THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION
INSTITUTE OF SCIENCE AND TECHNOLOGY

SAFETY CLIMATE MODEL TO EVALUATE SAFETY PERFORMANCE IN IRAQI CONSTRUCTION INDUSTRY

MASTER THESIS

Elaf AL- ZUBAIDI

THE DEPARTMENT OF ENGINEERING MANAGEMENT

THE PROGRAM OF ENGINEERING MANAGEMENT

NOVEMBER 2016

THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION
INSTITUTE OF SCIENCE AND TECHNOLOGY

SAFETY CLIMATE MODEL TO EVALUATE SAFETY PERFORMANCE IN IRAQI CONSTRUCTION INDUSTRY

MASTER THESIS

Elaf AL- ZUBAIDI
1406060002

THE DEPARTMENT OF ENGINEERING MANAGEMENT

THE PROGRAM OF ENGINEERING MANAGEMENT

Supervisor: Assist. Prof. Dr. Meltem Y. IMAMOĞLU

NOVEMBER 2016

Elaf Dhyaa , having student number 1406060002, enrolled in the Master Program at the Institute of Science and Technology at the University of Turkish Aeronautical Association, after meeting all of the required conditions contained in the related regulation, has successfully accomplished, in front of the jury, the presentation of the thesis prepared with the title of " Safety Climate Model to evaluate Safety Performance in Iraqi Construction Industry ".

Supervisor: **Assist. Prof. Dr. Meltem Y. IMAMOĞLU**

Türk Hava Kurumu Üniversitesi

.....

Jury Members: **Assist. Prof. Dr. Gülesin Sena Daş**

Kırıkkale Üniversitesi

.....

Assist. Prof. Dr. Ayyüce KARADAĞ

Çankaya Üniversitesi

.....

Assist. Prof. Dr. Meltem Y. IMAMOĞLU

Türk Hava Kurumu Üniversitesi

.....

Thesis Defense Date: 25.11.2016

THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION
INSTITUTE OF SCIENCE AND TECHNOLOGY

I hereby declare that all the information in this study I presented as my Master's Thesis, entitled: Safety Climate Model to Evaluate Safety Performance in Iraqi Construction Industry, has been presented in accordance with the academic rules and ethical conduct. I also declare and certify with my honor that I have fully cited and referenced all the sources I made use of in this present study.

1.11.2016

Elaf AL-ZUBAIDI

ACKNOWLEDGEMENTS

All praise to Allah, today we fold the days' tiredness and the errand summing up between the cover of this humble work.

I am heartily thankful to my supervisor, Dr. Meltem Y. IMAMOĞLU, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject and carrying out the research.

I owe my loving thanks to my husband, children, the wider family and my friends. Without their encouragement and understanding it would have been impossible for me to complete my degree.

NOVEMBER 2016 **Elaf AL-ZUBAIDI**

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBRIVIATION

ACR	Accident Rate
CM	Construction Management
CPRW	The Center For Construction Research And Training
EU	European Unions
EIE	Employee Involvement Empowerment
GC	Contractor/Subcontractor
HSE	Health And Safety Executive
HSW	Health And Safety At Work
JP	Job Planning
KM	Kuwait Municipality
KPI	Key Performance Indicators
LI	Leadership ship Involvement
MPW	Ministry Of Public Work
MT	Mutual Trust
MC	Management Commitment
OCI	Owner Client Involvement
OI	Occupational Injuries
OSHA	The Occupational Safety And Health Administration
PCMAT	Plan Condition And work Environment In The Construction Industry
PPPP	Programs, Policies, Practices, And Procedure
PPE	Personal protect equipment
SA	Safety Valued Aligned With Production
SC	Safety Climate
SP	Safety Performance
SHP	Safety Health Program
TE	Training /Education in all level

ABSTRACT

SAFETY CLIMATE MODEL TO EVALUATE SAFETY PERFORMANCE IN IRAQI CONSTRUCTION INDUSTRY

AL-ZUBAIDI, Elaf

Master, Department of Engineering Management

Thesis Supervisor: Assist. Prof. Dr. Meltem Y. IMAMOĞLU

November 2016, 146 page

Construction in IRAQ suffering lately due to poor health and safety. The risk of construction industry makes it very important to pay more consideration of safety and improve safety performance. The objective of the study is to identify factors that influence the safety and to create tools to evaluate and improve the safety of construction companies in Iraq.

