



ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE

EFFECT OF OCCUPATIONAL SAFETY AND HEALTH ON
PROJECT PERFORMANCE: THE CASE OF BUILDING
CONTRACTORS IN ADDIS ABABA

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A project work submitted to the school of graduate studies of Addis
Ababa University, School of Commerce in Partial Fulfilment of the
Requirement for the Degree of Master's of Arts in Project
Management

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ADDIS ABABA

APRIL, 2021



**Effect of Occupational Safety and Health on Project Performance: The
Cases of Building Contractors in Addis Ababa**

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Declaration

I, the undersigned, declared that this project work entitled “Effects of Occupational Safety and Health on Project Performance : The Case of Building Contractors in Addis Ababa” is my original work performed under the support and guidance of the research advisor , Fesseha A. (A/professor) and the entire material I used for the study have been acknowledged . The study has not been presented for degree in this university or other university so far.

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Acknowledgment

First of all I would like to thank the almighty God for being besides me in every step of my life. Next, I would like to extend my heartfelt gratitude to my advisor Ato Fesseha Afework (A/professor) for his invaluable comment and suggestions whilst working on the project work.

I am also grateful for families and friends who encourage and support me from the beginning to the end of the program

Finally, I would like to extend my deepest appreciation to respondents who replayed to my questionnaire and made the research complete.

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List of Acronyms

BC: Building Contractor

ILO: International Labor Organization

OSHA: Occupational Safety and Health Association

OSH: Occupational Safety and Health

PPE: Personal Protective Equipment

SPSS: Software Package for Social Science

ABSTRACTS

Occupational accidents are very common in construction industry but its impact on project performance was barely studied. The purpose of this study was to scrutinize effect of health and safety practice on construction performance by giving due consideration on the impact of occupation accident of the three project performance measures: Schedule, cost and quality. Accordingly, two building construction companies of BC 2 and BC 3 were selected for the study. The Companies have a combined staffs of over 100 out of which 15 staffs are administrative staffs and not directly exposed to construction site accidents and in effect excluded from the study. The rest of the employees were entirely participated in the study. Data were collected through questionnaire and analyzed through SPSS 20.0 using statistical tools like ANOVA, mean, frequency and Standard deviation. According to the study, construction place accidents were mainly emanated from failure of management to enforce workplace safety policy and procedure, incompetence on the side of employee and scarcity of PPE. Accidents happened due to these reasons impedes project schedule through disruption of operation ; escalate project budget due to raise in insurance premium , re-work of damaged works and compensation for injured employees; and in general adversely affect project quality .

Keywords: Occupational health and safety, Occupational accidents, project performance

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Occupational safety and health (OSH) is commonly defined as the science of prediction, recognition, measurement and control of hazards arising in or from the workplace that could spoil the health and well-being of workers, in view of the imaginable impact on the nearby communities and the general environment.(Alli, 2008)

The human, social and economic costs of occupational accidents, injuries and diseases and major industrial disasters have long been cause for concern at all levels from the individual work place to the national and international. Hence, in an attempt to reduce such costs, Countries have developed and implemented measures and strategies devised to prevent, control, reduce or eliminate occupational hazards and risks over the years to be in line with technological and economic changes.

Yet, workplace accidents and diseases are still recurrent and their cost in terms of human suffering and economic burden remains significant. The International Training Centre of the International Labor Organization (2011) claims that one in six fatal accidents at work occur on a construction site. It further unveiled that no less than 60,000 fatal accidents occur on construction sites around the world every year.

Construction industry, naturally, exposed construction workers to many hazards activities which can cause injury to workers, from falling from height, transport in the workplace, exposure to excessive noise and harmful substances, dangerous large work equipment and

plant, risk of slips from a wet working environment, manual handling and working with unsafe machinery, risks of fire and explosions(ILO, 2006)

Generally, in developing countries like Ethiopia building construction activities are labor intensive which requires employees to work at height, underground, confined spaces, handling loads manually, handling hazardous substances, exposed to noises, dusts, power cables and use of plants and machineries. Besides, construction workers face rapidly changing workplaces, a high degree of competition, bouts of unemployment as well as vast amount of overtime. The use of overtime is the common means of speeding up projects that are under the schedule. Pressure and fatigue related with overtime work may hamper workers' ability to remain safe in the construction site (Dong X, 2005). These particular situation exacerbated work related risk and hazard.

Albeit, the rationale that a construction job or work environment is considered as highly risky and hazardous does not mean that its susceptibility to accident is not controllable –merely because it depends on work environment which is humanly controllable (Olutuase, 2014)

Safe and healthy work environment don't happen by chance. Rather it requires an effort from the stakeholders predominantly involved in the construction business- The government through development and supervision of safety guideline, the employers through investing on personal protective equipment (PPE) and training employees on how to use the PPE; and employees through strictly following safety procedures and guideline.(Lucy, 2016)

Company's engaged in construction industry are susceptible to many barriers prohibiting them from achievement of good safety and health standards. The pressure of achieving production, schedule or performance targets with in a given budget and complexity of the

organization are distinctive examples of such impediments. In difficult economic times, organizations need to reduce their costs and this often has an impacts on the management of workplace health and safety such as the maintenance of complex machinery and the training of workforces in safe ways of doing job. But, there are still powerful enticements for organizations to work for high health and safety standards. These enticements are moral, legal and financial (Hughes, 2016)

In a nut shell, poor occupational safety and health practice could have an impact on project performance through absenteeism of key project staff, may increase project budget due to re-scheduling of the project, compromise project performance and/or quality, the medical cost and compensation may be higher than what was thought at the commencement of the project.

This study devised to scrutinize the effect of occupational safety and health practice on project performance with particular reference to two building construction company currently operating in Addis Ababa.

1.2. Background of the organization

The Construction Companies we elect to use as case for the study of the effects of occupational safety and health on project performance are:

- i. MT Building contractor which is a sole owned BC- 2 building construction Company established with a registered capital of ETB 5,000,000.00. Principal registered office of the Company is Addis Ababa, Bole Sub city. MT Building Contractor has two active project sites in which more than 75 professional and semi-professional employees are deployed.

- ii. AW Building contractor is also a sole owned business with a level of BC-3. It is established with a registered capital of ETB 2,000,000.00. Principal registered office of the Company is situated at Addis Ababa, Yeka Sub city. AW Building contractor has one active project site on which more than 25 professional and semi-professional deployed into the project site

1.3. Statement of the Problem

Addis Ababa which is a city of more than 6 million residents is teeming with construction activities - high-rise buildings, residents, condos etc - but when constructions sites were observed terms of occupational safety and health often only the project managers, project consultants or site engineers wearing protective gear, while most of the workers going without PPE . Consequently, work place hazards which can easily been avoided through wearing of PPE are frequently observed.

The other aspect observed in building construction industry is the pressure to meet cost, schedule and performance requirements. In so doing, building contractors are compelled to use overtime work , less experienced and trained workforce , provide unsafe working conditions and sometimes use downgraded construction materials. Such pressure in general jeopardizes safety and health of the workforce deployed in the construction site.

Close and continuous attention to occupational safety and health is vital because ill-health and injuries imposed by way of work or working condition cause suffering and losses to individuals and their dependents. In addition, accidents and absences through ill-health or injuries result in losses or damages to the project in a way that injured employee may

temporarily absent or permanently replaced which can eventually affect project team performance as it increase project schedule and learning time for the new entrant.

Apparently, causes of accidents and injuries in the construction site are well known. Falling from heights, such as scaffolding are the main, along with accidents involving transportation on and off site. Equally, individual related factors such age, lack of experience and education, job dissatisfaction, smoking and excessive use of alcohol can also attribute to work place accidents and injuries (Dong X, 2005)

In adequate occupational safety and health program has an adverse effect on project performance as it entails penalty by regulatory authority and even in the worst scenario the project office may be prohibited from completing the project which ultimately affect overall project performance through escalating project cost and increasing project schedule.

Generally, to enhance project performance, it is advisable to reduce project teams' absenteeism through good practice of occupational safety and health program. Health risk and failure of employee to participate in fitness and health promotion program are directly associated with higher rate of employee absenteeism (McCunney, 2001). These calls for a need for existence of occupational safety and health program that each member of the project team should follow.

During the preliminary visit of the construction site, the researcher comprehend that personal protective equipment has not been used by project employees except by the site engineer, employees have not been trained on safety rules and regulation and there is not safety bulletin board on the project site . Yet, fire extinguisher and first aid kits are placed in the

project site. The researcher has also noted that workplace accidents are quite common in the project sites.

Very few researches have been done on occupational safety and health practice of building contractors in Addis Ababa. One of the study done by Hanna Mersha, Seid Tiku Mera and Lamessa Dube (2016) on the title of prevalence of occupational injuries and associated factors among construction workers in Addis Ababa conveyed that working for more than 48 hours per week, lack of vocational training and not using of personal protective equipment had significantly contributing to higher risk of occupational injuries. Whereas, the research conducted by Lucy Feleke, Emer T. Quezon, and Yolente Macarubbo (2016) focused on evaluation of health and safety practice in building construction industry in Addis Ababa .

Hence in this study the researcher devised to analyze the effect of occupational safety and health practice on project performance of AW building contractor (BC-3) and MT building contractor (BC-2) and provide recommendation on observed shortcoming in the occupational safety and health practice of the case Company's.

1.4. Research Questions

The researcher devises and conducts the study so as to answer the following fundamental research questions. These are:

1. What is the effect of occupational safety and health practice on project schedule performance?
2. What is the effect of occupational safety and health practice on project cost performance?
3. What is the effect of occupational safety and health practice on project quality performance?

1.5. Objective of the Study

1.5.1. General Objective

The principal objective of this study is to analyze the effect of occupational safety and health on project performance with particular emphasis to three widely used project performance measurement- cost, schedule and performance or quality and there by determine the extent to which project performance adversely affected by poor occupational safety and health practices.

