

JIMMA UNIVERSITY
JIMMA INSTITUTE OF TECHNOLOGY

FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
CONSTRUCTION ENGINEERING AND MANAGEMENT CHAIR

**SAFETY MANAGEMENT ASSESSMENT FOR UNSKILLED LABOR
IN BUILDING CONSTRUCTION: A CASE OF BONGA TOWN**

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

Advisor: Engr. MAMUYE BUSIER (As. Prof)

Co Advisor: Engr. DAWIT KETEMA (MSc)

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DECLARATION

I declare that this research entitled “Safety management assessment for Unskilled labor in building construction: A case of Bonga town” is my original work and has not been submitted as a requirement for the award of any degree in Jimma University or elsewhere.

Mekides Ayalew Haile

NAME

SIGNATURE

DATE

As research Adviser, I hereby certify that I have read and evaluated this thesis paper prepared under my guidance, by Mekides Ayalew Haile entitled “Safety management assessment for unskilled labor in building construction: A case of Bonga town” and recommend and would be accepted as a fulfilling requirement for the Degree Master of Science in Construction Engineering and Management.

Advisor: Engr. Mamuye Busier (As. prof)

NAME

SIGNATURE

DATE

Co Advisor: Engr. Dawit Ketema (Msc)

NAME

SIGNATURE

DATE

ABSTRACT

The construction industry is less mechanized and more labor-intensive; construction workers are the backbone of this industry. Establishing safety management for construction workers plays a vital role in the construction industry. So the major consideration is ensuring the safety of unskilled workers during construction.

This research assess the safety management practices for unskilled labor in building construction projects, focusing on public construction sites in Bonga town. The study aims to explore the current practices, identify challenges in implementation, and assess the effects of improper safety management for unskilled labor on building construction in the Bonga area. However, it is known that numerous people lost their lives and had significantly worse injuries on building sites, including both construction workers and non-industry personnel. On those sites, poor safety management for unskilled workers is practiced.

Literature review revealed significant gaps in safety management for unskilled labor, prompting the formulation of research questions and objectives. Descriptive research design methods are used to analyze the data. The data collection methods takes both primary and secondary data collection methods. The target area is around Bonga town, and the questionnaire is conducted on stakeholders in the study, which are local contractors, consultants, and unskilled laborers. The collected data is analyzed using the relative importance index (RII).

The Results indicate critical challenges and effects such as lack of safety training facilities, lack of personal protective equipment's, inadequate safety budget, improper safety policy implementation, lack of safety professional. These factors contribute to accidents, injuries, financial losses and finally death.

Based on these findings, enhancing safety trainings, investing on PPE, increasing safety budget, improving safety policies and documentation and involvement of all parties are some recommendations that are proposed to enhance safety management practices and bridge the identified gaps.

Keywords: Construction Industry, Construction workers, Safety management, unskilled labor,

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Table of Contents

DECLARATION	i
ABSTRACT	ii
ACKNOWLEDGMENT	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
ACRONYME	viii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background	1
1.2 Statement of the problem	4
1.3 Research questions	5
1.4 Objective of the research	5
1.4.1 General objective	5
1.4.2 Specific objective	5
1.5 Scope of the study	5
1.6 Significant of the study	6
CHAPTER TWO	7
LITERATURE REVIEW	7
2.1 Construction industry and its safety management	7
2.2 Current practice of safety management in construction	9
2.3 Challenges of implementing safety management in building construction	9
2.4. Effects of Safety management in Building Construction	10
2.5 Unskilled workers and their knowledge of safety	10
2.5.1. Safety management for unskilled labor of building construction	11
2.5.2. Improving safety at work for unskilled labor of building construction	11
2.5.3. Implementation of safety management for unskilled labor of building construction	12
2.9. Safety management system performance	14
2.10. Construction safety through design	15
CHAPTER THREE	16
RESEARCH METHODOLOGY	16
3.1 Research Area	16
3.3 Study variables	17
3.3.1 Dependent Variables	17

3.3.2 Independent variables	17
3.4 Population and Sampling technique	17
3.5 Sources of Data	18
3.6 Data collection procedure	19
3.7 Data presentation and Analysis	19
3.7.1. Relative Important Index (RII)	19
3.7.2 Cronbach Coefficient Alpha	20
CHAPTER 4	21
RESULT AND DISCUSSION	21
4.1. Introduction	21
4.2. Response rate	21
4.3. General respondent and Company characteristics	22
4.3.1 Respondents Gender distribution	22
4.3.2 Type of Organizations	22
4.3.3 Current job position of respondent	23
4.3.4 Work experience of respondent	23
4.3.5 Respondent Educational Level	24
4.3.6 Respondent Educational profession	25
4.4. Current practice of safety management for unskilled labors in building construction in case of Bonga town	25
4.5.1 Top ten factors in current practice of safety management on building construction projects	27
4.6. Challenges to implement safety management in building construction sites	32
4.6.1 Top ten factors in challenges to implement safety management on building construction projects	33
4.7.1 Top ten factors of Effects of improper safety management	40
CHAPTER FIVE	48
CONCLUSION AND RECOMMENDATION	48
5.1. CONCLUSION	48
5.2. RECOMMENDATION	49
REFERENCE	51
APPENDIX	54

LIST OF TABLES

<i>Table 4.1 cronbach Coefficient Alpha</i>	16
<i>Table 4.1 Current practice of safety management in unskilled labors</i>	25
<i>Table 4.2 Current practice of safety management in unskilled labors</i>	27
<i>Table 4.3 challenges of implementing safety management of unskilled labor</i>	32
<i>Table 4.4 Top ten challenges of implementing safety management of unskilled labor</i>	29
<i>Table 4.4 Effects of improper safety management of unskilled labor</i>	39
<i>Table 4.5 Top ten Effects of improper safety management of unskilled labor</i>	40
<i>Table 4.6 Cumulative result of safety management</i>	45
<i>Table 4.6 Result of Cronbach's alpha</i>	47

LIST OF FIGURES

Fig 3.1 Map of kaffa, Bonga.....	16
Fig 4.1 questionnaire distribution	22
Fig 4.2. Gender of respondent.....	22
Fig 4.3 respondent organization.....	23
Fig 4.4 work position of respondents.....	23
Fig 4.5 work experience.....	24
Fig 4.6 Level of education	24
Fig 4.7 Educational Profession	25
Fig 4.8 current practice of safety management	26
Fig 4.9 Top ten current practice of safety management.....	28
Fig 4.10 challenges of implementing safety management.....	33
Fig 4.11 Top ten challenges of SM.....	34
Fig 4.2. Effects of implementation of safety management in building construction	40
Fig 4.13. Top ten effects of implementation of safety management	41
Fig 4.14 cumulative factors of safety management	43

ACRONYME

- DOL-----United State Department of Labor
- CSAO-----Council of senior Administrative Officer
- EU-----European Union
- GNP-----Gross National Product
- H&S-----Health and Safety
- ILO-----International Labor Organization
- ISCED-----International Standard Classification of Education
- ISCO----- International Standard Classification of Occupations
- MOL-----Ministry of Labor
- MS Excel----Microsoft Excel
- NGO-----Non-Governmental Organization
- OHSMS-----Occupational Health and Safety Management System
- OHSAS-----Occupational Health and Safety Association
- OSHA-----Organizational Safety and Health Association
- PPE-----Personal Protective Equipment
- RII-----Relative Important Index
- SC-----Safety culture
- SM-----Safety management
- SMS-----Safety Management System
- SPSS-----Statistical Package for the Social Science
- UK-----United Kingdom
- USA-----United states of America
- WHO-----World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background

The construction industry is one of the major sectors which dominating sources of economic growth and development of any developing country involves substantial financial and human resources. It is focused on the construction, demolition, renovation, maintenance or repair of building and infrastructure. It covers a wide range of services, from planning and surveying to structural construction to finishing services such as painting and decorating (Stefania Manzi, Maria Chiara Bignozzi 2020). Construction industry is a key sector of the national economy for countries all around the world, as traditionally it took up a big portion in nation's total employment and its significant contribution to a nation's revenue as a whole. However, until today, construction industries are still facing number of problems regarding the low productivity, poor safety and insufficient quality. In this industry the one and the major participants are skilled and unskilled labors.

The International Standard Classification of Occupations classifies low-skilled work as mainly consisting of “simple and routine tasks which require the use of hand-held tools and often some physical effort”. It includes: office cleaners; freight holders; garden laborers, kitchen assistants (ISCO-08). By extension, a low-skilled worker could be defined as a person who undertakes low-skilled work.

According to the International Standard Classification of Education - ISCED 2013, based on the level of education attainment, low-skilled workers are those on:

Level 2 Lower secondary level of education

Level 1 Primary level of education.

According to ILO occupations at skill level1/ unskilled labor typically involve the performance of simple and routine physical or manual tasks. They may require the use of hand held tools, such as shovels as clearing; digging; lifting and carrying materials by hand; sorting, storing or assembling goods by hand(sometimes in the context of mechanized operations); operating non- motorized vehicles; and picking fruit and vegetables.

Many occupations at skill Level 1 may require physical strength and/or endurance. For some jobs basic skills in literacy and numeracy may be required. If these skills would not be a major part of the work.

For competent performance in some occupations at Skill level 1, completion of primary education or the first stage of basic education (ISCED-97 Level 1) may be required. A short period of on –the-job training may be required for some jobs.

Safety on construction site is one of primary aspect to be considered in construction process of any system. Ignorance regarding safety may lead to serious injuries or fatality which may negatively impact the work environment. (Shubham R. 2019).

The safety of employees was not given prior attention which led to numerous labor agitations, due to this government had to step in to intervene which led to the introduction of reforms such as compensation for injuries to improve the safety of employees in the organization (Amegee, 2010). Employee safety and workplace safety performance improvement is a subject that safety professionals and researchers continue to relentlessly pursue. Investigation or research related to safety climate, safety motivation, and other associated subjects is aimed at deepening our knowledge on workplace safety with the ultimate objective of improving the safety outcome. (Soh, 2013).

According to Stoddart and Evans (2017), maintaining workplace health and safety is increasingly being recognized as a wide concept that greatly influences employees' quality of life in organizations. Safety and health are explained as the absence of detrimental effects emanating from one's job that deteriorates psychological, physical, and emotional well-being (Lim et al., 2008).

Employees with a low level of education are also far more likely to be involved in industrial accidents than employees who are more highly educated (Venema & Bloemhoff, 2006). The reason for this is the generally poor working conditions including repeated exposure to hazardous substances. Moreover, interventions and campaigns aimed at unskilled employees are not reaching their intended target groups, probably because of the way the groups are approached (Annick Starren, 2009).

The term 'safety management' as defined by World Health Organization (WHO) is: "the process of enabling people to increase control over, and to improve their health." (WHO 1990).

Management engagement with employee safety is a key. Management engagement is a primary safety responsibility. Geller (2008) suggests leaders must be held accountable and take responsibility for failure in workplace safety. Dunlap (2011) identifies a key to encouraging employee engagement is management engagement. Managers commonly engage in safety when reacting to an incident. In some cases, this may be the only time that management gets involved. Dunlap states, "Rather than becoming involved only when an incident occurs, ongoing engagement in the safety program allows managers to understand an incident within the context of the comprehensive safety management system"

Construction sites are prone to hazards. Hence, injuries in construction industries are very prominent. If safety practices are not followed on site, there might be huge compensation to be paid depending on the severity of the injury. This might even cause the project to be terminated. Ultimately which will lead to addition of expenses or delay in project completion. Hence, reduces following safety rules is a must on site. Project completion on time would even help the organization to promote business growth. And to top it would keep work environment free from hustle. Various sites follow different safety norms. Physical condition of sites matter a lot in the safety. It is thus referred to "Attribute". Safety Management on site depends various reasons and they are (1) Business, (2) Workplace and (3) Workforce. Moreover, due to lack of safety management compromising situation may occur due to dissatisfaction among the client. Hence it is obligatory to know the most mandatory site practices to be worked out on site. (Ankita J. Shruti Wadalkar, 2018)

The main goal of safety and health programs is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardship these events can cause for workers, their families, and employers. The recommended practices use a proactive approach to managing workplace safety and health. Traditional approaches are often reactive that is, problems are addressed only after a worker is injured or becomes sick, a new standard or regulation is published, or an outside inspection finds a problem that must be fixed. These recommended practices recognize that finding and fixing hazards before they cause injury or illness is a far more effective approach.(OSHA 3886 October 2016).

This research aims to assess safety management protocols for unskilled labors in building constructions in Bonga town and the current applies of safety management and drawbacks of the application for unskilled labors in project sites.

1.2 Statement of the problem

The construction industry has traditionally been considered as a hazardous occupation due to the high incidence of occupational injuries and fatal accidents. The number of fatal occupational accidents in construction all users the world is not easy to quantify, as information on this issue is not available for most countries. (Subramani, R. Lordsonmillar2014). ILO recently estimated that globally about 2.2 million people die every year. The impact of occupational health and safety hazards faced by construction workers in developing countries is 10 to 20 times higher than those in industrialized countries. (Jukka et al. 2014). According to section 14 of the OSHA (DOL, 2017), workers must protect themselves and colleagues from workplace hazards, comply with legislation imposed on their employer, obey workplace safety rules, report unsafe working conditions and immediately report injuries to their employer or safety representative.

In Ethiopia, building construction industries are the second leading cause of injury next to a traffic accident and the risk of fatality in the construction sector is five times higher than in manufacturing industries (Aguma JN, Musonda I. 2015). Factors contributing to these prevalence rates of occupational injuries were lack of safety training, job stress, the absence of safety signs, sleep problems, workload, drinking alcohol, and chewing khat (T. Gebremeskel & T. Yimer, 2018). Sermolo, 2014 suggested that Poor working conditions/environment and lack of personal protective equipment (PPE) are the cause of accidents in construction industry and striking, crushing.

In Ethiopia a lot of accidents occurred on unskilled labors in construction industry due to lack of permanent safety management and this accidents are not well recorded. However, it is known that numerous people lost their lives and had significantly worse injuries on building sites, including both construction workers and non-industry personnel. In Bonga Town there are public building constructions in which large number of unskilled labors are participated. On those sites poor safety management for unskilled workers are practiced. Those practices

will must be avoid because it has an adverse effect on safety management of building construction.

1.3 Research questions

1. What is the current practice of safety management for unskilled labor for building construction?
2. What are the major challenges of implementation of safety management for unskilled labors of building construction?
3. What are the effect of improper implementation of safety management for unskilled labors of building construction?

1.4 Objective of the research

1.4.1 General objective

The general objective of this research is to assess safety management for unskilled labor of building construction on Bonga town.

1.4.2. Specific objective

1. To explore current practice of safety management for unskilled labor of building construction.
2. To assess challenges for implementation of safety management for unskilled labor of building construction.
3. To assess effect of improper implementation of safety management for unskilled labor of building construction.

