



Addis Ababa University
School of Commerce

**Assessment of Construction Safety and Health Management in
High Rise Building in Addis Ababa**

By:

Fasil Argaw H/Mariam

**A Project Work Submitted to the School of Graduate Studies of AAU in
Partial Fulfillment of the Requirement for the Degree of Master of Arts in
Project Management**

Advisor: Temesgen Belayneh (PhD)

June, 2017

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

**Assessment of Construction Safety and Health Management in High Rise
Building in Addis Ababa**

**A Project Work Submitted to Addis Ababa University College of Business and Economics
in Partial Fulfillment of Requirement for the Degree of Masters of Arts in Project Man-
agement**

By: Fasil Argaw

Approval Board Committee:

_____	_____	_____
Research Advisor	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

Declaration

I, the undersigned, declare that the study entitled “***Assessment of Construction Safety & Health management in high rise building in Addis Ababa***” is the result of my own effort and study that all sources of materials used for the study have been acknowledged. I have conducted the study independently with the guidance and comments of the research advisor.

This study has not been submitted for any degree in any university .It is conducted for the partial fulfillment of the Master of Arts Degree in Project Management.

Fasil Argaw

Date

Letter of Certificate

This is to certify that Fasil Argaw has conducted this project work entitled “Assessment of Safety and Health Management in High rise building in the case of Chinese International contractors & Grade one local Contractors in Addis Ababa” is under my supervision.

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

Temesgen Belayneh (PhD)

Advisor

Signature

Date

Acknowledgement

First of all my praise and thanks go to my Lord Jesus Christ for his love, help and protection in every aspect of my life.

I would like to thank my advisor Dr. Temesgen Belayneh for his remarkable advice and guidance in this study. I want to say “thank you” to all the respondents for their willingness in participating in the research

My honor and love goes to my parents, for their love and support throughout my life and many thanks and appreciations for encouraging and supporting me.

Abstract

The nature of the construction work is dangerous, risky and needs attention in integrating health and safety management in to the entire process. The safety and health of workers should not be taken as a luxury but rather a necessity. Hence, the objective of this study was to assess safety & health management practice in high rise building construction projects in the city of Addis Ababa .This study took a total sample of 20 contractors currently constructing high-rise building in Addis Ababa Ethiopia; of which 5 were Chinese international contractors and 15 were local grade one contractors and questionnaire were distributed to project managers, safety & health officer, and team members. The data was analyzed quantitatively using descriptive statistics Microsoft Excel & SPSS. Consequently, the study result revealed that for the majority of Health and safety (HS) practice indicates an average value of greater than 60% for Chinese international contractors, and less than 50% for local grade one contractors, which means that projects that are constructed by international Chinese contractors have relatively better practice of HS management, whereas the projects of local grade one contractors have a poor practices. In addition Objects falling from height & scaffolding & ladders cause injuries and fatality highly. Further Attitude of Owners & Role of government & engineering society affects the performance of health & safety in construction very highly.

Key Words: health and Safety management, high rise building projects, Construction Sites

Acronyms

BLS	Bureau of Labour Statics
ETB	Ethiopian Birr
EU	European Union
GDP	Growth Domestic production
GTP	Growth and Transformation Plan
HS	Health and safety
HSE	Health and Safety Excusive
ILO	International Labor Organization
MoLaSA	Ministry of Labor and Social Affair
MoUWD	Ministry of Works and Urban Development
MoH	Ministry of Health
OHS	Occupational health and safety
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
U.K	United Kingdom
U.S.A	United States of America
UAE	United Arab Emirates
WHO	World Health Organization

List of Table

Table 2.3-1 Summary of literature review in successful health and safety management practices.....	10
Table 2.3-4 - summary of literatures on factors affecting the safety and health performance in construction.....	18
Table 2.3-5- summary of literature review on construction hazards	22
Table 3.2-1 Shows population and response rate of contractors working in Addis Ababa city in high rise building construction projects.....	25
Table 4.3-1 Appointment of health & safety staffs.....	37
Table 4.3-2 Project planning of health & safety.....	38
Table 4.3-3 Health& Safety policy.....	40
Table 4.3-4 Formal and informal communication.....	41
Table 4.3-5 Upper management commitment & involvement.....	43
Table 4.3-6 Health & Safety resources.....	45
Table 4.3-7 Training in Health & Safety.....	47
Table 4.3-8 Project supervision.....	49
Table 4.3-9 Accident and fatality.....	51

List of Figure

Figure 4.2-1: Category of Contractors.....	31
Figure 4.2-2: Work experience of company on construction work.....	31
Figure 4.2-3: Job title of respondents.....	32
Figure 4.2-4: Experience of respondents in the construction field	32
Figure 4.2-5: Cost of projects.....	33
Figure 4.2-6: Average number of employee.....	33
Figure 4.2-7: Companies expenditure of cost of prevention for local contractors.....	34
Figure 4.2-8: Companies expenditure of cost of prevention for Chinese contractors.....	34
Figure 4.2-9: Companies expenditure of cost of Accident for Chinese contractors.....	35
Figure 4.2-10: Companies expenditure of cost of Accident for Chinese contractors.....	36
Figure 4.4-1: Major safety & health areas to be considered during construction of high rise building projects.....	56
Figure 4.5-1: Factors which affect performance of high rise building construction projects.....	57
Figure 4.5-2: Factors which affect performance of high rise building construction Projects (continuation).....	58

Table of Contents

Contents	Page No.
Declaration	ii
Letter of Certificate	iii
Acknowledgement	iv
Abstract	v
Acronyms	vi
List of Table	vii
List of Figure	viii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the study	1
1.2 The problem statement	2
1.3 Research Questions	4
1.3.1 General research question	4
1.3.2 Specific research question	4
1.4 Objectives of the Study	4
1.4.1 Main Objective	4
1.4.2 Specific Objectives	4
1.5 Significance of the study	5
1.6 Scope of the research	5
1.7 Limitation of the research	6
1.8 The Organization of the report	6
CHAPTER TWO	7
REVIEW OF RELATED LITERATURE	7
2.1 Introduction	7
2.2 Theoretical Review	7
2.2.1 Health, Safety and safety management	7
2.2.2 Health and Safety in Construction Industry	8
2.2.3 Occupational safety and health	9
2.3 Empirical Review	9

2.3.1 Health and Safety Management in Construction	9
2.3.2 Legal aspect of safety and Health management	14
2.3.3 Health and Safety Integrated Management Systems	16
2.3.4 Integration of Health and Safety with Project Management	17
2.3.5. Factors Affecting Safety and Health Performance in Construction	18
CHAPTER THREE	24
RESEARCH METHODOLOGY	24
3.1. Research Design	24
3.1.1 Research Process	24
3.2 Population and Sampling Method	25
3.2.1 Target Population	25
3.2.2 Sampling Method	26
3.3 Study Location	26
3.4 Pilot Study	27
3.5 Sources and Tools/Instruments of Data Collection	27
3.5.1 Procedure of Data Collection	27
3.5.2 Questionnaire Design	26
3.6 Data Analysis	28
3.7 Validity and Reliability	29
3.8 Ethical Issues	29
CHAPTER FOUR	30
DATA PRESENTATION, ANALYSIS AND INTERPRATON	30
4.1. Introduction	30
4.2. General information of the company/Projects	30
4.3 Current health and safety practice in high rise building construction projects	37
4.4 Major Health & Safety areas to be considered during construction of high rise building construction projects	57
4.5 Factors which affect health and safety performance of high rise building construc- tion projects	58
CHAPTER FIVE	62
SUMMARY, CONCLUSION AND RECOMENDATION	62

5.1. Summary of major finding	62
5.2. Conclusions	63
5.3. Recommendation	63
5.4 Future work	67

BIBLIOGRAPHY

APPENDIX A

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The construction industry plays significant role in the growth of any economy. Particularly in many developing countries, major construction activities account for about 80% of the total capital assets Lioryd (1987) cited in (Wubshet, 2004). In these countries, construction accounts for 10% of their GDP and more than 50% of the wealth invested on fixed assets. In addition to that, the industry provides high employment opportunities, probably only second to agriculture Ofori (2006) cited by (Abadir, 2011). Similarly, in Ethiopia, public construction projects shared an average annual rate of 58.2% of the capital budget between years 1997/98 and 2001/02 (Wubshet, 2004). Moreover, construction industry accounted for 4%-7.6% of the total GDP of the country between years 2010/11- 2013/14 (MoFED, 2014). This shows that the construction industry plays significant role in Ethiopian economic development.

Currently, a number of mega construction projects like great renaissance dam, other electric producing dams, irrigation dams, mega sugar factories, and high rise condominium housing projects and high rise apartment, offices and other buildings are implemented by the government of Ethiopia and private sectors. The exploding population, largely urban, creates an increasing demand for tall buildings. The tall building can accommodate many more people on a smaller land than would be the case with low-rise building on the same land. The outward expansion of cities into the suburbs has resulted in increased travel time and traffic gridlock. Clustering of buildings in the form of tall buildings in densely built-up areas is the opportunity for creating open spaces like playgrounds, plazas, parks, and other community spaces by freeing up space at the ground level. A high rise building can be defined as any new or existing structure over 80ft (National Fire Association, 2008 20-80).

However, construction projects pose enormous challenges to not only finish within an owner's schedule and budget, but to also eliminate and minimize harmful impacts to the environment. Construction has significant impacts on the natural environment (Hendrickson and Horvath 2000). Even a minor impact, such as a small release or spill of

hazardous substance can cause a health or environmental threat and lead to costly cleanup activities.

Many construction activities are inherently exposed to health and safety risks such as working at height, underground, in confined spaces and close proximity to falling materials, handling load manually, handling hazardous substances, noises, dusts, using plant and equipment, fire, exposure to live cables, poor housekeeping and others. In an urban context, health and safety accidents are relatively higher due to the fact that high rise buildings remain predominant with the fast-growing complexities of domain-wide construction projects to cope with modernizing cities arena and high demand for housing, offices, services and other infrastructures. Despite its importance, construction industry is considered as risky with frequent and high accidents rate and ill-health problems to workers, practitioners and end users.

The need for this paper is to assess safety and health management on high rise buildings specifically in Addis Ababa and recommended the best and upper proposed project safety and health management methods. Hence, when reviewing project results and performance metrics, some firms see a strong correlation between construction quality and construction safety. Gary Amsinger, vice president for safety at McCarthy Building companies, says that safety professionals recognize quality issues, such as construction defects, as both financial risks and safety risks.

1.2 The problem statement

Prior literatures, proved that the construction industry one of the most hazardous industries. It marginalizes productivity, quality, time and also negatively affects the environment which consequently add to the cost of construction Mohammed (2003), and in most developing countries, health and safety consideration in construction project delivery is not given priority, and employment of safety measures during construction is considered a burden (Mbuya and Lema, 2004). And lack of information and experience limit the intervention process of improving healthy and safe working environment in the construction sites (Adan, 2004). However, it has been proved that investment in construction health and safety actually increases the profitability by increasing productivity rates, boosting employee morale and decreasing attrition (Mohammed, 2003)

Ethiopia targeted to be one among lower middle income countries by 2025G.C (GTP2, 2016-2020). It is planned to achieve through industrial transformation. Construction industry which takes 8.5% share of GDP registered remarkable average growth rate of 28.7% in the first growth and transformation plan implementation years (GTP1, 2010-2015national planning commission Ethiopia). Currently construction projects of high rising building are under construction including the private financial sectors. Being Ethiopian economic policy industrial transformation, strengthening construction industry as one sub component of industry is unquestionable hence forth increasing construction projects of high rising buildings. Moreover, high rise buildings are expected to be undertaken by the government of Ethiopia and private sectors. From practices and experience it is confirmed that most construction companies in Ethiopia have no well-articulated and developed risk policy and response plans. As a result, in most construction industry adequate measures for health and safety in the sites have not been put in place and also various challenges are encountered in the management of health and safety. At construction sites numerous accidents/ injuries, health problems which result to hospitalization and absenteeism are viewing.

Although, many accidents and ill-health problems remain unreported, there is concern that existing situation is alarming. Construction sites and have different levels of health and safety awareness and requires different ways of training and communication. Some prior studies, Evaluation of Health and Safety practice in building construction a case study in Addis Ababa by (Lucy Fekete, Prof. Emer T. Quezon, Yolente C. Macarubbo, 2016), Occupational safety and health profile for Ethiopia by(Dawit Seblework, ILO Consultant, Oct.2016), Study of Health and Safety performance indicators on Ethiopia public (road & Building) construction project in case of Addis Ababa city by (ZeruTariku ,July 2014) and others few studies has been done in relating to safety and health management in Ethiopia. But from practice and experience in the construction industry prior literatures in Ethiopia have leaved not enough documentation on safety and health management of high-rise buildings and health and safety management is not given as apriority as compared to budgeted cost, quality and scheduled time. The cumulative sum of problems stated related to safety and health management in construction building and the expected expansions of high rising building in future in Ethiopia, and the need for effective safety management in construction building inspired the researcher to conduct research on safety and health management in high rising buildings in Addis Ababa city and put forwarding solution in the construction industry safety and health management.

1.3 Research Questions

The research questions this study has addressed have been differentiated as general and specific, as has been presented below.

1.3.1 General research question

The general research question this study answers is:

- What is the current level of safety and health management in Addis Ababa high rise building projects?

1.3.2 Specific research question

The specific research questions this study addresses are:

- What are the major safety and health measures used in currently constructing high rising building projects?
- What are the weaknesses and strengths of safety and health management in high rising construction buildings projects?
- What are the reinforcement techniques on safety and health regulation on high rise building construction sites?

1.4 Objectives of the Study

1.4.1 Main Objective

The main objective of this study is to assess safety and health management in high rising building in Addis Ababa city administration.

1.4.2 Specific Objectives

The research will be conducted research specifically; -

- To examine the major safety and health measures used in constructing high rising building today
- To identify the weaknesses and strengths of safety and health management in high rising construction projects

- To identify the reinforcement techniques on safety regulation at high rising construction sites

1.5 Significance of the study

Problems of health and safety in construction can be addressed and solved on a global scale resulting in improvements that can be observed on a global scale. Therefore, solutions to health and safety problems in one country may readily be adapted to other countries to generate further improvements. The significance of this research,

- To improve health and safety standards at construction sites by covering general health and safety provisions as well as duties and responsibilities of the employers, engineers, and contractors regarding safety measures and the minimum necessary requirements.
- Measures to be followed during all the stages of the project to provide safe workplace to all employees and to protect them against accidents.
- To ensure that there are satisfactory health and safety standards within their organization.

1.6 Scope of the research

The study only focused on high rise building construction projects which are constructed by Chinese international contractors and local grade one contractor in Addis Ababa, Ethiopia. The rationale behind this delimitation is that high-rise buildings present the greatest amount of health and safety risk and they are currently being constructed in our capital more regularly. With regards to the selection Chinese constructors, their selection is backed by the continuous number of high rise building projects being awarded to them. Local grade one contractors are selected because, in attempting to compare them with their international counterparts, they are the closest compared from all grades of contractors operating in our country. Finally, the selection of Addis Ababa, Ethiopia is based on its convenience of the researcher.

1.7 Limitation of the research

- The research address only high rise building construction projects that constructed by Chinese and local grade one contractor due to limited time. It was difficult to collect sufficient data and gave more empirical results and the finding of the result may not represent as a general representation in the construction industry.
- Questioner data collection was limited to Chinese and local grade one contractor in Addis Ababa who are constructing high rise building.

1.8 The Organization of the report

This research report has five chapters containing introductory part with background of the study, statement of the problem, research objectives and questions, scope and limitations of the study are included in chapter one. Chapter two is composed of the review of the relevant literature. Various books and journal articles were reviewed to base the study on existing literature, discuss relevant issues to build understanding of the subject matter. Chapter three contains the details of the research methodology and the steps used to gather and analyze data from which findings are drawn. Chapter four contains the analysis of the data gathered by means of data collection methods and instruments indicated in the methodology part. The last chapter discusses about summary, conclusion and recommendation. The references used in the study are listed at the end. Interview guide and questionnaire used are also included in the Appendix part.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter provides the theories used for this research. A construction site involves a lot of activities and participants, and to understand the process and the interacting elements there is a need to understand the whole system. Construction hazards, accidents and source of accidents has been used in this study to show the setup of construction projects on construction sites and the flow of construction safety and health information having an impact on safety and health management. Construction projects have been guided by regulations and system which influences the safety performance of a project. In addition, some safety related aspects from prior studies are discussed in this chapter to give a richer context for understanding construction safety and health influence the performance of a project.

2.2 Theoretical Review

2.1.1 Health, Safety and safety management

Health: - is the general condition of a person in mind, body and spirit, usually meaning to be free from illness, injury or pain. The World Health Organization (WHO) defined health in its broader sense in 1946 as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO, 2006).

Safety: - is related to external threats, and the perception of being sheltered from threats. According to the business Dictionary, safety is defined as a relative freedom from danger, risk, or threat of harm, injury, or loss of personnel and/or property, whether caused deliberately or by accident.

According to Davis safety is defined as freedom from any dangers of risk (Davis, 1999). Safety also can be defined as absence of danger, a state of protection and condition not involving risk (Lingard, 2005). Construction site safety is a self-explanatory that the environment or condition of construction which is safe enough for the construction participants to perform their particular duties and tasks safely (Jannadi, o & Bu-Khamsin, M., 2002).

Hazard: - in general means anything that can cause harm but, for your purposes, this must be workplace generated (e.g. dangerous chemicals, electricity, working at heights from ladders,

poor housekeeping) (Authority, 2006), HSE define hazard as any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work (HSE, 2004). Basically, a hazard can cause harm or adverse effects (to individuals as health effects or to organizations as loss of property or equipment).

The terms accident and injury refer to separate phenomena, mutually interrelated as cause and effect (exposure and outcome) (Andersson, 1999). The terms ‘accident’ and ‘injury’ are hereby used in accordance with the definition adopted at the first World Conference on Accident and Injury Prevention (WHO, 1989) that is, an accident is an unintentional event which results or could result in an injury, whereas injury is a collective term for health outcomes from traumatic events. (Rejda, 1992) defined an accident as a “sudden, unforeseen and unintentional” event, which may result in physical harm to a person and/or damage to a property. The use of the term ‘accident’ in this thesis is based on an event which cause physical harm or damage to the body resulting from an exchange, usually acute, of mechanical, chemical, physical, or other environmental energy that exceeds the body's tolerance.