1.5.2. Specific Objective

The researcher devises the study to undertake the following activities which will provide a solution to the identified research problems and general objective. These are:

1. To identify effects of occupational safety and health practice on project schedule performance
2. To explore the effects of occupational safety and health practice on project cost performance
3. To scrutinize the effects of occupational safety and health practice on project quality

1.6. Significance of the Study

The significance of this study could be considered from three perspectives. The first one is exploration of safety and health practice in the building construction industry and thereby scrutinizing the causes of the accident which may broaden existing knowledge about occupational accidents experienced in the construction industry. Next, it can create awareness on the impact of occupational safety and health practice on successes of construction projects.

Finally, this study could be a reference material for further studies to be conducted in similar areas with other dimension.

1.7. Scope of the Study

Evidently, occupational safety and health is a broad discipline applicable to each and every industry. In this study we focus on the effect safety and health practice on project performance with particular reference to building construction in Addis Ababa. In consideration of time and cost factors, even from building construction underway in the capital city, due consideration shall be given to two building construction projects done by AW building constructors and MT building contractors.

In this study the researcher devise to cover active construction site and workers deployed on the site because such employees are directly exposed to unsafe workplaces and a number of hazardous activities which impede their health and performance more than workers engaged in other industries.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This section will review and scrutinize existing literature and publication on occupational safety and health in building construction industry; and its impact on construction project performance.

2.2. Theoretical Review

2.2.1. Definition and Basic Concepts of Terminologies

In order to clarify basic concepts and terminologies used in the study, definitions of some technical and operational terminologies provided as follows:

Occupational: means work-related matters and work concerned activities. **Occupational Health** is to be defined as a state of optimal physical, mental and social well-being. The term '**job safety**' is the interrelationship among manpower and work, material resources, property, plant and machinery, environmental, and other economic considerations like productivity. **Accident** is any unanticipated event or conditions that results in injury or ill health of people, or damage or loss to property, plant, equipment, materials or the environment or a loss of business opportunity (Friend and Kohn, 2007). **Work-related accident** refers to an incident that directly affects a worker's health while performing work activities (Roberto, 2006), but **ill health** is to be defined as a distinguishable/ or adverse physical or mental state resulting from and/or worsen by a work activity and/or work related situation. **Hazard** is source, condition, or act with a potential for injury in terms of human suffering or ill health and damage to property (OSHA, 2015).

2.2.2. Work Place Characteristic of Construction Industry

Globally, construction is a dynamic and vital economic sector, and also considered as crux of the world's economy (Panassaya, 2015). Particularly in Ethiopia, this sector deploys substantial amount of budget and resources that seized huge human resources of diverse professions through creating job opportunity (Lucy, 2016).

A number of professionals deployed and work together on a construction site: client, project supervisor, coordinator for safety and health matters, and contractors and contractors deliver many construction materials and inputs, often heavy and bulky to the site. The ill-defined conditions of construction site with numerous material-handling, transportation and storing operations which involve various equipment is considered as responsible factor for frequent occupational accidents and occupational diseases .

Hence, determining the routes and areas for the passage and movement of plant and equipment; the conditions under which various materials are handled (handling and lifting equipment, working platforms, removal of waste and debris, dangerous materials); and preparing areas for the storage of various materials are vital decisions to be made for multidimensional benefits.

Apart from that, improved logistics and material handling culture in construction site benefits construction firms in varies perspective such as: removing unnecessary activities, reducing incidents of accidents arising from manual handling, enhance productivity and create better brand image of construction industry as a whole (Alli, 2008).

2.2.3. Nature of Occupational injuries in Construction

Davis and Tomasin (1996) classify occupational injuries from construction activities in to two as follows:

- i. Danger of physical injuries and fatalities ; and
- ii. Damage to health

Whereas King and Hundson (1985) categorize construction site accidents in to four, namely

- i. Accidents which couldn't affect either property or personnel;
- ii. Accident which causes damages to property without affecting personnel ;
- iii. Accident which resulted in personnel fatalities without affecting property;
- iv. Accident which end up in both property and personnel injuries

Contractor, generally, not concerned with accidents that do not involve personnel injuries or property damage. The focus of attention of the contractor is always on accidents that involves personal injury and/or property loss.

Construction accidents that end up in physical harms and fatalities can be mainly classified into the following eight categories.

- i. **Falling from heights** – involves workers falling from higher floors to lower floors/ground and falling from ground level to excavation level.
- ii. **Collide with falling/moving objects/vehicles** – mainly involves workers being collide with equipment, construction machineries, vehicles, falling materials, vertically raised materials and horizontally transported materials.
- iii. **Excavation related injuries** – encompasses accidents due to cave-in, contact with underground utilities, subsiding of nearby structures, falling of materials/vehicles/ objects onto people working in the excavation as well as vapors, gases and inrushes of water at the lowermost of excavations.
- iv. **Accident due to faulty operation of machinery/tools** – caused by toppling of machinery, collapsing of the parts of machinery and unsuitable or unsafe hand-held tools.

- v. **Electrocution** – caused by contact with electric current from machinery, tools, appliances or light fixtures, faulty electrical equipment and tools, and contact with overhead/underground power lines.
- vi. **Fire/explosion** – accidents resulting from the explosion of pressure vessels or gasoline pipes and fire due to welding/hot works.
- vii. **Failure of temporary structures** – accidents owing to the failure of formworks and scaffoldings.
- viii. **Others** - e.g. lightning strikes, sliding on the same level, deficiency of oxygen in confined spaces, etc.

Nature of health hazards that a construction workers deployed to construction site may encounter are summarized in Table 2.1 below

Table 2.1: Health damages in Construction

Health Hazard	Causes
1. Skin diseases	Contact with cements , mortar , slaked lime , paint , varnish, solvent , strong chemicals , grouts seals and adhesives
2. Difficulty of hearing	Noise
3. Muscular and bone diseases	High static
4. Respiratory diseases	Inhalation of toxic dusts, vapors and gases
5. Cancer	Carcinogenic genic materials
6. Disease resulted from vibration	Vibration
7. Mental illness	Stress, Inhalation of toxic material affecting brain and central nervous system

(Source: Adopted from King and Hudson, 1985)

2.2.4. Causes of Accident in Construction Site

Unsafe acts and unsafe conditions are considered to be immediate or prime causes of accidents, because they are the most obvious causes and are usually directly involved or present the moment accidents encountered. According to Holt (2001), secondary causes are

the failure of the management system to anticipate, and include lack of training, maintenance, adequate job planning and instruction, and not having safe system of work in place.

2.2.4.1. Unsafe Act

Holt (2001) uncovered that unsafe act is an act on the side of a person that will enhance his or her chances of suffering from an accidents. Some unsafe acts are so hazardous that it may take little repetitive action occurrence of the accidents

Some of the most commonly observed unsafe acts at construction site include:

- i. Make use of defective or broken hand tools
- ii. Failure to use personal protective equipment
- iii. Not duly following safety procedures
- iv. Poor site Management

2.2.4.2. Unsafe Conditions

An unsafe condition is a condition within construction site that increases the chance of having accidents. Among the greatest contributors of unsafe conditions at construction work environment are the action of the employee themselves.

There are many reasons for unsafe conditions, yet they generally fall under any one of the following groups

- i. The action or indecisiveness of the workforce at construction site
- ii. The deterioration of plant, machinery , tools and equipment due to usual wear and tear
- iii. Poorly designed plant , machinery, construction site and operating system

- iv. The oversight of safety features during design, engineering or maintenance of construction equipment

2.2.4.3. Contributing Causes of Accident

Holt (2001) further noted that contributing causes of accidents are those acts or conditions that may led up to the accidents, but in themselves were not principal causes of accidents

- i. Insufficient code or standards
- ii. Inability of management to implement safety rules
- iii. Defective design or lack of maintenance
- iv. Scarce personal protective equipment

2.2.5. Theories of Accident Causation

Several theories of accident causation have been developed in order to comprehend occurrence of accidents. Some of theories of accident causation have been explored in this section

2.2.5.1. Domino Theory

According to Friend and Kohn (2007) domino theories represent accidents as predictable chronological sequences of events or causal factors. Each event builds on and affects the others. If permitted to exist without any form of interference, these hazards will interact to develop the accident. In domino games, where the pieces are queued and the initial one is knocked over, the first domino sets into motion a chain reaction of events resulting in the toppling of the remaining dominos. Likewise, accidents, in accordance with the domino theories, will materialize if the sequence of pre-defined phase causes is not interjected.

2.2.5.2. Multiple Causation Theory

Multi causality theory, according to Friend and Kohn (2007), refers to the fact that there may be more than one cause to any accidents. It uses four Ms to represent factors causing an accident: machine, media, man, and management .Machine refers to tools, equipment, or vehicles

contributing to the cause of an accident. Media comprised of the environmental factors surrounding an accident, like the walking surfaces or environmental conditions. Man associated with human factors attributing to the incident. Management also comprises the other three Ms, oversee the method used to select equipment, train and develop personnel, or ensures a relatively hazard-free working environment.

2.2.5.3. Human Factor Theory

The human factor theory argued human error mainly contributes to accident causation which ultimately ends up in chain of events leading to an accident. The factors are overburdened, unsuitable response, and inappropriate act.

2.2.6. Effect of Accident in Construction

Accidents happened in the construction site has cost the employer an additional amount of fund to be used in reorganizing works, replace damaged materials, replace lost manpower and plant or compensation and legal costs. In a nut shell, they have an impact on project cost, schedule and performance.

Effects of accidents in construction sector are divided in two three major categories, i.e.

2.2.6.1. Manpower

This refers the impact of accidents on employees deployed in the construction site and that includes:

- i. Suffering of individuals
- ii. Hardship
- iii. Minor injuries
- iv. Permanent disability
- v. Loss of earning

2.2.6.2. Financial

According to Sharma (2010) the cost of supervision is considered to be cost of preventing accidents that is responsible for safety and efficiency on construction site. Besides, cost of insurance involves a large sum of money and do not stop even there and it may also require additional fund that may eventually affect the profit margin of the project.