The main objective of this thesis will investigate construction worker perception associated with safety climate at construction sites. In addition, the relationship between safety climate and safety performance are explored. The research methodology is dependent on survey questionnaires focus on construction workers. A total of 190 questionnaires are distributed and the end of the number of valid answer is 180 then analyzed to obtain the objective of the thesis. In this study, the field of survey has been carried out through the questionnaire including seven (7) construction companies in Baghdad, Iraq.

Safety performance is to use occupational injuries and accident rate. The correlation between safety climate and safety performance is studied based on the results of liner regression. Most of the safety climate factors have a good

relationship towards achieving safety performance. Two models are developed to show the relationship between safety climate factors, along with the achievement of safety performance. The first model proved that Owner/Client involvement, Leadership involvement, Safety valued aligned with Production, Management Commitment, Communication, Training and Education, Mutual Trust, Safety and Health Programs, and General Contractor or subcontractor construction manager have significant effect against the accident rate. The second model showed that Owner/Client involvement, Leadership involvement, Safety valued aligned with Production, Management Commitment, Communication, Training and Education, Programs, Polices, Procedure and Practices, Safety and Health Programs, and General Contractor or subcontractor construction manager have significant effect on the occupational injury.

KEYWORDS: Construction Industry, Safety Climate, Safety performance, Iraq.

ÖZET

IRAK İNŞAAT ENDÜSTRİSİNDE İŞ GÜVENLİĞİ PERFORMANSININ DEĞERLENDİRİLMESİ İÇİN GÜVENLİ ORTAM MODELİ

AL-ZUBAIDI, Elaf

Yüksek Lisans, Mühendislik Yönetimi Bölümü

Tez Danışmanı: Doç. Dr. Meltem Y. IMAMOĞLU

KASIM -2016, 146 sayfa

Irakta inşaat sektörü, son dönemlerde düşük sağlık ve güvenlik durumlarına bağlı olarak büyük bir buhran yaşamaktadır. İnşaat endüstrisi, güvenlik ve güvenli performansın geliştirilmesine odaklanılabilmesine daha da fazla önem vermektedir. Çalışmanın amacı, güvenliği etkileyen ve inşaat sektörlerinin güvenlik önlemlerinin değerlendirilmesi ve bunların iyileştirilebilmesini etkileyen hususları ortaya koymaktır.

Bu tezin temel amacı, inşaat sahalarında güvenli ortamlar ile ilişkili olarak inşaat işçisinin algısını araştırmaktır. Ayrıca güvenli ortam ve güvenli performans arasındaki ilişki de keşfedilmiştir. Kullanılan araştırma metodolojisi, inşaat işçilerine yönelik yapılan anketlere dayanmaktadır. Toplamda 190 sorudan oluşan bir anket dağıtılmış ve geçerli cevap sayısının ise 180 olduğu görülmüş ve ardından çalışmanın amacını elde edebilmek amacıyla bu veriler analiz edilmiştir. Bu çalışmada nüfus alanı olarak, Iraktaki inşaat şirketleri seçilmiştir. Saha çalışmaları, Irak Bağdat'ta bulunan yedi (7) inşaat firmasını kapsayan bir anket aracılığıyla icra edilmiştir.