Safety Management can be defined as the management functions connected with the carrying on of an industrial undertaking that relate to the safety of personnel in the undertaking, including

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

Safety management system means a system which provides safety management in an industrial undertaking.

2.2.2 Health and Safety in Construction Industry

Health: - health means being free from illness, injury or pain which can be caused by construction activities & preventing construction related diseases or health hazard and the effect of health in the construction is internal and prolonged.

Safety: - means freedom from danger, harm, and injury to the person involved in construction activities & taking precautions measures to safe guard the lives of the workers against fatal injuries and death and the effect of safety in the construction is internal and immediate.

Hazard: - is anything which has the potential to cause harm to people on construction sites

Safety Management System: -means a system which provides safety management in a construction undertaking.

2.2.3 Occupational safety and health

According to WHO (1995), occupational safety and health can be defined as a multidisciplinary activity aiming at

- Protection and promotion of the health of workers by eliminating occupational factors and conditions hazardous to health and safety at work
- Enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work
- Development and promotion of sustainable work environments and work organizations The ILO/WHO definition of occupational health is “The promotion and maintenance of the highest degree of physical, mental social well- being of workers in all occupation” and the WHO considers occupational health service to be responsible for the total of worker and, if possible, his or her family.

2.3 Empirical Review

2.3.1 Health and Safety Management in Construction

The activities of the construction industry have raised serious health and safety concerns amongst governments, health and safety stakeholders, health and safety professionals and researchers over the past few decades (Enshassi and Mayer 2002, Gibb 2005, International Laborer Organization (ILO) 2005, Kaplinski 2002, Leopold and Leonard 1987, Rowlinson 2004). In response, health and safety legislation has been developed to ensure management of construction businesses, and recently many other participants in a project, assume responsibility for managing the risks associated with construction projects. Health and safety management in the construction industry has evolved from measures adopted in accident prevention to more systematic and proactive approaches to minimizing the risk of hazards in the industry. Past research has shown certain practices can lead to improved health and safety performance and therefore constitute good health and safety practices. These findings are summarized in Table 2.3-1

Table 2.3-1 Summary of literature review in successful health and safety management practices

Year and author(s)	Summary of research	Health and safety management practices
Simonds and Shafai-sahrai (1977)	Identified factors that distinguished firms with lower injury frequency rates from those with higher rates	The distinguishing factors include the following •top management involvement; • higher average age of workers; •longer average length of employment; •adequate working space and neat environment; and, •higher percentage of married workers.
Liska et al., (1993)	Identified zero accident techniques	Identified the following to be associated with safety success: •safety training and orientations; • provision of safety incentives; •safety pre-task planning included in safety goals; • safety person or personnel; • safety policies and procedures; • fire protection program; •accountability/responsibility and safety budget; •alcohol- and substance-abuse program in place; •accident and near-miss investigation; and, • Record keeping and follow-ups.
		Companies with lower records in-

Jaselkis et al., (1996)	Strategies for achieving excellence in construction safety performance	incidence rate characterized by the following: • more detailed safety programs; • expended large percentage of revenue on safety programs; • greater safety training time; • more formal safety inspections per month; and, • more safety meetings
Gallagher (1997)	Identified factors associated with improved health and safety performance	The study identified the following factors to the associated with better health and safety performance: • high level of top management commitment; • health and safety responsibilities known; • supervisor involvement encouraged; • active involvement of health and safety representatives who have a broad role; • effective health and safety committees; • planned identification of risk and hazard elimination/control emphasis; and, comprehensive approach in inspections and investigations.
Tam and Fung (1998)	Investigated effectiveness of management strategies on safety performance	The study concluded the following management strategies were effective in reducing accidents: • post-accident investigation; • safety awards; • safety training; and, • use of more directly employed labor

Wright (1998)	Identified factors motivating proactive health and safety management	Factors that create positive pressure to proactively manage health and safety were identified as follows: • fear of prosecution by maintaining image of responsibility thereby avoiding adverse regulatory, customer or public reaction; • belief that it is necessary and morally right to comply with health and safety regulations; • compliance with customer or regulator certification schemes; • minimization of cost of ill-health and injury; • conformity with principles of total quality management, empowerment etc. ; and, • desire to improve staff morale and productivity. Factors that reduce the motivation resulting from factors that create positive pressure to proactively manage health and safety were identified as follows: • cost of health and safety improvements; • ease of implementation; • existence of corporate entity and personal accountability of decision makers; • background of employees and managers; and, • Sector specific obstacles e.g. short term contracting.
---------------	--	--

Gad (2002)	Identified factors influencing safety performance of specialty contractor	Factors found in the study to positively affect safety performance include the following • minimizing worker turnover; • implementing employee drug testing; • training with assistance of contractor association; and, • Growth in company size. Safety incentives were not necessarily associated with better safety performance.
Baldock et al (2005)	Identified main influences on the adoption of improvement measures by small business	Factors identified as being particularly associated with a propensity to make health and safety related improvements were found to be following: • regulatory enforcement activity; • use of external assistance with respect to health and safety issues; • management training and experience; and, • membership of trade/business association
Aksorn and Hadikusumo (2008)	Investigated the effectiveness of safety programs in the construction industry	Safety performance was found to be influenced by the nature of the implemented programs. Particular elements of safety programs found to be positively associated with safety performance included: • accident investigations; • jobsite inspections; • job hazard analysis; • safety inductions; • safety record keeping; • safety committees; • safety incentives; and, • control of subcontractor

2.3.2 Legal aspect of safety and Health management

Developed country

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

Developing country

Developing countries have a poor health and safety record compared to the developed world, which may be attributable to a low use of technology, labor intensive methods and low workforce participation in health and safety issues. According to the (Lee S. a., 2003) construction sites in developing countries are ten times more dangerous than in industrialized countries.

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

In many developing countries, the legislation governing Occupational Health and Safety (OHS) is significantly limited when compared with that in the UK (Enshassi C. R., 2008). Previously, (Lee S. a., 2003) found that in many countries that have safety legislation, the

regulatory authority is weak or non-existent and employers support regulations only superficially.

Unlike many countries, in Ethiopia there is one comprehensive labor law (Ethiopia, Labour Proclamation 377/2003, 2003) that is operating in order to address all aspects of ensuring labor relation to be governed with basic fundamental rights and obligation focusing on industrial peace in all work places. The law is also formulated in order to guarantee and maintain all fundamentals rights at work and to define the powers and duties of the organ charged with enforcing of the implementation of the ideals of the law which is tantamount to the labor inspectorates.

The law applies to all employer employee relationship or undertaking that employs one or more persons, and clearly states duties and responsibility of the employer and employees and addresses the issues of work injuries, accidents and diseases which result in connection of during performing of his work, and the liability , medical benefits , compensation (cash benefits) in different sections of, part seven of the proclamation 377/06 (the occupational safety ,health and working environment). And other related laws like regulations directives can be found, a directive by Ministry of Labor and Social Affairs (MoLaSA) 2007G.c was issued for General Occupational health and safety ,Environment protection , a specific section five is dealing about construction health and safety industry and another Directive by Ministry of Works and Urban Development (Ethiopia, Ethiopian Building directive 5/2003, 2003)in its section four discusses about the health and safety of the workers on the construction activities.

Table 2.3-1 Applicable Laws and standards of HS in Ethiopia

No	Applicable laws or directives, standards	Specific area	Remark
1	Proclamation No. 1/1995 (constitution)	Article 42 sub (2) & 44(1)	
2	Labor Proclamation no 377/2003 (labor law)	Part seven	
3	Occupational Safety and Health Directive 2008	Section five	
4	Building directive 5/2003	Section four	
5	Civil code 1960	Section for 2548-2559	
6	Ethiopian Building Code Standards (EBCS 14)	Whole code of standard	

Though the existing labor Legislation obliges employers to report all accidents occurred at work places the employers do not usually comply to the law. Due to this there is high under reporting. The accidents are reported only from around 10% of the undertakings that are covered by the legislation (Dawit, 2006). accidents that occurred and reported during the years 1993-2004 for 11 years. Total sum of 44903 non-fatal and 101 fatal accidents were reported during these years (Dawit, 2006).

In Ethiopia there is no work place and plant registration system put in place due to absence pertinent law which obliges occupier or employer to do so (Adane, 2009). No arrangement designed so far to do so both at the regional and national levels. Even the system that was working in order that work places include safety, health and working environment issues at their planning and establishment level is not working very well and the Ethiopian national occupational safety and health information center (National C/S center) though established in 1992, due to absence of trained manpower in information and lack of requisite materials especially Internet and Web site it could not function very well.

2.3.3 Health and Safety Integrated Management Systems

Research suggests integrating the health and safety management function of a business with other management functions could enhance the overall performance of the business (Kamp and Bansch 1998, Koehn and Datta 2003, Taylor et al. 2004:544). Besides, the benefits to be derived from such an integrated management systems. Gibb and Ayoade (1996) have pointed out client pressure, cost reduction, legislation and total project management as factors promoting their adoption.

Many management systems, especially health and safety, environment and quality have many identical elements. For instance, policy, training of personnel, auditing, responsibility for task and controls are common elements in all three areas of management. This, therefore, makes it possible to integrate them as a single management system. Proponents of integrated systems argue that such an integrated system will lead to management effectiveness, reduced duplication, and elimination of conflicting responsibilities and harmony of objectives (Douglas and Glen 2000, Scipioni et al. 2001).

Dias (2000) examined the possible integration of the elements of families of standards, ISO 9000, ISO 14000 and a similar standard in health and safety in construction. Many elements

of the three standards were found to be candidates for possible integration. Hamid et al. (2004) investigated the integration of safety, health, environment and quality in the construction industry. Their findings indicate that safety, health, environment and quality have many common grounds which make integration possible. Based on the similarities in many areas of these management functions, the authors proposed a model of integrated management system for the construction industry. Similarly, Kirbert and Coble (1995) explored the integration of health and safety regulations with environmental regulations in the construction industry. Arguing that environmental issues are safety issues, the authors suggest a single administrative procedure for safety and environment via an environmental safety plan. The benefits of such a procedure include fewer processes involved in regulatory agency reviews and workers benefiting from training in both environmental and safety aspects of their work environment.

2.3.4 Integration of Health and Safety with Project Management

Studies in construction accidents suggest many accidents on construction sites could be prevented by taking appropriate steps in all phases of the project life. Thus, participants in a project have a role to play in improving the health and safety performance of construction sites and completed projects. Current thought on health and safety in construction put emphasis on integrating health and safety management into the entire construction process. This view of health and safety management is, at least to some extent, largely driven by developments in health and safety legislation in Europe and USA.

This view of integration of health and safety management into construction processes requires responsibility for health and safety to be equitably shared between the key participants in a construction project. This view therefore requires project participants to “think health and safety” throughout the phases of a project. As Hinze (1998) has emphasized, addressing the safety of construction workers in the design phase involves recognizing the potential impact designers’ decisions can have on the health and safety of construction site workers. Similarly, owners’ involvement in construction safety could reduce cost of safety to minimum.

In the UK and other countries which are members of the European Union, the European Directive on Temporary and Mobile Construction Sites calls for health and safety to be considered during the early stages of a project. However, maximum benefits can be derived from considering health and safety at the early stages of project if procurement routes are adopted which facilitate coordination and team spirit (Kheni and Gibb 2006).

Integration of health and safety into project planning has been promoted by authors such as Kartam (1997), Cameron and Duff (2002), Murray (2002), Saurin et al. (2004), Pavitt et al. (2004), Gibb and Pendlebury (2005) and Hare et al. (2006). The work of these authors have each sought to explore avenues for managing health and safety as integral aspect of project-ing planning during one or more of the phases of project execution. For instance, one the most recent studies, Hare et al. (2006) investigated the integration of health and safety with the pre-construction phase of projects. The authors highlighted the importance of effective teams and effective two-way flow of information for successful integration.

2.3.5. Factors Affecting Safety and Health Performance in Construction

An extensive literature review has been conducted to identify the factors which affect the safety and health performances in construction projects see (Table 2.3- 4).

Table 2.3-4 - summary of literatures on factors affecting the safety and health perfor-mance in construction

Factors Affecting the Safety and Health Per- formance in Construc- tion Industry	Year and author(s)	Health and safety management practic- es
Complexity of the De- sign	(Hinze & Wiegand, 1992), (Kartam, et al., 2000)	Safety and health performance was found to be influenced when designers improve awareness to the safety conse- quences of their design decisions • reduction in injuries • decrease in redesign costs and in operating costs for special procedures and protective equipment
		owners can take processes to accom- plish better safety and health perfor- mance such as: provide safety and health guidelines

Type of Owners	(Hinze & Gambatese, 2003), (Report-A-3, 1982)	that the contractor must follow; Implement, the use of work permit systems for potentially harmful activities; Oblige the contractor to elect a responsible supervisor to coordinate safety in the workplace; Discuss safety at owner-contractor meetings; Conduct safety audits during construction; Enforce prompt reporting and full investigation of accidents
Weather Condition	(Brake & Bates, 2002), (Neitzel, et al., 2001)	Extreme weather conditions have direct effect on safety and health performance. There are signs for heat stress like: nausea, headache, fatigue, excessive thirst, profuse sweating, confusion, painful large muscle cramps and loss of consciousness. Those signs of heat stress can lead to heat cramps, heat exhaustion, or heatstroke, which if untreated or sufficiently severe, may lead to death
Project Cost	(Levitt & Samelson, 1993), (Hinze, 1997)	Safe workplaces and workers increase productivity accompanied by reduced costs and increased profitability
Project Duration	(Zou, et al., 2007), (Report-A-3, 1982)	tight project schedule had high rank on safety performance of the project
		The reduction of accidents would be

Safety and Health Policy	(Sawacha, et al., 1999), (Shibani, et al., 2012)	accomplished when top management takes a dynamic attention and is dedicated to safety and health improvement as well as maintaining good safety and health policy.
Accidents / Incidents / Near Miss Report	(Al-Kaabi & Hadipri- ono, 2003), (Hassanein & Hanna, 2008), (Shi- bani, et al., 2012)	managers are kept knowledgeable about where accidents are occurring so that they can dedicate their responsiveness to problem areas
Risk Assessment	(Chapman & Ward, 2004), (Agwu, 2012)	Better safety and health performance of construction companies is depending on risk assessment compliance.
Safety and Health Training	(Hinze & Gambatese, 2003), (Teo, et al., 2005), (Kartam, et al., 2000)	Training has a positive preventive effect on workers to avoid injury.
Personal Protective Equipment (PPE)	(Al-Kaabi & Hadipri- ono, 2003), (Kenrick, 2012)	Unsuitable PPE were related to the incident that caused the injury.
Emergency Planning and Procedures Safety and Health In- spection	(Jannadi & Bu- Khamsin, 2002), (Hislop, 1999)	One of the most factors affecting safety performance is emergency/disaster planning and preparation
Safety and Health In- spection	(Reese, 2003), (Hinze & Raboud, 1988)	lower injury rates were noted on projects that employed safety officers who conducted job site safety inspections
Safety and Health Man- agement Meetings	(Hinze & Raboud, 1988), (Fang, et al., 2004)	the projects that practice sophisticated schedules and those which included the owner for coordination meetings are

		having safer performances
First-Aid Arrangements	(DM, 2008), (Fang, et al., 2004)	these arrangements would not eliminate the hazards but only to reduce the potential risk on the injured person which might be exposed
Safety Signals, Signs and Barricades	(Chapanis, 1994), (Edworthy & Adams, 1996)	Warnings in the forms of signs and symbols have been recognized as one of the effective tools to influence behavior and develop the risk awareness of stakeholders.
Work environment	(Mattila, et al., 1994), (Site-Safe, 1999)	poor housekeeping and the untidy construction sites had the largest contributing factors to accidents,
Reward and Punishment System (Incentives)	(Teo, et al., 2005), (Lee & Jaafar, 2012)	Monetary and non-monetary are forms of reward which capable to improve safety and health performance as it encourages workers to monitor their own safety behavior
Role of Government and Engineering Societies	(Fang, et al., 2004), (Teo, et al., 2005)	The engineering societies shall help to extend engineering knowledge by developing the awareness of safety and health issues among engineers. In developing countries, there are no strong laborer unions like industrial countries have, which own the power to defend on their laborers and to enforce contractors to provide safe working conditions and safety tools to their laborers.

Table 2.3-5- Summary of literature review on construction hazards

Construction Hazards	Year and author(s)	Occurrence of the construction hazards
Height:- Common construction site falls include roof-related falls, crane falls, scaffolding falls, elevator shaft falls, falls resulting from holes in flooring, and falling objects.	(ILO, 2005), (Bentley et al., 2006), (Yung, 2009). (Chan et al., 2008). Chi and Wu (1997), (Murie,2007)	These may occur as a result of inadequate edge protection, or from objects in storage being poorly secured. Workers at risk of falling from a height include painters, masons, decorators and window cleaners and those who undertake one-off jobs without proper training, planning or equipment
Equipment, Machinery, Tools and Transport	(HSE, 2004).	Many people are injured due to being chopped and cuts by equipment and hand – held working tools such as chisels, screwdrivers, knives, saws, hammers, nails and drilling machines. The greatest hazards posed by hand tools results from misused and improper maintenance.
Electricity	(Huges and Ferrett, 2011).	Most injuries and deaths from electricity are due to, using poorly maintained electrical equipment, working near overhead high tension lines or domestic electricity supplies, contact with underground power cables during excavation work and working without appropriate safety gear
		Fires on site are caused by braising work carried out by plumbers, gas lines for underground work, power lines, power leads and tools, machinery requiring petrol and diesel, and

Fire	(HSE, 2000).	hazardous chemicals
Noise	NOHSC National Code of Practice (2004)	Noise comes from the operation of plant, machinery and power tools, the movement of vehicles and deliveries of materials (HSE, 1998).
Chemicals Substances	(HSE, 1998) (Murie, 2007 (Hughes and Ferrett, 2011	Some paints and varnishes, bonding agents and resins, can cause asthma and dermatitis. Welding fumes – which may include a cocktail of metal fumes, can cause serious health problems in the long term.
Slips and Trips	(Hughes and Ferret, 2011). (HSE, 2004). (HSE, 1998).	Slips and trips are caused when materials are scattered everywhere haphazardly, the floor is wet or greasy, inappropriate footwear is worn, mainly by casual employees and visitors, something large or heavy is being carried, reducing one's balance, and when the lighting is poor.

CHAPTER THREE

RESEARCH METHODOLOGY

This part discuss the research design, research process, sample and sampling technique, sources, tools and procedures of data collection and method of data analysis employed for the study.