Financial effects of accidents in construction industry include;

- i. Delay in production
- ii. Escalation of insurance premium
- iii. Legal charges
- iv. Loss of time by employee
- v. Reduced quality
- vi. Training cost of temporary or permanent replacement
- vii. Time spent on supervision and management in investigating and reporting the accident

2.2.6.3. Legal

Sharma (2010) has also implicated that negligent in law may call for employer to be responsible for injuries of the worker during the processes of accomplishing their duties. All call for damages under bodily injury made in the name of negligence. The legal effect of accidents includes;

- i. Legal obligation;
- ii. Inability to safeguard workforce from occupational injuries become a criminal offence and lead to prosecution

2.2.7. Accident Prevention

Construction site is considered to be one of the most hazardous workplaces. All the activities can cause different kinds of accident to materialize and these often result in deaths or injuries. Consequently, accident prevention should be in place to safeguard or to decrease the rate of the accidents. Holt (2001) explained that accident prevention or reduction in construction is not

merely a matter of developing a list of rules and directive and making safety supervision against the stated Company rules, but is calls for a system for managing workplace health and safety which complies with laws of the Country. The safety measure considered in this research are safety and health rules, regulation and policy, personal protective equipment, fire extinguishers, tool inspection, emergency procedures, safety bulletin board, first aid training and incident investigation.

2.2.7.1. Safety Rules, Regulations, Policies

Health and safety policy is a written general statement of principles, rules and goals representing the company's commitment to occupational health and safety. Safety policy demonstrates the tone at the top about commitment of management to ensure and enforce safe working condition and working methodology at every construction sites.

2.2.7.2. Construction Safety Meeting

Cheung (2005) noted that kick-off meeting or initial work meeting should be carried out and attended by the whole project teams include the safety advisors and inspecting engineer. At the time of meeting, there should be an explanation on safety policy, procedures and also about the detail component of the safety plan. Start of site works shall be instigated only if getting approval from the inspecting engineer. On top of this, safety manager and safety officer are appointed as required by the contract. Inspecting engineer should also be required to approve appointment of safety staff.

2.2.7.3. Incident Investigation

Petersen (1978) unveiled that the inspection of accident is the most challenging in accident prevention. Procedures for investigating all accident should be defined and be in place for others to follow. Checklist and format should be developed and put in place to collect and record basic details.

Normally, incident investigation team comprises the management team. But sometimes employees' representative can be involved as part of the team of investigation. The following are basic tools used while accident investigated:

- i. Report form, possibly a checklist as a routine prompt for basic questions
- ii. Notebook or pad of paper
- iii. Tape recorder for on-site comments or to assist in interviews Camera — Polaroid instant-picture cameras are useful Measuring tape, which should be long enough and robust
- iv. Special equipment in relation to the particular investigation, e.g. meters, plans, video recorder

From the perspective of prevention, the rationale for the investigation and report is to develop a mechanism to prevent recurrence of incident of accident through taking note on lessons learned and establish safeguard to prevent reoccurrence of accidents.

2.2.7.4. Personal Protective Equipment (PPE)

PPE's are available in various forms and each of them have distinct function including hearing or ear protection, eye shield, respiratory organ protection, skin and general protection in the form of protective or safety clothing, helmets, harnesses and lifelines. According to Holt (2001), personal protective equipment has limitation mainly due to its incapability to eliminate a hazard if it fails and the failure is not identified. Therefore, the equipment must be selected appropriately and accordingly to its use and its condition has to be monitored. Workers are required to be trained before using any types of the safety equipment.

2.2.7.5. House keeping

According to Federated (2007), standard and good housekeeping in any construction site is a crucial activity that can improve the entire safety performance by reducing the accidents from

happening. A good housekeeping program ought to be well planned and coordinated as well as regularly practice. This is should be a continuous process that involves everyone in workplace. A number of accidents are arise from other incidents, such as tripping or slipping that are basically results of unsafe working condition due to the deficient housekeeping

2.2.7.6. Fire Prevention or Fire Extinguishers

Holt (2001) revealed that there are two methods of dealing with fire in construction work; i.e. preventing it from happening and controlling the consequences if it happen. Both of the activities require equal attention during the planning process. Oxygen, fuel and source of ignition are determined to be sources of fire. If any one of them is removed there will be no fire. Most of fire prevention activities done at the planning stage, where simple rules apply:

- i. Use less flammable substance
- ii. Minimize the quantity of flammables on site
- iii. Store flammable materialize like solids, liquids and gases safely, separated from each other and from oxygen cylinders or oxidizing materials.
- iv. Make sure that rubbish is removed regularly
- v. Ban smoking in inappropriate areas

2.2.7.7. Emergency Procedures

According to Gibb (2000), the most common emergency situation happening in project site involves fire. So, safety plan should contain an appropriate emergency plan, written to cover the detailed arrangements on a project. Other potential emergency situations that require emergency plan comprises flooding and multiple injuries from any cause. The most common form of emergency is the need to evacuate an injured person especially from the most inaccessible area of the project. Emergency plan can be shorten the duration taken between an injury occurring and arrival at a treatment center. Such activity should often be appraised as construction work continues to enhance effectiveness and efficiency in the area.

Developing a plan for emergencies commenced with the purpose of reducing their likelihood of occurrence. The objective of publishing an emergency plan is to ensure that everyone on site can be alerted in an emergency situation, and comprehends the emergency signal and also the action that will be taken. All the emergency routes must be clearly identified, signed, adequately lit and kept clear.

2.2.7.8. Safety Bulletin Board

Safety bulletin board is principally used to enhance employee's safety awareness and disseminate Company's safety message to employees. It is one way of easily communicating policies and procedures to employees. The most recent information will be displaying on this board. Hence, it is an effective way to disseminate information among employees and employers. Well-designed and attractive bulletin board can help promote safety in the workplace

2.2.7.9. Tool Inspection

According to Cheung (2005), tool inspection should be done on daily as well as weekly basis to ensure the all plant, equipment and machineries deployed to construction sites are well functioning and are in the good condition. All the equipment's and machinery have to be duly inspected before put into operation such as personal protective equipment (PPE), hand tools and portable tools and equipment.

2.2.7.10. First Aid Training, Equipment and Procedures

OHS regulation (2001) prescribed that first aid is important and be placed in the right location in every workplace. First aid provides immediate help to a person suffering from an injury at work place and also prevent the injury from become worse. Employers are required to provide first aid materials and put them where it is easily accessible any time in the workplace.

2.2.8. Health and Safety Programs

Occupational health programs calls for the avoidance of ill-health resulting from working environment. They comprised of two components – Occupational medicine and occupational hygiene. Occupational medicine is a specialized branch of preventive medicine that deals with diagnosis and prevention of health hazards and dealing with any ill health or stress which has occurred in spite of preventive action. Whereas, occupational hygiene is the province of the chemist and the engineer or ergonomist involves in the measurement and control of environmental hazard. (Armstrong, 2009)

Safety programs deals with prevention of occupational accidents and /or minimizing the result of loss and damage to people and property. They prone to the system of work than the working environment, yet both health and safety programs are concerned with protection against hazard, and their aims and methods are clearly interlinked.

2.2.9. Occupational Health Impacts

Great variety of occupational health hazards and accidents happening each time and day makes quantification of their associated health risk and impact at global level very cumbersome .Yet, some estimates have been made based on occupational injuries and diseases reported in official statistics notably ILO and world bank documents. Yet, a number of injuries and diseases caused by occupational hazards are not conveyed. (Joubert, 2002)

Safety professionals attempt to control or reduce or eliminate several occupation accidents or incidents of accidents. Typical work related health and safety losses include injuries, illnesses, and fatalities. Work place losses includes damaged equipment, damaged raw materials or finished products , damaged or destroyed facilities , downtime , service /production interruption , or loss of reputation (Friend and Kohn, 2007)

2.2.10. Contribution of Occupational Safety and Health for Project Success

The main objective of safety and health management program, is to protect the workers, and resources of the employers from workplace injuries, illness, and minimizing the suffering and financial hardship these events can cause (OSHA, 2015). Organizations often deploy considerable resources in protecting workers safety and ensuring healthy workplaces. For business and financial reasons, many go beyond the minimum requirements set by occupational health and safety laws. OSH management system provides organizations with the framework to develop a solution to the increasing challenges facing them at the workplace today, from serious injury and illness, lost work days, increasing occupational health and safety regulations, large citations/penalties, rising worker's compensation costs, costly medical claims, worker retention and employee satisfaction (Takele, 2007).

Implementation of safety and health programs in work places has a significant influence on the performance and profitability of the firm developing system. Generally, good practice of work place safety and health program provides the following direct and indirect benefits for the individuals as well as for the employer.

Direct benefits: such as higher employment opportunities; reduced insurance premiums; reduced litigation costs; reduced sick pay costs; improved production/productivity rates; reduced production and materials damage and lower accident costs/production delays will be yield while an organization implements proper management system of safety and health matters in workplace.

Indirect benefits: reduced absenteeism; reduce staff turnover; improved corporate image; improved chances of winning contracts and more job satisfaction/employee morale.

Thus, companies with effective occupational safety and health management system earn positive returns and benefits on their health and safety investment by savings operational cost through integrated OSH management. Among these; less work-related accidents and ill health and associated costs; improving performance through heightened employee morale and adherence to policies and procedures; increased control of regulator issue; reinforcing a responsible and well-managed reputation with customers, stakeholders and communities; the company receives clear demonstration of legal and regulatory compliance to regulatory authorities, customers and employees; better management of health and safety risks increased access to new customers and business partners through an improved company image.

2.3. Empirical Review

Construction industry is considered to be one of the risky sectors in terms occupational safety and health. Yet, research conducted to figure out the impact of occupational safety and health on organizational performance is very limited let alone project performance. In this section of the study review of some of the studies conducted on the topic of occupational safety and health have been made.