Güvenli performans, mesleki yaralanmalardan ve kaza oranından istifade etmektedir. Ardından aralarında mevcut bulunan korelasyon, doğrusal regresyon sonuçları baz alınarak çalışılmıştır. Güvenli ortam faktörlerinin çoğunun, güvenli performansa yönelik aralarında iyi bir ilişki bulunmaktadır. Güvenli ortam faktörleri ile güvenli performansı arasındaki ilişkiyi ortaya koyabilmek adına iki farklı model

geliştirilmiştir. İlk modeller; Mal Sahibi / Müşteri İlişkisinin, Liderlik Katılımının, Güvenlik vb. Üretim, Yönetim Taahhüdü, İletişim, Eğitim, Karşılıklı Güven, Güvenlik Sağlık Programları ve Yüklenici / Altyüklenicinin de kaza oranlarına karşı önemli bir etkisi olduğunu kanıtlamıştır. İkinci model de Mal Sahibi / Müşteri İlişkisinin, Liderlik Katılımının, Güvenlik vb. Üretim, Yönetim Taahhüdü, İletişim, Eğitim, Programlar ve Politikaların, Güvenlik Sağlık Programları ve Yüklenici / Altyüklenicinin de mesleki yaralanmalar üzerinde önemli bir etkisi olduğunu kanıtlamıştır.

ANAHTAR SÖZCÜKLER: İnşaat Sanayi, Güvenli Ortam, Güvenli Performans, Irak.

CHAPTER ONE

INTRODUCTION

1.1 Background

Construction sites are commonly complex and in some cases unsafe. These sites are complex due to considerable use of advanced plants, equipment, and modern construction methods, multitasked and multi-disciplinary areas of the project workforce (Evelyn, Florence, & Adrian, 2005).

In general, construction objects are still probably the most dangerous and unsafe workplaces due to the fact of high occurrence of accidents (Teo, Ling, & Chong, 2005). The industry of construction is characterized by frequent changes, poor working conditions, increased of varying technologies, and require for coordination of various interdependent operations and trades. As a result of the dangerous nature of work, safeness is a serious challenge in the industry (Tam, Zing, & Deng, 2004). Globally, the construction industry possesses a poor safe practices record as well as it is disproportionately risky compared to some other industries, recommended the idea in which safety is no luxurious but an importance (Fung, Tam, Tung, & Man, 2005).

An important consideration in the awareness of well-being among development association has been enhanced in the previous decade. This awareness higher security that can be taken too many elements. For example, business development has come to identify the relationship between hazard administration and profit rates. At any time, which increases the cost of care convalescent treatment, health care and likely for all add to the higher insurance premiums, which are often as likely to have a negative impact on the profit of a corporation. Next, the organization that has a high accident rate is usually prohibited from bidding on the type of work. Therefore, the whole welfare of the company to take whatever shows that needed to deal with safety at work site (Koehn, Kothari, & Pan, 1995).

Large organizations tend to be more efficient construction management and use. Therefore, safety management may be more appropriate to the construction of

large organizations that have the capacity for management to deal with issues like this. In the small along with medium companies, security programs important usually minor and very informal while in large organizations of this type of program is better documented and structured (Tam, Zing, & Deng, 2004). Moreover, each Contractor or Subcontractor can be responsible for producing a risk-free working environment pertaining to each of the employees which meet all present cities, state common safety laws, regulations, and standards. In case there is a discord involving any governing safety rules the greatest standard recognized by any shall apply and use. The primary concentrate will be to avoid injury and property damage or loss to the general public, for example the workers and pedestrians as a result of wrongful and negligence acts of omission or commission by safety personnel or Contractor employees. The Authority of government construction is dedicated to safety and also considers an efficient safety management for sharing responsibility. Every employee of the qualified contractor, irrespective of position, should be essential to allow their safety duties and should certainly be held dependable for such performance.

Many of Safety Management levels are accountable for offering a work environment that maximizes work safety and minimizes dangers to the employees, Contractor Personnel as well as the Public.

Workers are anticipated to provide complete cooperation and support to almost all safety programs phases. This involves compliance with started regulations and rules applicable to their particular conduct and actions; use of personal protecting equipment; and otherwise doing their responsibilities in a secure and safe manner. Every employee is titled and also expected, to record all job-related unhealthy and unsafe working situations for his/her supervisor. Many supervisors are required to correct unfavorable conditions taken to their attention. Each and every Safety employee is accountable to be correctly attired; to have and wear, inside a visually well-known location a photo recognition tag; along with wearing proper Personal Protecting Equipment PPE, such as work boots and hard hat, any time physically provide any construction project. To minimize the number of injuries, fatalities, and accidents in the workplace, essential safety must be the top priority. Despite the fact that the challenge of workplace safety has been viewed in the past as an engineering problem, several researchers have significantly identified that management components have played a critical role in the safety of workplace (Enshassi, 2003;

Hassona, 2005). Scientific studies have been carried out that examine factors for instance safe behavior like safe scaffolding. Then again, little attention is actually focused on other various factors including the effect of group processes, decision making, leadership, communication, degree to which values workers and management utilizes of barricades and signals.