1.5 Scope of the study

As the idea is broad and deep, this research was limited to Bonga town public construction sites. The successful completion of this research had a significant contribution in the safety management for unskilled labor on building construction sites in Bonga town, and examining the level of understanding safety management issue. The level of knowledge of safety management topics covered by this research was evaluated on the study area. The respondent are contractors, consultants, and unskilled labors of building construction in Bonga town. The research was takes place with literature review and questionnaire survey. The questionnaire designed based on the problems of unskilled labors in Bonga town building construction sites.

1.6 Significant of the study

Construction industry has complexity in its nature because it contains large number of parties as contractors, consultants, and other stakeholders. This all stakeholders have a duty on making a safety management clear and implemented. This research assesses the current practice of safety management for unskilled employees. It also assess the factors that challenges to implement safety management for building constructions sites in Bonga town. And significance of the study shows the prerequisites that should be made for unskilled construction labors to maintain their safety and increase their knowledge in construction in proper and appropriate way.

CHAPTER TWO

LITERATURE REVIEW

2.1 Construction industry and its safety management

Construction industry is one of the largest industries contributing to about 10% of the gross national product (GNP) in industrialized countries (Navon, 2005). However, it is complex and associated with high level of risk that leads to failure in terms of time, cost and quality.

The construction industry is perceived as a pillar industry in national economies. Construction projects encounter significant risks and uncertainties in term of safety, cost, time, and quality. These risks threaten the successful completion of these projects, slow the pace of development, and could impact the whole society. (Ahmed Senouci, 2015)

Safety management:-The term '**safety management**' actually is used for convenience and for brevity, and wherever it is used it should be taken to refer to the management of occupational health and the environment as well as safety. Safety management is concerned with, and achieved by, all the techniques which promote the subject. In addition, safety management is also concerned with influencing human behavior and with limiting the opportunities for mistakes to be made which would result in harm or loss (Husrul Nizam, Husin Hamimah Adnan,2008).

The term '**safety management**' as defined by World Health Organization (WHO) is:

"The process of enabling people to increase control over, and to improve their health." (WHO 1990).

Construction involves a little percentage of the overall workforce. But it is regarded as the most hazardous industry due to its unique nature and the safety record of building construction industry has always been poor (Rowman & Littlefield 2018). Within many business developments sector construction industry is one of the largest and rapidly growing industrial sectors. This industry is considered as the most dangerous industry in recent year (Guo H., Yu Y., and Skitmore M.2017). The incidence rate for both fatal and non-fatal accidents causing death, injuries and illnesses exceeds that of numerous different enterprises. At least 108 thousand workers are killed on site every year, which represents about 30% of all occupational deaths (Bourmpoula V., Kapsos S., Pasteels, J-M.2015)

Safety in the construction industry has always been a major issue. Wherever reliable records are available, construction is found to be one of the most dangerous on safety and health criteria, particularly in developing countries. The safety climate of any organization consists of employees' attitudes towards, and perceptions of, health and safety behavior. Construction workers' attitudes towards safety are influenced by their perceptions of risk, management, safety rules and procedures. Although research into safety climate has continued for more than two decades, there is still no universally accepted theory of safety climate. Nevertheless, positive correlation exists between workers' safe behavior and safety climate in construction site environments. (Tauha Hussain Ali, 2006)

Developing a proactive safety culture may take long time and require spending of large sum of money for planning, investigating and implementing into each level within the organization. However, it is worthy of being compared with invaluable health and life of human beings. Once it succeeds, the relative rewards will be achieved in terms of competitive advantage, quality, reliability and profitability within organization. (R. Che Hassano. J. Basha, W.H. Wan Hanafi, 2007).

Safer behavior is reflected by good attitude. Many accidents/incidents that occurred in the workplace especially in the building construction sites were due to inadequate adherence of workers to work procedures. The workers must realize that they play an important role contributing in the accomplishment of the building construction. The awareness and perception of the workers toward safety, health and their working environment are important aspects to enhance the building construction to the better condition to the workers themselves. (R. Che Hassano. J. Basha, W.H. Wan Hanafi, 2007).

As described in Occupational Safety and Health (OHSAS 18001), Occupational Health Management System (OHSMS) is:

“Part of the overall management system that facilitates the management of the OH&S risks associated with the business of the organization. This includes the organizational structure, planning activities, responsibilities, practices, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization's OH&S policy.”(Shamsul Efendi Dismal, 2002).

Safety management is expected to take account of all risks and accidents that may possibly be expected that put project employees at risk. The health and safety (H&S) of any workplace is very important to diminish such risks, legally and ethically, but in mainly dangerous contexts such as the construction industry HS takes on perilous importance as daily activities of the industry are highly unsafe. It is thus important to identify suitable safety activities and strategy, accommodating potential serious H&S problems (Twort and Rees, 2011).

Safety management is the procedure used to recognize H&S risks and implement actions to decrease the possibility of a risk materializing and to diminish or eliminate the potential consequences of identified project H&S risks. This research focused on principle type of risks in construction projects: risk of construction on health and safety (H&S) of employees. (Yousif S. Saeed, 2017).

2.2 Current practice of safety management in construction

According to Fasil Argaw (2016), developing countries have poor SH records compared to the developed world, which may be attributable to low use of technology, labor-intensive methods, and low workforce participation in health and safety issues. Site Safety is a small independent organization set up by the construction industry. It is a single job to reduce construction injuries and deaths by taking the lead in promoting construction site safety. Each project has a safety management in place that outlines the policies, processes, instruction, and documentation that will serve to establish the culture of safety (“OSH514: Safety in construction”). Safety is the state of being safe; freedom from danger, risk, or injury. It is the absence of danger. Basic terms involved in safety are: Accident, Risk, Hazard, and Danger. (Nisarg Jani, 2017). Failure in any of these areas can result in an increased risk in exposing workers to harm in the construction environment. Falls are the leading cause of injury in the construction industry, is particularly for elder and untrained construction workers. (Ramesh A. Bagi, 2019)

2.3 Challenges of implementing safety management in building construction

There are health and safety problems on almost all construction sites that need reporting. However, employers and victims do not report them to the right institutions for action. British Safety Council, (2009) confirmed this. It indicated that the reporting of both work-related accidents and ill-health is poor across the world. Although some regions report accidents

better than others, there is a need for much improvement in all countries. The ILO is calling for countries to develop national programs including targets and indicators of progress (Kheni & Afatsaw, 2022). Safety management must be thorough, and it must apply to all aspects of the job, from the defining phase of the project until the last worker has left the premise after the other because in the safety program every party is responsible (Al-Kilani, 2011). The findings revealed that site accidents are more likely to happen when there are inadequate company policies, unsafe practices and poor attitudes of construction personnel, poor management commitment and insufficient safety knowledge and training of workers. Zimolong and Elke (2006) observed that most injuries result from minor hazards at the workplace. Some factors that result in an accident include the use of faulty tools and equipment; non-compliance to standard safety rules and regulations; poorly maintained and or inadequate scaffolding; lack of experience; and improper handling and storage of flammables such as explosives and combustibles (Aniekwu, 2007).

2.4. Effects of Safety management in Building Construction

Workers are exposed to acute health hazards like fall from height and electric shocks, while chronic health hazard like exposure to hazardous substances is common in the construction industry (Vitharana, 2015). Kibe (2016) found out that accidents and injuries sustained at construction sites had a high impact on workers absenteeism, disruption of work and resulted in low morale among the employees. According world health organization (WHO) data, 40%-50%, of the world population, is exposed to hazardous conditions in the workplace. . It is also estimated that approximately 120 million occupational accidents occur worldwide each year, with 200,000 fatalities. Adeogun and Okafor (2013) observed that in many African countries organizations should implement OHS practices geared towards increasing the level of organizational commitment and motivation through reduced incidence at workplaces.

2.5 Unskilled workers and their knowledge of safety

The Collins Dictionary (2017) defines unskilled employees as those that do not have any special skill or training. Unskilled workers are characterized by limited educational attainment and are usually employed in work that requires no specific education level or specialized experience (Investopedia, 2017). Less experienced or unskilled labors have less knowledge about safety incidents due to the lack of information on appropriate construction practices and processes (Karimi et al., 2016). Glazner et al. (2005) conducted a study and concluded that inappropriate acts, lack of experience, and lack of follow-up safety

instructions were the most common causes for damages during the construction of the project.

2.5.1. Safety management for unskilled labor of building construction

The construction industry employs large unskilled labor. For example in fiscal year of 2009, over 11 million workers in USA that represents about 8% of the total labor force at that time, were employed in construction industries (Benjamin, 2011). The sector is also highly dependent upon manual labor, of which a high proportion is comprised of unskilled foreign workers (mostly Egyptian), most with minimal education who work for low wages (MOL 2010). Annual reports published by the Ministry of Labor and Social Security Department (between 2006-2010) show that the sector is associated with a disproportionately high number of job-related accidents and diseases compared to other industries, accounting for 10.5% of all workplace accidents (El-Mashaleh et al. 2010).

For occupational safety, it is important to systematically study the psychological preconditions and causes of erroneous actions of employees; violation of safety rules, labor protection, technological modes of operation. Develop psychological requirements and training conditions for safety rules and support of technological processes. Improve and implement measures to prevent erroneous actions and violations. To form diagnostic and methodical means of prevention of accidents and injuries on psychological grounds. Model the causal structures and dynamics of emergencies, accidents. (Vladyslav Kolomiichuk, 2020).

2.5.2. Improving safety at work for unskilled labor of building construction

Employees with a low level of education are faced with unsafe working conditions more often than their better educated counterparts. At the same time the lower end of the labor market is evolving rapidly, with workers from new EU member states increasingly being taken on to do low-skilled and generally risky work. (Raphael Gallis, 2009).

Employees with a low level of education are also far more likely to be involved in industrial accidents than employees who are more highly educated (Venema & Bloemhoff, 2006).

The main variables that account for social class inequalities in health are work organization variables: low-skilled workers tend to face disadvantageous working conditions; for example, job insecurity, high physical demands, repetitive work, and a lack of social support and autonomy (Bauer et al., 2009; Borrell et al., 2004; Kawachi and Marmot, 1998; Lyly-Yrjanainen, 2008). They possess few resources at work for coping with the burden of stressful work. Resources are also missing in other spheres of their lives, and personal resources such as control beliefs are insufficient (Bosma et al., 2005; Rydstedt et al., 2007; Wege et al., 2008). Their low participation rates in health-promoting activities may be because of these low control beliefs but also to negative learning experiences and limited reading and writing skills (Blue et al., 2003; Thompson et al., 2005).

2.5.3. Implementation of safety management for unskilled labor of building construction

Worldwide, the ILO has estimated that it accounts for 100, 00 fatalities annually, some 30 to 40 per cent of fatal occupational injuries overall (ILO, 2005). Absences of health and safety committees on construction sites and excessive use of heavy machinery where operators are unskilled are concluded parameter might cause high risk and accidents on construction sites. From observations of the construction site, the study concluded that due to stricken law implemented on all construction sites none of employees can enter on the site without proper protection such as gloves, shoes, helmet also necessary to wear sun shade glass if working with wielding job on site or steel cutting. This stricken law encouraged the above mentioned safety practicing on mega construction site which lead the project to high level of safety. Based on the study findings it is recommended that the safety training should conduct for all employees; must hire full time safety engineers and supervisors should monitor the site on daily based and identify the weak point. Based on the past literature and construction experts' opinions this study also recommends for the construction agencies to carry regular based medical checkup of employees, for drugs addicted or mentally issues. (Mushtaq Ahmad, Aneel Manan, Jamshid Ali Turi 2018).

2.6. Causes of accidents in construction

As cited by (Daniel.N, 2015) the causes of accident (Aniekwe ,2007) in his research concluded that the factors leading to accidents on construction sites include:

- Use of faulty tools.

- Noncompliance to standard safety rules and regulations.
- Improperly maintained and inadequate scaffolding.
- Lack of experience.
- Improper handling and storage of flammables.
- Poor handling of tools and equipment.
- Worker fatigue and boredom.
- Improper Supervision.
- Management attitude.
- Workers operating environment.
- Natural causes.
- Inadequate management of work environment.
- Faults in design details and specifications.
- Faulty construction techniques.
- Workers physical condition.
- Lack of Job satisfaction.

2.7. Management Safety Practices

To guarantee workplace safety and acceptance from other stakeholders, management must express safety concerns and ensure that everyone in the workplace understands their health and safety obligations (Brauer, 2016). Hence, management safety practices denote the extent to which management shows full concern and support for employee protection in performing their jobs and put in measures that reduce or eliminate incidences and hazards from the work environment. Management assists in developing safety plans and ensures that the resources necessary to maintain a safe working environment are accessible. (Cooper 2006) defines management commitment to safety as employers' and workers' involvement and engagement in activities to attain safety goals.

2.8. Elements of Safety Management Practices

Elements of safety management systems varies from one organization to another (Ismail Z, Doostdar S and Harun Z 2012). Some organizations have drawn the elements of safety management by making a comparison between high and low accident rate in companies. Whereas, others have drawn the elements of safety management based on actual case studies of highly safe and reliable organizations with good safety performance (Jazayeri E and Dadi G B 2017).

A more developed safety management system was developed and created by Oregon OSHA (Occupational Health and Safety Administration) consists of seven elements of safety management (Oregon OSHA 2002)

- The first element is management commitment to protecting employees. In fact, this element is the most important element in any safety management system as it determines how much the top management are committed on the safety of their workers.
- The second element of Oregon OSHA is accountability. One of the most important methods which can improve the accountability is stating in the employees' job description their safety responsibility.
- The third element is employee involvement in safety such as: allowing employees to participate and be part of the committee, and posting safety policies and guidelines in workplace where all of them can see, and promoting recognitions awards for best safety awards. It was found that safety incentives and rewards are one of the most effective techniques for improving safety performance (Diethelm S and Pellicer E 2016).
- The fourth element is hazard identification and control. There are a variety of ways to identify hazard (such as maintaining a periodic inspection, providing an efficacious reporting system for the employees). As whole, well-developed hazards identification techniques can be classified into two categories: First is the Reactive Approach which is identifying hazards that may lead to an accident event before it occurs. Second is the Proactive Approach which is identifying the hazards before an accident occur depending on historic data and previous experiences (Khanzode V V, Maiti J and Ray P. 2012).