A study conducted on the title “Effect of Occupational Safety and Health on organizational Performance: A Case of Nzoia Water in Trans-Nzoia Count” was conducted by (Bilhah N., Elizabeth N. Makokha, and Gregory N., 2020) was done in Kenya. The searchers targeted the entire population of the case Company for their study, use questioner to collect data and test validity of the instrument using Cronbach Alpha to test validity of the instrument. Outcome of their study reveals that accident reduction enhances organizational growth, survival as well as performance. Hence, the organization should provide a health and safety program to employees to reduce cost.

(Hanna M, Seid T Mereta and Lemessa D., 2016) have conducted a research on the title “Prevalence of Occupational Injuries and Associated Factors among Construction Workers in Addis Ababa, Ethiopia”. The researchers have used cross-sectional studies on 15 licensed contractors operated in Addis Ababa. Data was collected through face to face interview and observation checklist. They analyzed the data using SPSS version 20 statistical software. Outcome their studies revealed that working for more than 48 hours per week, lack of vocational training, not using of personal protective equipment had significantly contributed to the higher risk of occupational injuries.

A research on the title of “Effect of Occupational Health and Safety Practice on Organizational Commitment, Work Alienation and Job Performance: Using the PSL-SEM Approach” was conducted by (Ramzan K, Arzu T. Toklu, Meral E. and Ismael T. Toklu, 2016). The study investigated health and safety practice in five dimensions, i.e., safety procedure and risk management, safety and health rules, first aid support and training, occupational accident prevention, and organizational safety support. The data set obtained from private enterprise was analyzed by structural equation modelling using least square method. The finding of the analysis suggested that occupational health and safety practice as safety procedure and risk management, safety and health rules, first aid support and training, and organizational safety support had an affirmative impact on organizational commitment.

Xiuwen Dong(2005) on his study on the topic of “Long workhours, work scheduling and work-related injuries among construction workers in the United States” unveiled that construction workers started work earlier, worked longer days and fewer weeks a year, and were more likely to hold multiple jobs and change jobs than their non-construction counterparts. Long working hours and irregular or unbalanced work schedule were significantly linked with a higher occupational injury rate after control for likely confounders. To come up with such results Dong

X. has used the National Longitudinal Survey of Youth, 1979 cohort (NLSY79), for data analysis, and odd ratios were used to measure the risk-related injury in different work groups.

(A E Dembe , J B Erickson , R G Deblos , S M Banks, 2005) studied the impact of overtime and long working hours on occupational injuries and illness – a new evidence from the United States . The researchers have used a response from 10,793 Americans in the National Longitudinal Survey of Youth injuries and survey between 1987 and 2002. They have also used multivariate analytical technique to analyze the data. The outcome of the study revealed that working in jobs with overtime schedule was associated with a 61% higher injury hazard rate compared to jobs without overtime. Working a minimum of 12 hours per day was linked with a 37% raise of hazard rate and working a minimum of 60 hours a week was linked with a 23% raise in hazard rate.

2.4. Conceptual Framework

The researcher developed conceptual research framework based on the theoretical and empirical review of literature. The Conceptual framework for this particular project work is developed based on the premises that:

- i. Occupational safety and health (OSH) is commonly described as the science of prediction, recognition, measurement and control of hazards arising in or from the workplace that could spoil the health and well-being of workers, in view of the imaginable impact on the nearby communities and the general environment.(Alli, 2008)
- ii. If accidents occurred in project site they have an impact on human resource, financial resources and in the worst case they may have legal impact which may go as far as closing of the Company. So, Company's should have OSH policy and procedure and properly follow its implementation. On top of the OSH policy should be updated each time new or unanticipated sources of accidents materialize.

- iii. Effectiveness of a Company to develop the right occupational health and safety policy and procedure depends on its ability to analyze causes of accidents in project site, its effect on project budget and its impact on project schedule. A company that develops OSH policy and procedure in view of current and anticipated causes of accidents can counter act any possible damages arising out of impair of OSH of employees at project site.
- iv. Apart from developing proper occupational health and safety policy , company's should implement it properly so as to get the benefit out of it in terms of managing and/or reducing work place accidents

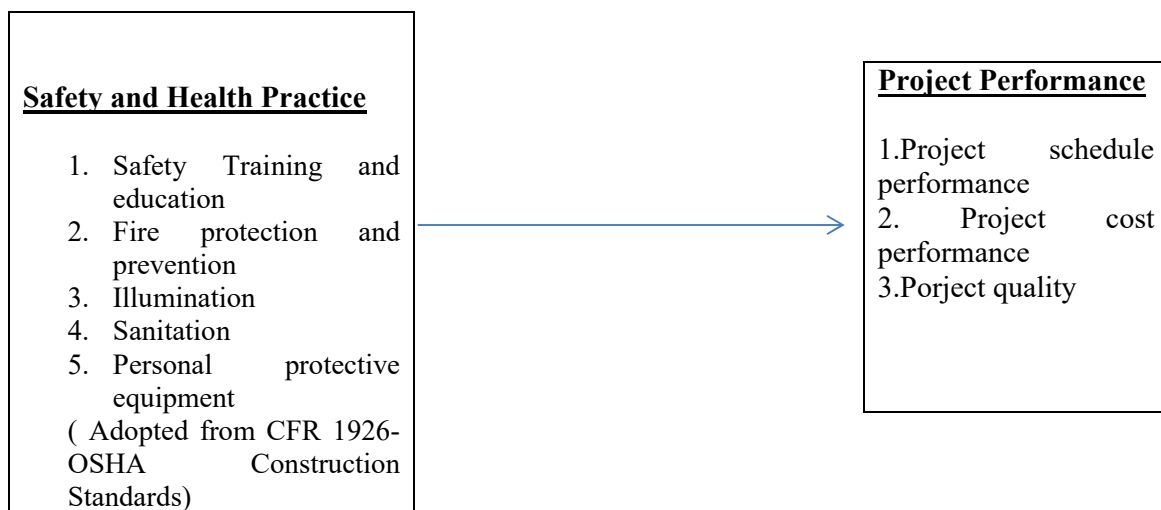


Figure 1: Conceptual frame work model

Besides, the conceptual framework model in dictated under figure 1 above, the researchers has developed two hypothesis models in the area of PPE and causes of accidents in construction site

H1- There is no significant difference between job categories on the availability of PPE

During preliminary visit of construction sites, the researchers comprehend that only site engineers and consultants have used PPE. So, in this study we should figure out whether PPE are available equally to all employees working in different occupational groups.

Further, according to ILO (2006) construction industry, naturally, exposed construction workers to many hazards activities which can cause injury to workers, from falling from height, transport in the workplace, exposure to excessive noise and harmful substances, dangerous large work equipment and plant, risk of slips from a wet working environment, manual handling and working with unsafe machinery, risks of fire and explosions. But, each of hazardous activities couldn't equally contribute to occupational accidents . So the researched developed the following hypothesis to identify workplace activities which significantly contribute to occupational accidents

H2 -There is no significant difference between the means (μ) of causes of accidents at construction sites

CHAPTER THREE

RESEARCH METHEDODOLOGY

3.1. Introduction

Research methodology uncover the research design, population and sampling, sources of data, data collection method and methods of data analysis including the data processing and data analysis methods to be used. According to Kothari (2004), research methodology is a way to analytically resolve research problems. It may be comprehend as a science of learning how research is done scientifically. Hence, the objective of research methodology is enhancing research procedure and criteria used in conducting scientific studies.

In this section of the study the focus is on methods adopted to gather and process pertinent data for the achievement of the project work objectives.

3.2. Research Design

According to Kothari (2004), a research design is a framework of conditions for gathering and analyzing data in a way that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design is the conceptual framework through which research is conducted.

In this study descriptive types of research designs were used. Descriptive research attempt to describe the extent of occupational hazard at the selected construction site as it exists at present, and connect ideas to comprehend cause and effect relationship between dependent and independent variables, i.e., construction health and safety and project performance.

3.3. Research Approaches

To obtain sufficient and appropriate data for this project work, the researcher devised to use quantitative research approach for this study.

3.4. Population and Sampling Frame

The population for the study was building constructors operating in Addis Ababa. In consideration of cost and time for the project work, the researcher has judgmentally selected two constructions Company's namely MT building Contractor, a BC-2 level building contractor and AW Building contractor-a BC-3 level building contractor. The Company's selected for the research have three projects all of them are within Addis Ababa housing projects situate in Bole Arabsa low cost housing or Condominium projects.

As per the payroll for the months of December 2020, they have about 100 employees including administrative staffs. From these only 15% are administrative and the rest are project staffs. So our sampling frame for the study shall be limited to 85% of the employees of the Company as they are directly exposed to work place hazards.

Since the project sites are few in numbers, they equally constitute the sampling frame.

3.5. Sampling procedures

The study is basically focused on occupation health and safety at construction site. Therefore, administrative staffs who are working apart from construction site should be excluded from study. In view of this our target population of 85 employees was entirely considered in the study. In effect, the entire population exposed to workplace hazards has been considered in the study.

3.6.Types and Sources of Data

To accomplish this project work the researcher plans to use only primary data gathered through questionnaire from target population, which believed to attain objective of the study described in the forgoing sections

3.7.Methods of Data Collection

The type of data collection method that the researcher used was questioner. The questionnaire was distributed to obtain view of different professionals working in the construction sector. It was developed using an instrument called Likert scale from strongly disagree (1) to strongly agree (5) and distributed to workers at project sites. The instrument is elected to get more flexible ideas from respondent and provide more accuracy in judging their view

3.8. Methods of Data Analysis

Data collected from administrated questionnaire should be analyzed through statistical or quantitative analysis.

In this study, the data collected through questionnaire were analyzed using percentage, Mean Score, and Analysis of Variance (ANOVA). The percentage was used to analyze data collected from Section one of the questionnaire. Analysis of Variance (ANOVA) and Mean Score were used for other section of the questionnaire that extracts historical data from the analysis.