1.2 Problem Statements

Owners of construction companies ought to acknowledge that the management control principles typically utilized to costs, quality, productivity, and schedules are equally relevant to safety. If employed, will enhance Safety Performance (SP). For that reason, we require a tool with regard to management and safety evaluation by finding every factor that may have an effect on the safety performance of construction in Iraq. In Iraqi construction industry, safety is not a priority and safety culture oral and risk assessment is inaccurate.

The problem statement listed below.

- Weakness in the management of safety in Iraq.
- The absence of accident records.
- The presence of unskilled workers.
- Poor safety culture.
- Scarves research on the importance of safety in the Iraqi construction industry.
- Spread misconceptions that the safety measures are considered extra cost.

Worldwide, construction is dangerous because the industrial sector is most dangerous and unique nature. Safety has become a serious problem in the construction project. In the United States (US), construction industry paid 20% of death almost all jobs, any time they produced only 5 % of the United States ' workforce. In Kuwait, an account of the construction industry to get 42% of occupational deaths, in addition to Hong Kong industry accounts for more than one-third of all industrial accidents for the past ten years. Singapore, this particular construction industry occupies 29 % of the overall number of employees of the industry, however, the industry paid taking into account the imbalance by 40 % of

injuries in the industry. These percent generally involve others indicating that this industry provides a poor record for safety performance (Chua & Goh, 2004). Workplace injuries and fatalities provide great losses for either societies or individuals.

Petersen (1971), has described the problem throughout two points: Firstly, people are the essential reason regarding injuries. Secondly, management is accountable for the elimination of accidents. The administration failures symbolize the real and main causes of accidents (Fang et al, 2004).

For developing countries, certainly, there should be efforts to increase the level of understanding among both employers and employees of the significance of wellness and safety in the projects. Many research in developing countries has placed similar truth (Farooqui et al. 2008, Koehn et al. 1995, Kartam et al. 2000, Jill and John 2010).

The emphasis in both developed and developing countries to build the need can be put to the top of the exercise as well as the use of expanded safety program and courses (Koehn, Kothari, & Pan, 1995).

However, safe practices are not a luxurious and could be regarded as an essential purpose to utilize against avoidable loss of injury, property damage, or death. Protecting against occupational injuries and health issues ought to be a major concern of all workers. Little has been done in safety of construction industry in Iraq according to publication studies distributed by country /region (Zhipeng, Yang, & Qiming, 2015).

This study is an effort to recognize the factors influencing the construction safety in Iraq and to provide a tool for assessing the safety of construction companies and accordingly improve it

1.3 Importance of the Study

Safety is paramount importance for the construction industry. The target is to eliminate or reduce the possibility of accidents and illnesses to employees. The construction of secure, workers can complete their work properly and has the ability to carry out the project as planned. Safety is also important to ensure that the flatness of development works on construction sites.

Practitioners and researchers have determined safety climate and safety culture as an essential to decreasing injuries, fatalities, and illnesses on worksites of construction. Numerous construction contractors tend to be improved these indicators as an approach to precede closer to the achieving aim of zero injuries in the worksites.

Accidents in any kind of industry mainly in construction are usually costly in both financial and human terms. As safety is worried with decreasing rates of accidents as well as controlling or reducing dangers in the worksite, avoiding accidents need to be the first substantial step towards protection improvement. Certainly, there are needs to enhance awareness along with exerting pressure on organizations for safety. Social, economic, and governmental rules are a number of factors accountable for this improved pressure. Understanding and identification of accident causing is a prerequisite with regard to improve the safety in the projects.