2.9. Safety management system performance

Kim and Choi (2016) mentioned that, to successfully operate SMS, the SC factors such as the level of staff awareness, safety attitude and belief must be combined. SMS strategies encompass the organization's, internal safety environment and performance, external regulation and standard, cost factor, the organization's resource capability, stakeholder's influence and organization's culture of commitment resulting in safety decision and action, Kevin Loebbaka and Lewis (2009). According to Santos-Reyes & Beard, (2002), (cited by Hsin Lin, 2012), the execution of the SMS and its performance can become an important

interrogation point by the competent authority for aviation. Flight Safety Foundation, (2005), (cited by Hsin Lin, 2012), mentioned that leadership and answerableness ought to be the key factors within the implementation of SMS, particularly within the development of SC for the airline.

2.10. Construction safety through design

Construction safety should, according to R. Szymberski, (1997), be a prime consideration in the conceptual and preliminary design phases. His hypothetical time/safety influence curve illustrates the idea that the ability to influence construction site safety is progressively lost as the project moves into the construction phase, with a significant opportunity in design. Until recent legislation in the UK, France and Australia, however, designers' consideration of construction safety has been largely voluntary (J. Gambatese, J. Hinze, (1999)). In the USA, construction contracts and regulatory requirements from the Occupational Safety and Health Administration (OSHA) clearly place the burdens for worker safety solely on the constructor (M. Behm, 2005). This approach is still widespread across many countries, but has been changing since more parties have been brought into litigation regarding worker injuries. A recent study of the effect of European directives on construction workplace accidents, shows a statistical decrease in incidents since legislation came into force (Gámez, A. Gibb, 2010).

2.11. Safety policy

A health and safety policy is a written statement of principles and goals embodying the company's commitment to workplace health and safety (CSAO, 1993). It clearly shows top management's commitment to ensure safe working methods and environment at the construction sites. Safety policy imposes additional ethical and professional responsibility of the management for providing a safe work site for all employees. (Sukmolson,2009) Unavailability of written safety policy and failure of effective implementation is one of the challenges to practice health and safety in construction site.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Area

This study was conducted in Bonga area. Bonga is located in south west of Ethiopia. It is a town, district and capital of the South West Ethiopian Peoples Regional Government. Located in the Kaffa Zone upon a hill in the upper Barta valley, it has a latitude and longitude of $7^{\circ}16'N$ $36^{\circ}14'E$ / $7.267^{\circ}N$ $36.233^{\circ}E$ with an elevation of 1,714 meters above sea level. The population is Around 874,716 and the distance from Addis Ababa is 450km, and from Jimma is 110km. In Bonga there are a lot of private and governmental construction projects. On this project both skilled and unskilled labors are participated.

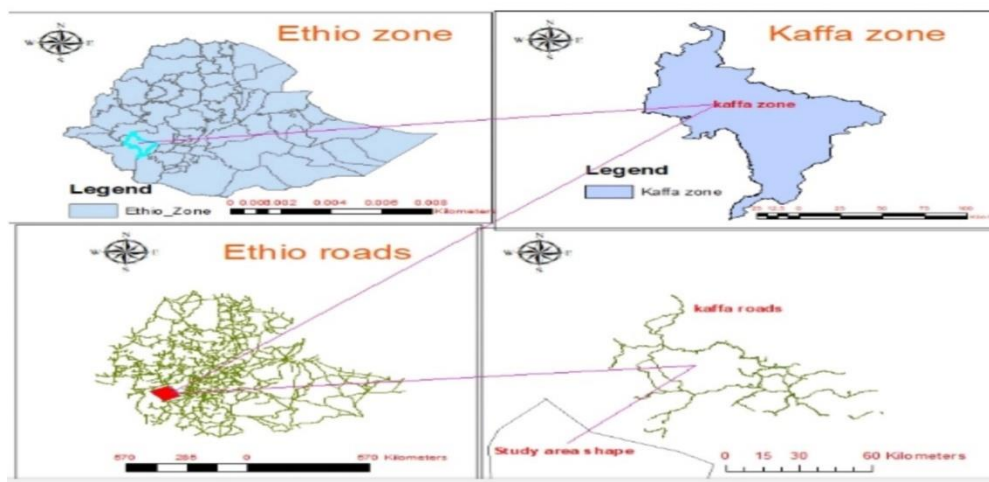


Fig 3.1. Map of kaffa, Bonga

3.2 Research Design

The survey and descriptive research designs was combined in this study. The survey method, which is vital for gathering data from local contractor, consultant, and clients. Data is collected from those stakeholder on construction sites through questionnaires and interviews. The purpose of this descriptive research project is to identify and know the current safety management precautions used on building construction sites and to assess the systems in place to ensure that they are implemented. A questionnaires have been widely used for descriptive and analytical surveys in order to find out facts, opinions and views. An Interview also have an advantage of response rate is relatively high and provides more accurate answers and Eliminating the tedium and idleness of the responds about the stated issue.

3.3 Study variables

3.3.1 Dependent Variables

Safety management for unskilled labor on construction site.

3.3.2 Independent variables

- Current practice of safety management for unskilled labor.
- Factors that challenge implementation of safety management for unskilled labor.
- Improper implementation of safety management for unskilled labor of building construction.

3.4 Population and Sampling technique

This study targeted public building projects in Bonga town which are constructed by local contractors. The target population were contractors, consultants and clients. Therefore, 15 local construction contractors, 15 consultant and 10 clients are involved. The respondent were selected from public building construction projects in Bonga town with the major stakeholders of the South West Ethiopian Peoples Region Construction authority and Bonga University building construction projects such as contractor and consultant.

3.4.1 Sampling Method

Due to the substantial population and simultaneous dispersion across the town, a sample survey was used. As described in the Study area section, a sample of building construction sites is chosen at random from Bonga town public construction projects.

To calculate sample size, the equation below is used

$$a) SS = \frac{Z^2 * P(1-P) / e^2}{1 + \left(\frac{Z^2 * P(1-P)}{e^2 * N} \right)}$$

Where

SS = the Sample size,

z = z-score, =1.96 for 95% confidence

P = Standard of deviation, 50%

N = Population size,

e) margin of error,

On this case, we calculate the sample size for a given population.

SS = the Sample size,

$z = 1.96$ for 95% confidence

$P = 50\%$ where 0.5

$N = 45$,

$$\text{Then, } SS = \frac{1.96^2 * 0.5(1-0.5) / 0.05^2}{1 + \left(\frac{1.96^2 * 0.5(1-0.5)}{0.05^2 * 45} \right)} = \frac{384.16}{1 + (8.536)} = \frac{384.16}{9.536} = 40.2$$

Therefore, approximately 40 questionnaires are distributed for respondents.

3.5 Sources of Data

The study was conducted have approached by primary data collections depending on literature reviews, discussion with colleagues and professionals. Both primary and secondary data are required in order to comprehend the topic. The main source of information will be the questionnaire's results. Secondary data will be gathered via secondary sources of information, including, but not limited to, books, journals, papers, and related online articles. The contractor, consultants, and clients are the main sources of information.

3.5.1. Primary Data

There are several methods of collecting primary data, particularly in surveys and descriptive research. In descriptive research, we obtain primary data either through observation or through direct communication with respondents in one form or another or through personal interviews.

3.5.2. Secondary Data

These are already available, i.e., they refer to the data which have already been collected and analyzed by someone else. Secondary data may either be published or unpublished data. The researcher must be meticulous in using secondary data, because the data available may be sometimes unsuitable.

3.6 Data collection procedure

The implementation of the research approach for this study will take place in two stages. The first phase is a review of the literature, and the second phase is a questionnaire. The literature review is carried out through the use of books, the internet, and numerous journals that are relevant to this topic. As a result of the assessment, safe and better safety management for unskilled labor in construction projects will be determined. After conducting a literature review, the identified factors are prepared for further suggestion and evaluation in order to select the most relevant factors that are consistent with the objectives of this study.

3.7 Data presentation and Analysis

After data collection, the collected data was analyzed by qualitative data analysis method through the data obtained from questionnaire, interview and observations. In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is an appropriate methods that can be applied. In this research, ordinal scales / Linkert scale ranging /from very low to very high/ analyze using MS EXCEL by Relative Importance Index (RII) formula which is using for ranking of possible source of current safety management practices and challenges in implementing safety in building construction and improper implementation of safety management for unskilled labor in building construction projects.

3.7.1. Relative Important Index (RII)

The relative importance index method (RII) was used here to determine contractors, consultants, client's perceptions of the relative importance of the safety management construction projects. The relative importance index is computed as.

Analysis of data consists of the following:

- 1) Calculating the Relative Importance Index (RII)
- 2) Ranking of factors in each category based on the Relative Importance Index(RII)

$$RII = \frac{\sum W}{A*N}$$

Where

RII = is the Relative Importance Index,

W = weighting given to each factor by the respondents,

A = highest weight,
 N = total number of respondents.

The values of RII ranges from 0 to 1 (0 not inclusive); the higher the RII, the more important the cause of accident and challenges & implementation of safety management. The RII value ranks and the results are present using tables and/or graphs

3.7.2 Cronbach Coefficient Alpha

Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A “high” value for alpha does not imply that the measure is unidimensional.

Table 3.1. Cronbach Coefficient Alpha

No	Cronbach's alpha	Internal consistency legend
1	$\alpha \geq 0.9$	Excellent
2	$0.9 > \alpha \geq .8$	Good
3	$.8 > \alpha \geq 0.7$	Acceptable
4	$0.7 > \alpha \geq 0.6$	Questionable
5	$0.6 > \alpha \geq 0.5$	Poor

The equation for Cronbach alpha to measure internal consistency is as follows:

$$\alpha = \frac{k}{k - 1} \left(1 - \frac{\sum_{i=1}^k \sigma_{y_i}^2}{\sigma_y^2} \right)$$

k represents the number of items in the measure

$\sigma_{y_i}^2$ the variance associated with each item *i*

σ_y^2 the variance associated with the total scores $\left(y = \sum_{i=1}^k y_i \right)$

..... (Eq. 1)

Alternatively, it can be calculated by the following formula

$$\alpha = \frac{k\bar{c}}{\bar{v} + (k - 1)\bar{c}} \quad \text{..... (Eq.2)}$$

where

\bar{v} represents the average variance

\bar{c} represents the average inter-item covariance.

CHAPTER 4

RESULT AND DISCUSSION

4.1. Introduction

This chapter included analyses and discussion of the results of collected data from of the questionnaire distribution in four major sub topics. The first part, deals about the General information /description of company and the second part contains information on the current practice of safety management for unskilled labor in building construction, the third part shows the challenges to implement safety management for unskilled labors in building construction projects and Finally effect of improper implementation of safety management for unskilled labor in building construction projects. This is done to systematically reorganize the data such that it is easy to understand. The result is analyzed by Rankings, Tables and charts made with Microsoft Excel and SPSS descriptive statistical tools. This are chosen over other types of data presentation because they make the information easier to interpret and give a clearer image of what needs to be communicated.

4.2. Response rate

For assessing safety management for unskilled labor in building construction in case of Bonga Town, a total of 40 questionnaire were distributed to contractors, clients and consultancies and 32(80%) questionnaires were returned and the rest 8(20%) were not returned.

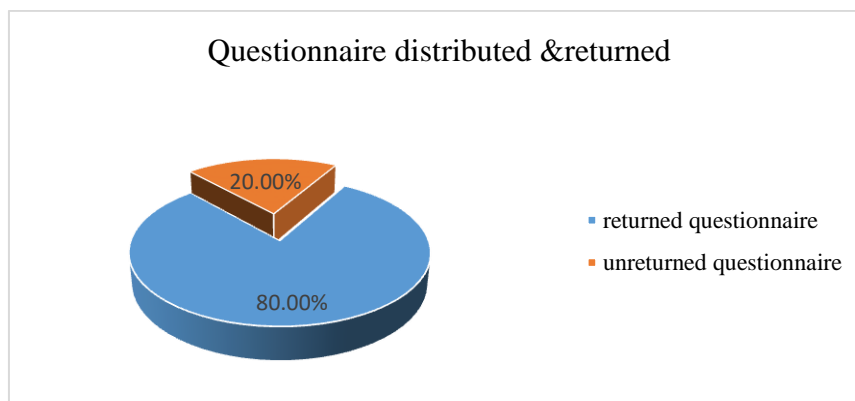


Fig 4.1 questionnaire distribution

4.3. General respondent and Company characteristics

This section presents the description of the respondents who participated in this study. This include the contractors, client, and consultants categories, gender, experience of respondent, working position, educational level and educational profession in the company.

4.3.1 Respondents Gender distribution

In this survey the respondents are both males and females. Figure 4.2 illustrates from a total of 32 respondents 28(87.50%) are males and 4(12.50%) are females. Determining the gender distribution of the respondents facilitates the identification of potential bias in the data.

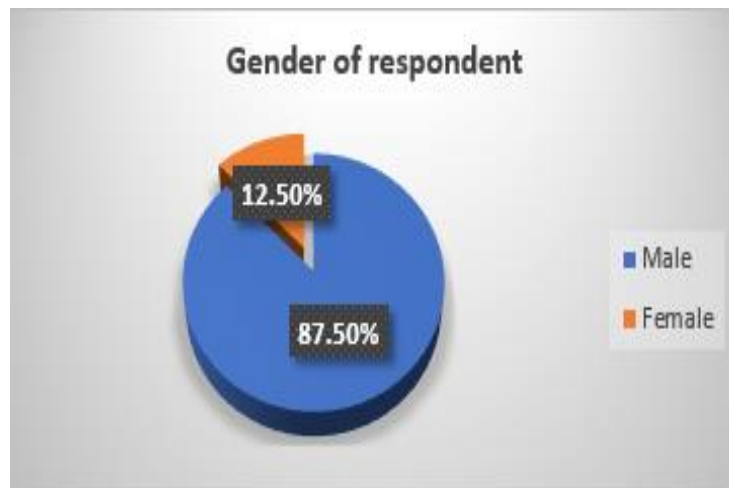


Fig 4.2. Gender of respondent

4.3.2 Type of Organizations

Figure 4.3 indicates the responded organization's company are Clients 7 (21.88%), Consultants 13 (41.63%) and Contractors 12 (37.50%). Different type of Organization had different ideas and out looks regarding on safety management and their experience in their organization gave them better understanding of safety.



Fig 4.3 respondent organization

4.3.3 Current job position of respondent

Figure 4.4 indicates the current job position of respondent indicates Director 5(15.63%), Project manager 8(25.00%), coordinator 5(15.63%), Office engineer 4(12.50%), Site Engineer 9(28.13%), and other 1(3.13%). The response regarding on their work position may differ. The study is more credible because it demonstrates how participating respondents have been progressively improving their job position through work experience on the construction project.