3.1. Research Design

The study was used both survey and descriptive designs. The survey technique was significant in gathering information from contractor management staffs, consultant representatives and client representative's on the construction sites by use of questionnaires and/or interviews. This study used descriptive research and it helped to identify the nature of the health and safety measures used on the construction sites and evaluate their enforcement mechanisms on construction sites.

In addition, interviews were also used as one of the sources of collecting primary data. The interviews were held with managers, site supervisors and site personnel and they assist in explaining and clarifying information required. Questionnaires were used as the main source of data collection. The questionnaires were self-administered whereby they were hand deliver to the respondents to complete the questionnaires themselves. Direct observation was also used in visits to construction sites to directly observe and document the identified hazards, tasks, job site organization, work practices, equipment and tools being used.

3.1.1 Research Process

The research process is a systematic guide for obtaining findings, data collection, developing data analysis as well as formulating the conclusion. The research process for this study was the systematic structure of objectives was set in such a way that they complement one another and they afford a flow in the research through ensuring that the objectives interlink whilst remaining interdependent.

3.2 Population and Sampling Method

3.2.1 Target Population

This study targeted high rise building projects which are constructed by local grade one contractors and Chinese international contractors.

The studied population was based on the data acquired from the construction minister and Addis Ababa city administration municipality office, high rise buildings projects which are constructed by local grade one contractors are 90 and 6 projects are constructed by Chinese international contractors and totally 96 high rise building projects are constructed in the city.

Table 3.2-1 Shows population and response rate of contractors working in Addis Ababa city in high rise building construction projects

Type project	Population in number	Sample size	distributed Questioner	collected Questioner	Return rate in %
Projects by local contractor	90	48	60	50	83.33%
Projects by Chinese contractor	6	5	24	20	83.33%

For results to be generalized the sample should be a true representative of the population it comes from (Walliman, 2005). This means that the sample to be used to arrive at a conclusion should not be too big or too small but large enough for the researcher to make a decisive conclusion about the population. (Sorinolu, 2008) echoed this concept by claiming that when a research is being undertaken, it is important that the researcher have a sample that will represent the population that is being investigated because investigating the whole population is not always feasible due to time and financial constraints. Therefore it is crucial to have sufficient response in order to make an inference decision when conducting a research survey. (Sidumedi, 2009) summarizes the importance of enough response and claim that higher response rate helps to reduce the problem associated with non-response biasness. As already mentioned in the above table, the response rate found for local and Chinese contractors was Eighty three percent (83.33%). This indicates the response rate was well representative.

3.2.2 Sampling Method

This study used the convenient sampling method.

3.2.2.1 Sample Size

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

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

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

Where: n is sample size from finite population.

N : Total population (90, projects constructed by local contractors and 6, projects constructed by Chinese contractors)

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

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

The sample size for the contractors' population can be calculated from the previous equations as follows: $n' = S^2 V^2 = (0.5)^2 (0.05)^2 = 100$

The size of the sample was calculated by using $n = n' / (1 + n' / N) \dots\dots\dots \text{Equation 1}$, overall then the sample size of projects was 50 projects. $n = 100 / (1 + (100/90)) = 48$ for projects undertaken by local grade one contractors.

For projects which are constructed by Chinese contractors almost all of the population that is five projects was taken as sample, since they are small in number and convenient.

3.3 Study Location

This study was conducted in Addis Ababa only. The questionnaires were distributed to high rise building construction sites undertaken by Chinese contractors and local Grade one contractors in Addis Ababa.

3.4 Pilot Study

It is normal practice that the survey tool should be piloted to measure its validity and reliability which test the collected data. A pilot study was conducted with five project managers in a top contracting companies in Addis Ababa who are working high rise building projects, to test whether the questions are understandable, easy to answer, unambiguous, cover most the required questions, etc. Valuable comments were obtained to improve the quality of the questionnaire. After a refinement, the questionnaires were developed.

3.5 Sources and Tools/Instruments of Data Collection

Primary sources were used to collect enough information in the study area and primary data are collected from the above mentioned samples through questionnaire and interview. In order to collect the intended amount of data, questionnaire, and interview were used. The questionnaire contains open ended questions in order to give the chance for respondents to explain issues in detail. In addition to the questionnaire, semi structured interview was applied. The main focus of the tools was to collect information about the current practices, major areas and factors that affect the performance of health & safety issues in high rise construction projects and to answer the research questions. Questionnaire was distributed for project managers, Safety & Health officers, project engineers, contract administrators and site supervisors. Interview was conducted with project manager, project engineer and contract administrator.

3.5.1 Procedure of Data Collection

As per the data collection tools and techniques, questionnaire was prepared having open ended questions. These enabled respondents to respond without limit. The questions were prepared based on the research questions. Then it is distributed and collected. The same went for interview. It was conducted by the researcher face to face. Related documents were also collected.

3.5.2 Questionnaire Design

The survey questionnaire was used to achieve the answers for the research questions, i.e. what was the major safety & health measures used in currently in high rise building sites, what was the weakness and strengths of safety and health management in high rise building

construction projects and what was the reinforcement techniques on safety regulation on construction sites.

A survey questionnaire was sent to Contractors staff, Consultant & Client representative of high rise building construction projects. The survey questionnaire were used to gain insight into the conditions on projects and to evaluate the implications and compliance with the construction regulations by all parties concerned, the main focus being to assess the safety & health management in high rise building construction projects and to get feedback how different factors affect the performance of health and safety on high rise building construction projects. This survey questionnaire uses a qualitative approach to gather the honest opinions of those partaking in the survey and is a quantitative means of obtaining data when responses was tallied and thereafter was analyzed.

The questionnaire was composed four parts. The first part of the questionnaire gives the General information about the company and current project and analyzed with averages, figures and percent's. The second part, which contained questions about the current Health and Safety practice in the projects were identified. The respondent answered in YES, NO form and if they said NO they selected reasons from the list or added the reason. The third part includes the major areas to be considered during construction of high rise building and analyzed with figures. The fourth and final part contained the factors that affect Health and Safety performance in high rise building construction projects and analyzed with figures.

3.6 Data Analysis

In this study, descriptive statics was the major technique of statically analysis through using Microsoft Excel spreadsheet and SPSS. The quantitative data collected from sample respondents who are working in the Chinese and local Grade one contractors were analyzed Using averages, percentages, tables and figures to answer safety and health measures used, weakness and strength of safety and health management, reinforcement techniques on safety regulation in currently construction of high rising building sites. The qualitative data's were gathered from general comments and interview and analyzed separately but presented in combination with the quantitative information.

3.7 Validity and Reliability

To guarantee validity of the data acquired and to give added depth the questionnaire has been initially piloted by few numbers of project managers to ensure consistency, clarity and relevancy, and cross-checking was done. Each piece of data gathered from official sources was double-checked with data from other secondary sources. It was kept in mind to gather latest data, as this will help to draw picture of the current scenario. Here I would like to point out about my other secondary resources; those are research paper and articles from relevant journals and research institutes. The main reason for cross-checking is to nullify errors from data and to have complete confidence over data. This will help in concluding the result that will be more meaningful and reliable. To test the internal reliability of the questionnaire, Cronbach's alpha test was used and found to be 0.82 which is higher than 0.7, thus the construct has been believed to have adequate reliability.

3.8 Ethical Issues

The ethical issues need to be considered in a scientific research were also considered in this study. The study results depend on the data provided by the respondents and the qualitative data obtained from interview and the process is realistic and bias free. In addition, the researcher asked for consent of the interviewees and pledged to keep the confidentiality of the information gathered to conduct this study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRTATON

4.1. Introduction

This chapter analyses the results of collected data from of the questionnaire, interview and literatures in four major sub topics. The topics are mainly emphasized and only sub topic two has further two categories, the first category is for local grade one contractors and the second is for Chinese contractors. Totally, 20 Contractors which 15 are local grade one contractor and 5 are Chinese contractors were participated in the study located in Addis Ababa. The analysis have four parts , the first part, deals about the General information /description of company and the second part contains information on the current safety and health practice of the companies/projects, the third part shows the major areas to be considered during high rise building construction projects and the last part is the selected factors that affect safety and health performance of high rise building construction projects. This is to reorganize the data in a systematic manner so that they are clear and unambiguous to be understood and hence to be analyzed. The methods of analyzing are by using averages, and percentages. Tables and charts are used because this method of data presentation is much more preferred among others, as it provides easier understanding and clearer picture of information to be delivered.

4.2. General information of the company / Projects

This section presents the description of the respondents who participated in this study. The results collected from the questionnaire shows the (20) contractors will describe the characteristics of the respondents that participated in this survey. These characteristics also include the contractors' categories, grade, experience of company and respondent, cost (size) of project and size of employee, cost of health & safety prevention and cost of health & safety accident

Category of contractors

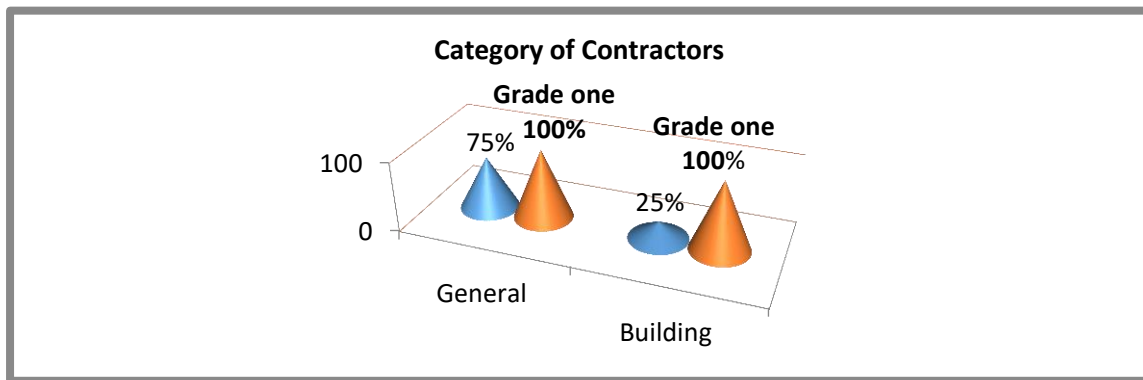


Figure 4.2-1 Category of contractors

The figure above shows that 75% of the high rise building projects are carried out by General contractors, and 25% are carried out by Building contractors and all are Grade one Contractors.

Work experience of company on construction work

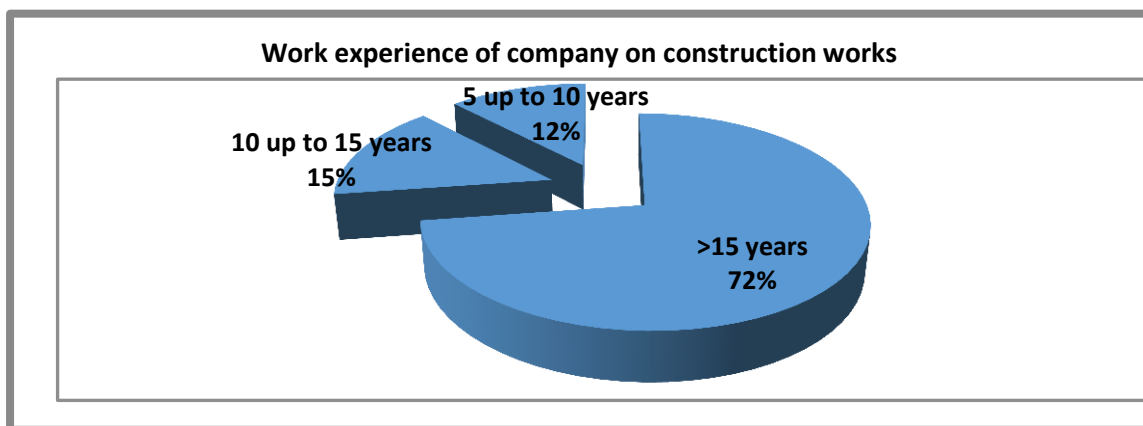


Figure 4.2-2 Work experience of company on construction works

The figure above shows 72% of respondents witnessed the companies have an experience of fifteen and above years in the construction industry and 15 % have ten up to fifteen years of experience and 12% of the company have five up to ten years work experience. Most of the companies have experiences greater than fifteen implies that companies involved in the study have a vast of experience in the area, which implies that the information forwarded could be important as required in the study.

Job title of respondent

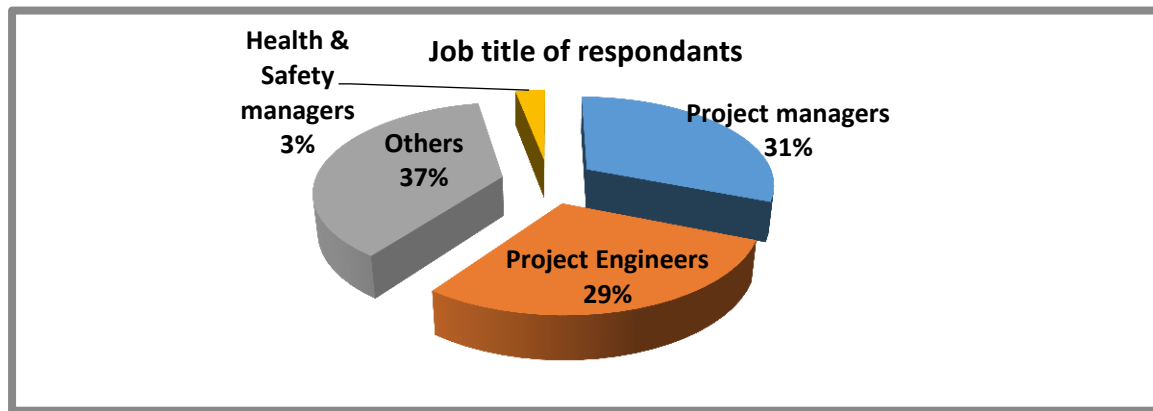


Figure 4.2-3 Job title of respondents

From the figure above, 31% the respondents are project managers, 29% of the respondents are project engineer, 37% of the respondent are resident engineers, construction supervisors and site engineers and 3% are health and safety manager/officer. This shows, almost no health and safety manager were present on the site during the questioners were distributed. This indicates only vary few of the projects assign a health and safety professional.

Educational status of respondents and their work experience

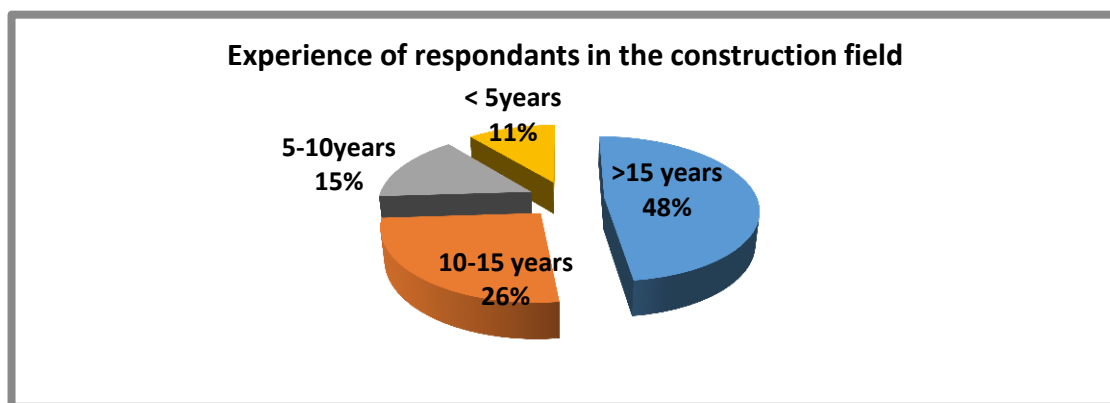


Figure 4.2-4 Experience of respondents in the construction field

From the figure above, 48% of the respondents have an experience of fifteen and above years in the construction industry, 26 % have 10 up to 15 years of experience, 15% have 5 up to 10 years of experience and 11% have less than 5 years of experience in the construction industry

and 23% of the respondents have masters degree, 60% have first degree and 17% have diploma. Most of the respondents have experiences greater than fifteen and have first & second degree holders and implies that respondents involved in the study have significant work experience in the area, which implies that the information forwarded could be important as required in the study.

Cost of projects (in mill. Of ETB)

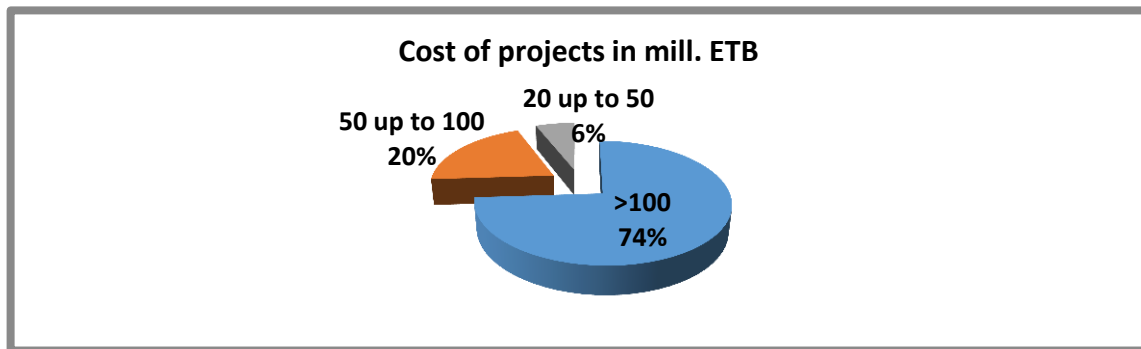


Figure4.2-5 Cost of projects (in mill. Of ETB)

The above figure shows 74% of projects have a cost of 100 million of ETB and above 20% of the projects have a cost of 50 up to 100 million ETB, 6% of the projects have 20up to 50 million of ETB. This indicates the projects have huge amount of money, which implies it participate many man power since it needs at least one health and safety professional in each project.