The accident is consequently invariably permitted or caused directly by the hazardous act of an individual and a mechanical as well as physical hazard (i.e. harmful situation). To prevent accidents it is needed to determine and reduce unsafe conditions and unsafe acts, which might be achieved by standard evaluation of safety on employee training, inspection and site.

This study purposes at evaluating the safety performance including safety and physical climate of the construction organizations in Iraq. This is to the construction companies' benefit to recognize the condition and recognize the factors influencing the safety of construction. This will assist them to obtain the required precautions to manage these factors just prior to be aware for them as soon as they occur throughout constructions that will lead to enhance the overall company performance. This study will be benefit to the construction industry in specific and all industries at large. It will help in increasing awareness and in identifying areas of deficiencies in construction safe.

1.4 Research Aim

This study aims to develop a model for determining the factors of Safety Climate (SC) for construction industry in Iraq. Besides, it will try to examine a relationship between safety climate and Safety Performance (SP) in the industry of construction. This study also aims to enhance SP in Iraq through assessment the factors that influencing SP, as well as achieve the extensive goal to obtain minimum level of injuries and maximum levels of health benefits regarding the labors.

1.5 Research Objectives

The primary objectives of this study could be described in the subsequent points:

1-To develop a SC model to measure SP in Iraqi Construction-Industry.

2-To determine the group of factors that has the highest influence on SC.

3-To determine the relations between SC and SP on construction industry.

The outcomes will make contributions to an enhanced SC as well as an improved safety awareness in construction industry in Iraq.

This study will contribute to:

1- Increased awareness of safety culture and the climate of safety in the construction industry.

2- Reducing the number of accidents and human injuries through a commitment to safety practices.

3- Detecting the factors linked to the climate of safety that may be more influential for safety performance of contractors in Iraq.

4- Guide and lead the staff, management, and contractors focusing on all construction projects in IRAQ for sake promoting a safe work environment for all workers and the general public.

1.6 Research Scope and Limitation

The study is limited to the construction industry in IRAQ. This study has been designed as a filed study by utilizing survey methodology. The unit of analysis will be the individual person in seven construction companies in Baghdad.

1.7 Research Methodology

The main principals used in this study are: Safety Climate and Safety Performance.

Safety Climate and Safety Performance

Valuing and prioritizing safety (i.e., obtaining a positive protection climate) have been demonstrated to improve the performance of safety and reduce employee accidents (Zohar, 2002). The particular impact of SC on safety behavior of individual transferred to SP, known as the effective method (Fang et al, 2006). Many studies provided correlation evidence through recognized factors or dimensions, the SC measure with the performance of safety (Findley et. al, 2007). The climate of safety is generally regarded as a part of a company's climate; in the same way, SP is regarded as to be a sub system of company performance. Therefore, the SC could affect the performance of safety (Wu et. al, 2008).

Key Performance Indicators (KPI) include the advantage of determining weaknesses in practice safety instructions before they reveal as injuries (Mearns et al, 2003). In the case with the development of SC to get any effect on SP, in the case with this study must first make changes in knowledge (Neal et al. 2000). Mohammed (2002), produce model research depends on the hypothetical action safe work that has implications of the current SC environment at the construction site. Generally, SP measurement techniques can be classified directly to behavioral measures, statistical measures, safety audit periodically and good balanced scorecard techniques. Guldenmund (2000), agreed that SC can be regarded as a surrogate indicator of SP. In fact, the concept as the power of safety placed upon the ability to estimate the performance on the safety project (Pousette et al. 2008).

By continuous observation and review of the SP regarding the construction industry, help to enhance safety system, to attain this, a (SC) model is a prerequisite.

A SC model should take into account SC factors, which are pertinent to an organization and its project. In this study, the prevalent factors of SC will be studied together with other factors such as safety training, job planning, program's policies, mutual trust, communication, safety and health programs/system activity, general contractor or subcontractor's construction managers.

This study methodology will be included steps that could be described in the subsequent points:

1. Accomplish literatures review relating to this study topic. The target of this review is to indicate the factors which affect the SP within construction organizations and the measurement techniques of SP.