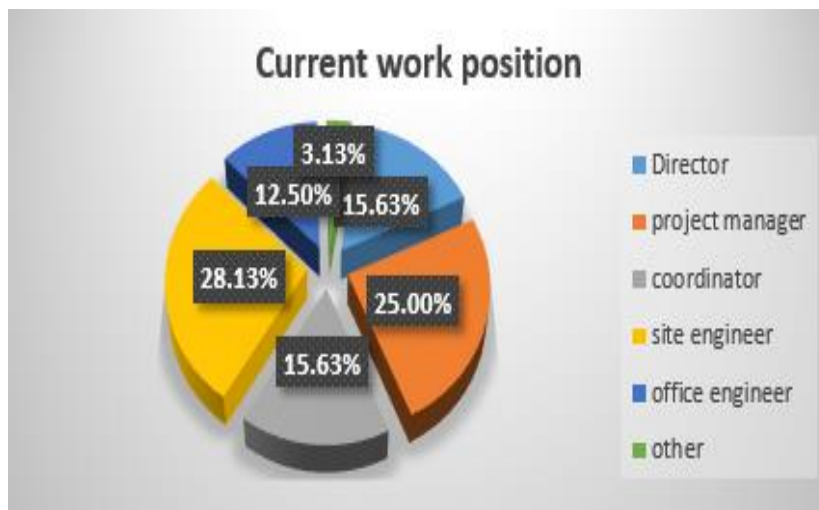


Fig 4.4 work position of respondents

4.3.4 Work experience of respondent

The number of years that respondents have worked in the construction industry is used to measure their working experience. Construction industry work experience enhances work and maximizes potential. Figure 4.5 deals the respondents work experience in a construction

sector is less than five years 6(18.75%), five up to ten years 18(56.25%), ten to fifteen years 5(15.63%) and greater than fifteen years 3(9.38%). Most respondent have five to ten years of work experience.



Fig 4.5 work experience

4.3.5 Respondent Educational Level

In order for the respondents to fully comprehend the questionnaire and gain a deeper understanding of safety management system issues via their education, it was crucial to know their level of education. Respondent on figure 4.6 shows that 1(3.13%) respondents have educational level of Diploma 1(3.13%), Degree 20(62.50%), MSc 10(31.25%), and PhD 1(3.13%)

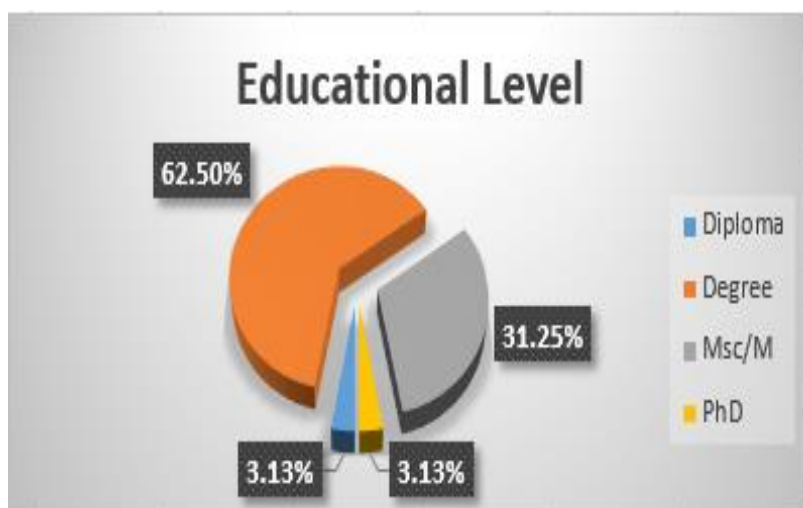


Fig 4.6 Level of education

4.3.6 Respondent Educational profession

It is necessary to gather information about safety management in perspective of construction sectors workers and other civil workers. The outlook differ one to another and different ideas was shared. Figure 4.7 indicates the respondent educational profession are engineering related 24(75.00%), construction management 3(9.38%), project management 0(0%) and other 5(15.63%). The most respondent are well educated in engineering related courses.

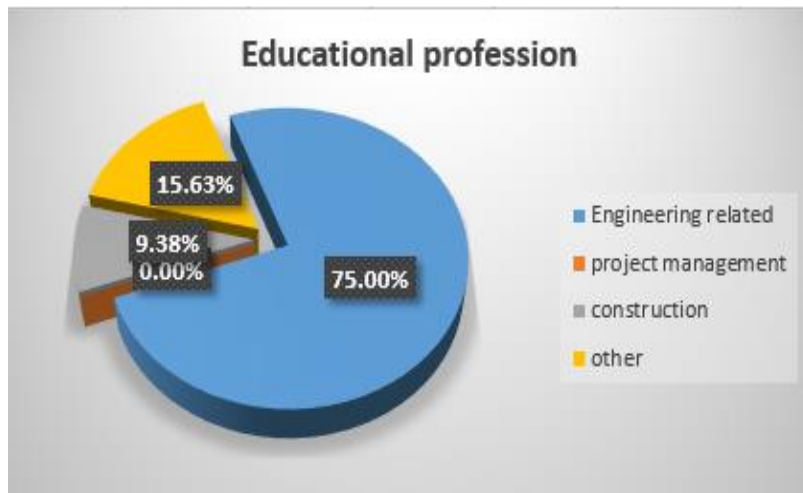


Fig 4.7 Educational Profession

4.4. Current practice of safety management for unskilled labors in building construction in case of Bonga town.

This section provides information on the current safety management practices of the projects. Data containing potential safety management issues and factors were gathered from the questionnaire and analyzed in detail. The results were graphically displayed in tables and figures, and an additional interview was conducted with some randomly selected respondents to help with any points that needed further clarification or support.

Table 4.1 Current practice of safety management in unskilled labors

No	Current practices of safety management	RII
1	Use of faulty or improper tools or equipment.	0.725
2	Weak checkup of safety management implementation during supervision.	0.713
3	Improper safety policy documentation and implementation.	0.706
4	Providing poor personal protective equipment (PPE) for all employees	0.706

5	Unregister employment accidents and occupational diseases on time.	0.631
6	Workers get inadequate training and orientation before starting their job.	0.675
7	Your project has no site-specific Safety management plan	0.638
8	Inadequate safety budget.	0.775
9	There is insufficient first aid and first aider(s) on your construction projects or sites.	0.713
10	Absence of a construction safety management expert on the site.	0.719
11	Lack of Managers encourage and support worker participation, commitment and involvement in safety activities.	0.631
12	Weak governmental role towards organizations follow up and contribute in improving safety	0.663
13	Lack of local authorities and Safety enforcement agencies visit sites for inspection	0.700
14	All accidents, injuries and fatalities are improperly filed & reported to the concerned body	0.688

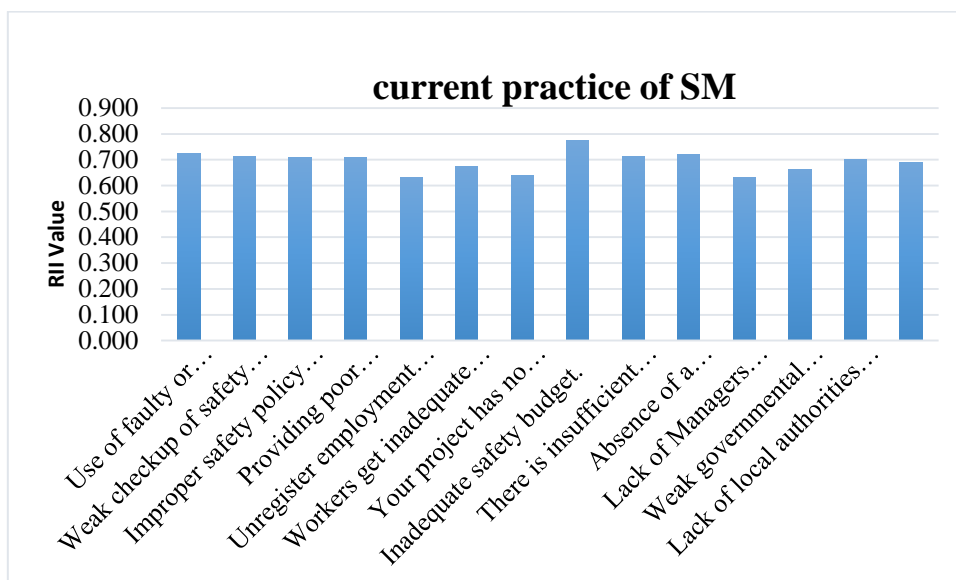


Fig 4.8 current practice of safety management

4.5.1 Top ten factors in current practice of safety management on building construction projects.

As per the result that is mentioned on table 4.2, the leading current practice of safety management in building construction for unskilled labor ranked are Inadequate safety budget (0.775), Use of faulty or improper tools or equipment (0.725), Absence of a construction safety management expert on the site (0.719), Weak checkup of safety management implementation during supervision. (0.713), There is insufficient first aid and first aider(s) on your construction projects or sites (0.713), Improper safety policy documentation and implementation (0.706), Providing poor personal protective equipment (PPE) for all employees (0.706), Lack of local authorities and Safety enforcement agencies visit sites for inspection (0.700), All accidents, injuries and fatalities are improperly filed & reported to the concerned body (0.688), Workers get inadequate training and orientation before starting their job (0.675), are RII value of current practice of safety management of unskilled labors in descending order.

Table 4.2 Current practice of safety management in unskilled labors

No	Current practices of safety management	RII	Rank
1	Inadequate safety budget	0.775	1
2	Use of faulty or improper tools or equipment.	0.725	2
3	Absence of a construction safety management expert on the site.	0.719	3
4	Weak checkup of safety management implementation during supervision.	0.713	4
5	There is insufficient first aid and first aider(s) on your construction projects or sites.	0.713	4
6	Improper safety policy documentation and implementation.	0.706	6
7	Providing poor personal protective equipment (PPE) for all employees	0.706	7
8	Lack of local authorities and Safety enforcement agencies visit sites for inspection	0.700	8

9	All accidents, injuries and fatalities are improperly filed & reported to the concerned body	0.688	9
10	Workers get inadequate training and orientation before starting their job.	0.675	10

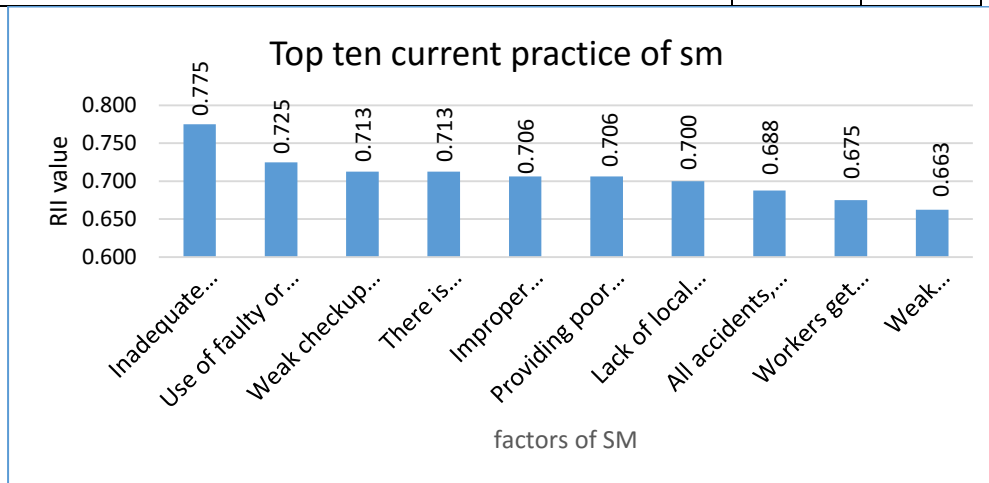


Fig 4.9 Top ten current practice of safety management

4.5.1.1 Inadequate safety budget: is ranked at 1st, with RII=0.775 and it implies inadequate safety budgets the major issue in current practice of safety management There is a serious risk associated with inadequate safety budgets for unskilled workers in building construction. Risks associated with construction include electrical hazards, hazardous materials, and falls. Safety budgets are frequently squeezed by tight project margins, which put worker safety last and cost effectiveness first. Inadequate safety measures can lead to injuries or deaths of unskilled workers, resulting in legal action, financial liabilities. This can slow down projects, increase costs, and cause long-term health problems, impacting families and livelihoods in which often due to companies viewing safety as a cost rather than an investment, prioritizing it over other factors, and lacking awareness of the importance of safety.

4.5.1.2 Use of faulty or improper tools or equipment: It is ranked on 2nd and RII=0.725. It implies that it is unacceptable to use defective or inappropriate tools when building a structure as they can cause major harm and injuries. They may break down, result in mishaps, impede productivity, and slow down work. Injuries can result from fines from regulatory agencies like OSHA, while lawsuits can be costly for injured workers. Project delays can increase costs and delay timelines. Employers are required by law to provide safe working environments, and using defective equipment may be construed as negligence. Making sure all tools are in good operating order, offering suitable training, requiring the right PPE,

creating explicit safety procedures, and promoting a safety culture are all examples of effective safety management techniques. Preventing accidents and injuries requires open communication as well as reporting of hazards and near misses.

4.5.1.3 Absence of a construction safety management expert on the site: was found on 3rd rank RII= 0.719. This result indicates the absence of a construction safety management expert on a building site, particularly for unskilled labor, is a significant concern. Unskilled laborers lack the knowledge and experience to identify and address safety hazards, leading to accidents, injuries, and fatalities. Companies risk fines, penalties, and project shutdowns without an expert. The absence of a safety expert can signal a lack of commitment to safety, leading to a culture where safety is not prioritized. Regular and thorough safety inspections/audits are crucial for ensuring safety protocols and procedures are being properly followed. Infrequent or cursory inspections can allow unsafe practices to develop.

Supervisors need to take an active role in monitoring safety rather than just assuming it is being handled properly. They should conduct observations of work processes, inspect equipment, and engage with workers about safety issues.

4.5.1.4 Weak checkup of safety management implementation during supervision:

This was on the 4th rank and its (RII= 0.713). The result shows the current practice of safety management, Weak safety management implementation is a major problem for the construction industry, especially for unskilled laborers. This is because supervisors lack the necessary knowledge, tools, and time, which causes them to overlook dangers and disregard safety protocols. Reporting unsafe practices can be impeded by a number of factors, including fear of retaliation, lack of training, and language barriers. Furthermore, the need to fulfill deadlines may take precedence over safety considerations, increasing the likelihood of accidents, injuries, and fatalities. This leads to a never-ending circle of safety problems.

4.5.1.5 There is insufficient first aid and first aider(s) on your construction projects or sites: It was the other factor ranked on 4th with R=0.713). The result shows Insufficient first aid on construction sites is a serious problem, especially for unskilled workers who might be more prone to mishaps because of their inexperience or education. This lack of readiness may result in improper treatment, postponed medical attention, and psychological effects on both workers and victims. An assessment should identify specific risks and hazards, have enough first aid kits, a designated number of trained first aiders, and teach employees basic first aid

procedures in order to address this issue. This will encourage a safer workplace and aid in the prevention of injuries. If there is insufficient first aid and first aiders on a construction site, workers may not receive the timely and effective care they need. Whatever the reason, insufficient first aid and first aiders on construction sites is a serious problem. Employers need to take steps to ensure that their workers have access to the first aid and first aiders they need in the event of an accident or injury.