Average number of employees

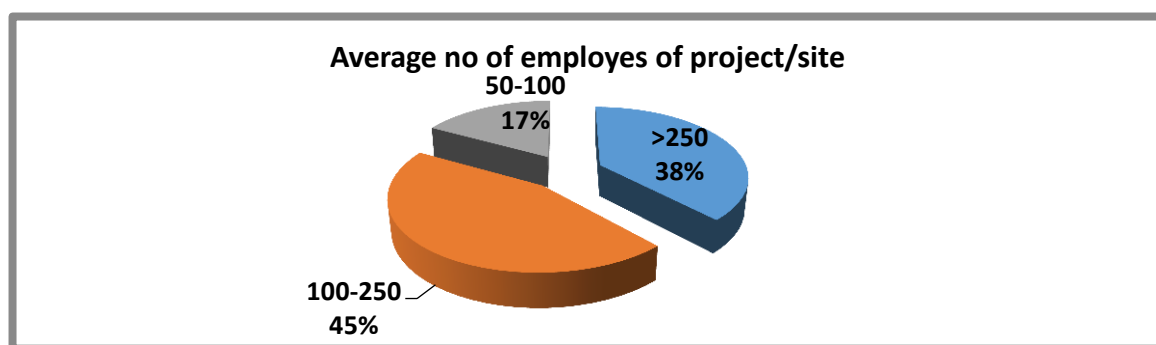


Figure 4.2-6 Average no of employee

The figure above shows that 38% of the projects/ sites have 250 and above daily average workers and 45% of the projects have 100-250 workers where as 17% of the projects had 50-100 workers. These indicates majority of the projects have significant number of workers which implies safety & the project needs one or more safety & health professional to be assigned. But from my observation on site most of them did not have a safety officer.

Company Expenditure on safety & health (Cost of prevention COP)

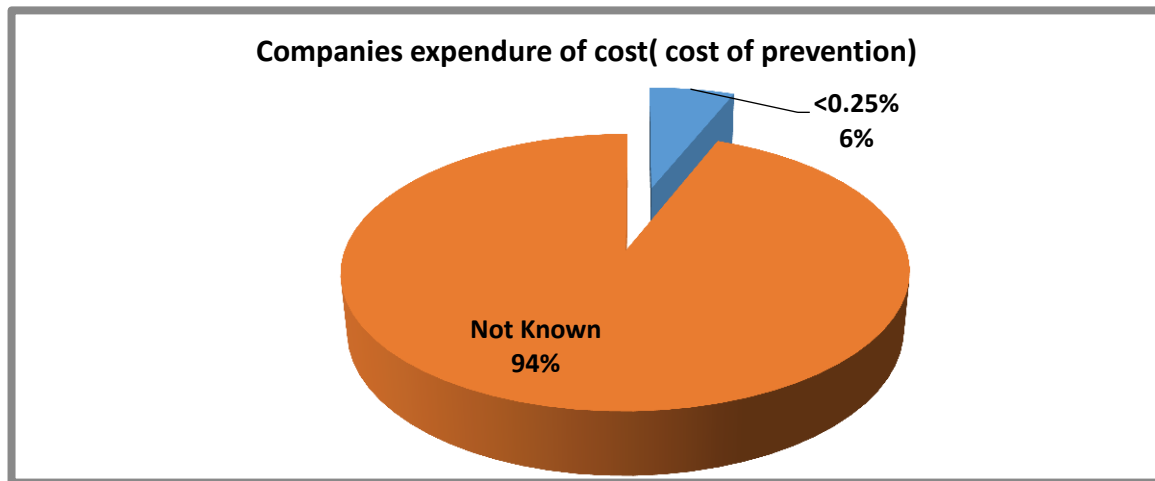


Figure 4.2-7 Companies expenditure of cost of prevention for local contractors

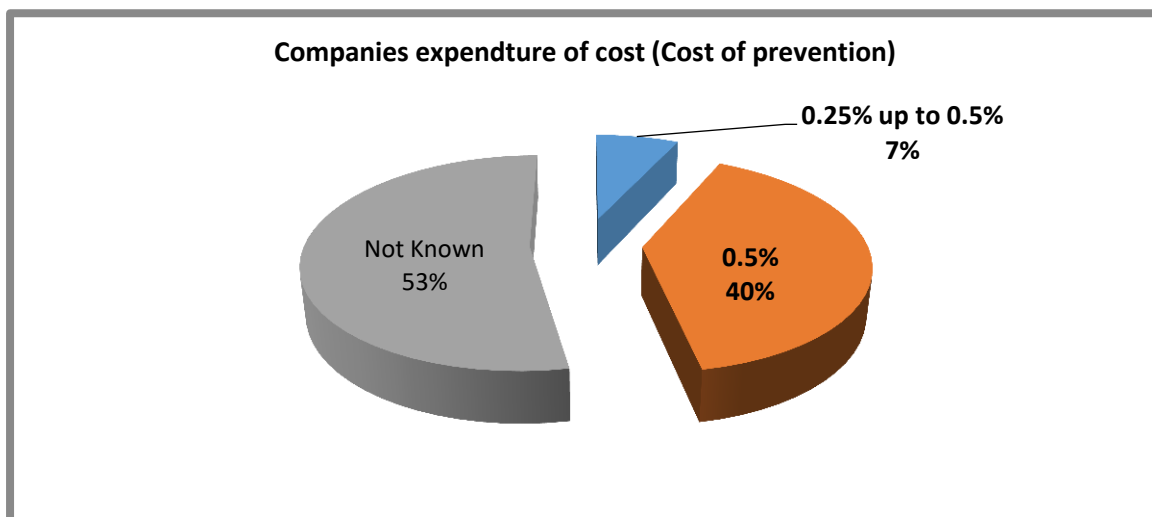


Figure 4.2-8 Companies expenditure of cost of prevention for Chinese contractors

The above figure (4.2-7) for local contractor shows that, 94% of the respondents did not know their projects cost of incurring to administering health & safety program, while only 6% of the respondents witnessed the cost of incurring to administering health & safety pro-

gram is less than 0.25% of the project cost. And for Chinese contractors, 53% of the respondents witnessed they did not know their projects cost of incurring to administering health & safety program, while 40% witnessed the cost of incurring to administering health & safety program is 0.5% and the remaining 7% witnessed 0.25% up to 0.5% of the project cost. An interview was carried out to know whether the contractors consider cost of health & safety (cost of prevention COP) during preparation of quality plan, budgeted cost, and scheduled time in the initial stage during the project start.

Question, do engineers have an understanding of the cost of expenditure on safety and health (cost of prevention COP).

Most of them answered they only focus to finish the project within the scheduled time budgeted and agreed quality standards. They do not plan for safety & health. Few of the respondents from Chinese contractors, their company have experience in doing in health & safety in other countries & the cost of health & safety is 0.5% of the project cost. But they have no experience here in Ethiopia.

Company Expenditure on safety & health (Cost of accident COA)

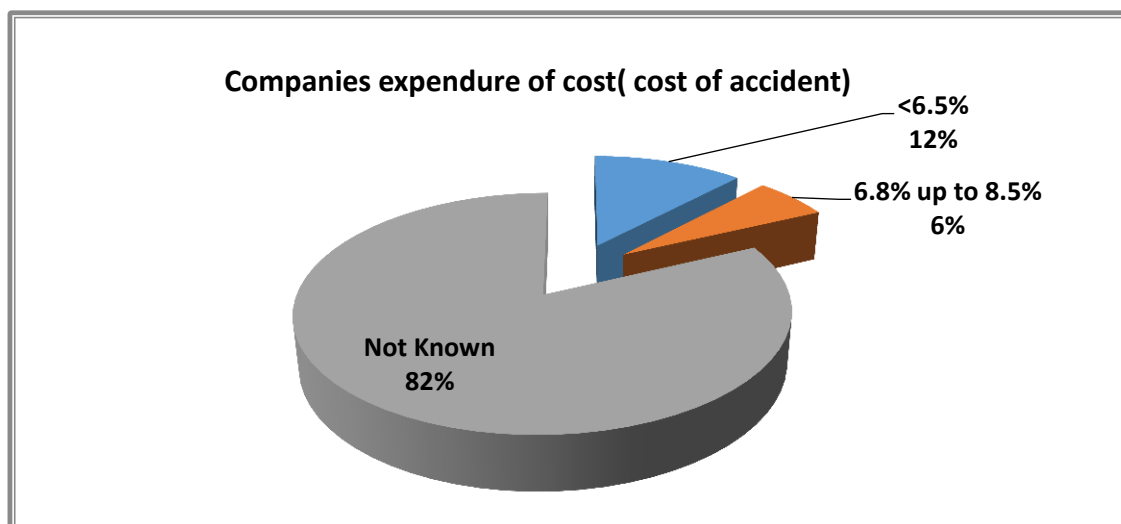


Figure 4.2-9 Companies expenditure of cost of accident for local contractors

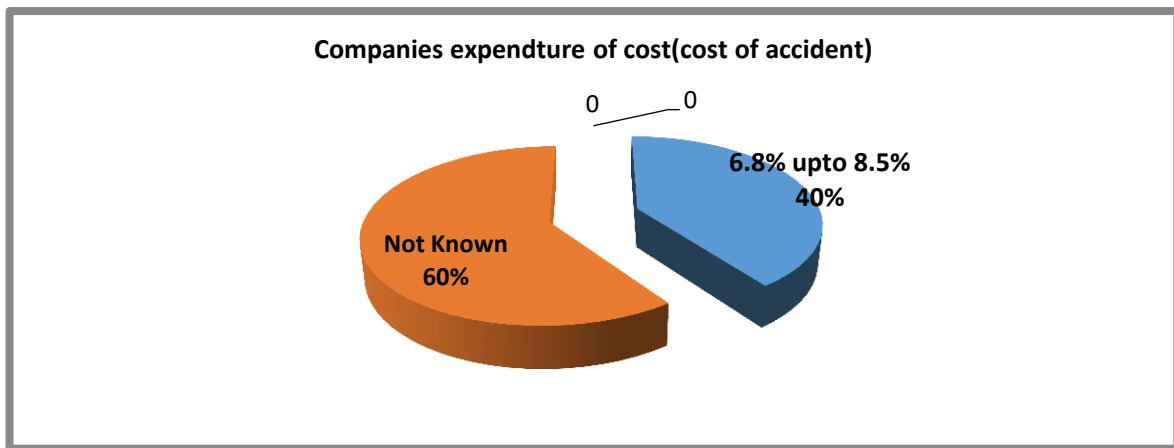


Figure 4.2-10 Companies expenditure of cost of accident for Chinese contractors

From the above figure(4.2-9) for local contractors,82% of the respondents witnessed they did not know their projects cost of treatment of the injury & unique compensation offered to workers as a consequence of being injured,12% of the respondents agreed the cost of treatment of injury & unique compensation offered to workers as consequence of being injured is less than 6.5% the project cost and 6% of the respondents agreed cost of treatment of injury & unique compensation offered to workers as consequence of being injured is 6.5%up to 8.5%of the project cost.

From the above figure (4.2-10) for Chinese contractors, 60%of the respondents witnessed they did not know their projects cost of treatment of the injury & unique compensation offered to workers as a consequence of being injured, 40% of respondents witnessed the cost of treatment of injury & unique compensation offered to workers as consequence of being injured is 6.5%up to 8.5% of the project cost.

Here, majority of the respondents witnessed projects did not knew their percentage of expenditure relating to their project costs may indicate the projects are not ready even to assess where portion of the activities needs a high follow-up for the sake of improving to minimize the expense due to accidents. An interview was carried out to know whether the contractors or supervisors notice the benefit of implementing health and safety management on the project works.

Question, Do engineers have an understanding the benefit which may incur if they develop and integrated health and safety on their all other construction activities.

All of them answered they focus only on the early finishing (time schedule) and the expense (budgeted cost) of the project, but do not considering the benefit which one can realize the taking of advantage of the cost (Direct costs that are associated with the treatment of injured parties as well as the compensation insurances provided for the employees in the event of an accident).

The indirect costs incurred by contractors include: Reduced productivity of injured party, reduced productivity of workforce which results Cost of delays, Costs for provision of supervision Costs resulting from rescheduling, Costs of transportation, Cost of replacing injured party, Wages paid while the injured party is non-productive and recuperating).

4.3 Current health and safety practice in high rise building construction projects

This section presents information on the current safety and health practice of the projects, a data contain potential Health & Safety issues/factors which are drawn from different literatures and the analysis were collected from the questionnaire and analyzed in detailed result were displayed graphically in tables, figures and an additional interview was carried out to some random respondents which was used in points that needs additional supportive clarification or points that believed not assessed by questionnaire.

4.3.1 Appointment of Health & Safety staff

Table 4.3-1 Appointment of health & safety staffs

Item no.	Description	Local contractors		Chinese contractors	
1.0	Appointment of health & safety staff	Yes	No	Yes	No
		13%	87%	60%	40%
Reason for ”No” answers					
A	Lack of awareness by all parties in the industries		21%		%
B	No contractual obligation in the contract		32%		0%
C	There is no controlling and enforcement law in the contract agreement		38%		100%
D	Others		9%		0%

The above table shows that from 15 local contractors 13% of the respondent has witnessed they appointed health and safety officer; whereas 87% of projects/site didn't have appointed health and safety officer. The reasons not to appoint safety and health officer were 21% believed lack of awareness by all parties in the industry, 32% believed no contractual obligation in the contract, 38% agreed there is no controlling and enforcement law in the contract and 9% agreed lack of government enforcement & lack of willingness of managers.

From 5 Chinese contractors, 60% of respondents have agreed they appointed safety & health manager/officer, whereas 40% didn't assign safety & health manager/officer. The reason not to appoint safety and health manager /officer were 100% believed there is no controlling & enforcement law in the contract agreement. Here, one can notice from the information on the table that many of the local contractors didn't appoint health & safety officer while most of Chinese international contractors have assigned health & safety officer.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from local contractors and 40% of respondents from Chinese contractors reflects their firm/projects did not appoint health & safety staff. In most developing countries, health & safety consideration in construction project delivery is not given priority, and employment of safety measures during construction considered as a burden (Mbuya and Lema, 2004). But this increases the accident rates in construction. Liska al., (1993) identified zero accident techniques by practicing having safety person or personnel on project site.

4.3.2 Project planning of Health & Safety

Table 4.3-2 Project planning of health & safety

Item no.	Description	Local contractors		Chinese contractors	
1.0	Projects have a site- specific health & safety plan	Yes	No	Yes	No
		19%	81%	87%	13%
	The layout of the site consider health & safety aspects	21%	79%	100%	0%
	Constructability of the project reviewed	22%	78%	100%	0%
Reason for " No" answers					

A	Lack of awareness by all parties in the industries	23%		100%
B	No skilled person	19%		0%
C	There is no controlling and enforcement law in the contract agreement	40%		0%
D	Others	18%		0%

The above table shows that from 15 local grade one contractors an average of 19% of the respondents have witnessed their firm /projects have site specific safety & health plan, 21% of the respondents have witnessed the layout of the site consider health & safety aspects and 22% of the respondents have witnessed constructability of the projects/ sites reviewed which is an average of 21% of respondents agreed that their firm/ project plan for safety & health while 79% of the respondents agreed their firm /project didn't have planned for health & safety.

The reasons not to have project planning of health & safety were an average of 23% witnessed lack of awareness by all parties in the industry, 19% witnessed no skilled personnel, and 40% agreed there is no controlling and enforcement law in the contract and 18% believed this is not a standard practice.

From 5 Chinese contractors, 87% of respondents have witnessed their firm / project plan for safety & health whereas 13% of the respondents witnessed their firm /project didn't have plan for safety & health. The reason not to have plan for safety & health were 100% of respondents believe that there is lack of awareness by all parties in the industry. An interview was carried out to know whether the contractors/ consultants consider planning in health & safety.

Question, Do your firm engineers/managers/ planners plan for safety & health. Majority of the responses collected from local contractors were they have no plan for safety & health. Because the contract did not enforce to plan for safety & health, to assign health & safety officer and the consultants & clients also did not request to the contractor to have safety & health plan as well as to assign health officer. While the response collected from Chinese contractor their firm has got international experience to have safety & health plan and they will consider safety & health plan in the initial stage during the preparation of other plans like risk plan, quality plan. And like other plans the plan for safety & health reviewed periodically.

In Addis Ababa city, high rise building construction projects most of the majority of respondents from the local contractors and 13% of respondents from Chinese contractors reflect their firm/projects did not have plan for safety & health. Integration of health and safety into project planning has been promoted by authors such as Kartam (1997), Cameron and Duff (2002), Murray (2002), Saurin et al. (2004), Pavitt et al. (2004), Gibb and Pendlebury (2005) and Hare et al. (2006). The work of these authors have each sought to explore avenues for managing health and safety as integral aspect of projecting planning during one or more of the phases of project execution. Hare et al. (2006) investigated the integration of health and safety with the pre-construction phase of project and highlighted the importance of effective teams and effective two-way flow of information for successful integration.

4.3.3 Health & Safety policy

Table 4.3-3 Health& Safety policy

Item no.	Description	Local contractors		Chinese contractors	
		Yes	No	Yes	No
1.0	Projects have health & safety policy	27%	73%	100%	0%
	the firm coordinates the policy with other human resource policy	19%	81%	87%	13%
	firms have written safety rules & regulations	31%	69%	100%	0%
	Reason for "No" answers				
A	Lack of awareness by all parties in the industries	31%			100%
B	Budget not considered in the firm	22%			0%
C	Clients don't consider perquisites for awarding projects	20%			0%
D	Others	27%			0%

The above table shows that from 15 local grade one contractors an average of 27% of the respondents have agreed their firm/projects have health & safety policy, 19% respondent have witnessed their firm/projects coordinate the policy with other human resource policy and 31% of respondents agreed their firm/projects have written safety rules & regulations which is an average of 26% of the respondents have agreed their projects/firm have safety & health policies whereas an average of 74% of respondents have believed their firm do not have safety & health policy.

The reasons not to have health & safety policies were an average of 31% of respondents witnessed lack of awareness by all parties in the industry, 22% budget not considered in the firm, 20% agreed clients don't consider prerequisites for awarding projects and 27% agreed it is not a standard practice, no enforcement law to have health & safety policy & no controlling & enforcement law in the contract agreement.

From 5 Chinese contractors, 100% of respondents have believed they have safety & health policies and have written rules & regulation. But 13% respondents witnessed their firm/ project did not coordinate their policies with other human resource policies.

In Addis Ababa city, high rise building projects, most of the majority of respondents from the local contractors reflects their firm/projects did not have safety & health policy. A policy is an administrative belief used to set a path in an organization. It can be a sequence of actions and an effective decision. (Sawacha, et al., 1999) discussed numerous variables that effect safety on construction sites. The results propose that variables correlated to organization policy are the most main group of factors affecting the safety performance in the U.K. construction industry. Liska al., (1993) also identified zero accident techniques by practicing having safety policies and procedures on project sites.