In order to have perfect result, data collected via questioners were analyzed by quantitative technique of analysis using Statistical Packaged for Social Science (SPSS)

3.9. Ethical Consideration

All participants were informed on their rights according to research ethics process. It was made clear to the participants that their participation in this research was voluntarily and anonymous. To ensure confidentiality, the process of data gathering and processing was anonymous. Further, the data was analyzed without identifiers. The data collected was of official nature and involve information of confidential nature; it was declare in the questionnaire that all data collected was for research purpose only.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1. Introduction

In this chapter an attempted should be paid to analyze and present data collected through observation and questionnaire. A total of 85 employees within two construction firms selected for this study were considered as respondents for questionnaire. In addition, data were thoroughly scrutinized and presented in a tabular format to attain the stated objective of the study. The questionnaires was used to obtain data on whether construction firms have safety policy and procedure , causes of accidents on construction site , cost implication of construction accidents and impact of accident on construction project performance .

4.2. Data Presentation

In this section data obtained from completed questionnaire presented. A total number of 85 questionnaires were distributed, yet eighty three was retrieved and eighty of them are completed which represent response rate of 94%.

4.2.1. Reliability Test

The researcher has used Cronbach's Alpha to measure reliability of the instrument used to gather data. Accordingly, result from the SPSS unveiled Cronbach's Alpha coefficient of 0.753 which according to suggestion from Nunally (1978) is acceptable at it is above the threshold of 0.70

Table 4.1. Reliability Statistics

Cronbach's Alpha	N of items
0.753	11

4.3. Characteristic of Respondent

In this section characteristic of respondents are analyzed. In doing so general information about respondents are thoroughly scrutinized using percentage distribution level and frequency of age groups, sex, level of education ,and year of experience in construction sector

Table 4.2- Percentage Distribution of Responses

Response	No of Questionnaire	Percentage
Analyzed (Complete response)	80	94%
Discarded (incomplete response)	2	2%
Unreturned	3	4%
Total	85	100

Table 4.2 shows percentage distribution of response rate of the questionnaire in that 94% of it are analyzed completely, whereas 2% are discarded and the rest 3% are unreturned. Since the analyzed percentage margin is the highest margin it is well enough to sample general opinion for the study.

Table 4.3. Characteristic of respondent

Gender	Frequency	Percentage
Female	27	32%
Male	53	62%
Total	80	100
Age group		
20-30 years	35	44%
30-40-years	28	35%
40-50 years	15	19%
50-60 years	1	1%
Above 60 years	1	1%
Total	80	100%
Level of education		

High school	33	41%
Vocational education	23	29%
Diploma	15	19%
Degree	8	10%
Post graduate	1	1%
Total	80	100%
Year of experience		
0-5 years	52	65%
6-10 years	21	26%
11-15 years	5	6%
16-20 years	1	1%
Over 20 years	1	1%
Total	80	100%
Occupational category	Frequency	Percentage
Site engineer	5	6%
Plasterer	8	10%
Carpenter	11	14%
Masonry worker	4	5%
Electrician	4	5%
Metal worker	6	8%
Driver /operator	4	5%
Painter	3	4%
Laborer	33	41%
Other	2	3%
Total	80	100%

Table 4.2 illustrates that 63% of the work force deployed in the construction site are male and the rest are female. From this it can be inferred that more positions in building construction sector are occupied by male than women. Age analysis of the respondent revealed that 44% of employees working in construction sector are less than 30 year of age. In the contrary only

2% of the work force are more than 50 years in age. Yet, 56% of the employees are between ages of 31-50

Besides, 41% of employees deployed in the construction site are non-professional mainly working in the construction site as a labor. Besides 48% of the work force is semiprofessional i.e., they have a diploma or certificate in vocational education in building construction or other related discipline. Only 11% of the workforce deployed in the construction site are professional have a Bachelor degree or above in building construction and related discipline. So, construction sector is considered to be one of the sectors which give a lot of employment opportunity to skilled and semi-skilled workforces.

Table 4.3 also illustrates that more 91% of employees working in construction site have less than ten years of experiences in the sector. Particularly 65% of the workforce has less than 5 years of experiences. So, the sector provide job opportunity to workforces having 0-10 years of experience than employees with experience of above 10 years as salary and benefit for employees raises as it experience increase which have an impact on total project cost.

Generally, ten different job categories are identified during our study. Out of which 41 % comprised daily laborers and the rest 59 % are professionals and semi-professional working in the building construction industry.

4.4. Safety and Health Practice of Construction Firms

To analyze safety and health practice of construction firms the researcher designed ten parameters believed to measure construction firm's safety and health practices. Then, gather

information about it using structured survey questionnaire. Result from the survey is tabulated under Table 4.4

Table 4.4. Safety Practice at Construction Site

No.	Safety and Health practice at Construction site	N	Mean		Std. Deviation	Variance
		Statistic	Statistic	Std. Error	Statistic	Statistic
1	PPE are used at the right time and at the right place	80	3.0125	.09983	.89292	.797
2	PPE are available	80	2.8625	.08484	.75881	.576
3	Training and/or orientation on work place safety provided	80	2.5000	.07547	.67505	.456
4	Fire extinguishers are available and serviced on time	80	3.4875	.08151	.72903	.531
5	Emergency exit available	80	2.8250	.07708	.68943	.475
6	Safety bulletin board used	80	2.0375	.09653	.86337	.745
7	Tool and machinery inspection done on time	80	3.5875	.07691	.68794	.473
8	First aid kits available	80	3.1125	.06888	.61611	.380
9	Responsibility for workplace safety included in the job description	80	2.0250	.07542	.67458	.455
10	Construction sites managed to avoid work place accidents	80	2.7750	.06884	.61572	.379
	Valid N (list wise)	80				

4.4.1. Personal Protective Equipment (PPE)

PPE was analyzed in two ways. First, its availability was scrutinized based on the mean score and standard deviation. Accordingly the mean score is 3.0125 with standard deviation of 0.89292 meaning that PPE is not always available and employees are prone to accidents

which are simply avoided by only wearing PPE like safety shoe, and eye goggle. Then, we analyzed whether the available PPE are used at the right time and places. Our survey indicated that even the available PPE are not utilized properly, and only 50% employees having PPE are wore it at the right time.

Hence, our survey indicated that construction firms sometimes avail PPE to their employee. Even, when it is available they are not using them at the right time and places. Due to this avoidable workplace accidents sometimes materialized at construction site.

Our physical observation of the construction indicated that most laborers did not fully use PPE while caring out their day to day activities in the construction site. Whereas, site engineers and supervisors often uses PPE. So we developed the following hypothesis to test whether PPE are equally available to all categories of construction workers.

Ho = There is no significant difference between job categories on the availability of PPE

HA = There is significant difference between job categories on the availability of PPE

Table 4.5 – One Way Analysis of Variance (ANOVA) on availability of PPE for all employees deployed on different job categories

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	14.409	9	1.601	3.606	.001
Within Groups	31.079	70	.444		
Total	45.488	79			

P is significant at 0.05 level

Table 4.5 revealed that the one way analysis of variance performed on availability PPE for all employees working different job categories at construction site . The table shows that $F_{ratio} = 3.606$ which is highly significant at 0.001. This means that the hypothesis H_0 is rejected and the alternative hypothesis H_A which states that there is a significant difference between job categories and availability of PPE to each of job categories

4.4.2. Training and Orientation on Workplace safety and health , Availability of First Aid Kits , fire extinguisher

Our survey result tabulated under table 4.4 unveiled that first aid kits and fire extinguisher are sometimes available at Construction site. Albeit, training is rarely provided to employees on how to use safety equipment like first aid kit and fire extinguisher at the time of emergency and/or accidents. In effect, minor injuries which can easily been treated using first aid kits can be referred to hospitals and even employees suffered from minor injuries severely hearted through bleeding due to lack of skills on how to use first aid kit.

Availability of safety exit at construction site has a mean score of 2.8250 out of 5 meaning that safety exits are not usually available at construction site. By their very nature, construction industry requires employees to work at a confined space, underground and even at height. So, in the absence of emergency exit, accidents which can easily been controlled before it created collateral damage may be materialized.

Machineries and tools used at construction site has been usually serviced and inspected as indicated under mean score of 3.5875 with standard deviation of .68794. Hence, incident of accidents due to faulty machine and tools were considered to be managed.

4.4.3. Responsibility for Safety and Health

As indicated in the table above, the mean score for inclusion of responsibility for safety and health is 2.0250 which implicate that responsibility for safety and health rarely included in the job description. In effect, most of the construction workers are not aware of their responsibility in protecting themselves, property and equipment of the firm, co-workers and colleagues on the site by respecting safety rules and regulation incorporated in the job description

4.4.4. Construction site management

Construction site should be designed to avoid work place hazards. Our observation of the construction site and our own survey unveiled that construction sites are poorly managed as justified by absence of safety exit in most of the construction site. Further, safety bulleting and safety boards that guides employees and visitors to follow safety procedure before entering construction site are barely used as conveyed in mean score of 2.0375. In conclusion, construction sites are not managed in order to avoid workplace hazards.

4.4.5. Occupational safety and health policy and procedure

As indicated in the table 4.6 below the entire sample selected for the study responded that the construction firms have no safety policy and procedure. So, in the absence of such policy it is difficult to uniformly and consistently implement safety rules with in construction site.

Table 4.6 Occupational safety and health policy and procedure

Response	Frequency	Percentage
Yes	0	0%
No	80	100%
Total	80	100%

4.5. Causes of accidents in Construction site

The factors responsible for causes of accidents were listed in a tabular format and respondents were asked to rate the factors that cause accidents based on degree of occurrence on their previous encounter on construction site.

Ho = There is no significant difference between the means (μ) of causes of accidents at construction sites

HA = There is significant difference between the means (μ) of causes of accidents at construction site .