2. Collect data via a questionnaire survey to assess the factors that affect the SP determined in the review of literature.

3. Carry the analysis of data utilizing proper statistical techniques and methods.

4. Ranking the final results according to their importance and relevance.

5. Report and explain results and significant findings to release recommendations and conclusions.

The study will depend on questionnaires, surveys, and interviews. The collected data will be analyzed using Statistical Methods such as a Descriptive Statistical Analysis, Hypothesis Testing, etc.

Factors that will be surveyed (CPRW, 2013)

1. Owner/client involvement: Typically the owner expectations regarding safety, the owner involves the schedule to support safety. The owner supports prevention through Design.

2. Leadership involvement: Leaders tend to be visible for safety and give needed resources are included with producing safety goals along with metrics, in addition to, performance evaluation contains safety, etc.

3. Safety valued and aligned with production: Safety is appreciated equal to or perhaps higher than production, together with everyone in the company gives that answer coming from the top associated in the organization completely down, etc.

4. Management commitment: Top management is determined to a discussed safety and health vision; management is determined to integrating safety, quality, and productivity.

5. Employee involvement/ empowerment: Primary part for the team - involved and empowered in risk to safety assessment as well as pre-task planning, Effective safety committees, etc.

6. Communication: Continuously facilitated, Active engagement, Two-way of open communication, no filtering, no reprisal fear, Multilingual, Safety metrics visible along with shared with everyone, down, up, and extensive among hierarchy, peers, subcontractors, and colleagues. Experienced-to-inexperienced of peer communication, the early communicates wins throughout company.

7. Training/Education in all levels: The education offered to employees, supporting environment intended for training, continuous verification of training, ensuring that training is presented to all employees, and that training is evaluated correctly; Training contains workers and supervisors.

8. Mutual trust: Fair treatment and consistent response, Transparent flow and free of information, not any fear of recrimination, workers trust that supervisors tend not to dismiss health and safety, workers trust supervisors to perform what they say these workers will do, in order to back them up to any time they are right, as well as to tell them whenever they are performing something wrong.

9. **Job planning:** Safety needs involvement throughout the planning of the construction phases.

10. **Programs, policies, practices, and procedures:** Safety systems tend to be institutionalized and established, policies and programs present commitment to safety practices, and policies support safety and health.

11. **The programs of safety and health (systems activity):** The program or system of Safety and Health is obviously defined, as well as it is uniformly applied and enforced. This is communicated for workers, and that provides appropriate safety training to workers. These are aggressive, not reactive, Normal audits with obvious action plans are utilized, there are obvious learning indications as part of accountability, and this also concentrates on near misses. The item encourages employee participation.

12. **Construction Manager and General Contractor subcontractors' management:** The CM/GC set's safety targets with subcontractors, Involves safety in choosing subcontractors, empowers/Communicates subs on safety, Generates pride as well as provides adequate resources pertaining to safety.

There are five main factors of SC that need more study, because there are no adequate studies about them and its maybe has a good effect on SP mainly in the developing country such as our case study in Iraq.

Test the common SC factors, but in different areas from what it previously held and, which is concentrated in developed countries, and there are no similar studies in developing countries, including Iraq.

Focus on the role of personal safety factors and the amount of people understands the concepts of safety and their role in SP.

To discover their effect on SP, a questionnaire on SC and SP will be conducted in Iraqi construction industry. The questionnaire results will be utilized to develop a SC model suitable for employ in the industry of construction and methods for assessing the SP.

Safety culture is natural to the company; SC can be an appearance of safety culture as a work site, and (safety awareness, safety communication, and safety competence were identified to affect the measurement of safety climate). Literature review showed that SC has considered being a primary indicator associated with SP.

The researcher compared many questionnaires, and at last she adopted two questionnaires as a guidance, first of them was Nordic Occupational Survey NOSACQ-50 and second OFFSHORE Assessment tool to collected data about the safety climate.

Then she added some questions to overcome the lake in questions in these two questionnaires.