4.3.4 Formal and informal written Communication

Table 4.3-4 Formal and informal communication

Item no.	Description	Local contractors		Chinese contractors	
		Yes	No	Yes	No
1.0	Providing awareness with written information about health & safety	7%	93%	100%	0%
	Preparing written broacher that aware workers about risk identification	10%	90%	60%	40%
	Preparing written broacher or orientation that aware workers about risk preventive measures	20%	80%	40%	60%
	Reason for "No" answers				
A	Lack of awareness by all parties in the industries	20%			42%
B	Budget constraints	22%			58%
C	No company health & safety policy in the firm	37%			0%
D	Others	21%			0%

The above table shows that from 15 local grade one contractors an average of 7% of respondents witnessed their firm/project provide awareness with written information about health & safety, 10% agreed their firm prepare written broacher or orientation that aware workers about risk identification and 20% witnessed their firm prepare written broacher or orientation that aware workers about risk preventive measures which is an average of 12% of the respondent have witnessed their firm have formal & informal written communication, whereas 88% of respondents have believed their firm do not have formal & informal written communication.

The reasons not to have formal & informal written communication were 20% witnessed lack of awareness by all parties in the industry, 22% budget constraint in the firm, 37% agreed no

company health & safety policy in the firm and 21% agreed upper level management commitment, there no controlling & enforcement law in the contract agreement & no skilled personnel to do the job.

From 5 Chinese contractors, 100% of respondents have witnessed their firm provide awareness with written information about health & safety, 60% agreed their firm prepare written broacher or orientation that aware workers about risk identification and 40% witnessed their firm prepare written broacher or orientation that aware workers about risk preventive measures which is an average of 67% of the respondent have witnessed their firm have formal & informal written communication, whereas 33% of respondents have believed their firm do not have formal & informal written communication.

The reasons not to have formal & informal written communication were an average of 42% witnessed lack of awareness by all parties in the industry, and 58% believed budget constraint in the firm.

4.3.5 Upper management commitment & involvement in Health & Safety

Table 4.3-5 Upper management commitment & involvement

Item no.	Description	Local contrac-tors		Chinese contractors	
		Yes	No	Yes	No
1.0	Managers encourage & support workers participation, commitment & involvement in HS activities	38%	62%	47%	53%
	Managers encourage & support training of employees in HS	32%	68%	33%	67%
	Managers actively monitor health & safety performance	32%	68%	40%	60%
	Managers ensure the budget is adequate for safety & health	14%	86%	60%	40%
Reason for "No" answers					
A	Lack of awareness by all parties in the industries	36%			29%
B	Budget not considered in the contract	16%			13%
C	Upper level management & commitment problem	48%			58%

The above table shows that from 15 local grade one contractors 38% of the respondent have agreed their firm managers encourage & support workers participation, commitment & involvement, 32% of the respondent have witnessed their firm managers train employees in health & safety, 32% actively monitor health & safety performance and 14% of respondents agreed their firm managers ensure the budget is adequate for safety & health which is an average of 29% of respondents witnessed their firm have upper management commitment & involvement in health & safety, whereas 71% of respondents have believed their firm have no upper management commitment & involvement in health & safety.

The reasons firms have no upper management commitment & involvement in health & safety were an average of 36% witnessed lack of awareness by all parties in the industry, 16% agreed budget is not considered in the contract, and 48% believed upper level management & commitment problem.

From 5 Chinese contractors, 47% of respondents have agreed their firm managers encourage & support workers participation, commitment & involvement, 33% of the respondent have witnessed their firm managers train employees in health & safety, 40% actively monitor health & safety performance and 60 % of respondents agreed their firm managers ensure the budget is adequate for safety & health which is an average of 45% of respondents witnessed their firm have upper management commitment & involvement in health & safety, whereas 55% of respondents witnessed their firm have no upper management commitment & involvement in health & safety.

The reasons managers not to have upper management commitment & involvement in health & safety were 29% agreed lack of awareness by all parties in the industry, 13% budget is not considered in the contract and 58% believed upper level management & commitment problem.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects their firm did not have upper management and commitment & involvement in health and safety. The finding did not much the findings of (Teo, et al., 2005), found that the reduction of accidents would be accomplished when top management takes a dynamic attention and is dedicated to safety and health improvement as well as maintaining good safety and health policy. Moreover, (Hinze & Raboud, 1988) concluded in their research, that top management must be supportive to have better health and safety performance. And also Tam and Fung (1998) investigated effectiveness of management strategies on safety performance and the study concluded one of the effective strategies in reducing accidents were safety training. Gallagher (1997) identified factors associated with improved health & safety performance and the study concluded one of the factors to increase health & safety performance were high level of top management commitment.

4.3.6 Health & Safety resources

Table 4.3-6 Health & Safety resources

Item no.	Description	Local contractors		Chinese contractors	
		Yes	No	Yes	No
1.0	provision of first Aid and first Aider	34%	66%	73%	27%
	Providing personal protective equipment(PPE)	60%	40%	100%	0%
	Providing right tools, equipment's& plant	80%	20%	100%	0%
	Providing good welfare facilities	56%	44%	93%	7%
	Providing material schedule data sheet for all hazardous material	16%	84%	29%	71%
Reason for "No" answers					
A	Lack of awareness by all parties in the industries	15%			63%
B	Budget constraints	32%			0%
C	There is no enforcement law	29%			0%
D	Others	23%			37%

The above table shows that from 15 local grade one contractors 34% of respondents believed their firm/project provide first aid, first aider, 60% of the respondent have witnessed their firm provide personal protective equipment (PPE), 80% believed their firm provide correct tools, equipment and plant, 56% witnessed their firm/project provide good welfare facilities such as showers, canteens, toilets for the construction projects/sites workers and 16% respondents witnessed their firm provide material schedule for hazardous material which is an average of 49% of respondents believed their firm provide health & safety resources, whereas an average of 51% of respondents believed their firm don't provide health & safety resources.

The reasons firms/projects not to provide health & safety resources were 15% agreed lack of awareness by all parties in the industry, 32% witnessed budget constraint, 29% agreed there is no enforcement law and 23% agreed lack of skilled personnel & there is no controlling & evaluation mechanism from concerned parties.

From 5 Chinese contractors, 73% of respondents believed their firm/project provide first aid, first aider, 100% of the respondent have witnessed their firm provide personal protective equipment (PPE), 100% believed their firm provide correct tools, equipment and plant, 93% witnessed their firm/project provide good welfare facilities such as showers, canteens, toilets for the construction projects/sites workers and 29% respondents witnessed their firm provide material schedule for hazardous material which is an average of 79% of respondents believed their firm provide health & safety resources, whereas an average of 21% of respondents believed their firm don't provide health & safety resources.

The reasons firms/projects not to provide health & safety resources were 63% agreed lack of awareness by all parties in the industry and 37% agreed lack of skilled personnel & there is no controlling & evaluation mechanism from concerned parties. Interview was carried out to assure whether there is provision of personal protective equipment, right tools, equipment's & plant, good welfare facilities, provision of first aid and material schedule data sheet for all hazardous material. Most of the response from the local contractors they do not provide personal protective devices and clothing because they have no budget to provide this items and the contract also do not enforce to provide the items. While the response from the Chinese contractors, they are international contractors and most of the items provided to the workers on site.

4.3.7 Training in Health & Safety

Table 4.3-7 Training in Health & Safety

Item no.	Description	Local contrac-tors		Chinese contractors	
		Yes	No	Yes	No
1.0	projects/sites provide or give induction in HS before commencing work	6%	94%	12%	88%
	Provide regular training for their workers on health & safety before commencing work	3%	97%	17%	83%
	Training on how to care & use of personal protective equipment's	18%	82%	17%	83%
	Instruction manuals or safe work procedures	27%	73%	50%	50%
	Reason for "No" answers				
A	Lack of awareness by all parties in the industries	21%			27%
B	Budget is not considered for health & safety	15%			24%
C	Upper level management & commitment problem	26%			35%
D	There is no enforcement law	34%			14%
E	Others	4%			0%

The above table shows that from 15 local grade one contractors 6% of respondents believed their firm/projects provide or give induction before commencing work, 3% agreed their firm/project provide regular training for their workers on health & safety, 18% witnessed their firm/project provide training on how to care and use of personal protective equipment's and 27% agreed their firm/project provide instruction manuals or safe procedures which is an average of 14% witnessed their firm/project provide training in health & safety, whereas an average 86% of the respondent believed their projects/sites do not provide training in health & safety.

The reasons not to provide training in health & safety were 21% agreed lack of awareness by all parties in the industry, 15% witnessed budget is not considered for safety & health, 26% witnessed upper level management & commitment problem, 34% believed there is no enforcement law, and 4% agreed all parties give attention after accident happens & do not give attention for health & safety as a priority and workers lacks attitude to know and train on health & safety issues.

From 5 Chinese contractors, 12% of respondents believed their firm/projects provide or give induction before commencing work, 17% agreed their firm/project provide regular training for their workers on health & safety, 17% witnessed their firm/project provide training on how to care and use of personal protective equipment's and 50% agreed their firm/project provide instruction manuals or safe procedures which is an average of 24% witnessed their firm/project provide training in health & safety, whereas an average 76% of the respondent believed their projects/sites do not provide training in health & safety.

The reasons not to provide training in health & safety were 27% agreed lack of awareness by all parties in the industry, 24% witnessed budget is not considered for safety & health, 35% witnessed upper level management & commitment problem and 14% believed there is no enforcement law.

In Addis Ababa city, in high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects their firm did not give training in health & safety. Training provide workers with ways to obtain added information about potential hazards and their control; they could gain skills to assume a more active role in implementing hazard control programs or to effect organizational changes that would enhance worksite protection. The finding of the study did not much with the finding of Aksorn and Hadikusumo (2008), investigated the effectiveness of safety programs in the construction industry and concluded one of the safety programs found to be positively associated with safety performance is safety induction.

4.3.8 Project supervision

Table 4.3-8 Project supervision

Item no.	Description	Local contrac-tors		Chinese contractors	
		Yes	No	Yes	No
1.0	Proper supervision by staff trained in health & safety carried out on projects	17%	83%	80%	20%
	Ad - hoc health &safety inspections done regularly	5%	95%	40%	60%
	local authorities and health &safety enforcement agencies visit sites for inspections	4%	96%	20%	80%
	Reason for ” No” answers				
A	Lack of awareness by all parties in the in-dustries	30%			39%
B	Budget constraints	10%			3%
C	There is no enforcement law	35%			33%
D	Others	25%			25%

The above table shows that from 15local contractors 17% of respondents witnessed projects/firm have supervision by staff trained in health &safety, 5% witnessed firms/projects have ad-hoc health & safety inspections done regularly and 4% believed firms/projects local authorities, health &safety enforcement agencies visit sites for inspections which is an average of 9% witnessed firms/projects execute project supervision, whereas an average of 91% believed projects do not work project supervision.

The reasons firms/projects not to execute proper supervision were 30% agreed lack of awareness by all parties in the industry, 10% witnessed budget constraint, 35% believed there is no enforcement law and 25% agreed there is no regulatory body established for health & safety & there are no standards in the code of practice.

From Chinese contractors, 80% of respondents witnessed projects/firm have supervision by staff trained in health & safety, 40% witnessed firms/projects have ad-hoc health & safety inspections done regularly and 20% believed firms/projects local authorities, health & safety enforcement agencies visit sites for inspections which is an average of 47% witnessed firms/projects execute project supervision, whereas an average of 53% believed projects do not work project supervision.

The reasons firms/projects not to execute proper supervision were 39% agreed lack of awareness by all parties in the industry, 3% believed budget constraint, 33% agreed there is no enforcement law and 25% believed there is no regulatory body established for health & safety & there are no standards in the code of practice.

In Addis Ababa city most of the majority of respondents from the local and Chinese contractors reflects their firm did not have proper supervision by staff trained in health & safety. Therefore the finding of the study did not much the findings of Aksorn and Hadikusumo (2008) investigated the effectiveness of safety programs in the construction industry and concluded one of the safety programs found to be positively associated with safety performance is having safety committee (ad-hoc). Gallagher (1997) identified factors associated with improved health and safety performance and the study identified with conclusion of supervisor involvement and effective safety & health committee associated with better health and safety performance.

4.3.9 Accident and fatal reporting

Table 4.3-9 Accident and fatality

Item no.	Description	Local contractors		Chinese contractors	
		Yes	No	Yes	No
1.0	projects /sites records and reports site accidents, injuries and illness	37%	63%	73%	27%
Reason for "No" answers					
A	Lack of awareness by all parties in the industries	0%			100%
B	Upper level management & commitment problem	6%			0%
C	There is no regulatory body enforce to report	56%			0%
D	Others	38%			0%

The table above shows that from 15 local grade one contractors 37% of the respondents have witnessed their firms/projects records and reports site accidents, injuries and illness, whereas an average 63% projects /sites do not records and reports site accidents, injuries and illness. The reasons projects/sites not to records and reports site accidents, injuries and illness were 6% agreed upper level management & commitment problem, 56% witnessed there is no regulatory body enforce to report and 38% believed this reporting is rarely done by consultants & projects only report to their main office.

From 5 Chinese contractors, 73% of respondents firms/projects records and reports site accidents, injuries and illness, whereas an average 27% firms/projects do not records and reports site accidents, injuries and illness. The reasons projects/sites not to records and reports site accidents, injuries and illness were 100% believed lack of awareness by all parties in the industry. An interview was carried to site supervisors to get more supportive information for the above questioner (Accident recording and reporting issues)

“Do you record and report all accidents and injuries to your supervisor immediately?”

Most of the response collected from projects constructed by local contractors they do not have well-organized recording and reporting system on the projects, only partially, for high injuries accidents reported to managers. This is because of they have no experience & culture for recording & reporting of accidents. While most of the responses collected from the international contractors accidents recorded & reported to the managers in their firm.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local contractors reflects their firm did not have proper supervision by staff trained in health & safety. Therefore the finding of the study did not much with researchers Aksorn and Hadikusumo (2008), investigated the effectiveness of safety programs in the construction industry and concluded one of the safety programs found to be positively associated with safety performance is having accident investigations, safety record keeping and safety reporting. Liska et al., (1993) identified zero accident techniques and concluded the study accident & near –miss investigation; and record keeping and follow-ups associated with safety success.

4.3.10 Governmental organizations follow up and contribution in improving safety

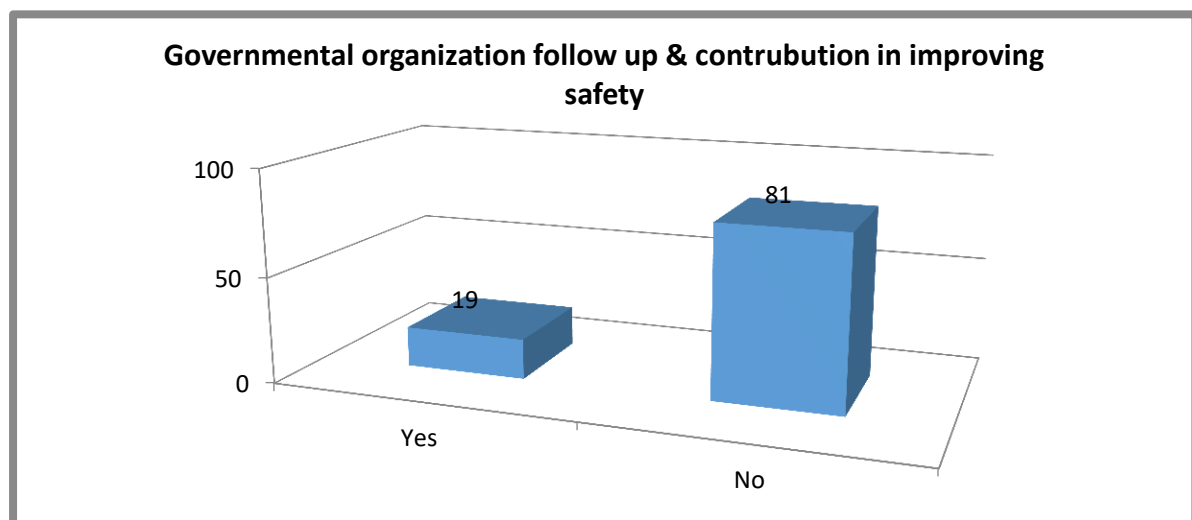


Figure 4.3-10 Governmental organization follow-up in improving HS

The figure above shows that from 15 projects which are undertaken by local and Chinese international contractors only 19% of the respondent have witnessed governmental organization follow their projects and contribute in improving safety, whereas 81% of respondents agreed

governmental organizations do not follow their projects and they do not contribute in improving safety.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects their firm did not have follow-ups from governmental organizations. But government shall conduct a periodically site inspection through an experienced safety engineers and subjecting the contractors to a warning or fine for unsafe conditions or hazards existing on a workplace. Moreover, the engineering societies shall help to extend engineering knowledge by developing the awareness of safety and health issues among engineers, (Fang, et al., 2004). Therefore, the finding in the study did not much with the study of Wright (1998), identified factors motivating proactive health and safety management and concludes in the study compliance with customer or regulatory certification schemes and complies with health & safety regulations create positive pressure to proactively manage health & safety.

4.3.11 Major reason of accidents

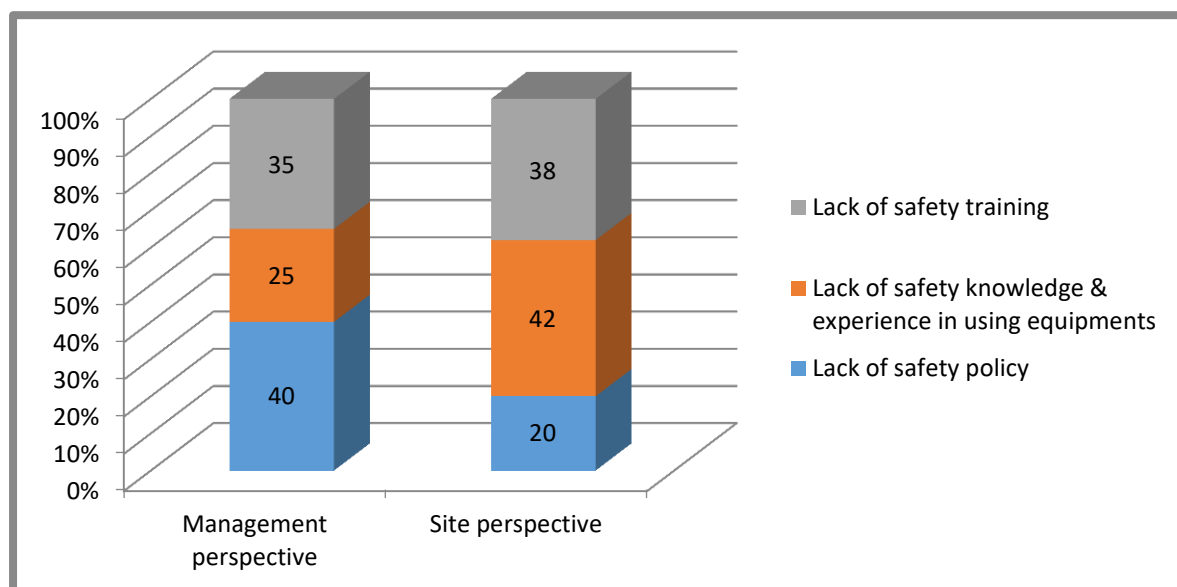


Figure 4.3-11 High accident construction site report

The above figure shows that from 15 local and 5 Chinese international contractor, the main cause of high accident rates in construction sites from managers views are 40% of respondents believed due to lack of safety policy, 25% of respondents witnessed due to lack of safety

knowledge & lack of experience in using equipments and 35% of respondents agreed due to lack of safety training

From site perspective, respondents believed that high accidents rates on the construction site are due to 42% witnessed lack of safety knowledge & experience in using equipments, 38% witnessed lack of safety training and 20% witnessed lack of safety policy. This, high accident rates on lack of safety knowledge & experience in using equipments implies that there is no training of workers in the construction projects, and how to use the equipment in the construction sites, and also there is no orientation for the workers. The results in this study did not agree with the results of Tam and Fung (1998). Which has founded the main strategies in reducing accidents are safety training & post –accident investigation.