Table 4.7. One Way Analysis of Variance Non Implementation of Safety policy and procedure at Construction site

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	12.898	9	1.433	2.798	.007
Within Groups	35.852	70	.512		
Total	48.750	79			

P is significant at 0.05 levels

Table 4.7 illustrates the one ways analysis of variance performed on non-implementation of safety policy at construction project site. The table reveals Fratio= 2.798 that is highly significant at 0.007. Implying the hypothesis Ho is rejected and the alternative hypothesis HA which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted

Table 4.8. One Way Analysis of Variance for Failure of Management to apply Safety Rules at Construction Site

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	22.787	9	2.532	5.035	.000
Within Groups	35.201	70	.503		
Total	57.988	79			

P is significant at 0.05 levels

Table 4.8 illustrates that the one way analysis of variance performed on the failure of management to apply safety rules. We comprehend from the above table that Fratio = 5.035 is highly significant at 0.000. In conclusion the hypothesis Ho is rejected and the alternative hypothesis HA which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted

Table 4.9. One Way Analysis of Variance for Unsafe Acts or Unsafe Working environment

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	2.120	9	.236	1.281	.263
Within Groups	12.880	70	.184		
Total	15.000	79			

P is significant at 0.05 levels

Table 4.9 illustrated that the one way analysis of variance performed on using unsafe method of work execution or unsafe working environment. We learned from the above table that $F_{ratio} = 1.281$ is not significant at 0.263. In conclusion the hypothesis H_0 which states there is no significant difference between the means (μ) causes of accidents on construction site is accepted. Hence, unsafe method of work and/or unsafe working conditions is not among the variable causing accidents at construction site. This implies that while carrying out their duties employees adhered to code of practice provided by site engineer and/ or construction supervisor.

Table 4.10. One Way Analysis of Variance for Inability of workers or improper behavior

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	8.583	9	.954	3.440	.001
Within Groups	19.405	70	.277		
Total	27.988	79			

P is significant at 0.05 levels

Table 4.10 illustrates that the one way analysis of variance performed on inability of workers or improper attitude. We comprehend from the above table that $F_{ratio} = 3.440$ is highly significant at 0.001. In conclusion the hypothesis H_0 is rejected and the alternative hypothesis H_A which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted. Hence, inability in the side of employee to carryout assigned tasks and inappropriate behavior like using of Khat, and intoxication with alcohol while doing job contribute a lot to occupational accidents.

Table 4.11. One Way Analysis of Variance for Unawareness of Safety Technique or Deficiency of Knowledge

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	7.305	9	.812	2.129	.038
Within Groups	26.683	70	.381		
Total	33.988	79			

P is significant at 0.05 levels

Table 4.11 illustrates that the one way analysis of variance performed on unawareness of safety technique or deficiency of knowledge. We noted from the above table that $F_{ratio} = 2.129$ is highly significant at 0.038. In conclusion the hypothesis H_0 is rejected and the alternative hypothesis H_A which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted. Hence, ignorance of worker on using PPE properly at the right time and condition, and even lack of knowledge on how to safety tools like first aid kit, and fire extinguisher has contributed a lot to work place accidents.

Table 4.12. One Way Analysis of Variance for Scarce PPE

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	6.928	9	.770	2.399	.020
Within Groups	22.459	70	.321		
Total	29.388	79			

P is significant at 0.05 levels

Table 4.12 reveals the one way analysis of variance performed on scarce of PPE. We learned from the above table that $F_{ratio} = 2.399$ is highly significant at 0.020. In conclusion the hypothesis H_0 is rejected and the alternative hypothesis H_A which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted. Hence, insufficiency of PPE like illumination, eye goggle, safety shoe, gloves etc. at construction site become one of the contributing factor for work place accidents.

Table 4.13. One Way Analysis of Variance for Lack of Site Control Measures like Safety Signs, tags , bulletin , barriers, restriction

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	15.264	9	1.696	5.002	.000
Within Groups	23.736	70	.339		
Total	39.000	79			

P is significant at 0.05 levels

Table 4.13 illustrates that the one way analysis of variance performed on ignorance of safety technique or lack of knowledge. We noted from the above table that $F_{ratio} = 5.002$ is highly significant at 0.000. In conclusion the hypothesis H_0 is rejected and the alternative hypothesis H_A which states that there is a significant difference between the mean (μ) of causes of accidents on construction site is accepted. Hence, lack of site control measures like safety signs, tags, entry barriers and restriction has contributed a lot to work place accidents materialized at construction site.

Table 4.14. One Way Analysis of Variance for Insufficient or inappropriate employee training

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	11.047	9	1.227	1.401	.205
Within Groups	61.341	70	.876		
Total	72.388	79			

P is significant at 0.05 levels

Table 4.14 illustrated that the one way analysis of variance performed on insufficient employee training. We comprehend from the above table that Fratio = 1.401 is not significant at 0.205. In conclusion the hypothesis Ho which states there is no significant difference between the means (μ) causes of accidents on construction site is accepted. Hence, inadequate employee training is not among the variable causing accidents at construction site. This infers that construction companies are successful in hiring skillful employees particularly in the critical areas like electricity, masonry, carpentry, plastering, metalwork and etc. Hence, work place accident due to inadequacy of employee training kept minimal.

Table 4.15. One Way Analysis of Variance for Exhaustion

	Sum of Squares	Degree of Freedom	Mean Square	Fratio	Sig.
Between Groups	12.603	9	1.400	1.875	.070
Within Groups	52.285	70	.747		
Total	64.888	79			

Table 4.15 illustrated that the one way analysis of variance performed on Exhaustion. We comprehend from the above table that $F_{ratio} = 1.875$ is not significant at 0.070. In conclusion the hypothesis H_0 which states there is no significant difference between the means (μ) causes of accidents on construction site is accepted. Hence, exhaustions are not among the variable causing accidents at construction site. This infers that construction companies provide sufficient rest to their employees in accordance of the labor proclamation of the country.

Hypothesis

H_0 = There is no significant difference between the means (μ) of causes of accidents at construction sites

H_A = There is significant difference between the means (μ) of causes of accidents at construction site .

Table 4.16 – Summary of One Way Analysis of Variance (ANOVA) on Causes of Accidents on Construction Site

S/N	Causes of Accidents at Construction Site	Sig. Level	Accept H_0	Reject H_0	Accept H_A	Reject H_A
1	Non Implementation of safety plans at Construction site	0.007	x	√	√	x
2	Failure of Management to apply safety rules at construction site	0.000	x	√	√	x
3	Unsafe working environment or unsafe acts	0.236	√	X	x	√
4	Inability of worker or improper behavior	0.001	x	√	√	x
5	Unawareness of safety technique or deficiency of knowledge	0.038	x	√	√	x
6	Scarce of PPE	0.02	x	√	√	x
7	Lack of site control measures	0.000	x	√	√	x
8	Insufficient or inappropriate employee training	0.205	√	X	x	√
9	Exhaustion	0.07	√	X	x	√

Table 4.16 summarizes the one way analysis of variance (ANOVA) performed on causes of accidents on construction site. Accordingly, factors responsible for causes of accident at construction site are identified and comprised of the following: Non Implementation of safety policy for construction site; Failure of management to enforce safety rules; Incompetence of worker or improper attitude; Ignorance on safety technique or lack of knowledge; Insufficient PPE; and Lack of site control measures.

4.6. Effect of Accident on Construction Project Performance

Effects of accidents in building construction project has been analyzed and tabulated in the following table 4.17 using mean and standard deviation of the perception of respondent on each of the parameters listed on the survey questionnaire designed for the study

Table 4.17 Effects of accident on project performance

Job Category		Production Delay	Time Spent on training a temporary or permanent replacement	Corrective action to prevent re-occurrence of accident	Loss of Productivity	Slowdowns in Operation while accidents causes are determined	Damage to plant, equipment , completed work	Degradation of Efficiency	Disruption of Current Work
Sie Engineer	Mean	4.2000	3.4000	2.8000	3.2000	3.6000	2.8000	3.6000	3.6000
	N	5	5	5	5	5	5	5	5
	Std. Deviation	.44721	.54772	.83666	.44721	.54772	.44721	.54772	.54772
Plasterer	Mean	3.8750	2.7500	3.1250	3.3750	3.3750	3.2500	3.5000	3.7500
	N	8	8	8	8	8	8	8	8
	Std. Deviation	.64087	.88641	.83452	.51755	.51755	.46291	.53452	1.03510
Carpenter	Mean	4.1818	3.0000	3.2727	3.0909	3.0000	3.3636	4.0909	3.9091
	N	11	11	11	11	11	11	11	11
	Std. Deviation	.40452	.77460	1.10371	.94388	.77460	.50452	.70065	.70065
Masonry worker	Mean	4.0000	3.0000	3.2500	3.5000	3.5000	3.0000	4.2500	4.0000
	N	4	4	4	4	4	4	4	4
	Std. Deviation	0.00000	.81650	.50000	1.00000	.57735	0.00000	.50000	0.00000
Electrician	Mean	4.0000	2.0000	3.0000	3.7500	3.2500	4.5000	3.5000	4.2500
	N	4	4	4	4	4	4	4	4
	Std. Deviation	0.00000	0.00000	0.00000	.50000	.50000	.57735	.57735	.50000
Driver/Operator	Mean	3.7500	2.0000	3.0000	3.2500	3.5000	4.0000	4.0000	3.5000
	N	4	4	4	4	4	4	4	4
	Std. Deviation	.50000	0.00000	0.00000	.50000	.57735	0.00000	.81650	.57735
Metal worker	Mean	4.0000	2.0000	3.0000	3.5000	3.0000	3.3333	4.1667	3.6667
	N	6	6	6	6	6	6	6	6
	Std. Deviation	0.00000	0.00000	0.00000	.54772	0.00000	.51640	.75277	.51640
Painter	Mean	4.0000	2.0000	4.0000	4.0000	3.6667	3.0000	4.3333	3.6667
	N	3	3	3	3	3	3	3	3
	Std. Deviation	0.00000	0.00000	0.00000	0.00000	.57735	0.00000	.57735	.57735
Laborer	Mean	3.6970	3.5455	3.6364	3.7879	2.7273	3.5152	3.9394	4.0000
	N	33	33	33	33	33	33	33	33
	Std. Deviation	.52944	.50565	.82228	.64988	.67420	.50752	.74747	.61237
Other	Mean	4.5000	3.0000	4.0000	4.0000	4.0000	3.0000	4.0000	4.0000
	N	2	2	2	2	2	2	2	2
	Std. Deviation	.70711	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	Mean	3.9000	3.0125	3.3750	3.5625	3.0750	3.4250	3.9250	3.8875
	N	80	80	80	80	80	80	80	80
	Std. Deviation	.49299	.80338	.80150	.69069	.68943	.56870	.68943	.63632

4.6.1. Production delay

Effects of accidents on production or project delay has an overall mean of 3.900 which implies that almost all respondent thought that accidents occurring at construction site has an impact on project schedule. Among the employees working in identified job categories except plasterer, drivers the mean of their response on the effect of accident on production delay is above 4.000. Implying accidents occurring in those particular areas has a capability of delaying production as it takes time to get permanent or temporary replacement for the position.

