Project Management.Vol.24, No.2, pp. 167-174.
- Andreoni,D.(2006).cost of occupation accidents and disease.Geneva: international labor organization. Occupation safety and health series ILO
- Anderson, R. (1999). Injury Causation, Injury Prevention and Safety Promotion – Definitions and Related Analytical Frameworks. In: Safety Promotion Research, Laflamme, L., Svanström, L. and Schelp, L. (Eds.) 15-42. Karolinska Institutet, Stockholm
- Carter, G. and S. Smith. (2001).”Construction safety risk -improving the level of hazard identification.” Ersel 2001 European safety and reliability international conference, Torino, Italy, September, 16-20.
- Carter, G. and S. Smith. (2006). ‘Safety Hazard Identification on Construction Projects’, Journal of Construction Engineering and Management; Vol.132, No.2, pp. 197-205.
- Creswell,W.J.(2003).“Reaserch design:A qualitative,quantitative and mixed method approaches”.second edition, saga publications,Inc.University of Nebraska,Lincoln
- Chamber of Turkish civic engineering (2010), the sector most at risk of accidents construction. Occupational health magazine, 2010(2), in Turkish
- Construction industry institute (CII).(2009).improving construction safety performance .report A-3 ,January,1990 ,reprinted July
- Dawit , S. (2006). Occupational Safety and Health profile in Ethiopia.
- Edward,J.J., Stuart D.Anderson and Jeffrey S.Russell (), ‘Strategies for Achieving Excellence In Construction Safety Performance’, Journal of Construction Engineering & Management, Vol.122, No.1pp.61-70.,June,2007

- Ethiopian Civil code (Proclamation No. 165/1960)
- Ethiopia Labor Code (Proclamation No. 377/2003)
- Farooqui R. U. (2008). Safety Performance in Construction Industry of Pakistan. First International Conference on Construction Education, Research and Practice. Karachi, Pakistan.
- Peter, J.C. (2016). Health and safety in the construction industry: A review of procurement, Monitoring cost effective and strategy. John Wiley and Sons, nc, New York.
- Health and Safety Executive (HSE). (2004). Improving Health and Safety in the Construction Industry. The Stationery Office, London
- . Kheni, N. A., Gibb, A. G. and Dainty, A. R. (2006). Health and safety management practices of small and medium-sized construction businesses In: Global Unity for Safety and Health in Construction, Proceedings of CIB W99 International Conference (edited by Fang, D., Choudry, M. and Hinze, J.). Tsinghua University Press, Beijing, China, 91-101.
- Kumar, S.A and Bansal, V.K. (2013) 'Construction safety knowledge for practitioners in the construction industry', Journal of Frontiers in Construction Engineering, vol. 2, no. 2, pp. 34-42.
- ILO, & International Labor office. (2005). Safety and Health in Construction Code of Practice. Geneva.
- ILO, I. L. (2005). Safety, Health and Welfare on Construction Sites: A Training Manual .International Labor office.
- ILO, I. L. (2001). The Construction Industry in the Twenty First Century: Its Image, Employment Prospects and Skill Requirements. Tripartite Meeting on the Construction Industry. Geneva

- International Labour Organization (ILO, 2005). Global estimates of fatal work related diseases and occupational accidents, World Bank Regions. International Labour Organisation, Geneva.
- Levitt, R. and H. Parker. (2001). 'Reducing Construction Accidents – Top Management's Role'. Journal of the Construction Division.; Vol.102, No.3,pp. 465-478.
- Lingard.H. (2013); Occupational health and safety in the construction industry: Construction Management and Economics, Vol. 31, No.6, pp.505–514.
- Lingard, H.F & Rowlinson, S. M. (2005). Occupational Health and Safety in construction project management; UK: Taylor and Francis.
- Mayer.A.,K. Mohamed.F and El-Masri.F,(2007). 'Perception of construction managers towards safety in Palestine'.journal of construction management; Palestine,pp 41-51.
- Nishgaki. S., J. Vavrin, N. Kano, T. Haga, J. Kunz. and K.Law. (2007). 'Humanware, Human Error, and Hiyari-Hat: 'A Template of Unsafe Symptoms'. Journal of Construction Engineering and Management: Vol.120, No.2, pp. 421-441.
- Osama. A., J.Ahmed.and S.Mohammed.(2002). 'Safety Factors Considered by Industrial Contractors in Saudi Arabia', Building and Environment 37, pp. 539-547.
- Peter. E., S. Mohamed,G and E.Fayez.(2014). Perception of construction managers towards safety in palastine.Adnn,palastain
- Pheng .L.S. and Shiua .S.C.(2000). 'The maintenance of construction safety: riding on ISO 9000 quality management systems'. Journal of Quality in Maintenance Engineering: vol. 6. No.1, pp. 28—44
- Rikhardsson, 2014; Waewcer, ligh,cassdy and miller,2004) leveaend dughuary, 2013, schulze, 2014: the America society of safety engineers,2014
- Ethiopian Economic Association (EEA) "The current state of the construction industry Ethiopian Economic Association",ISBN – 978-99944-54-08-2,volume VI 2006/07, Addis Ababa ,Ethiopia September 2008.