4.3.12 Responsibility of accidents during construction

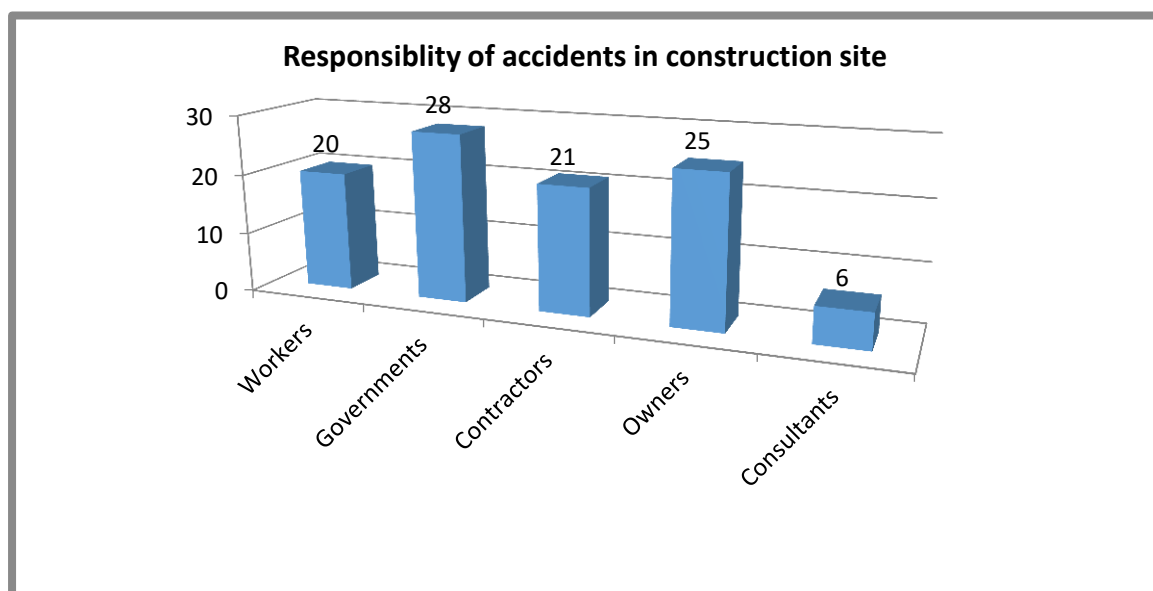


Figure 4.3.12 Responsibility of accidents on construction site

The above figure show that from 15 local and 5 Chinese international contractors the main responsibility of accidents during construction 20% of respondents believed workers, 28% agreed governments, 21% agreed contractors, and 25% agreed owners and 6% agreed consultants.

4.3.13 Expense of safety & health management in terms of contract cost

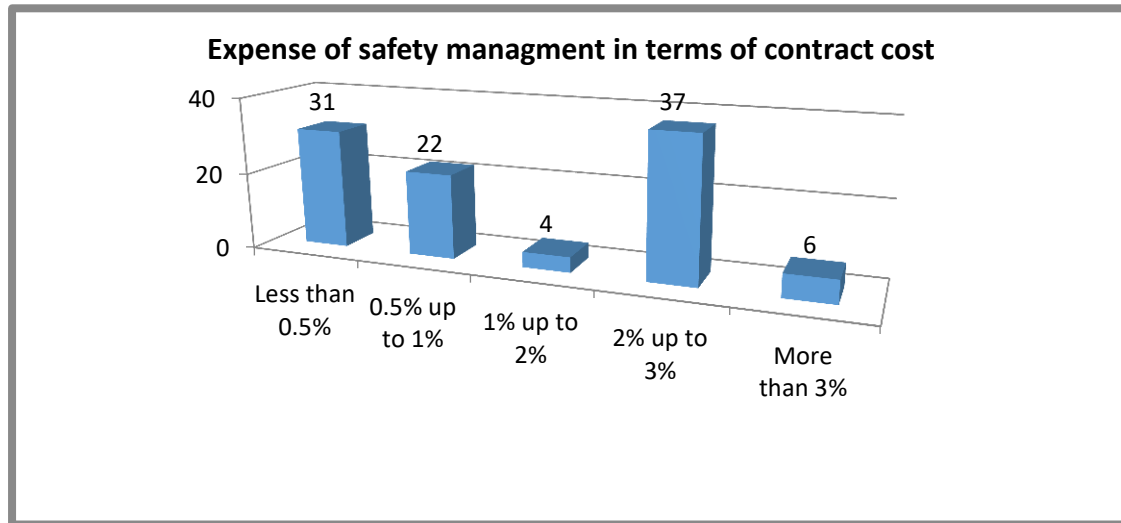


Figure 4.3-13 Expense of safety management in terms of contract cost

The above figure shows that from 15 local and 5 Chinese international contractors the expense of safety management in terms of contract cost 31% respondents believed less than 0.5%, 22% witnessed 0.5% up to 1%, 4% agreed 2% up to 3%, and 3% witnessed more than 3%. Most of the respondents believed that the cost of safety & health management is 2% up to 3%.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects that the firms/projects did not know cost of safety & health in terms of contract cost. But research findings by show that knowing the budget of safety & health creates accountability & responsibility. The results in this study did not agreed with the results of Liska et al., (1993). Which has founded accountability/responsibility and safety budget is associated with safety success.

4.4 Major Health & Safety areas to be considered during construction of high rise building construction projects

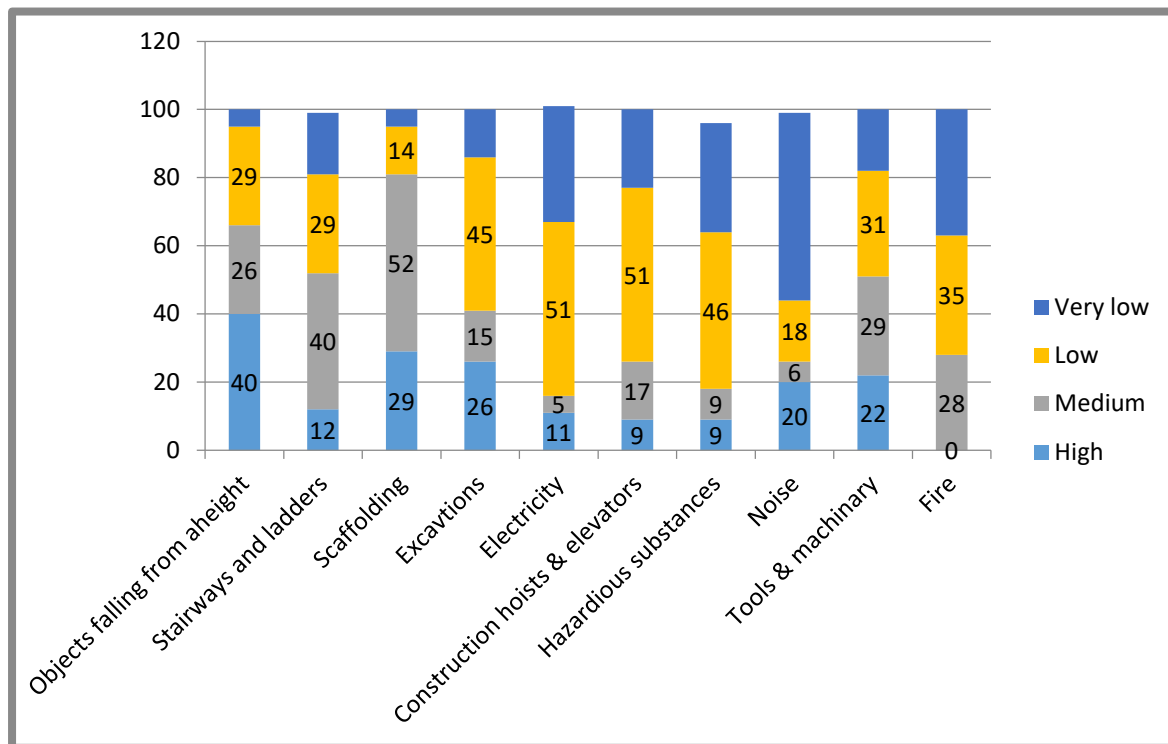


Figure 4.4-1 Major safety & healthy areas to be considered during construction of high rise building projects

The above table shows that from 5 Chinese and 15 local grade one contractors, a high percentage of the respondents believed that objects falling from a height, workers falling from scaffolding during construction, un shored protection of excavation followed by noise, tools & machinery, stairway & ladder, electricity power accident, and then construction elevators & hazardous substances cause injuries & fatalities in a high rate in decreasing order. Stairways and ladders, scaffolding, fire, followed by tools & machinery, objects falling from a height, and then construction hoists & elevators, excavations and electricity causes injuries & fatalities in medium rate in decreasing order. An interview was carried to get more supportive information for the above questioner (If they identified major health & safety areas to be considered during the construction of high rise building projects)

“Did you identify the major safety & health hazard areas to be considered in the construction of high rise building projects?”

Most of the response collected from the interview in the local contractor construction site projects they do not identified the major hazard areas to given attention in the construction of health and safety but from experience in the industry objects falling from a height, falling from scaffolding and excavation like collapse of soil has very dangerous and needs high attention and may cause physical injury or death. While most of the response collected from Chinese contractors they plan for safety & health and for each activities safety will be considered. But from past experience, all needs very high attention.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects the above mentioned hazards results physical injury or ill –health problem. The findings are in the same as those found out by (Davies and Tomasin, 1996, HSE, 1998, Murie, 2007)

4.5 Factors which affect health and safety performance of high rise building construction projects

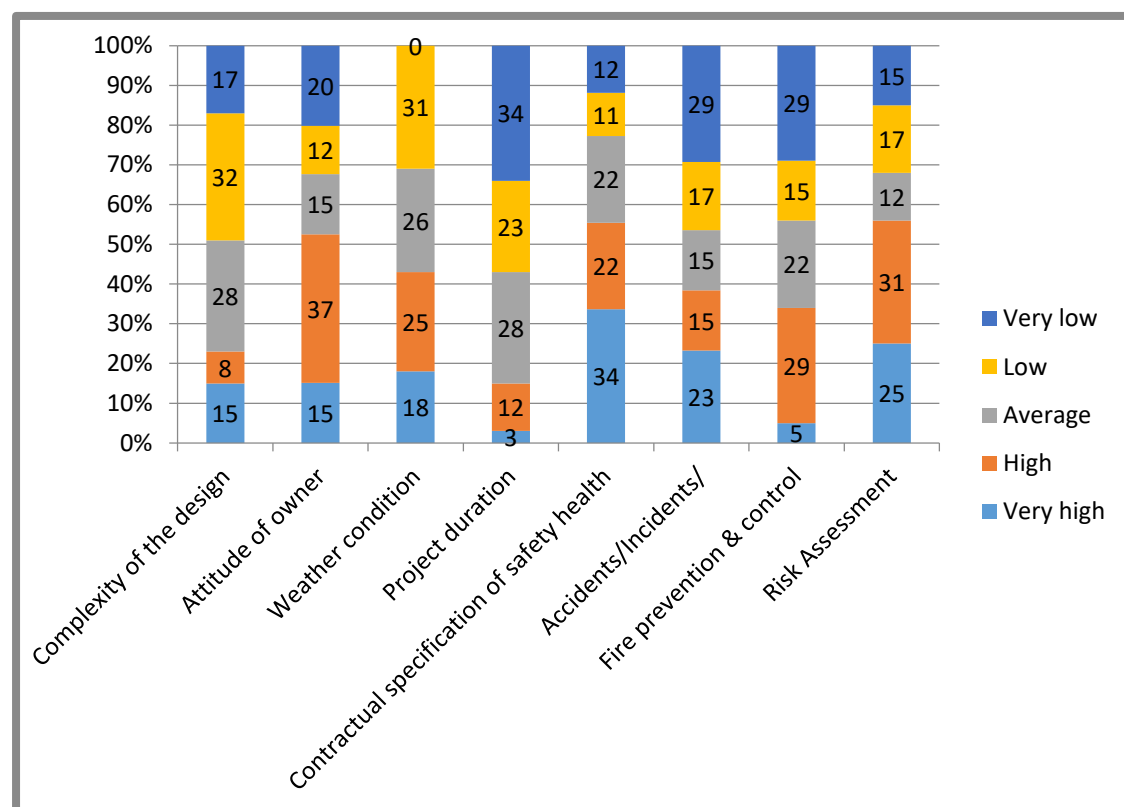


Figure 4.5-1 Factors which affect HS performance of high rise building construction projects

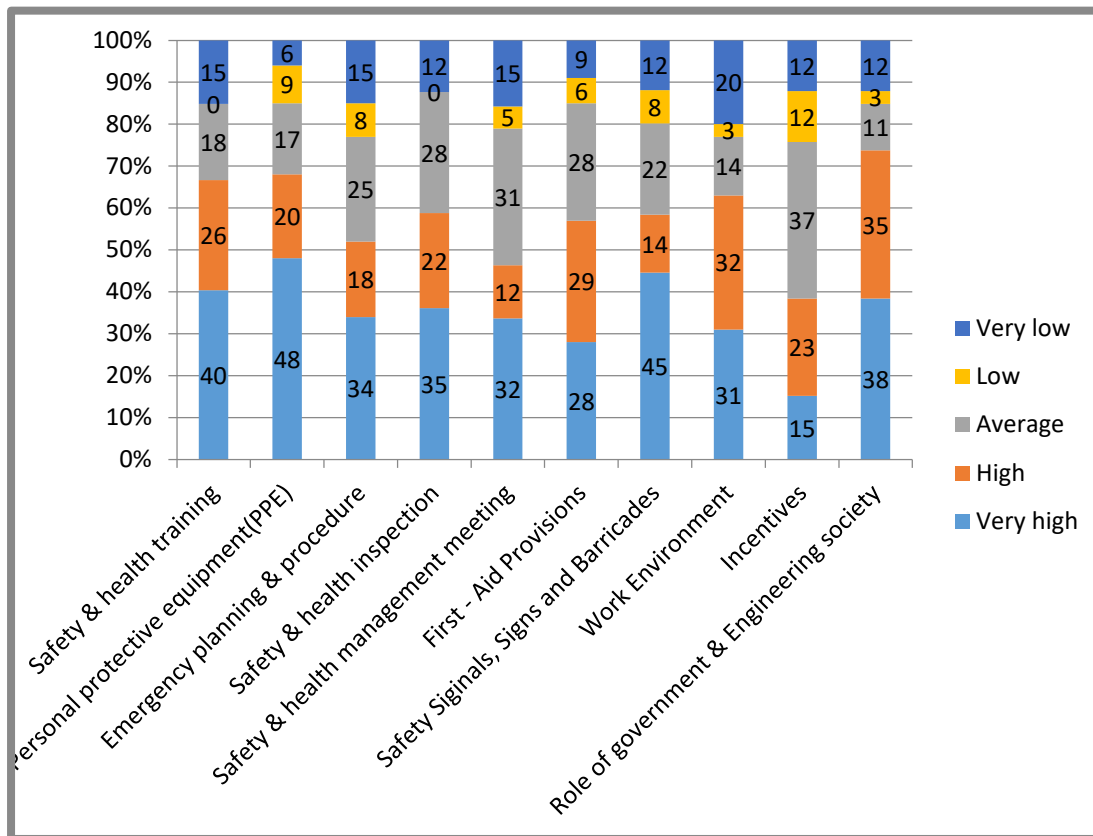


Figure 4.5-2 Factors which affect HS performance of high rise building construction project (continuation.)

The figure above shows that from 5 Chinese and 15 local grad one contractors Attitude of owners(37%), Role of government & engineering society (35%),work environment& risk assessment(32%), followed by Fire prevention &control (29%), first–Aid provision, safety & health training (26%), weather condition(25%), Incentives (23%), Safety & health inspection (22%), and then emergency planning & procedure(18%), Accidents/Incidents (15%), safety signals, signs and Barricades (14%), safety& health management meeting (12%), Project duration (12%) and complexity of design (8%) affect the performance of the project in a **very high** rate in decreasing order. Incentives (37%), safety & health management meeting (31%), followed by complexity of design & Project duration, Safety & health inspection and first–Aid provision (28%), weather condition (26%), emergency planning & procedure (25%), safety signals, signs and Barricades (22%) and Fire prevention &control (22%), and then safety & health training (18%), Personal protective equipment (17%), Attitude of owners (15%), Accidents/ Incidents (15%), work environment (14%), Risk assessment (12%), Role

of government & engineering society (11%) affect the performance of the project in **high** rate in decreasing order.

In Addis Ababa city, high rise building construction projects, most of the majority of respondents from the local and Chinese contractors reflects Attitude of owners, role of government in engineering society, work environment & risk assessment affects the performance of health & safety at a very high rate.