4.6.2. Time Spent on Training of Permanent or Temporary Replacement

Table 4.18 illustrated that the overall mean on the impact of accidents on additional time required from training temporary or permanent replacement for an injured personnel 3.0125 with standard deviation of 0.80335. Hence the majority of respondent on this variable is neutral, because readily available and skilled workforce can easily hired to temporarily or permanently replace the injured workforce.

4.6.3. Corrective Action Taken to Prevent Re-occurrence of Accident

We can infer from the table 4.17 above that the overall mean for corrective action taken to prevent re-occurrence of accident 3.3750. Implying majority of respondent is neutral about it. Detail scrutiny of employees by job category unveils Site Engineers are more of neutral on whether corrective action required after major accidents in order to avoid re-occurrence of accidents . Yet, Painters and Others take part in the survey agrees with the factor that corrective action should be done to prevent re-occurrence of accidents as most of them believes that causes of accidents in painting activity is failing from scaffolding. All other

categories are either neutral for fall between neutral and agree with the premise that additional times requires to take corrective action to prevent reoccurrence accidents.

4.6.4. Loss of Productivity

The mean score of productivity is 3.5625 with standard deviation of 0.69069 meaning that the more than 50% of the respondent agrees that work place accidents resulted in loss of productivity and their rest are neutral about impact of accident on productivity.

4.6.5. Slow Down in Operation

Table 4.17 illustrated that the overall average score fore slowdown in operation while accidents causes are determined after major accidents happened in construction site is 3.0750 which approximate the score for neutral. Hence, workers remain neutral on slowdown of operation after incident of accident

4.6.6. Degradation of Efficiency after Loss of Co-worker

The mean score for degradation of efficiency after loss of co-worker is 3.9250 meaning that workers efficiency substantially degraded after they lost co-worker through injury. From the prevision section (4.6.5), we learned that every accident could not have the capability to slow down operation, but accidents which took life of employee have the capability to degrade efficiency of co-worker.

4.6.7. Damage to Plant , Equipment and Completed Work

As illustrated in the table 4.17 Masonry worker, Painters and Other workers are neutral about effect of occupational accidents on plan, equipment and completed work. Whereas, Electrician and Drivers / Operators agrees that occupational accident has an effect on plant, equipment and completed works. On top of these, other employees working in other

department are between neutral and agrees with damages on construction equipment and completed work, except site engineers.

4.7. Cost Implication of Accidents on Construction Project

Cost implication of occupational accidents on construction project were identified and listed on tabular format. Based on survey questionnaire, respondents rated their opinion based on Likert scale which ranges from strongly disagree (1) to strongly agree (5) . Result from the survey is tabulated hereunder.

Table 4.18 Mean of Cost Implication of workplace accident on Construction project

Job Category	Escalation of Insurance Premium	Payment For Settlements of Injuries or Death Claim	Medical Payment	Cost of Rescue Operation	Expenditure on Emergency Equipment	Transportation cost to nearest medical treatment facility	Training cost of replacement
Site Engineer	4.2000	4.2000	4.4000	4.4000	4.0000	3.6000	2.8000
Plasterer	4.2500	3.8750	3.8750	3.7500	3.8750	3.6250	2.8750
Carpenter	4.3636	4.1818	4.1818	4.0000	3.6364	3.1818	3.0909
Masonry worker	4.7500	4.2500	4.7500	4.2500	3.2500	3.0000	3.2500
Electrician	4.5000	4.5000	4.2500	4.0000	3.2500	3.0000	3.2500
Metal worker	4.5000	4.3333	4.3333	4.3333	3.3333	3.0000	4.3333
Driver/Operator	4.2500	4.0000	4.2500	4.5000	3.0000	3.0000	4.0000
Painter	4.3333	4.0000	4.3333	4.0000	3.0000	3.0000	4.0000
Laborer	4.3636	4.1515	4.1212	4.0909	3.6061	3.2121	4.1212
Other	5.0000	3.5000	4.0000	4.0000	3.5000	3.5000	5.0000
Total	4.3875	4.1375	4.1875	4.1000	3.5500	3.2250	3.7125

Table 4.18 illustrated that the mean score for escalation of insurance premium, Payment for settlement of injuries or death claim, medical payment and cost of rescue operation is greater than 4. Implying respondent agrees that occupational accidents can escalate project costs. On the other hand, the mean score for expenditure on emergency equipment, transportation cost to nearby medical facility and training cost of replacement ranges between 3.2 and 3.7 specifically, respondents are more neutral about the cost effect of transportation to nearby medial facilities.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Introduction

This chapter presents summaries of the findings, conclusions drawn from the analysis and the recommendations that will help to improve occupational health and hazard at construction site which have an impact on project performance

5.2. Summaries of Major Finding

Based on the analysis and presentation of chapter four, the following findings were identified and are presented as follows:

- i. Our study on Safety and health practice of construction firms unveiled that construction firms considered in the study did not have safety policy and procedures. On top of this responsibility for safety and health are not included in the job description of the employees. In effect, neither the employer nor employee clearly knows their responsibility for occupation safety and health.
- ii. PPE were not sufficiently available to employees at construction site. Even, when it is available employees did not use it at the right time and places. From physical observation of construction site and our analysis, the researcher comprehend that PPE were not equally available to all employees working in different job categories. Meaning that PPE were not equally available to Site Engineers and daily laborers.
- iii. Emergency equipment's like first aid kits and fire extinguisher are usually available in construction site , yet training were not provided to employees on how to use them in case of emergency. Consequently, minor injuries which can easily been treated using first aid kits and procedures can be referred to hospital. Besides, emergency exits are rarely available at construction site.

- iv. Factors responsible for accidents or causes of accidents at construction site are identified and comprised of the following: Non implementation of safety policy for construction site, failure of management to enforce safety rules, incompetence of worker or improper attitude, ignorance on safety technique or lack of knowledge, insufficient PPE, and lack of site control measures.
- v. Workplace accidents have the capability to delay project delivery as it takes time to get replacement for injured employees in case of major accidents. Besides, immediately after major injuries efficiency of co-workers degraded because they thought about causes of accident whilst doing their job. Accidents usually observed in the area of electricity and machine operation has the capability to damage plant, equipment and completed work.
- vi. In case of frequent accidents, insurance company can raise insurance premium which subsequently escalate project costs. In the incident of major construction accidents construction firms covers additional costs for settlement of medical payment for injured employees and/or death claims in excess of workmen's compensation insurance.

5.3. Conclusion

The aim of the project work is to analyze the impact of occupational safety and health on project performance. Hence, in-depth analyses were conducted on the subject and the following conclusions are drawn:

- i. Causes of occupational accident in construction industry mainly emanated from failure of management to develop and enforce workplace safety policy and procedure so that it can be uniformly implemented throughout the firm, incompetence of employee and insufficiency of personal protective equipment.
- ii. Mismanaged occupational safety and health impedes project schedule through disruption of operation whilst temporary and/or permanent replacement were looking for, loss of efficiency immediately after incident of major accidents , and through damage of plant , equipment and completed work due to accidents.
- iii. Occupational accidents can escalate project budget through raises of insurance premium, settlement of death claim and/or medical insurance, re-performance of damaged work due to accident.
- iv. Occupational accidents can affect project quality as the escalation of project cost as indicated in the conclusion iii above may force them to use low grade material in an attempt to be with in project budget.

5.4. Recommendation

Based on the findings and conclusion of the study, the researcher forwards the following recommendation

- i. Management of construction firms should develop safety policy and procedures tailored to their specific industry. On top of this they should endeavor to enforce its implementation, for example, by including it in job description.
- ii. Management of construction firms should train and/or orient new employees on the nature of occupational accident they may encounter, the benefit of personal protective

equipment to coop with it and emergency procedures to be used in case workplace accidents materialized.