4.5.1.6 Improper safety policy documentation and implementation: the 6th factor was Improper safety documentation and implementation with RII= 0.706. The result shows because of inadequate safety policy documentation and implementation, unskilled laborers frequently work in hazardous conditions in the construction industry. Outdated policies can give the impression of security, but poor documentation can cause confusion and non-compliance. Policies that are hard to obtain or that are poorly communicated may put employees at risk. Inadequate resources and a culture of complacency can arise from flawed implementation, endangering worker safety and putting them at risk for avoidable injuries. Ensuring worker safety requires appropriate enforcement and training.

Improper safety policy documentation and implementation can lead to a ripple effect, exposing unskilled workers to hazards and increasing the risk of accidents, injuries, and fatalities. This can result in financial burdens, public scrutiny, and legal repercussions for companies. To safeguard unskilled labor, a paradigm shift is needed, including developing clear, concise safety policies, training all workers on safety procedures, creating a culture of safety, providing necessary PPE, and encouraging open dialogue and continuous improvement in safety practices.

4.5.1.7 Providing poor personal protective Equipment (PPE) for all employee: the other 7th factor with RII=0.706 also indicates a major problem in the construction industry is the use of subpar or inadequate personal protective equipment (PPE), which puts unskilled workers at risk for accidents and injuries. Workers are at risk for hearing loss, eye injuries, and respiratory issues due to this equipment shortage. Timeliness and cost-cutting frequently take precedence over safety, which causes employees to neglect or forego personal protective equipment. Cuts, bruises, falls, exposure to toxic substances, breathing problems, hearing loss, chronic pain, decreased productivity, and possible medical costs are some of the effects of this. Companies should make quality PPE investments, carry out routine inspections, offer

training, promote open communication, and enforce tight adherence to safety regulations in order to address this problem.

4.5.1.8 Lack of local authorities and Safety enforcement agencies visit sites for inspection: It was 8th factor and (RII=0.700), the result indicated Workers are exposed to dangerous practices on construction sites by the absence of routine inspections, which can result in fatalities and serious injuries. This oversight gap can increase risks by fostering a culture of complacency and disdain for safety laws. Workers may be deterred from reporting safety violations if there are no inspections, which could lead to the continuation of risky practices. To build a safer construction industry, local authorities should prioritize regular inspections, especially for unskilled labor, addressing all safety aspects. Workers should be empowered to report safety violations anonymously, and companies should be held accountable through strict enforcement mechanisms. Comprehensive safety training should be provided to all workers, including those with limited skills or experience.

4.5.1.9 All accidents, injuries and fatalities are improperly filed & reported to the concerned body: this factor was ranked 9th (RII=0.688). The result illustrates the claim that all accidents, injuries, and fatalities are improperly reported for unskilled labor in building construction is a broad and misleading claim. It simplifies a complex issue, involving factors like fear of repercussions, lack of awareness, and inadequate safety protocols. Instead of making blanket statements, focus on solutions like anonymous reporting mechanisms, training, trust building, improving safety protocols, and enforcing safety regulations to deter future violations.

4.5.1.10 Workers get inadequate training and orientation before starting their job: It was 10th ranked factor on current practice of safety management with (RII=0.675), Inadequate training and orientation for construction workers increases the risk of accidents and injuries. This is due to lack of awareness of hazards, lack of investment in necessary training, and a lack of safety awareness among employers. The consequences of inadequate training include increased risk of accidents, reduced productivity, increased costs for employers, and damage to reputation. To improve training and orientation, employers should develop a comprehensive program covering hazard identification, safe work practices, and emergency procedures. The program should be clear, concise, and tailored to the specific needs of the workers and the hazards they face. Regular evaluations of the program's

effectiveness are crucial to ensure it meets the needs of both workers and the company. Employers can also use various training methods, provide training materials, make training mandatory for all workers, and gather feedback from workers to improve the program. By following these tips, employers can help reduce the risk of accidents and injuries in the construction industry.

4.6. Challenges to implement safety management in building construction sites

Ineffective safety management performance is a major issue in the construction sector. Implementing safe safety programs has long been one of the best strategies to lower construction accident rates. The national economy and the financial health of construction industry are both negatively impacted by this poor performance. Construction companies have created and executed a variety of safety plans in response to the requirement to improve safety management performance.

Table 4.3 challenges of implementing safety management of unskilled labor

No	Challenges to implement safety management	RII
1	Lack of safety training facility	0.806
2	Lack of PPE	0.719
3	Lack of safety orientation for new workers	0.731
4	Lack of defined safety policy	0.725
5	Lack of safety professionals	0.731
6	Lack of first aid	0.631
7	Lack of safety audit	0.756
8	Un availability of safety budget	0.781
9	Lack of knowledge about safety management system	0.656
10	Large number of Daily Labor	0.631
11	Providing design without techniques of safe construction method	0.625
12	Lack of support from client on safety issues	0.694
13	Transit nature of workers(Rapid change of workers)	0.650
14	Lack of addressing surrounding community problems during planning and design stage	0.688

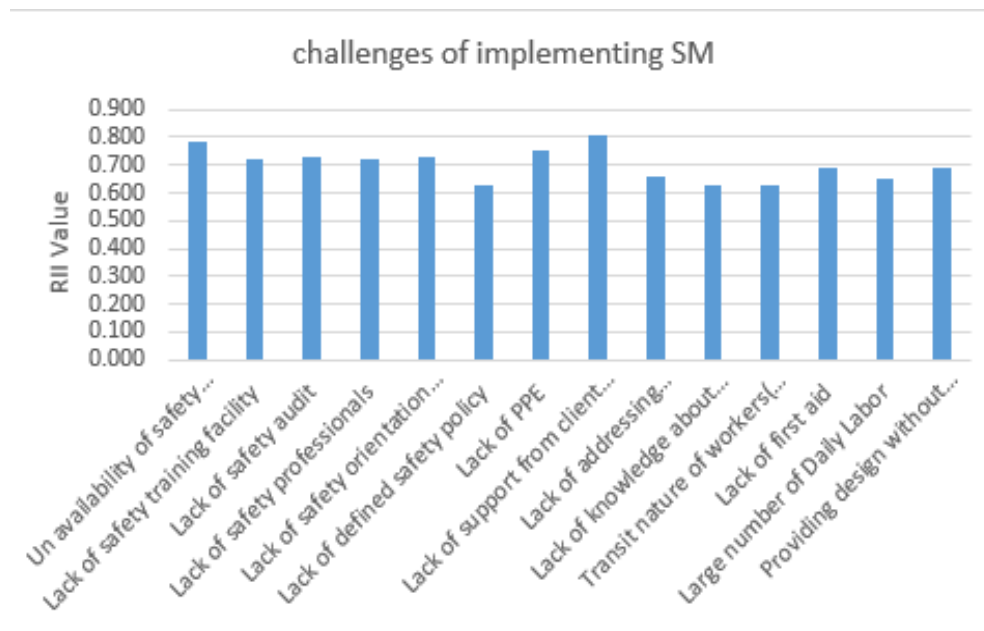


Fig 4.10 challenges of implementing safety management

4.6.1 Top ten factors in challenges to implement safety management on building construction projects.

The result in table 4.4 shows, the RII of listed factors of challenges of implementing safety management for unskilled labor in building constructions in case of Bonga town. The rank in descending order of each factor is also listed. Un availability of safety budget (0.806),Lack of safety training facility (0.781), Lack of safety audit (0.756), Lack of safety professionals (0.731), Lack of safety orientation for new workers (0.731), Lack of defined safety policy (0.725), Lack of PPE (0.719), Lack of support from client on safety issues (0.694), Lack of addressing surrounding community problems during planning and design stage (0.688), Lack of knowledge about safety management system (0.656), Transit nature of workers(Rapid change of workers)(0.650), Lack of first aid (0.631), Large number of Daily Labor (0.631), Providing design without techniques of safe construction method(0.625) are challenges to implement safety management for unskilled labors according to respondents perspective that have the highest to the lowest RII respectively.

Table 4.4 Top ten challenges of implementing safety management of unskilled labor

No	Challenges to implement safety management	RII	Rank
1	Lack of safety training facility	0.806	1

2	Un availability of safety budget	0.781	2
3	Lack of safety audit	0.756	3
4	Lack of safety professionals	0.731	4
5	Lack of safety orientation for new workers	0.731	4
6	Lack of defined safety policy	0.725	6
7	Lack of PPE	0.719	7
8	Lack of support from client on safety issues	0.694	8
9	Lack of addressing surrounding community problems during planning and design stage	0.688	9
10	Lack of knowledge about safety management system	0.656	10

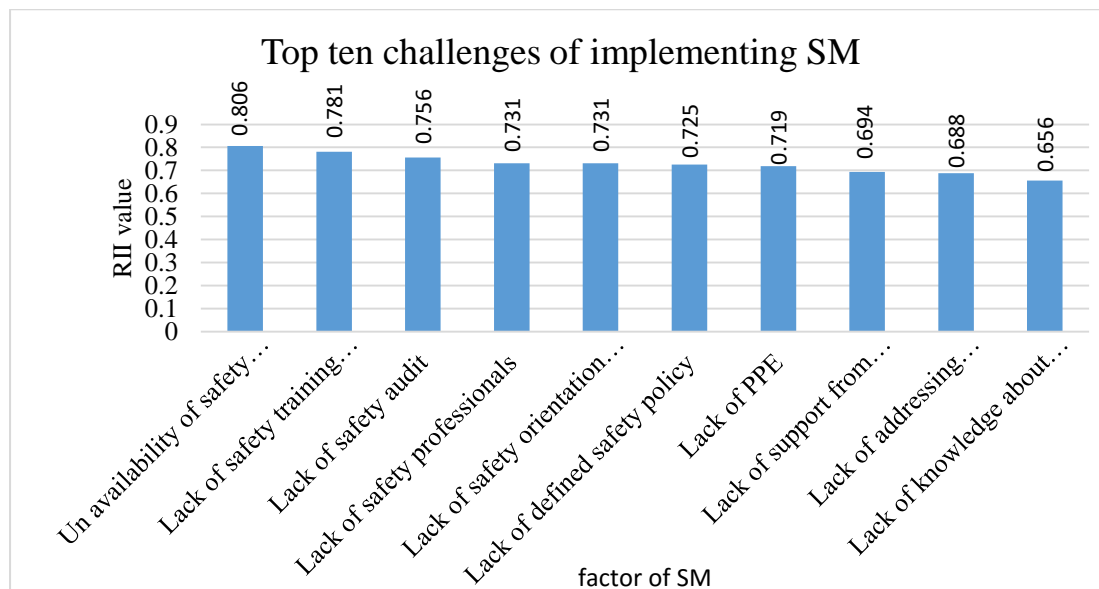


Fig 4.11 Top ten challenges of SM

4.6.1.1 Lack of safety training facility: The 1st ranked factor is lack of safety training facility with RII=0.806. The lack of safety training facilities in developing countries poses a significant challenge to safety management, particularly for unskilled laborers. These workers are often the most vulnerable to workplace accidents and injuries, as they lack the knowledge and skills to identify and mitigate hazards. Factors contributing to this lack include limited resources, lack of awareness among employers and workers, and language barriers. The absence of safety training leads to increased risk of accidents, reduced productivity, increased costs for employers, and damage to an organization's reputation. To address this issue,

governments, donor organizations, and private sector initiatives can support safety training by providing financial assistance, developing programs in local languages, and enforcing safety regulations. It is crucial to note that safety training is an ongoing process that should be tailored to the specific needs of the workplace and regularly reviewed by employers.

4.6.1.2 Unavailability of safety budget: this factor ranked 2nd RII=0.781. The result indicates a lack of safety budget can lead to increased risks of accidents and injuries, non-compliance with safety regulations, reduced employee morale and engagement, and increased insurance premiums. Industries like construction, healthcare, and manufacturing may face increased risks due to inadequate training and equipment, infection control measures, and inadequate maintenance. To address these issues, organizations should focus on identifying the most important safety needs, seek funding from other sources, be creative with their budget, and prioritize safety. To reduce the cost of safety programs, organizations can develop in-house training programs, purchase used or refurbished equipment, or communicate its importance to employees. Investing in safety is an investment, not a cost, and can reduce accidents, injuries, employee morale, and insurance costs. Remember that safety is an investment, not a cost.

4.6.1.3 Lack of safety audit: Was ranked 3rd with RII=0.756, and the result shows lack of safety training facilities in developing countries poses a significant challenge to safety management, particularly for unskilled laborers. These workers are often the most vulnerable to workplace accidents and injuries, as they lack the knowledge and skills to identify and mitigate hazards. These audits are systematic evaluations of a company's safety program and procedures, aiming to identify and address safety hazards before they lead to accidents and injuries. Companies may not prioritize safety audits, may not be able to afford them, or may not be aware of their importance. Factors contributing to this lack include limited resources, lack of awareness among employers and workers, and language barriers.

4.6.1.4. Lack of safety professionals: this was ranked 4th with R=0.731 in which it implies the absence of safety professionals in developing countries is a significant issue, particularly for unskilled laborers. These professionals are essential for identifying hazards, developing safety programs, and training workers. However, many developing countries lack these professionals due to limited resources, lack of awareness, and a shortage of qualified professionals. To address this issue, governments, donor organizations, and private sector

initiatives can support the development of safety professionals. Governments can fund training programs, donor organizations can fund NGOs, and private sector companies can develop and implement their own safety training programs. Employers can also improve safety management by developing safe work procedures, providing personal protective equipment, regularly inspecting the workplace for hazards, involving workers in safety discussions, and seeking safety training and resources from government agencies, donor organizations, and industry associations. The lack of dedicated safety professionals and resources allocated to overseeing unskilled construction workers is definitely a key challenge to effective safety management.

The absence of safety professionals in the building construction industry poses a significant challenge for unskilled workers. To overcome this issue, companies can hire safety professionals, outsource safety services, and train workers on safety procedures. Additional tips include getting creative, using technology, empowering workers, and making safety a top priority in the company's culture. By following these tips, companies can improve the safety of their workers, especially unskilled labors, even without the need for full-time safety professionals.

Addressing this requires contractors to hire more dedicated safety personnel for unskilled worker oversight, invest in specialized training, promote the career path, and work to build understanding across language/culture barriers via visual aids, translators, and in-language training.