1.8 The Organization of the Thesis

This thesis is involved into five chapters, following by the references in addition to three appendixes. The following is included these chapters:

Chapter One: It provides the research introduction. This includes the statement of the problem, the objectives, the research scope and limitations, following by the significance to the study then the research methodology.

Chapter Two: It provides the literature review along with the prior studies and efforts that have been produced within the safety field and the factors that can be affected the safety performance together with safety measurement.

Chapter Three: It covers the research methodology that contains the information regarding the research design, research location, research population, pilot study, the design of the questionnaire, the validity and reliability, the structure of research and then statistical data analysis.

Chapter Four: It provides and covers data analysis. The used of statistical methods, tables and data deduced coming from statistical analysis as well as the statistical results. The methods for improving and assessing the SP in addition to the practice are discussed.

Chapter Five: It summarizes the outcomes and main finding, to provide this research conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In spite of Construction site's importance, it has been considered as very risky places where construction employees are subject to ill- health problems and fatalities. Numerous activities of building construction are naturally risky to safety and health, for instance, working at height, working in confined areas and close spaces to falling materials, working underground, handling hazardous substances, handling loads manually, dusts, noises, making use of equipment and plant, exposure and fire to live cables.

Deaths, severe injuries and permanent disabilities have been increased with regard to build workers through poor working conditions and major accidents. This particular unfortunate scenario has recently been a monumental hazard to the productivity as well as the construction projects overall performance along with reducing the labor force in addition to the country's economy.

To address the above-mentioned issue risk communication, control, and assessment has been contended to be a main point for ill-health problems and reducing accidents on construction sites (Jung et al, 2008; Kirchsteiger, 2005; Smith et al. 2006).

Through risk communication, control, and assessment could be managed; shared, minimized, accepted or transferred (Lingard & Rowlison, 2005). Additionally, risk assessment can determine the risk employees degree face from direct exposure to safety hazard and health at work in addition to help build what is necessary for manage the risk and health protection (HSE, 2004). Likewise, through risk communication, control and assessment project participants are well-educated and informed regarding protective action and risk, concerning the understanding of risk and attitude, as well as warned pertaining to disasters and the way to manage emergencies and disasters (Argenti & Forman, 2002).

This study aims to draw a clear understand of safety in construction industry in Iraq, and to determine the factors affect safety, and how to ill-health problems and

decrease the accidents in the Iraqi construction sites which were a concern for a very long time.

Health and safety regulation universal level

There are various courses where health and safety in the controlled development of reduction of the quantity of mischances that at once reduces the quantity of passing and harm to representatives and harm to the teeth. Governments around the world have kept continuing responsibilities towards workplace that is free from hazards and diseases. This dedication invisible to working arrangements based on the implementation of safety and health laws set the target and to fight the implementation of the arrangement can be characterized responsibility for self-direction in business development in advance. A number of countries really depends upon the Government to control the hazard.

Despite the high cost of working accident environment, development organizations stopped rehearsing as systems administration only health and safety they comply with mandatory controls. In any case, for consistency with these controls may not be sufficient to ensure the adequacy of the health and the implementation of health, for example, include preventive measures only the least.

Various Nations now have laws about safety and well-being at the workplace and its inhabitants from damage by constraining private contract employees, Installations, equipment, instruments and level of security of any rate at the level of specific overall is recognized as a great design practice different. The health in development in the United States controlled by government offices, for example, the word related Safety and Health Administration (OSHA), which gives strict principles and directives to implement safety and well-being at the work site. OSHA characterizes the well-being and the well-being of the guidelines for the development of the industry. Instructions can be used for each of the people who put in development including contract employees, subcontractors, and suppliers. As stated by the head of managing health and safety, it is the obligation of business to build and continue projects to working conditions that are fine for labor. In addition, States that any program that will cover visits job assessment and locales that are consistent, materials and hardware that need to be made by one individual self-contained specified. Ready and health instructions make risks for business to get safety and

well-being that provides its own program and direct every employee of any dangerous conditions and controls identify with representatives, work to keep any threat.