- iii. Management should endeavor to analyze risk associated with occupational accident each time new construction project is commenced , and necessary safeguard should be in place incase new category of risk identified .
- iv. Construction site should be designed in a way to avoid occupational accidents like through establishment of emergency exit, site entry barriers for unauthorized personnel, through uses of safety board etc

REFERENCES

- Abera K. Tadesse A. Kiros B. Jonathan S. Nuvjote H. Fitsum G. and Frank G.** Occupational Health and Safety in Ethiopia: A review of Situational Analysis and Needs Assessment [Journal]. - Addis Ababa: Ethiop. J. Health Dev., 2016. - 1, pp. 136 - 148: Vol. 30.
- A E Dembe, J B Eriksson, R G Delbos, S M Banks.** (2005). *The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United State*. Occup. Environ Med 2005, 62:588-597
- Ameh , O John, Frainde, O Michael (2020) .** *Construction Contractors' Compliance to Health and Safety Insurance Policies in Lagos State*, JCICM
- Armstrong, M. (2009).** *Handbook of Human Resource Management Practice*, 11th Edition, London: Kogan Page Limited,
- Benjamin O. Alli (2008)** *Fundamental principles of occupational health and safety: International Labor Organization* [Book]. - Geneva: International Labor Organization, 2008. - Vol. 2nd edition.
- Cheung (2005).** *Findings from a research study of construction safety in Honk Kong : Accident related to falls of person from height .* ISSN : 1726-0531
- Christer Hogstedt (2006) .***Occupational Safety and Health in Developing Countries: Review of strategies, case studies and a bibliography [Report]*. - Bodhi Pieris : WHO,
- Davis and Tomasin (1996).** *Construction safety hand book*, 2nd edition , USA: Thomas Publishing Telford
- Dong X (2005).** Long working hours, work scheduling and work- related injuries among construction workers in the United State. Scand.J. Work Enviro.Health 31(5):329-335
- Dong XS, Wang X, Largay JA(2015).** *Occupational and Non occupational factors associated with work-related injuries among construction workers in USA* Int.J.Occup. Environ. Health 21(2):142-150
- Edward M. Finucane (2006).** *Definition, Conversion, and Calculation for Occupational Safety and Health Professionals*: Taylor and Francis Group
- Federated (2007).** *Housekeeping during Construction Operations* ,Malaysia: ISO Services Properties, Inc. SOCSO Annual Report Social Security Organization 2000
- Friend and Kohn (2007).** *Fundamentals of Occupational Safety and Health* , 4th edition, USA: Scarecrow Press Inc.
- Ethiopian Civil Code** (Proclamation No. 165/1960)
- Ethiopian Labor Code** (Proclamation No. 1156/209)

Guideline for Public Safety and Health at Construction Site (2007): Department of Occupational Safety and Health, Ministry of Human Resource Malaysia.

Hanna Mersha, Seid T. Mekuria , Lamessa Dube (2017) . *Prevalence of occupational injuries and associated factors among construction workers in Addis Ababa, Ethiopia.* *Journal of Public Health and Epidemiology*, PP1-8

Holt, A.S.J. (2001). *Principle of Construction Safety*, UK : Blackwell Publishing

ILO International Labor Organization the Prevention of Occupational Diseases, International Labor Organization Confidences [Conference] // World Day for Safety and Health at Work. - Geneva: ILO, 2013. - Vol. 1.

Joubert (2002). *Occupational Health Challenges and success in Developing Countries: A South African Perspective*, IJOEH, Vol. 8, PP. 119-124

King & Hudson (1985), *Construction hazard and safety hand book*, 1st edition, USA: Butterworth Heinemann

Kothari, C. R. (2004). *Research Methodology*, 2nd Ed. New Delhi: New age international limited

Lucy Feleke ,Emer T. Quezon, Yolente C. Macarubbo (2016). *Evaluation of Health and Safety Practice in Building Construction: A case study in Addis Ababa.* *Int. Journal of Science and Engineering Research*, ISSN 2229-5518

Mark A. Friend , James P. Kohn (2007). *Fundamental of Occupational Safety and Health*: The Scarecrow Press, Inc.

Nunnally , J (1978) *Psychometric Theory* , 2nd Ed. McGraw-Hill, New York, USA

OSHA (2015). *Occupational Safety and Health Administration OSHA Safety and health program management guidelines* [Report]. - [S.l.] :

OSHA (2007) *Occupational health and safety management systems: Guideline for implementation of OHSAS* [Report]. - Nairobi

Panassaya (2015), *Identifying root causes of construction accident: Non-human factors,* *Int'l Journal of Engg (IJCCIE)*, Vol.2 EISSN 2349-1472

Petersen, Dan. (1978). *Techniques of Safety Management*. New York,NY: McGraw-Hill

Phil Hughes, Ed Ferrett (2016). *Introduction to Health and Safety at Work*: Routledge, New York

Sharma, S.C. (2010), *Construction equipment and its management*, 5th edition New Delhi, India: Khanna

Takele T. Abera K. (2007) *Prevalence and factors affecting work and work related injury among small and medium scale industries in Gondar woreda* [Journal]. - Addis Ababa : Ethiopian Journal of Health Development, ,pp. 25–34. : Vol. 21.

RESEARCH QUESTIONNAIRE

ADDIS ABABA UNIVERSITY

MA IN PROJECT MANAGEMENT

Dear Respondents!

I am Bezuayehu Mengesha; a postgraduate student in Project Management at Addis Ababa University, School of Commerce , Distance education division . As part of accomplishment of the master's program, I am working on a project work on the title “**Effect of Occupational Safety and Health on Project Performance: The Case of Building Contractors in Addis Ababa**” Therefore, this is to kindly request you to participate in the survey that needs data from you as a principal stakeholder and active player in the construction industry.

Respondent's information is anonymous to anyone including the researcher, and your participation is voluntary. And your response is extremely important and valuable for the success of the research to achieve the objective by indication possible gaps, and will give directions for further improvement in Occupational Health and Safety in construction industry. Therefore, I appreciate if you spend a few minutes from your valuable time and replay the questions according to the instruction.

If you need any assistance in answering any questions feel free to contact me by the following methods. Mobile: +251 911 14 9392 or

Email: bzymng@gmail.com or bzymng@yahoo.com

Tank you in advance for your cooperation .

SECTION ONE : GENERAL INFORMATION

1. Age groups: 20-30 years ☐ 30-40Years ☐ 40 -50year ☐ 50-60years ☐ Above 60 ☐
2. Sex: Female ☐ Male ☐
3. Level of Education:
High school ☐ Vocational education ☐ Diploma ☐ Degree ☐ Postgraduate ☐
4. Years of work experience:
Below 3 years ☐ 3-7 years ☐ 8-12 years ☐ 13-18 years ☐ above years 18 ☐
5. What is the average numbers of projects executed by your firm in the last five years?
a) 0-5 ☐ b) 6-10 ☐ c) 11-15 ☐ d) 16-20 ☐ e) over 20 ☐
6. Where there accidents and health related problems on your project ?
Yes ☐ No ☐
7. If 'Yes', how many?
a) 1 ☐ b) 2 ☐ c) 3 ☐ d) 4 ☐ e) 5 ☐ f) > ☐
8. Job Category
Site Engineer ☐ Plasterer ☐ Carpenter ☐ Masonry worker ☐ Electrician ☐
Metal worker ☐ Driver /operator ☐ Painter ☐ Laborer ☐ other ☐

SECTION ONE: OCCUPATIONAL HEALTH AND SAFETY POLICY AND PRCEEDURE

1. Does the construction firm have Occupational Health and safety policy and procedure? If No, go to question Number 4
Yes ☐ No ☐
2. If yes, responsibility of employer and/or employee for workplace health and safety included
Responsibility of employer Yes ☐ No ☐
Responsibility of the employer Yes ☐ No ☐
3. Who is responsible to oversee occupational safety and health at project site

Safety Officer ☐

Resident engineer ☐

Project supervisor ☐

Other, Specify-----

4. In the absence of formal safety and health policy, what is your reference for implementing health and safety at work place

Labor law ☐

Directives from Construction supervision authority ☐

SECTION THREE : SAFETY AND HEALTH PRACTICE OF THE COMPANY

Kindly rate your opinion by ticking (✓) on each of the following causes of accidents on construction site in Addis Ababa using the scale below

S.No	Safety and health practice of the firm	Very Often	Often	Sometimes	Rare	Not at all
1	Personal Protective equipments are available					
2	Personal protective equipments are used at the right time and at the right place					
3	Training and/or orientation on workplace safety provided					
4	Fire extinguishers are available and serviced on time					
5	Emergency exit available					
6	Safety bulleting board duly used					
7	Tool and machinery inspection done on time					
8	First aid kits available					
9	Construction sites managed to avoid work place accidents					
10	Responsibility for work place safety included in the job description					

SECTION FOUR : CAUSES OF ACCIDENTS IN CONSTRUCTION SITE

Kindly rate your opinion by ticking (✓) on each of the following causes of accidents on construction site in Addis Ababa using the scale below

S.No	Cause of accident in construction site	Very Often	Often	Sometimes	Rare	Not at all
1	Non implimentation of safety policy and procedure at construction site					
2	Failure of management to apply safety rules at construction site					
3	Unsafe act or unsafe working environment					
4	Inability of worker or improper behaviour					
5	Unawarness of safety technique or deficiency of knowledge					
6	Scarce of personal protective equipment					
7	Lack of site control measures like safety signes , tags , barriers etc					
8	Insufficient or inappropraite employee training					
9	Exhaustion					

SECTION FIVE: EFFECT ACCIDENTS ON CONSTRUCTION PROJECT PERFORMANCE

In your opinion, do you agree that the following have impact on project performance as a result of accidents?

5- Strongly agree, 4- Agree , 3- Neutral , 2- Disagree, 1- Strongly disagree

Kindly rate your opinion by ticking (✓) your view in the table below

S.No	Effect of accident on construction perfomance	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
1	Production delay					
2	Disruption of current work					

3	Time spent in training a temporary or permanent replacement					
4	Degradation of efficiency of operation due to loss of co-worker					
5	Damages to plant, equipment, completed work					
6	Slowdowns in operation while accident causes are determined					
7	Loss of productivity					
8	Corrective action to prevent re-occurrence of accident					

How long does it take for site operation to resume its utmost after major accidents ?

a) 2 weeks ☐ b) 1 month ☐ c) 3 months ☐ d) 6 months ☐ e) over 6 months ☐

SECTION SIX : COST IMPLICATION OF ACCIDENT ON CONSTRUCTION PROJECT

In your opinion, do you agree that the following have impact on project performance as a result of accidents?

5- Strongly agree, 4- Agree, 3- Neutral, 2- Disagree, 1- Strongly disagree

Kindly rate your opinion by ticking (✓) your view in the table below

S.No	Cost implication of accident in construction project	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Escalation of insurance premium					
2	Training cost of replacement					
3	Cost of rescue operation and equipment					
4	Medical payment					
5	Payment for settlement of injuries or death claims					
6	Expenditure on emergency equipment					
7	Transportation cost to nearest medical treatment facility					