4.6.1.5. Lack of safety orientation for new workers: was the other 4th ranked factor with RII=0.731. The response implies the lack of safety orientation for new workers in developing countries is a significant issue, particularly for unskilled laborers. This lack of orientation can lead to increased risks of accidents and injuries, reduced productivity, increased costs for employers, and damage to an organization's reputation. Factors contributing to this issue include limited resources, lack of awareness among employers and workers, and language barriers. Governments can support safety orientation by developing guidelines, providing funding, and requiring employers to provide orientation to all new workers. Donor organizations can also support safety orientation by funding NGOs and other organizations that provide such programs. Private sector initiatives can also contribute by developing and implementing their own safety orientation programs. Employers can improve safety

orientation by developing a simple checklist or training program, translating it into the languages spoken by new workers, requiring all new workers to complete the program, having a supervisor review it, and observing workers to ensure they follow safety procedures.

4.6.1.6. Lack of defined safety policy: this factor ranked 6th (RII=0.725) and implies a lack of a defined safety policy is a significant challenge in building construction safety management for unskilled laborers. A safety policy is a written document outlining a company's commitment to safety and specific steps to protect workers from accidents and injuries. Companies may not prioritize safety, have limited resources, or be unaware of its importance. The absence of a defined safety policy for unskilled laborers poses a significant challenge for safety management in developing countries. These workers are often the most vulnerable to workplace accidents and injuries, as they lack the knowledge or skills to identify and mitigate hazards. Without a defined safety policy, they are at increased risk of serious injury or death. Unskilled laborers often have less bargaining power than skilled laborers, making it difficult for them to advocate for their safety and health. Barriers arising from language and ignorance of their rights, and increased insurance costs can also result from the lack of a defined safety policy.

4.6.1.7 Lack of PPE: Lack of PPE factor was ranked 7th (RII=0.725). The construction industry is highly hazardous, with unskilled laborers at a higher risk due to inadequate access to personal protective equipment (PPE). Insufficient PPE exposes workers to various hazards, including head and foot injuries, respiratory masks, noise, and fumes, leading to health problems. The lack of PPE also affects worker morale, productivity, and project progress. It can lead to fear, discomfort, a lax safety culture, and non-compliance with safety regulations, exposing companies to legal repercussions and fines. The lack of Personal Protective Equipment (PPE) for unskilled laborers is attributed to cost constraints, lack of proper training, ineffectiveness, and cultural resistance. To improve PPE provision, employers should make it available and accessible, make it affordable, educate workers on PPE importance, and enforce PPE use on site. Private sector companies can also develop and implement PPE procurement and distribution programs. Employers can implement a PPE policy, provide necessary PPE, train workers on proper use, regularly inspect PPE, and replace damaged or worn-out PPE.

4.6.1.8. Lack of support from client on safety issues: this factor ranked 8th (RII=0.719). Unskilled laborers' safety on construction sites can be seriously compromised by clients' and owners' lack of commitment and assistance. Clients often lack support for safety measures for unskilled laborers in construction due to unrealistic expectations in terms of cost and schedule. Reasons for this include cost, schedule, lack of knowledge, and pressure to compete. Effective safety management for unskilled laborers during building construction can be impeded by a lack of support from clients. Lower costs may be prioritized by clients, which could result in subpar PPE and insufficient safety training. It's possible that clients don't realize how important safety is, which leads to arbitrary deadlines and condescending attitudes. Contracts might not specify safety obligations precisely, which makes it challenging for businesses to enforce policies. In bidding situations where there is competition, businesses might put affordability ahead of employee welfare.

4.6.1.9. Lack of addressing surrounding community problems during planning and design stages : One of the biggest obstacles to implementing effective safety management for unskilled laborers in building construction is Lack of addressing community issues during the planning and design stages. It was ranked 9th (RII=0.694). As respondents this factors. Poor access routes, sources of pollution, and risky construction activities can result from this oversight. Lack of addressing community concerns can also lead to resistance and resentment, which could result in fines, legal action, and project delays. Unskilled laborers are also more likely to be exposed to hazardous materials, have less access to training and safety equipment, and are more vulnerable to exploitation and abuse.

4.6.1.10. Lack of knowledge about safety management system: this factor was rank 10th (RII=0.688). The lack of knowledge about safety management systems (SMS) among unskilled laborers in building construction poses a significant challenge. SMSs are frameworks for managing safety risks and preventing accidents and injuries, involving policies, procedures, and training programs. Unskilled laborers may not be aware of SMSs or their work practices, making it difficult for them to identify and address safety hazards. Factors contributing to this lack of knowledge include limited education and training, language barriers, and cultural differences. Negative consequences include increased risk of accidents and injuries, reduced productivity, increased costs for employers, and damage to reputation. To address this issue, contractors and stakeholders should provide training on SMSs, translate SMSs into multiple languages, develop culturally sensitive safety programs,

and empower workers to report safety hazards. These steps can help improve the safety of unskilled laborers and reduce the challenges posed by the lack of knowledge about SMSs. Targeted education and training of both unskilled workers and supervisors in structured safety principles, metrics, and responsibilities is essential to effective adoption of safety management systems.

4.7. Effects of improper implementation of safety management

A significant portion of industrial fatalities and injuries are caused by the construction industry. It is of major importance to evaluate the efficiency of the Safety Management System (SMS). In particular, it is vital to compare the quality and level of achievement of SMS and safety performance of a building project. A sizable sample of construction accidents is frequently unavailable, though. As a result, potential proxies to represent the safety performance were developed. Moreover, the motivation factors which characterize the quality and level of achievement should be identified. In this study, a structural model has been created to analyze the relationship between the SMS implementation and operational & safety performance of the construction projects.

Table 4.5 Effects of improper safety management of unskilled labor

No	Effects of improper safety management	RII
1	Extra occupational health cost	0.713
2	Fatal and injury	0.781
3	Reduction in potential construction time loss	0.694
4	Decline in quality performance of the construction project	0.681
5	Increase in project cost baseline	0.669
6	Late delivery of construction project	0.690
7	Decline of moral of construction personnel	0.700
8	Increase decline in overall project profit	0.719
9	Legal Repercussions	0.7125
10	Loss of Reputation	0.700

11	Decrease in Productivity, Increase in Turnover	0.650
12	Replace damaged equipment's	0.619

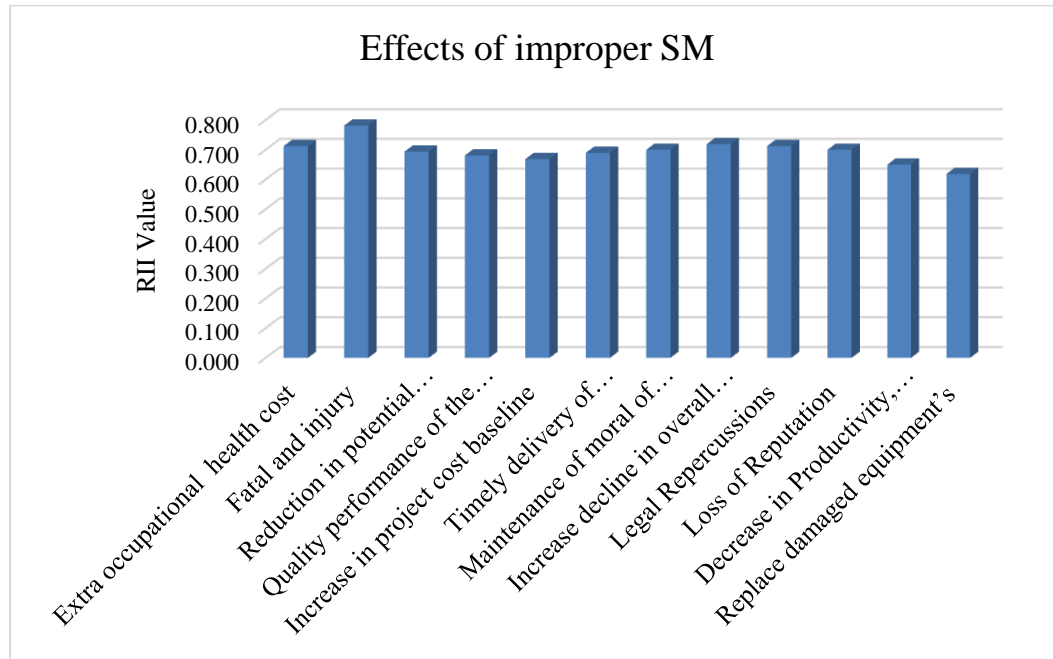


Fig 4.12. Effects of implementation of safety management in building construction

4.7.1 Top ten factors of Effects of improper safety management

As per the result that is mentioned above the table 4.6, the leading effects of improper safety management in building construction for unskilled labor ranked are Fatal and injury (0.781), Increase decline in overall project profit (0.719), Extra occupational health cost (0.713), Legal Repercussions(0.712), Decline of moral of construction personnel (0.700), Loss of Reputation (0.700), Reduction in potential construction time loss (0.694), Late delivery of construction project (0.690), Decline in quality performance of the construction project (0.681), Increase in project cost baseline(0.669), are RII value of challenges to implement safety management in descending order.

Table 4.6 Top ten Effects of improper safety management of unskilled labor

Rank	Effects of improper safety management	RII	Rank
1	Fatal and injury	0.781	1
2	Increase decline in overall project profit	0.719	2

3	Extra occupational health cost	0.713	3
4	Legal Repercussions	0.712	4
5	Decline of moral of construction personnel	0.700	5
5	Loss of Reputation	0.700	6
7	Reduction in potential construction time loss	0.694	7
8	Late delivery of construction project	0.690	8
9	Decline in quality performance of the construction project	0.681	9
10	Increase in project cost baseline	0.669	10

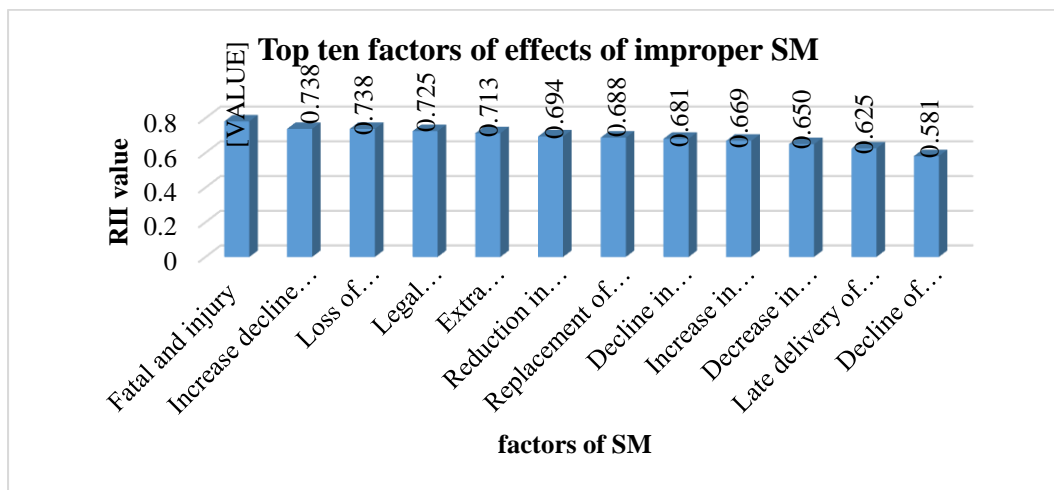


Fig 4.13. Top ten effects of implementation of safety management

4.7.1.1 Fatal and Injury: this factor is ranked with respondent in first row with (RII=0.781). The respondents believe that the major effects of improper implementation of safety management is fatal and injury. Construction sites are dangerous for workers since they contain equipment and entail activities that often result in significant injuries. When construction companies, contractors, and property owners don't pay attention to safety requirements and sufficient training for workers, building sites become traps for the men and women who are responsible with getting dangerous jobs done right. According to the Occupational Safety and Health Administration (OSHA), the leading causes of construction fatalities are falls, struck-by incidents, caught-between incidents, and electrocutions. Understanding common construction accidents can help you and your team stay safe and avoid potential risks. The construction industry is notorious for its high rate of accidents and

fatalities. This is particularly true for unskilled laborers who often lack the proper training and experience to work safely in hazardous environments. When safety management is inadequate, the consequences can be severe.

4.7.1.2. Increase decline in overall project profit: this factor is ranked 2nd with (RII=0.719) in respondents view the second factor is increase decline in all over projects profit. A rise in unskilled labor may have a detrimental effect on project profitability. The aforementioned factors encompass escalated expenses, diminished efficiency, amplified rework and errors, elevated insurance rates, diminished quality, postponements, safety hazards, and challenges in recruiting and maintaining proficient labor. Because they are less productive and take longer to finish tasks, unskilled workers cause delays and higher labor expenses. They also have a higher probability of making errors that incur extra expenses. A contractor's reputation may suffer and future project wins may become more challenging as a result of delays. Unskilled workers also face greater safety risks, which can lead to wasted time, injuries, and fatalities. Invest in appropriate training, appoint seasoned supervisors, employ prefabrication and modular construction, prioritize quality, and create a robust safety program to lessen these detrimental effects.

4.7.1.3. Extra occupational health cost: Extra occupational health cost ranked 3rd (RII =0.713), Safety management can result in additional expenditures for occupational health care, but it is also essential for safeguarding workers, particularly unskilled labor in the construction industry. These expenses can be classified as indirect, such as lower productivity, higher absenteeism, worse morale, and tarnished reputation, or direct, such as increased costs for personal protective equipment (PPE), safety training, medical surveillance, incident investigation, and reporting. Companies can reduce these expenses by investing in comfortable, high-quality personal protective equipment (PPE), and offering efficient safety training, fostering a culture of safety, automating safety duties with technology, and collaborating with occupational health specialists. Proper workforce health and safety stewardship dramatically reduces these ancillary costs and impacts that can squeeze contractor budgets and profitability.

4.7.1.4. Legal Repercussions: Ranked 4th (RII= 0.712), While proper safety management is essential for protecting workers in the construction industry, particularly unskilled laborers, it can also lead to legal repercussions for companies that fail to comply with safety regulations

and standards. These repercussions can be significant and far-reaching, affecting financial stability, reputation, and even the future of the business.

In the event of noncompliance, there may be penalties, civil litigation, criminal prosecution, higher insurance costs, and the revocation of business licenses and permits. A company's reputation could also be harmed, which would result in a staffing shortage and project delays. Additionally, there could be a loss of public trust and difficulty obtaining future contracts.

Companies should create a thorough safety program, keep up with regulations, encourage a safety culture, carry out routine safety inspections, look into and report accidents, and so on in order to reduce legal ramifications. This strategy promotes a more moral and accountable business while guaranteeing a safer working environment for all employees, including unskilled laborers. By making safety a top priority and putting in place an extensive safety program.