Attitude of Owners have a direct economic stake in the safety and health performance of their contractors because accident costs are an expense to the contractor and are passed on, one way or another, to the client. Moreover, owners have extended known an ethical duty to provide a safe work environment to reduce injuries. Therefore, owner can achieve this duty by signing contractors who have a record of good safety and health performance. Also, owners can take processes to accomplish better safety and health performance such as: provide safety and health guidelines that the contractor must follow; Implement, the use of work permit systems for potentially harmful activities; Oblige the contractor to elect a responsible supervisor to coordinate safety in the workplace; Discuss safety at ownercontractor meetings; Conduct safety audits during construction; Enforce prompt reporting and full investigation of accidents, (Report-A-3, 1982). Therefore the finding is the same as the works of (Hinze & Gambatese, 2003), concluded in their research in the USA that safety and health performance have better records when the owner is a private organization.

Role of Government and Engineering Societies should play a key role to apply the safety and health guidelines by endorsing standards and codes to protect the workers and properties. These guidelines should be officially obligate the companies to adhere them with suitable firm fines for non-compliance. Government shall conduct a periodically site inspection through an experienced safety engineers and subjecting the contractors to a warning or fine for unsafe conditions or hazards existing on a workplace. Moreover, the engineering societies shall help to extend engineering knowledge by developing the awareness of safety and health issues among engineers, (Fang, et al., 2004). (Teo, et al., 2005), suggested that safety and health regulations have to be taken seriously when planning job activities or setting up company policies. Further, regulation and its implementation do effect on the

construction safety and health to a significant degree. Therefore the finding is the same as the works of Fang, et al (2004) and Teo, et al (2005).

Work environment, a better working environment can be produced by setting a tide site. Aspects of a tide site that need to be identified are contain the following: access and traffic routes, material and storage handling, site offices and services, the construction plant, production workshops, services and facilities, and the site attachment. (Mattila, et al., 1994), found that there were direct relation between the quality of the work environment and the level of safety in construction sites. Further, the high quality work environment will improve the housekeeping and reduce the accident frequency rates. Also, it was recognised that poor housekeeping and the untidy construction sites had the largest contributing factors to accidents, (SiteSafe, 1999).

Risk Assessment reflects the likelihood and severity that harm will occur from an identified hazard, so that appropriate controls may be taken based on the probability and severity of the potential hazard, (Colling, 1990). Risk assessment is a structured approach for identifying, evaluating and controlling hazards in the workplace (Chapman & Ward, 2004) with a view to reaching a better performance of no harm to people or damage to assets. Therefore the finding is the same as the findings of (Agwu, 2012), which concludes that better safety and health performance of construction companies is depending on risk assessment compliance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMENDATION

5.1. Summary of major finding

The construction industry has been seen as one of the hazardous industries. As empirical reviews revealed that the industry has poor health and safety performance record compared to other industries all over the world. This paper is conducted on safety and health management in the high rising building projects in Addis Ababa city administration. The overall body of the paper is summarized as follows

Majority of the companies (87%) included in the study has more than (10) years of experience in the industry, which should make them familiar with safety and health related issues.

Out of the total respondents only (3%) respondents were from the safety & health department. Not all companies have a professional safety department yet this department drives majorly for the health and safety of workers. The level of projects/firms towards the expenditures of cost on safety and health is lower in Chinese international contractors, and almost not known for projects constructed by local contractors. and the level of expenditure on health and safety for all raised questions such as Availability of First Aid and occupational health service on site, Availability of Personal Protective Equipment, Providing Training and instruction regarding health and safety to every workers, appointment of health & safety staff, project planning of health & safety, health & safety policy, upper management & commitment in health & safety and accident fatality reporting which is less than 50% for local contractors and greater than 50% for international contractors. This means the Chinese contractors have relatively good practice of HS management whereas the local grade one contractors have a poor practice. Objects falling from height, Scaffolding and Ladders and collapse of soil during excavation are the most cause of injury and fatality during high rise building construction work followed by noise, then tools & machinery, Stairways & ladders, electric power accident, construction elevator and hazardous substances. Further, the majority of respondents agreed the main factors that affect the performance of health & safety in high rise building construction are Attitude of owner, Role of government & engineering society, Work environment, followed by risk assessment, safety & health policy, fire prevention & control, first Aid – provision, project cost, Safety & health training

5.2. Conclusions

The construction industry performs poorly in occupational health and safety (Dadzie, 2013). Despite many OHS campaigns and initiatives, the statistics reveal that construction workers continue to be killed or injured at work each year. These paper based on the analysis concluded that;-

- There is a serious lack of appointment of safety & health personnel; they have no plan, policy, upper management commitment & involvement in health and safety and they are not providing of health and safety resources. They don't train, supervise workers & there is no mechanism of recording and reporting of accidents. These shows there are structures and procedures problems at all levels of the project which are under constructed by local grade one contractors. And for projects constructed by Chinese contractors, there is lack of giving induction, regular training, and supervising by staff trained of workers. This shows there is procedures problem which are under constructed by international contractors in the focus area on the construction stage of health and safety.
- Although there are appropriate health and safety legislation for governing construction works there is lack of enforcement of regulations from government & regulatory bodies responsible for ensuring compliance are not properly resourced to carry out their legal responsibilities.
- Clients & consultants do not consider as perquisites for awarding projects and they do not even include as criteria in the contract documents in contractual specification of health and safety.

5.3. Recommendation

Having acknowledged that construction industry is inherently risky and complex in nature it can be said that these risks can affect and influence the performance of the projects. Through literature review, survey questionnaire and interviews, the research identified the poor practice of health and safety in constructions of building projects in Addis Ababa City, and non-compliance to the health & safety regulation in construction sites.

Therefore, several recommendations are suggested here on the role of each party involved in construction projects, including the government, the owners, the consultants, and the contractors.

The Contractors

- Construction contractors should adopt proactive and continuous learning approaches to manage health and safety of the projects workers.
- Construction companies are responsible for educating their labor force and increasing their awareness of the causes and effects of site incidents on themselves, families, the project and the community at large.
- Construction companies should priority (give an attention) to factors having a high influence on health and safety performance of the projects.
- Construction companies should take a more proactive approach towards implementing the health & safety plans on site through integrating health & safety procedures into overall project management plans. "Construction companies should appoint safety officers to continuously find and evaluate the Shortcomings of their health and safety plans and re-instate new working solutions.
- Contractors must ensure that their labor force is properly trained for their specific tasks. This will empower them to teach their peers.
- Contractors should consider the economic, social, political benefit of implementation health and safety management on their project phases.
- The contractors should train the workers, promote the safety culture for workers and educate them on how to avoid the risk and use the equipment properly in the construction site.
- Furthermore contractors should continuously brief their labor Force to maintain proper safety procedures on sight and this can be achieved through repetitive teaching.
- Contractors should prepare the regular safety meeting during the work in the construction site.

- The contractor should make sure that all the workers wear the personal protection equipment and punish the workers who make safety violation.
- Contractors must keep accident registers at sites, and make record of all kind of accidents from minor bruises to major and fatal accidents, and submit reports to Directorate of Occupational Health and safety services. All employees must be given health and safety induction training when they start work, which should cover basics such as first aid and fire safety. Training must also be provided if risks change, and refresher training when skills are not frequently used.
- Contractors should make provision for safety and health when preparing bids. The provision for safety and health must be made competitive with the aim to compete with other bidders and to avoid a monetary loss. Costs for Personal Protective Equipment's measures should be explored and explicitly be part of tendering and costing for the project implementation. - Site supervisory staff should be sensitized with Occupational Health and Safety and should share that knowledge with co-workers. The supervisors should incorporate safety officers to make rules, warning signs and other measures governing the sites. The rules should apply to everyone on site and should be in writing and be brought to the attention of all those who may be affected.

The Government

- The government should establish the Department of Occupational Health and Safety Administration with the strong terms of punishment for those who make safety violation. The government should follow up the safety performance in the construction sites by visiting the construction site and evaluating the safety performance during the construction project. The government should provide safety courses on how to improve safety performance in the construction sites for officials of safety in the construction projects, which is to be held annually.
- Government should instate a system for checking the competence of inspectorate from labor office and empowered respective ministry officers on a regular basis.
- In order to enhance the role of management in health and safety the existing legislation should be amended to put more emphasis on role of management. Provisions

should be made to make it a statutory duty for every contractor to have a safety management programs on site. Contractors should be compelled to draw up safety responsibilities and authority structure which should be available in every site to inform all a party as to their responsibilities as far as health and safety is concerned.

- Government should take the lead in enacting appropriate legislation and enforcing this by re sourcing the appropriate Ministries, Agencies and Departments of Government to do their jobs well. Clients, contractors and consultants of the construction sector in Addis Ababa should ensure that every construction contract takes comprehensive account of health and safety requirements for the project, environment and the workers. Workers and civil society should ensure and demand the provision of adequate health and safety policies, procedures and provisions to govern construction work.
- Governments address worker safety through mandatory requirements that aim to prevent or reduce injury. In many jurisdictions, there are specific agencies charged with enforcing these safety requirements or regulations. In the United States, the Occupational Safety and Health Administration (OSHA) of the Department of Labor is the official conductor of safety regulatory oversight in all sectors and industries

The Consultants

- The consultants should visit the construction sites to make sure all the tools used in the construction site are safe. The consultants should determine the factors that can cause accidents in the construction site such as the bad use scaffolding and stairs and minimize them during the construction project.
- Health & Safety plans should be thoroughly assessed at tender stage by all stakeholders as this could minimize accidents on site thereby reducing the costs significantly.
- To monitor health and safety performance (such as reports, audits and inspections) during bid the contractors should have to incorporate Safety audit report for their qualification. The contract document prepared for tender should have guidelines for health and safety regulation and enables the enforcement of rules and regulations for health and safety problem minimization

- In preparing the contract document the consultant has to put guidelines for health and safety regulation and enables to enforce rules and regulations for health and safety problem minimization.

The Owners

- The owners should control and mentor the contractors and consultants by giving safety training to workers, promoting safety culture in the construction site and by making sure that the consultants inspect the safety of the tools used in the construction sites.
- Employers and contractors should provide suitable programs that are consistent with national Laws and Regulations to ensure the health and safety of workers. This includes maintaining a workplace that has minimal risks and accidents that can result in injury or death. They should also ensure that a competent person inspects the construction project site at suitable intervals to ensure safety guidelines are adhered to.
- Employers must make an assessment of the health and safety risks to which employees and others are exposed on construction sites. The significant findings must be recorded where five or more people are employed. Since managing health and safety is different from managing any other aspect in construction there need to do a risk assessment to find out about the risks, and to put sensible measures in place to control them, and make sure they stay controlled.
- An adequate budget for safety and health provision should be stated in all construction contracts which should be approved by all parties. Safety as a pay item in contract document is suggested to be included.
- Finally all parties in construction project must contribute their rightful parts towards making construction sites healthy and safe.

5.4 Future work

- Research can be conducted to evaluate the current practice of Health and Safety performance on construction projects, considering all participants, contractor, client, consultant, and government, insurance company in case of Addis Ababa or all over the country.

- Research can be conducted to compare the construction safety and health performance with other industries like manufacture and agriculture industries in Ethiopia.
- Research can be conducted to other construction sectors like Dams, Airport fields, Rail ways, demolitions, maintenances realize the role of the owners and the consultants to avoid or mitigate the accidents in construction sites.
- Research can be carried out to quantify the extent damage (Accidents and injuries) which result in without implementing of Health and Safety management in the construction Industry.

BIBLIOGRAPHY

- Adan, E. (2004). *Factors affecting Safety on Construction Projects*. Department of Civil Engineering, Palestine
- Agwu, M., 2012. *The Effects of Risk Assessment (Hirarc) on Organizational Performance in Selected Construction Companies in Nigeria*. *British Journal of Economics, Management & Trade*, 2(3), pp. 212-224
- Aksonrn, T., and Hadikusumo, B.H.W. (2008), 'Critical success factors influencing safety program performance in Thai construction projects', *Safety Science*, Volume 46, pp 709-727 (2008)
- Al-Kaabi, N. &. (2003). *Construction safety performance in the United Emirates*. *Civil and Engineering and Environment system*, 197-212.
- Al-Kaabi, N. &. (2003). *Construction safety performance in the United Arab Emirate*. *Civil engineering and environmental system*, 197-212.
- Andersson, R. (1999). *Injury Causation, Injury Prevention and Safety Promotion – Definitions and Related Analytical Frameworks*. In: *Safety Promotion Research*, Laflamme, L., Svanström, L. and Schelp, L. (Eds.) 15-42. Karolinska Institute, Stockholm.
- Authority, H. a. (2006). *Guidelines on risk assessments and safety statements*. Dublin.
- Baldock, R., Vickers, I., Smallbone, D. and James, P. 2005. *Health and safety in small firms: what are the main influences on the adoption of improvement measures?* MUBS Discussion papers
- Bentley, T. A., Hide, S., Tappin, D., Moore, D., Legg, S., Ashby, L. & Parker, R. (2006). *Investigating risk factors for slips, trips and falls in New Zealand residential construction using incident centered and incident-independent methods*. *Journal of Ergonomics*, 49, 62-77.
- BLS, 2012. *Bureau of Labor Statistics - U.S. Department of Labor - News Release. National Census of Fatal Occupational Injuries In 2011 (preliminary results)*, 20 September, pp. 1-13.
- Brake, D. &. (2002). *Deep Body Core Temperatures in Industrial Workers under thermal stress*. 125-135.
- Cameron, I. and Duff, R. 2002. *A report on research into the integration of safety planning and the communication of risk information within existing construction project structures*. In: *Proceedings of Triennial Conference CIB W099 Implementation of Safety and Health*

on Construction Sites (edited by Rowlinson, S.). Department of Real Estate and Construction, the University of Hong Kong, Hong Kong, 1-6.

- Chan, A. P. C., Wong, F. K. W., Chan, D. W. M., Yam, M. C. H., Kwok, A. W. K., Lam, E. W. M. and Cheung, E. (2008). Work at Height Fatalities in the Repair, Maintenance, Alteration, and Addition Works. *Journal of Construction Engineering and Management-Asce*, 134, 527-535.
- Chi, C. F. and Wu, M. L. (1997). Fatal Occupational Injuries in Taiwan - Relationship between Fatality Rate and Age. *Journal of Safety Science*, 27, 1-17.
- Dawit, S. (2006). Occupational Safety and Health profile in Ethiopia.
- Dias, L. M. A. 2000. Management of safety, health and the environment in construction. In: *The Management of Construction Safety and Health* (edited by Coble, R. J., Haupt, T. C. and Hinze, J.). A.A. Balkema, Rotterdam, 186.
- DM, D. M., 2008. Code of Constructions Safety Practice. Dubai: Government of Dubai.
- Douglas, A. and Glen, D. 2000. Integrated management systems in small and medium enterprises. *Total Quality Management* 11(4/5and6), 686-690.
- OSHA, O. S. a. H. A., 2013. Heat Fatalities.
- Davis, V. a. (1999). *Construction Safety Handbook*,. New York: Thomas telford
- Enshassi, A. and Mayer, P. E. 2002. Analysis of construction site injuries in Palestine. In: *Proceedings of Triennial Conference CIB W099 Implementation of Safety and Health on Construction Sites* (edited by Rowlinson, S.). Department of Real Estate and Construction, the University of Hong Kong, Hong Kong, 29-34.
- Fung, I., Tam, C., Tung, K. & Man, A., 2005. Safety cultural divergences among management, supervisory and worker groups in Hong Kong construction industry. *International Journal of Project Management*, 23(7), p. 504-512.
- Gad, S. and Collins, A. M. 2002. *Safety culture; a review of the literature* Health and Safety Laboratory, London.
- Gallagher, C. 1997. Occupational health and safety management systems: an analysis of system types and effectiveness. Monash University, National Key Centre in Industrial Relations.
- Giang D. T & Pheng S.L. (2010). Role of construction in economic development; Review of key concepts in the past 40 years. Habitat International.
- Gibb, A. G. F. and Ayoade, A. I. 1996. Integration of quality, safety and environmental systems. In: *Implementation of Safety and Health on Construction Sites CIB Conference*,

Proceedings of the First International Conference of CIB Working Commission (edited by Dias, L. M. A. and Coble, R. J.). A.A. Balkema, Rotterdam, Brookfield, Lisbon, Portugal, 11-20

- *GTP 1(2010-2015), national planning commission Ethiopia*
- *Hare, B., Cameron, I. and Duff, A. R. 2006. Exploring the integration of health and safety with pre-construction planning. Engineering, Construction and Architectural Management 13(5), 438-450.*
- *Hassanein, A. &. (2008). Safety Performance in the Egyptian construction. Journal of construction engineering and management, 451-455.*
- *Health and Safety Executive (HSE). (2004). Improving Health and Safety in the*
- *Construction Industry .The Stationery Office, London.*
- *HSE. (1998). Managing Health and Safety.*
- *HSE. (2004). Health and safety report.*
- *HSE. (2004). Improving Health and Safety in the Construction Industry. London: The Stationery Office*
- *Hinze, J. (1997). Construction Safety. New Jersey: Prentice-Hall, Inc*
- *Hinze, J.W. (1998) Construction Safety. Prentice Hall Publications, New Jersey.*
- *Hinze, J. &. (1988). Safety on large building construction projects. . Journal of construction engineering and management, 283-293.*
- *Hinze, J. and Gambatese, J. 2003. Factors influencing safety performance of specialty*
- *Contractors. Journal of Construction Engineering and Management 129(2), 159-164.*
- *Hinze,J., & Wiegand. (1992). Role of Designers in Construction Worker Safety. Journal of construction engineering and management, 677-684*
- *Hudges P. & Ferrett E. (2008). Introduction to Health and Safety in Construction, (3rd Edition).Oxford: Elsevier Ltd.*
- *Hughes, P .and Ferrett E. (2011). Introduction to Health and Safety in Construction: The Handbook for NEBOSH Construction Certificates. (4th Edition) Routledge, Taylor and Francis Group; New York.*
- *ILO. (1992). Safety and Health in Construction Code of Practice. Geneva.*
- *ILO. (2005). Global estimates of fatal work related diseases and occupational accidents. Geneva: World Bank Regions. International Labour Organization,*
- *ILO. (2006). Promotional Framework for Occupational Safety and Health. Geneva.*