- Toole, T. (2002), 'Construction Site Safety Roles'. Journal of Construction Engineering and Management'; Vol.128, No.3, pp. 203-210. Alkilani
- WHO. (2006). Constitution of the World Health Organization - Basic Documents
- Xingu Huang and Jimmie Hinze (2003), 'Analysis of Construction Worker Fall Accidents', Journal of Construction Engineering and Management, Vol.129, No.3, pp. 262-271.

APPENDIX

JIMMA UNIVERSITY

School of Graduates Studies

Masters of Project Management (MA)

Questionnaire to be filled by clients, consultants and contractors

Dear respondents

This questionnaire is prepared to conduct a study in the partial fulfillment of a Master's Degree in Project Management (MA) program entitled with "Assessment of employee safety in construction sector : The Case Of Koye Feche Housing Project Akaki Site".

Hence, you are kindly requested to give the necessary information for the research questions. There is no need to write your name and address; and the information that you provide will be kept confidential and will only be used for academic purpose. The accuracy, honesty, and fairness of your response will have a great impact on the outcome of the research. Your cooperation and prompt is highly appreciated.

The questionnaire has three sections. The first section (Section A) consists of questions aimed at collecting General information (profile and experience in construction) of the respondents. The second section (Section B) is aimed at finding out the frequent accident occurs at site. And the third section (Section C) is focused on the causes of accident.

"Thank you very much in advance"

QUESTIONS

SECTION – A (General Information)

Q.1 Name of Organization (optional) -----

Q.2 Gender

Male Female

Q.3 Educational qualification

Diploma 1st Degree Masters PHD

Q.4 Relevant work experience (Years)

1-5

5-10

10-15

>15

Q.5 Type of job

Full time

Part time

Please indicate the significance rate of each factor by ticking the appropriate box.

For section B

E.F. = extremely frequent (5)

V.F. = very frequent (4)

N = neutral (3)

S.F. = slightly frequent (2)

N.F. = not frequent (1)

For section C

“5”= highly agree

“4”= agree

“3”= Neutral

“2”= highly disagree

“1”= disagree

SECTION B: FREQUENCY OF ACCIDENT OCCURRENCE AT THE STUDY AREA.

No	ACIDENT OCCUR FREQUENTLY AT SITE	VF	HF	N	SF	NF
1	death of person					
2	Skin infection					
3	Losses of body parts					
4	Body fracture					
5	falling from height					
6	hit by falling objects					

SECTION C: Factors that causes accident at the study area

		"5"	"4"	"3"	"2"	"1"
	Causes of accident at site					
	management related					
1	Appropriate personal safety procedures were not applicable					
2	Correct tools were not used for the specific task					
3	Lack of supervision and control on workers adherence to wear safety items					
4	failure to implement safety policy and procedures					
5	No safety personnel at site					
6	Safety items were not available on site					
7	lack of training program to create awareness about safety					
8	No written/known procedure for the assigned job is available					
	workers related					
1	Failure to follow safety rule of the company					
2	reckless operation					
3	overconfidence of the workers					
4	overloaded work condition					
	government related					
1	lack of assessing recorded data					
2	lack enforcement of the law					
3	lack of random site safety inspection					
4	lack of safety assessment for major activities in construction sector					

INTERVIEW GUIDE FOR LABORERS

1. What is your educational background?
2. How old are you?
3. What is your experience in construction industry?
4. Do you have any safety training in construction site?
5. Do the companies provide first aid?
6. Do you know the company safety rules and regulations?
7. Do the companies provide PPE?
8. Does the employer provides you health insurance provision and you know you have the right to be insured?

OBSERVATION CHECK LIST

Safety shoe	Present	Absent
Vest		
Helmet		
Glove		
Sign post		
Safe scaffolding		
Enough working space		
Fire extinguisher		
Safety engineer at site		