4.7.1.5. Decline of moral of construction personnel: this factor ranked 5th with (RII=0.700), There are instances when skilled workers' morale declines as a result of safety measures being implemented in the construction industry. Misconceptions, annoyance, excessive regulation, decreased adaptability, communication breakdowns, resentment toward new duties, and a sense of betrayal can all contribute to this. In order to lessen this, businesses should be transparent about concerns, offer specialized training and supervision, value the abilities of both skilled and unskilled workers, emphasize teamwork, give employees a sense of empowerment and autonomy, and regularly evaluate safety protocols. Construction companies can foster a safer and more positive work environment, which can lead to increased productivity, improved project outcomes, and a more sustainable workforce. This can be achieved by implementing proactive strategies and understanding the impact of safety management on worker morale ethical company practices.

4.7.1.6. Loss of Reputation: The other 5th ranked factor is Loss of reputation with RII=0.700, The idea that implementing safety management for unskilled labor in construction lowers morale is complicated and needs to be carefully considered. Potential drawbacks include a heavier workload, less mobility, and unfavorable working conditions. Effective safety management, on the other hand, can lower the number of mishaps and injuries while raising employee satisfaction and loyalty. Collaborative safety practices can strengthen relationships

and communication between employees and supervisors, which will ultimately result in a more supportive and positive work environment. Safety training can also improve employability and competence. The relationship between safety management and morale for unskilled laborers is complex and depends on factors like prioritizing well-being, focusing on education, promoting positive reinforcement, offering skill development opportunities, and balancing safety with productivity.

4.7.1.7. Reduction in potential construction time loss: this factor ranked 7th with (RII=0.694), in the construction industry, implementing safety management for unskilled labor can save costs, increase work efficiency, and save time. It reduces mishaps, injuries, and delays so that inexperienced workers can continue to produce. Additionally, safety management lowers the requirement for onboarding training, resulting in more consistent work schedules. Improved problem-solving and communication are fostered by a safe culture. Reduced accident rates may lead to cheaper insurance costs, which may draw in qualified personnel and lead to the acquisition of additional projects. Employee satisfaction and motivation increase in a safe work environment, which boosts output and lowers absenteeism. Customizing safety programs, offering unambiguous training, promoting active engagement, employing positive reinforcement, and routinely observing procedures are all necessary for successful implementation.

4.7.1.8. Late delivery of construction project: this factor ranked 8th with (RII=0.690), Project delivery may be delayed if safety management is implemented for unskilled labor in the construction industry. But it can also result in longer training sessions, less flexibility, and a greater need for planning and preparation. Unexpected delays resulting from safety incidents can also be caused by safety measures. Effective safety measures, on the other hand, can lessen the need for rework and repairs, increase quality and durability, improve project planning and risk management, and raise employee satisfaction and output. Thus, before putting safety measures in place, it's imperative to carefully assess the possible effects and weigh the advantages and disadvantages. To ensure successful implementation of safety measures, balance safety with productivity, involve workers in safety planning, continuously improve procedures, and use data analytics. Regular review and adaptation of safety procedures can minimize delays and ensure effectiveness. While initial delays may occur, long-term benefits like improved quality, reduced rework, and a more productive workforce can offset these delays.

4.7.1.9. Decline in quality performance of the construction project: This factor ranked 9th with (RII=0.681), the application of safety management can affect a construction project's quality, but it's crucial to take the possible drawbacks into account. Excessive emphasis on safety protocols may cause attention to divert from quality to following rules, and unduly stringent regulations may cause employees to lose motivation. Rigid regulations and an overabundance of paperwork can also impede quality control efforts. A culture of safety can improve quality in construction by promoting safety awareness, enhancing material handling and storage, and implementing standardized procedures. This can lead to better construction outcomes and reduced errors. Implementing context-specific safety protocols, fostering a safety culture, using technology for quality control, and regularly reviewing quality data can minimize negative impacts on quality while maximizing safety benefits. A well-designed safety program can enhance quality by striking a balance between safety and quality, empowering workers, and continuously improving practices based on data and feedback.

4.7.1.10. Increase in project cost baseline: This factor ranked 10th with (RII=0.669), Although the initial costs of implementing safety management for unskilled labor in construction projects may be higher, these costs may be offset in the long run by the benefits. Safety precautions that are effective can minimize injuries and accidents as well as the expenses associated with medical care, worker compensation, and accident investigations. Increased productivity, decreased errors, and higher worker morale can all be attributed to a safe workplace. Putting safety procedures into place can result in higher-quality building methods, cheaper insurance costs, and a solid safety record that draws in qualified workers and improves the company's standing. A safety culture should be promoted, technology for automation, well-thought-out training programs, and routine safety data analysis are all examples of cost-effective implementation techniques. Construction companies can achieve worker well-being, project quality, and the company's future by concentrating on long-term benefits.

4.8. Cumulative result of current practice of SM, Challenges of implementing SM & Effects of implementing SM for unskilled labor on building construction.

Table 4.7 Cumulative result of safety management

No	Item	RII	Rank
1	Lack of safety training facility	0.806	1

2	Un availability of safety budget	0.781	2
3	Fatal and injury	0.781	2
4	Inadequate safety budget.	0.775	4
5	Lack of safety audit	0.756	5
6	Lack of safety professionals	0.731	6
7	Lack of safety orientation for new workers	0.731	6
8	Use of faulty or improper tools or equipment.	0.725	8
9	Lack of defined safety policy	0.725	8
10	Absence of a construction safety management expert on the site.	0.719	10
11	Lack of PPE	0.719	10
12	Increase decline in overall project profit	0.719	10
13	Weak checkup of safety management implementation during supervision.	0.713	13
14	There is insufficient first aid and first aider(s) on your construction projects or sites.	0.713	13
15	Improper safety policy documentation and implementation.	0.706	15
16	Providing poor personal protective equipment (PPE) for all employees	0.706	15
17	Lack of local authorities and Safety enforcement agencies visit sites for inspection	0.700	17
18	All accidents, injuries and fatalities are improperly filed & reported to the concerned body	0.688	18
19	Workers get inadequate training and orientation before starting their job.	0.675	19
20	Increase in project cost baseline	0.669	20

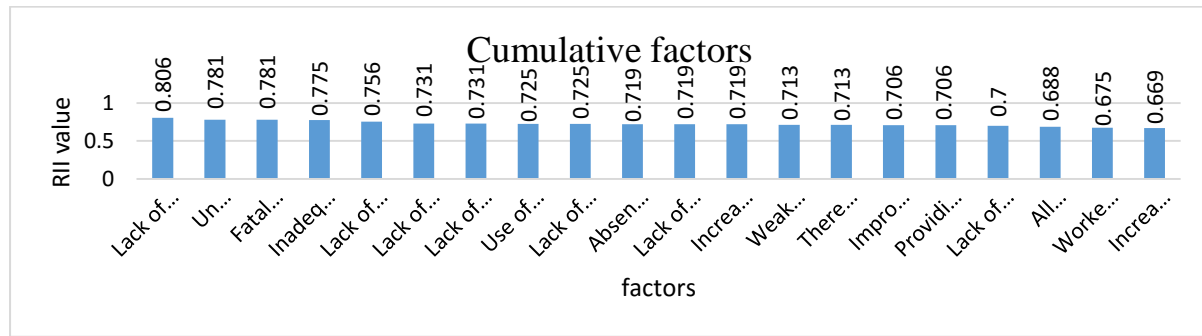


Fig 4.14. Cumulative result of safety management

4.9. Reliability Test

Reliability shows the degree to which the research instrument yields consistent results or data after repeated results. Table 4.6 shows the reliability test, which produced an overall Cronbach Alpha correlation coefficient of above 0.750 for all variables.

Table 4.8 Result of Cronbach’s alpha

No	Types	Cronbach’s alpha	mean	Items
1	Current practice of SM	0.969	2.884	14
2	Challenges of Implementing SM	0.965	3.839	14
3	Effects of Implementing SM	0.973	3.843	12

The Cronbach Alpha correlation coefficient showed in Table 4.8 above, that all the variables had a Cronbach’s coefficient of 0.968, 0.965 and 0.973, respectively, regarding their group, therefore the data is believed reliable. A Cronbach’s alpha of more than 0.750 shows a well-framed research instrument that is can adequately collect the required data for the study. In this case the value for Cronbach alpha is greater than 0.9 so, the pilot study results showed a strong internal consistency of the study variables, and hence the data was adopted for the study.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

The construction industry is inherently risky, and ensuring the safety of all workers, especially unskilled laborers, is paramount. However, employing unskilled labor presents unique challenges to safety management. This research was done in Bonga town public construction projects and successfully assessed the current practices, challenges, and effects of safety management for unskilled labor in building construction projects. The results emphasize how vital it is to enhance safety protocols in order to safeguard employees and guarantee project success.

The assessment of safety management for unskilled labor in building construction projects has revealed significant gaps and challenges in current practices. These include deficiencies in safety protocols, inadequate training and supervision, insufficient provision of personal protective equipment (PPE), and lack of oversight from regulatory authorities. These issues contribute to an increased risk of accidents, injuries, and fatalities among unskilled laborers.

The evaluation of safety management for unskilled labor in building construction projects has uncovered a number of important issues that lead to insufficient safety procedures. Key barriers have been identified as the lack of a safety budget, inadequate training facilities, a lack of safety audits and professionals, a lack of defined safety policies, a lack of personal protective equipment (PPE), a lack of client support for safety issues, and a failure to address community concerns during the planning and design stages.

Neglecting safety management has serious repercussions, including a rise in injuries, monetary losses from delays and accidents, possible legal problems, and a demoralized workforce. Improper implementation of safety management measures can have severe consequences for unskilled laborers in building construction projects. These may include injuries, fatalities, decreased project profitability due to increased health costs, legal repercussions, and a decline in morale among construction personnel. These results highlight how urgently safety management for unskilled construction workers needs to be improved. Enhancing training programs in the languages spoken by the workforce, committing

leadership to a strong safety culture, and strictly enforcing safety laws are among the recommendations made to guarantee the well-being of workers and project success.

Unskilled labors in the study area raise some effects that are happening on their working sites nowadays. For example their cultural norms regarding risk and safety may affect how they view the measures that have been put in place. They may be more understanding of the safety procedures if they have prior experience working in hazardous situations. The way that management explains and upholds safety regulations will affect how receptive they are. The importance or purpose of the procedures may not be fully understood by them and safety training is unclear or not presented in a language they can understand. And also in some project site they lack benefits are like health insurance, paid time off, or retirement plans may be less common in unskilled jobs. But in order to ask about their rights, they afraid of losing job and they could talk about how hard it is to find new work with their limited skill set or how afraid they are of being replaced.

5.2. RECOMMENDATION

1. Considering enough amount of safety budget is necessary before starting any project.
2. Implement comprehensive safety training programs for unskilled laborers to ensure they are equipped with the knowledge and skills necessary to work safely on construction sites.
3. Encourage all parties involved in building construction projects to have a safety-conscious mindset. This entails highlighting how important safety is, promoting the reporting of dangers and near-misses, and honoring and rewarding safety accomplishments.
4. Make certain that unskilled workers have access to and are required to wear high-quality PPE at all times. PPE should be regularly inspected to determine its condition, and worn-out or damaged items should be replaced right away.
5. Increase Budget Allocation for Safety to guarantee the required instruments, equipment, training facilities, and staff are available, stakeholders should place a high priority.
6. Create and maintain programs or facilities specifically designed for unskilled laborers that address basic safety procedures, hazard identification, and emergency response techniques.

7. Conduct Frequent Safety Audits to find weaknesses in safety procedures and guarantee adherence to legal requirements, conduct frequent safety audits by trained experts.
8. Employ Certified Safety Professionals to Supervise Safety Management Activities on Construction Sites:
9. Implement robust systems for reporting and documenting safety incidents, near misses, and hazards, and ensure that these reports are acted upon promptly.
10. Work closely with regulatory authorities to ensure compliance with safety regulations and standards, and to address any areas of non-compliance proactively.
11. Provide adequate supervision and oversight to ensure that safety protocols are being followed correctly and that any deviations are addressed promptly.
12. Create succinct and unambiguous safety policies and procedures, and make sure that they are applied and upheld consistently throughout the construction process.

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APPENDIX



JIMMAUNIVERISTY

JIMMA INSTITUTE OF TECNOLOGY

SCHOOL OF GRADUATE STUDIES

FACALITY OF CIVIL AND ENVIROMENTAL ENGINEERING

CONSTRUCTION ENGINEERING AND MANAGEMENT CHAIR

QUESTIONNAIRE

This questionnaire aims **Assessment on safety management for unskilled labor of building construction. In case of Bonga Town.** The research was conducted to fulfill the requirements for the degree of MSc in Construction Engineering and Management at Jimma University. This questionnaire is required to be filled in with exact relevant facts as possible. Your response is very important for the success of the study because all the information that you provide determines the analysis, conclusion, and recommendation of the research. Your input into the research outcome is crucial in this respect. The confidentiality of this questionnaire will be maintained. All information provided in this questionnaire will be treated with strict confidentiality and used only for the academic research under consideration. So, I am kindly requesting you to respond to each and every question. Thank you very much for your time and cooperation

Sincerely yours,

MEKIDES AYALEW

Jimma University Institute of Technology, Department of Civil Engineering
MSc. in Construction Engineering and Management

Contact info:

Tele: +251-923-337-876, Email: - octmekdes121@gmail.com

SECTION I: General Information

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

1. Sex; Male Female

2. Type of your Organization/Company:

Client

Contractor

Consultant

Other, please specify: _____

3. Your current job position in the company/organization:

Director

Project Manager

Coordinator

Site engineer

Office Engineer

Other, specify:

4. Your experience in building construction projects

< 5 years

5–10 yrs.

10–15 yrs.

> 15 yrs.

5. Your educational level/ status:

Diploma

Degree

MSc

PhD

Other

6. Your educational profession:

Engineering Related

Construction Management

Project management

Other, please specify: _____

SECTION II: Current practice of safety management in your organization

Please indicate your level of agreement for mentioned questions depending on your point of view and experience in building construction. Therefore, Put an “X” or “√” 1= Not at all, 2=Unlikely, 3=Likely, 4=Almost certain, 5= Certain. If you have extra description please mention it.

No	Item	(1) (0%)	(2) (25%)	(3) (50%)	(4) (75%)	(5) (100%)
1	Use of faulty or improper tools or equipment.					
2	Weak checkup of safety management implementation during supervision.					
3	Improper safety policy documentation and implementation.					
4	Providing poor personal protective equipment (PPE) for all employees					
5	Unregister employment accidents and occupational diseases on time.					
6	Workers get inadequate training and orientation before starting their job.					
7	Your project has no site-specific Safety management plan					
8	Inadequate safety budget.					
9	There is insufficient first aid and first aider(s) on your construction projects or sites.					
10	Absence of a construction safety management expert on the site.					
11	Lack of Managers encourage and support worker participation, commitment and involvement in safety activities.					