- *International Labour Office (ILO). (2005). Global estimates of fatal work related diseases and occupational accidents, World Bank Regions. Geneva: ILO.*
- *International Labour Office (ILO). (1999). Safety, health and welfare on construction sites: A training manual. Geneva: ILO.*
- *ILO, & International Labour office. (1992). Safety and Health in Construction Code of Practice. Geneva.*
- *ILO, I. L. (1995). Safety, Health and Welfare on Construction Sites: A Training Manual .International Labour office.*
- *ILO, I. L. (2001). The Construction Industry in the Twenty First Century: Its Image, Employment Prospects and Skill Requirements. Tripartite Meeting on the Construction Industry. Geneva*
- *Jannadi, O. and Bu-Khamsin, M. A. (2002) Safety Factors Considered by Industrial Contractors in Saudi Arabia, Building and Environment. The International Journal of Building Science and its Application, Vol37, No.5, pp539-547.*
- *Jaselskis, E. (1996) Strategies for achieving excellence in construction safety performance*
- *Journal of Construction Engineering and Management, Vol. 122 No.1, pp.61-70.*
- *Kartam, N. (1997) Integrating safety and health performance into construction CPM. Journal of Construction Engineering and Management, v. 123, n. 2, p. 121-126.*
- *Kartam, N.A., Flood, I. and Koushki, P. (2000) Construction safety in Kuwait: issues, procedures, problems, and recommendations, Safety Science, pp. 36163–36184*
- *Kaplinski, O. 2002. Accident rate on building sites as a quality data in a simulation model of production. In: Proceedings of the Triennial Conference CIB W099 Implementation of*
- *Safety and Health on Construction Sites (edited by Rowlinson, S.). Department of*
- *Real Estate, University of Hong Kong, 251-261.*
- *Kheni, N. A., Gibb, A. G. F. and Dainty, A. R. J. 2006a. Health and safety management practices of small and medium-sized construction businesses In: Global Unity for Safety and Health in Construction, Proceedings of CIB W99 International Conference (edited by Fang, D., Choudry, M. and Hinze, J.). Tsinghua University Press, Beijing, China, 91-101.*
- *Kartam, N.A., Flood, I. and Koushki, P. (2000) Construction safety in Kuwait: issues, procedures, problems, and recommendations, Safety Science, pp. 36163–36184.*
- *Kartam, N. (1997) Integrating safety and health performance into construction CPM. Journal of Construction Engineering and Management, v. 123, n. 2, p. 121-126.*

- Kibert, C. J. and Coble, R. J. 1995. Integration of safety and environmental regulation of construction industry. *Journal of Construction Engineering and Management* **121**(1), 95-99
- Koehn, E. and Datta, N. K. 2003. Quality, environmental, and health and safety management system for construction engineering. *Journal of Construction Engineering and Management* **129**(5), 562-569.
- Levitt, R.E. and Samelson, N.M. (1993) *Construction Safety Management*. John Wiley and Sons,nc. New York.
- Lingard, H. and Rowlinson, S. (2005) *Occupational Health and Safety in Construction Project Management*, Spon Press, ISBN 0 419 262105
- Mbuya, E. a. (1996).Towards development of a framework for integration of safety and quality management techniques in construction project delivery system. *International journal of quality*, 115.
- MoFED (2014), *Estimates of GDP and other Macroeconomic indicators – Ethiopia*. [Online]. <http://www.mofed.gov.et/GDP>. [Accessed 31 December 2016]. Ministry of Finance and Economic Development, Addis Ababa
- Mohammed, S. 2003. Safety climate in construction site environments. *Journal of Construction Engineering and Management* **128**(5), 375-384.
- Murie, F. (2007). *Building Safety – An international Perspective*. *International journal of Occupational Safety, Environmental Health*, 5-11.
- Myers, K. (2003), 'Health and safety performance in the construction industry', *Health and safely Executive*, (2003) Volume 9.
- Ofori, G. (2000), *Challenges of construction industries in developing countries: lessons from various countries*, *Proceedings of the 2nd international conference of the CIB TG29 on Construction in Developing Countries: Challenges facing the construction industry in developing countries 15-17 November 2000*, Gaborone, Botswana, pp.1-3.
- Ofori, G. (2006). *Construction in developing countries*
- OSHA, O. S. a. H. A., 2013.*Heat Fatalities*.
- Pavitt, T., Horne, K., Gibb, A. G. F. and Mckay, L. 2004. *Design for Health*. Apache4change
- CD ROM, Loughborough University, Loughborough.
- R.D, H. ((1991). *A construction safety program professional safety*.14-20.
- Reese, C. (2003). *Occupational Health and Safety Management: A Practical Approach*

- Rejda, G. (1992). *Principles of Risk Management and Insurance*. Harper Collins.
- Rowlinson, H. L. (2005). *Occupational health and safety on construction projects management*.
- Saurin, T.A., Formoso, C.T. and Guimares, L.B.A. (2004) *Safety and production: an integrated planning and control model*. *Construction Management and Economics* 22(2). pp. 159 – 169.
- Sawacha, E. N. (1999). *Factors affecting safety performance on construction projects*. *International journal of project management*, 309-315.
- Scipioni, A., Arena, F., Villa, M. and Saccarola, G. 2001. *Integration of management Systems*. *Environmental Management and Health* 12(2), 134-146.
- Shibani, A. S. (2012). *Health and safety influence on the construction projects performance in United Arab Emirates (UAE)*. *Journal of Civil Engineering and construction technology*, 32-44.
- Simonds, R. H. and Shafai-Sahrai, Y. 1977. *Factors apparently affecting injury frequency in eleven matched pair of companies*. *Journal of Safety Research* 9(3), 120-127.
- Tam, C. Z. (2004). *Identifying elements of poor construction management in china*.
- Tam, C. Z. (2004). *Identifying elements of poor construction safety management in china safety science*, 569-586.
- Taylor, G., Easter, K. and Hegney, R. 2004. *Enhancing Occupational Safety and Health*. Elsevier Butterworth-Heinemann, Oxford.
- Walliman, N. (2005). *Your research project: A step-by-step guide for the first time researcher*. UK: Sage
- Wilson, J& Koehn, E., (2000), *Safety Management: problems Encountered and Recommended Solutions*, *Journal of Construction Engineering and Management*, (2000), Vol.126,No.1,January/February
- WHO. (1989). *First World Conference on Accident and Injury Prevention*.17-20.
- WHO. (2006). *Constitution of the World Health Organization - Basic Documents*.
- Wright, M. S., 1998. *Factors motivating proactive health and safety management*. *Contract Research Report No. 179/1998*, Health and Safety Executive. Accessed on 14th February 2007 from http://www.hse.gov.uk/research/crr_pdf/1998/CRR98179.pdf
- Wubishet Jekale (2004). *Performances for public construction projects in developing countries: Federal road and building projects in Ethiopia*. *Doctoral Dissertation*, Norwegian university of science and technology, Norway

- Zekri, M. (2013). *Construction safety and health performance in Dubai*
- Zeng, S. X., Tan, V. W.Y., and Tam, C.M. (2008), *Towards occupational health and safety systems in the construction industry of China*’, *Safety Science*, (2008), Volume 46, pp 1155-1168.
- Zou, P. Z. (2007). . *Understanding the key risks in construction projects in china international journal of project management*, 601-614.

APPENDIX A

ADDIS ABABA UNIVERSITY

School of commerce

Department of Project Management

Assessment of construction health and safety management in high rise building (a case of Chinese and local grade one contractors in in Addis Ababa)

Dear Participant

This MBA thesis research questionnaire is designed to assess the practice of construction of health & safety management in high rise building construction projects in Addis Ababa. The objective of the study paper is to asses safety & health management in high rise building in Addis Ababa.

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

Thank you,

Fasil Argaw

Email: fasil_argaw@yahoo.com.

Part one (About the respondents, company and current projects

Mark “ ” on the space provided

Title	Item	Description	Option A	Option B	Option C	Option D
	NO.	Job title of respondents'	Project	Project	Health &	Others
About respondents			Manager ☐	Engineer ☐	Safety man- ager ☐	☐
	2	Educational status of re- spondents	MSc ☐	Degree ☐	Diploma ☐	Others ☐
	3	respondents work experi- ence(years)	1-5 ☐	5-10 ☐	10-15 ☐	>15 ☐
About the company and current project	4	Contractor category	General	building	Special	others
	5	Contractor grade	1 ☐	2 ☐	3 ☐	4 ☐
	6	Total Experience of compa- ny on construction (in years)	<5 ☐	5-10 ☐	10-15 ☐	>15 ☐
	7	Project/construction Cost (ETB million)	<20 ☐	20-50 ☐	50-100 ☐	>100 ☐
	8	Average number of employ- ees	<50 ☐	50-100 ☐	100-250 ☐	>250 ☐
	9	Company expenditure on safety and health (*Cost Of Prevention COP) % of pro- ject cost	<0.25 ☐	0.25-0.5 ☐	0.5 ☐	Not known ☐
	10	Company expenditure on safety and health (**Cost Of Accident COA) % of project cost	<6.5 ☐	6.5-8.5 ☐	>8.5 ☐	Not known ☐
	11	Number of fatalities on work (years in 2007-2009 E.C) in number per project	Death ☐	+Permane nt total disable- ment ☐	++Permanent partial disa- blement ☐	+++Temporar y disablement ☐

***Cost of Prevention (COP):-** means cost incurring to administering a Health & Safety program

**** Cost of Accident (COA) :-** means cost the treatment of the injury and any unique compensation offered to workers as a consequence of being injured and are covered by workmen's compensation insurance premiums and includes all incurred costs

+Permanent total disablement:- means incurable employment injury, which prevents the injured worker from engaging in any kind of remunerated work

++Permanent partial disablement:- means incurable employment injury decreasing the injured workers capacity

+++ Temporary disablement: results a reduction workers capacity which prevents from work partially or totally for a limited period of time.

Part two

Organizational, Technical, procedural and environmental factors

Use “ ” for Yes” ×” for No” on the box provided and it is possible to choose more than one answer.

12. Appointment of Health & Safety staff

12.1. Do your construction projects/sites have a Safety Officer?

☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. No contractual obligation in the contract

C. There is no controlling and enforcement law in the contract agreement

D. Others.....
.....
.....

13. Project planning of Health & Safety

13.1. Do your project have a site-specific Health & Safety plan?

☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industry
- B. No contractual obligation in the contract
- C. There is no controlling and enforcement law in the contract agreement
- D. Others.....
.....
.....

13.2. Does the Layout of the site consider Health & Safety aspects? (During constructing site offices, access roads, temporary structures while constructing the project)

☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industry
- B. There is no controlling and enforcement law in the contract agreement
- C. No skilled person
- D. No contractual requirement
- E. Others.....
.....
.....

13.3. Do Constructability of project is reviewed periodically or frequently in Health & Safety aspect?

☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industries
- B. No contractual obligation in the contract

- C. There is no controlling and enforcement law in the contract agreement
- D. Not standard practice
- E. Others.....
-
-

14. Health & Safety policy

14.1. Does your construction firm have Health & Safety policy? ☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industries
- B. Budget not considered in the firm
- C. Clients does not consider as a prerequisites for awarding projects
- D. Oth-
ers,.....
-
-

14.2. Do your construction firm have a written in house Health & Safety rules & regulations and implementation for all workers reflecting management concerns for safety and health? ☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industries
- B. Budget not considered in the firm
- C. Clients does not consider as a prerequisites for awarding projects
- D. Oth-
ers,.....
-
-

14.3 Do your firm coordinate its Health & Safety policies with other human resource policies to ensure wellbeing of workers?

☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industries
- B. Not a standard practice
- C. The construction agreement with clients does not enforce the company to have Health & Safety policy
- D. Others.....
.....
.....

15 Formal and informal written Communication

15.1. Does your firm provide awareness with written information about Health & Safety procedures?

☐

If your answer is no, why?

- E. Lack of awareness by all parties in the industries
- F. There is no controlling and enforcement law in the contract agreement
- G. Upper level management and involvement problem not giving priority for Health & Safety
- H. Others
.....
.....

15.2. Does your firm prepare written circular/brochure that aware workers about the risk identification associated with their work?

☐

If your answer is no, why?

- A. Lack of awareness by all parties in the industries
- B. Budget constraint

C. No company Health & Safety policy in the firm

15.3. Does your firm prepare written circular/brochure or orientation those aware workers about the preventive measures to reduce risk? ☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. Budget constraint

C. No company Health & Safety policy in the firm

I. Others.....
.....
.....

16. Upper management commitment & involvement in Health & safety

16.1. Do Managers encourage and support worker participation, commitment and Involvement in Health & Safety activities? ☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. Budget not considered in the contract

C. Upper level management and commitment problem

J. Others.....
.....
.....

16.2. Do Managers encourage and support training of employees in Health & Safety? ☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. Budget not considered in the contract

C. Upper level management and commitment problem

D. Others.....

.....

.....

16.3. Do Managers actively monitor the Health & Safety performance of their projects and workers through reports? ☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. Upper level management and commitment problem

D. Others.....

.....

.....

16.4. Do Managers ensure that the Health & Safety budget is adequate? ☐

If your answer is no, why?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. Upper level management and commitment problem

D. Others.....

.....

.....

17. Health & Safety resources

17.1. Is there adequate first aid and first aider(s) on your construction projects/sites? ☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Others.....
.....
.....

17.2. Do your firm Provided personal protective equipment (PPE)?

☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Others.....
.....
.....

17.3. Do your firm Provided right tools, equipment and plant to execute construction?

☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

B. Budget constraints

C. There is no enforcement law

D. Others.....
.....
.....

17.4. Do your firm Provided good welfare facilities such as showers, canteens, toilets?

☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

- B. Budget constraints
- C. There is no enforcement law
- D. Others.....
-
-

17.5. Does Material schedule data sheets provided for all hazardous materials on site? ☐

If your answer is no why?

- A. Lack of skilled personnel
- B. Lack of awareness by all parties in the industries
- C. Budget constraints
- D. There is no enforcement law
- E. Others.....
-
-

18. Training in Health & Safety

18.1. Do Workers undergo induction on Health & Safety before commencing work on a particular site? ☐

If your answer is no why?

- A. Budget constraints in projects
- B. Lack of awareness by all parties in the industries
- C. Lack of H&S policy implementation on projects
- D. There is no enforcement law
- E. Others.....
-

.....

18.2. Do Workers are regularly trained in Health & Safety? ☐

If your answer is no why?

- A. Lack of awareness by all parties in the industries
- B. Budget not considered for Health & Safety
- C. Upper level management and involvement problem
- D. There is no enforcement law
- E. Others.....

.....

.....

18.3. Do Workers trained in proper care & use of personal protective equipment? ☐

If your answer is no why?

- A. Lack of awareness by all parties in the industries
- B. Budget not considered for H&S
- C. Upper level management and involvement problem
- D. There is no enforcement law
- E. Others.....

.....

.....

18.4. Instruction manuals or safe work procedures are used to aid in preventive action? ☐

If your answer is no why?

- A. Lack of awareness by all parties in the industries
- B. Budget not considered for Health & Safety
- C. Upper level management and involvement problem
- D. There is no enforcement law

E. Others.....

.....

.....

19. Project supervision

19.1. Do Proper supervision by staff trained in Health & Safety carried out on your project? ☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

B. Budget constraint

C. There is no enforcement law

D. Others.....

.....

.....

19.2. Does ad hoc Health & Safety inspections done regularly? ☐

If your answer is no why?

A. Lack of awareness by all parties in the industries

B. Budget constraint

C. There is no enforcement law

D. Others.....

.....

.....

19.3. Do Local authorities and Health & Safety enforcement agencies visit sites ☐ for inspection?

If your answer is no why?

A. There is no regulatory body established for Health & Safety

- B. Lack of awareness by all parties in the industries
- C. There is no enforcement law in the contract agreement with the client
- D. There is no standards in the code of practice
- E. Others.....
-
-

20. Accident, fatal Reporting

20.1. Are all injuries, fatalities filed & reported to the concerned body? ☐

If your answer is no why?

- A. Rarely done by the consultant
- B. Lack of awareness by all parties in the industries
- C. Upper level management and involvement problem
- D. There is no regulatory body enforce to report
- E. Others.....
-
-

20.2 High accident rates on construction site are due to :

- A. Lack of Legislation
- B. Lack of Safety Knowledge
- C. Management Carelessness
- D. Careless worker attitudes
- E. Carelessness of the Consulting
- F. Others.....
-
-

20.3 The major reasons of accident on site are that the management is short of:

- A. Lack employs of Safety Officer
- B. Lack of Safety policy
- C. Lack of Safety Training
- D. Lack of Safety Motivation
- E. The cost of Safety
- F. Other.....
.....
.....

20.4 The major reasons of accident on the site are that the workers are short of:

- A. Lack of training
- B. Lack of experience in using equipment
- C. Lack of safety culture
- D. Lack of safety Motivation
- E. Others.....
.....
.....

20.5 In your opinion, who should be responsible for industrial accident during construction on site?

- A. Workers
- B. Government
- C. Contractors
- D. Owners Consultant
- E. Others.....

.....
.....

20.6 Is there a governmental organization follow up and contribute in improving safety in the Construction projects?

A. Yes

B. No

c. If yes, who is this? And how it works?

.....
.....
.....

20.7 What is your suggested expense in safety management in the terms of contract cost in construction projects?

A. Less than 0.5%

B. 0.5-1%

C. 1-2%

D. 2-3%

E. Morethan3%

.....
.....
.....

Part Three

The Major Health & Safety areas to be considered during construction of high rise building construction projects

Frequency of causes of Injuries in construction sites
Please Mark “ ” on the space provided

Item no	Description	Frequency of injuries and fatalities			
		High	Medium	Low	Exceptional
1	Falling (Objects falling from a height)				
2	Stairways and ladders				
3	Scaffolding (Falling from scaffolding during construction)				
4	Excavations (Slides, collapse, not shored protection...etc.)				
5	Electricity (Electric power Accidents)				
6	Construction Hoists & Elevators and Cranes & Derrick				
7	Hazardous substances				
8	Noise				
9	Tools and Machinery (Drilling, Grinding, Bending machine...etc.)				
10	Fire (from electric, fuel, chemical etc.)				

Part Four

Factors that affect safety and health performance in the construction industry

Please Mark “ ” on the space provided

No	Description	Degree of impact				
		Very high	high	average	Low	Very low
1	Complexity of the Design					
2	Type of Owner/attitude of owner/					
3	Weather Condition					
4	Project Cost					
5	Project Duration					
6	Contractual Specification of Safety health					
7	Safety and Health Policy					
8	Accidents / Incidents / Near Miss Report					
9	Fire prevention and control					
10	Risk Assessment					
11	Safety and Health Training					
12	Personal Protective Equipment (PPE					
13	Emergency Planning and Procedures					
14	Safety and Health Inspection					
15	Safety and Health Management Meeting					
16	First-Aid Provision					
17	Safety Signals, Signs and Barricades					
18	Work environment					
19	Reward and Punishment System (Incentives)					
20	Role of Government and Engineering Societies					