12	Weak governmental role towards organizations follow up and contribute in improving safety					
13	Lack of local authorities and Safety enforcement agencies visit sites for inspection					
14	All accidents, injuries and fatalities are improperly filed & reported to the concerned body					

If you have any other idea and opinion on current practice of safety management issue please mention it.

SECTION III: challenges to implement safety management in building construction sites.

Please indicate the degree to which the following practices are challenging construction safety management practice in your construction project. Therefore put “X” or “√” for 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=strongly agree.

No	Challenges on safety management implementation	Degree of challenge				
		1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)
1	Lack of safety training facility					
2	Lack of PPE					
3	Lack of safety orientation for new workers					
4	Lack of defined safety policy					
5	Lack of safety professionals					
7	Lack of first aid					
8	Lack of safety audit					
9	Un availability of safety budget					
10	Lack of knowledge about safety management system					
11	Large number of Daily Labor					
12	Providing design without techniques of safe construction method					
13	Lack of support from client on safety issues					
14	Transit nature of workers(Rapid change of workers)					
15	Lack of addressing surrounding community problems during planning and design stage					

Please specify other ideas regarding on challenges of safety management in building Construction. _____

SECTION V. Effects of improper implementation of safety management

Please indicate the degree to which the following practices are effect of improper implementation of safety management practice in your construction project. Therefore, put 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5= Strongly agree.

No	Item	Degree of effect				
		1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)
1	Extra occupational health cost					
2	Fatal and injury					
3	Reduction in potential construction time loss					
4	Quality performance of the construction project					
5	Increase in project cost baseline					
6	Timely delivery of construction project					
7	Maintenance of moral of construction personnel					
8	Increase decline in overall project profit					
9	Legal Repercussions					
10	Loss of Reputation					
11	Decrease in Productivity, Increase in Turnover					
12	Replace damaged equipment's					

What are other effects of improper implementation of safety management that you noticed in your environment?

Thank you!

1. RII calculation for section I, Current Practice of safety management for unskilled labors in Building construction.

A. For Item No.1. Use of faulty or improper tools or equipment.

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*8+4*12+3*6+2*4+1*2}{5*32} = \frac{116}{160} = 0.725$$

B. For Item No.1. Weak checkup of safety management implementation during supervision.

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*10+4*5+3*11+2*5+1*1}{5*32} = \frac{114}{160} = 0.713$$

- The RII value calculation for each item is calculated as shown on the above

No	Item	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)	Total	WT	RII	Rank
1	Use of faulty or improper tools or equipment.	2	4	6	12	8	32	116	0.725	2
2	Weak checkup of safety management implementation during supervision.	1	5	11	5	10	32	114	0.713	4
3	Improper safety policy documentation and implementation.	2	3	10	10	7	32	113	0.706	6
4	Providing poor personal protective equipment (PPE) for all employees	3	3	9	8	9	32	113	0.706	6
5	Unregister employment accidents and occupational diseases on time.	2	8	10	7	5	32	101	0.631	13
6	Workers get inadequate training and orientation before starting their job.	3	2	13	8	6	32	108	0.675	10
7	Your project has no site-specific Safety management plan	5	3	11	7	6	32	102	0.638	12

8	Inadequate safety budget.	1	3	6	11	11	32	124	0.775	1
9	There is insufficient first aid and first aider(s) on your construction projects or sites.	0	4	12	10	6	32	114	0.713	4
10	Absence of a construction safety management expert on the site.	2	3	10	8	9	32	115	0.719	3
11	Lack of Managers encourage and support worker participation, commitment and Involvement in safety activities.	3	6	12	5	6	32	101	0.631	13
12	Weak governmental role towards organizations follow up and contribute in improving safety	4	2	14	4	8	32	106	0.663	11
13	Lack of local authorities and Safety enforcement agencies visit sites for inspection	1	5	10	9	7	32	112	0.700	8
14	All accidents, injuries and fatalities are improperly filed & reported to the concerned body	2	4	10	10	6	32	110	0.688	9

2. RII calculation for section II, Challenges of Implementing safety management for unskilled labors in Building construction.

A. For Item No.1. Lack of safety training facility.

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*8+4*18+3*5+2*1+1*0}{5*32} = \frac{129}{160} = 0.806$$

B. For Item No.1. Lack of PPE

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*3+4*18+3*6+2*5+1*0}{5*32} = \frac{115}{160} = 0.719$$

- The RII value calculation for each item is calculated as shown on the above

No	Item	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)	Total	WT	RII	Rank
1	Lack of safety training facility	0	1	5	18	8	32	129	0.806	1
2	Lack of PPE	0	5	6	18	3	32	115	0.719	7
3	Lack of safety orientation for new workers	0	5	7	14	6	32	117	0.731	4
4	Lack of defined safety policy	0	6	6	14	6	32	116	0.725	6
5	Lack of safety professionals	0	5	5	18	4	32	117	0.731	4
6	Lack of first aid	0	9	11	10	2	32	101	0.631	12
7	Lack of safety audit	0	4	8	11	9	32	121	0.756	3
8	Un availability of safety budget	0	2	8	13	9	32	125	0.781	2
9	Lack of knowledge about safety management system	1	7	9	12	3	32	105	0.656	10
10	Large number of Daily Labor	0	8	13	9	2	32	101	0.631	12
11	Providing design without techniques of safe construction method	0	7	14	11	0	32	100	0.625	14
12	Lack of support from client on safety issues	2	4	7	15	4	32	111	0.694	8
13	Transit nature of workers(Rapid change of workers)	0	6	15	8	3	32	104	0.650	11
14	Lack of addressing surrounding community problems during planning and design stage	0	6	9	14	3	32	110	0.688	9

3. RII calculation for section III, Effects of Improper Implementation safety management for unskilled labors in Building construction.

A. For Item No.1. Extra occupational health cost.

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*7+4*11+3*7+2*7+1*0}{5*32} = \frac{114}{160} = 0.713$$

B. For Item No.1. Fatal and injury

$$RII = \frac{\sum W}{A*N}$$

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

$$RII = \frac{5*10+4*13+3*5+2*4+1*0}{5*32} = \frac{125}{160} = 0.781 \dots etc$$

- The RII value calculation for each item is calculated as shown on the above

No	Item	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)	Total	WT	RII	Rank
1	Extra occupational health cost	0	7	7	11	7	32	114	0.713	3
2	Fatal and injury	0	4	5	13	10	32	125	0.781	1
3	Reduction in potential construction time loss	0	3	14	12	3	32	111	0.694	7
4	Quality performance of the construction project	1	5	10	12	4	32	109	0.681	9
5	Increase in project cost baseline	0	9	7	12	4	32	107	0.669	10
6	Timely delivery of construction project	0	7	6	12	4	29	100	0.690	8
7	Maintenance of moral of construction personnel	0	9	6	9	8	32	112	0.700	5
8	Increase decline in overall project profit	1	3	9	14	5	32	115	0.719	2

9	Legal Repercussions	0	4	11	12	5	32	114	0.713	3
10	Loss of Reputation	1	4	10	12	5	32	112	0.700	5
11	Decrease in Productivity, Increase in Turnover	1	5	12	13	1	32	104	0.650	11
12	Replace damaged equipment's	1	11	8	8	4	32	99	0.619	12

Calculation of Cronbach alpha value by using SPSS software

The equation for Cronbach alpha to measure internal consistency is as follows:

$$\alpha = \frac{k}{k - 1} \left(1 - \frac{\sum_{i=1}^k \sigma_{y_i}^2}{\sigma_y^2} \right)$$

k represents the number of items in the measure

$\sigma_{y_i}^2$ the variance associated with each item i

σ_y^2 the variance associated with the total scores $\left(y = \sum_{i=1}^k y_i \right)$

..... (Eq. 1)

Alternatively, it can be calculated by the following formula

$$\alpha = \frac{k\bar{c}}{\bar{v} + (k - 1)\bar{c}} \quad \text{..... (Eq.2)}$$

where

\bar{v} represents the average variance

\bar{c} represents the average inter-item covariance.

Safety management assessment for unskilled labor in Building Construction: A Case of Bonga Town, 2024

*data collected.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Sex	Numeric	8	0	Gender of resp...	{1, Female}...	None	10	Right	Nominal	Input
2	Torg	Numeric	8	0	Type of organiz...	{1, Consulta...	None	10	Right	Ordinal	Input
3	Jposition	Numeric	8	0	current job posi...	{1, Director}	None	10	Right	Ordinal	Input
4	Experience	Numeric	8	0	Job Exoerience	{1, Less tha...	None	10	Right	Ordinal	Input
5	Education	Numeric	8	0	Educational Level	{1, Diploma}	None	8	Right	Ordinal	Input
6	Profession	Numeric	8	0	Educational Pr...	{1, Engineer...	None	8	Right	Ordinal	Input
7	Q8	Numeric	8	0	Use of faulty or ...	{0, Not at all...	None	8	Right	Ordinal	Input
8	Q9	Numeric	8	0	Weak Checkup...	{0, Not at all...	None	8	Right	Ordinal	Input
9	Q10	Numeric	8	0	Improper safety...	{0, Not at all...	None	8	Right	Ordinal	Input
10	Q11	Numeric	8	0	Providing poor ...	{0, Not at all...	None	8	Right	Ordinal	Input
11	Q12	Numeric	8	0	Unregister empl...	{0, Not at all...	None	8	Right	Ordinal	Input
12	Q13	Numeric	8	0	Workers get in...	{0, Not at all...	None	8	Right	Ordinal	Input
13	Q14	Numeric	8	0	your project hav...	{0, Not at all...	None	8	Right	Ordinal	Input
14	Q15	Numeric	8	0	Indequate safet...	{0, Not at all...	None	8	Right	Ordinal	Input
15	Q16	Numeric	8	0	There is inadeq...	{0, Not at all...	None	8	Right	Ordinal	Input
16	Q17	Numeric	8	0	Absence of a c...	{0, Not at all...	None	8	Right	Ordinal	Input
17	Q18	Numeric	8	0	Lack of manag...	{0, Not at all...	None	8	Right	Ordinal	Input
18	Q19	Numeric	8	0	Weak governm...	{0, Not at all...	None	8	Right	Ordinal	Input
19	Q20	Numeric	8	0	Local authorie...	{0, Not at all...	None	8	Right	Ordinal	Input
20	Q21	Numeric	8	0	All accidents, i...	{0, Not at all...	None	8	Right	Ordinal	Input
21	Q22	Numeric	8	0	Lack of safety t...	{1, Not at all...	None	8	Right	Ordinal	Input
22	Q23	Numeric	8	0	Lack of PPE	{1, Not at all...	None	8	Right	Ordinal	Input
23	Q24	Numeric	8	0	Lack of safety ...	{1, Not at all...	None	8	Right	Ordinal	Input
24	Q25	Numeric	8	0	Lack of defined ...	{1, Not at all...	None	8	Right	Ordinal	Input
25	Q26	Numeric	8	0	Lack of safety ...	{1, Not at all...	None	8	Right	Ordinal	Input

Data View Variable View

IBM SPSS Statistics Processor is ready Unicode:ON Weight On

*data collected.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
25	Q26	Numeric	8	0	Lack of safety ...	{1, Not at all...	None	8	Right	Ordinal	Input
26	Q27	Numeric	8	0	Lack of first aid	{1, Not at all...	None	8	Right	Ordinal	Input
27	Q28	Numeric	8	0	Lack of safety ...	{1, Not at all...	None	8	Right	Ordinal	Input
28	Q29	Numeric	8	0	Un availability o...	{1, Not at all...	None	8	Right	Ordinal	Input
29	Q30	Numeric	8	0	Lack of knowle...	{1, Not at all...	None	8	Right	Ordinal	Input
30	Q31	Numeric	8	0	Large number o...	{1, Not at all...	None	8	Right	Ordinal	Input
31	Q32	Numeric	8	0	Providing desig...	{1, Not at all...	None	8	Right	Ordinal	Input
32	Q33	Numeric	8	0	Lack of support...	{1, Not at all...	None	8	Right	Ordinal	Input
33	Q34	Numeric	8	0	Transit nature o...	{1, Not at all...	None	8	Right	Ordinal	Input
34	Q35	Numeric	8	0	Lack of adres...	{1, Not at all...	None	8	Right	Ordinal	Input
35	Q36	Numeric	8	0	Extra occupatio...	{1, Strongly ...	None	8	Right	Ordinal	Input
36	Q37	Numeric	8	0	Fatal and injury	{1, Strongly ...	None	8	Right	Ordinal	Input
37	Q38	Numeric	8	0	Reduction in po...	{1, Strongly ...	None	8	Right	Ordinal	Input
38	Q39	Numeric	8	0	Decline in Quali...	{1, Strongly ...	None	8	Right	Ordinal	Input
39	Q40	Numeric	8	0	Increase in proj...	{1, Strongly ...	None	8	Right	Ordinal	Input
40	Q41	Numeric	8	0	Late delivery of ...	{1, Strongly ...	None	8	Right	Ordinal	Input
41	Q42	Numeric	8	0	Decline of mora...	{1, Strongly ...	None	8	Right	Ordinal	Input
42	Q43	Numeric	8	0	Increase declin...	{1, Strongly ...	None	8	Right	Ordinal	Input
43	Q44	Numeric	8	0	Legal Repercus...	{1, Strongly ...	None	8	Right	Ordinal	Input
44	Q45	Numeric	8	0	Loss of Reputat...	{1, Strongly ...	None	8	Right	Ordinal	Input
45	Q46	Numeric	8	0	Decrease in Pr...	{1, Strongly ...	None	8	Right	Ordinal	Input
46	Q47	Numeric	8	0	Replace damag...	{1, Strongly ...	None	8	Right	Ordinal	Input
47											
48											
49											

Data View Variable View

IBM SPSS Statistics Processor is ready Unicode:ON Weight On

a. Reliability checking

To calculate Cronbach alpha value, all respondents' responses are inserted into SPSS software and analyzed. Then the result would be shown below.

Scale: current practice of SM

Case Processing Summary

		N	%
Cases	Valid	84	100.0
	Excluded ^a	0	.0
	Total	84	100.0

Weighted by the variable Use of faulty or improper tools or equipment.

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.969	.971	14

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.884	2.536	3.298	.762	1.300	.050	14

Scale: challenges of implementing SM

Case Processing Summary

		N	%
Cases	Valid	84	100.0
	Excluded ^a	0	.0
	Total	84	100.0

Weighted by the variable Use of faulty or improper tools or equipment.

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.965	.966	14

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.839	3.417	4.298	.881	1.258	.085	14

Scale: effects of implementing

Case Processing Summary

		N	%
Cases	Valid	84	100.0
	Excluded ^a	0	.0
	Total	84	100.0

Weighted by the variable Use of faulty or improper tools or equipment.

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.973	.975	12

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.843	3.500	4.226	.726	1.207	.037	12