Countries such as the United Kingdom(UK), Singapore, and Hong Kong have adopted the approach of self-regulation of safety, where the owner (including contractors) are required to develop, implement and maintain a safety management system (Ng et al., 2005). As regards to the UK, a lot of legal safety and health originated in Europe. Proposals from the European Commission agreed by the Member States. The Member States are responsible then make them part of their domestic law. The European Union's key role in health and safety is to harmonize standards and workplace laws and eliminate trade barriers across the Member States. Direction from the EU is valid binding on each member countries and must be included in the National law of each Member State. The instruction set specific aims at the minimum covered in national laws. Some States include instructions faster than others. Act Health and Safety at Work Act is based on general rules to all places of work. All the rules in the Act apply to construction sites. Health and Safety at Work Act 1974 (HSW, 1974) are the Basic Law of the British health and safety. It outlines the requirements of a valid employer and many others should be included. An important part of this Act forms the Health and Safety Executive (HSE). The purpose of the Act is to ensure safe working conditions and health of the working men and women to allow enforcement of the standards developed under the Act. The Act established by the HSE to achieve the above goals.

In Singapore, legal safety of construction sites is governed by the conditions stipulated under the factories (building operations and works of engineering construction) regulations require all colonial construction to some job site, which has a contract value of S $10 million or more to implement a safety management system that are prescribed under the 1999 code of practice for safety management system construction to some job site (Teo and Ling 2005).

In Finland, safety is the responsibility of the employer, while the occupational safety and health legislation are enforced by the labor inspection services, State Organization (Yränheikki and Savolainen 2000).

China's Ministry of construction has assumed overall responsibility for monitoring the construction industry where the role include implementing new

strategies and policies such as providing development programs, control of the construction market and construction institutions and monitoring the safety of construction (Tam, 2004).

Most Arab countries have enacted laws to protect the safety of the worker. Many have established committees or health and safety Affairs Ministry. Moreover, the Council of Arab Ministers of health and Safety is trying to increase the capacity in this field. However, the implementation of the law on safety and health is still limited. In addition the Committee on Federal in collaboration with several Arab and regional organizations and international has some directory to determine the effect of the health and safety of construction activities.

Safe practices in Kuwait are regulated by two agencies the Government of Kuwait Municipality (KM) and Ministry of public works (MPW) in addition, to the High Safety Committee and at the State level (Kartam and Bouz 1998). Safe practices in Saudi Arabia are not controlled by any government agency but become the responsibility of top management organization (Jannadi and Assaf 1998).

In Iraq, the Iraqi National Security Canter/Safety Precautions in the Division work in accordance with the provisions of law (151) in 1970 and functions relating to occupational safety and health law section patrol is a list of law-workplace safety for 2011 [http://wiki.dorar-aliraq.net/iraqilaws]

Therefore, every construction organization should have a clear policy for the management of health and safety so that everyone associated in the organization aware of health and safety goals and objectives. For policy, it must recognize the spirit as well as a letter. Safety and good health will also increase the performance of the Organization in areas other than health and safety, helps with the personal development of employees and reduces financial losses. It is important for each construction site the entire organization is aware of the policy (Hughes and Ed 2008).

2.2 Safety Climate

The Center for Construction Research and Training (CPRW, 2013) distinguished between two principles:

Safety Climate (Organizational): The shared creative ideas of safety procedures and policies by participants of a company at a given time limit, in particular, relating to the adequacy of consistency and safety between actual conditions in comparison to be espoused safety procedures and policies. Homogeneous subgroups are likely to develop shared creative ideas while between-group variations are not uncommon in a corporation.

Project Safety Climate: Occupational safety and health perceptions on a certain construction project within the time limit. These are the various safety climates' products coming from the different companies included within the project such as the project owner, general contractor/construction manager, in addition to subcontractors. Safety climate project could be heavily affected by local conditions, including project incentives, delivery schedule and planning, and method.

Zohar (1980), created the expression safety climate within an empirical research of safety perceptions in the industry manufacturing, and identified it as a brief conclusion of moral perceptions which employees share concerning their work environments and areas.

Niskanen (1994), highlights safety climate as some of the attributes, which can be recognized about certain work organizations and that might be caused by the practices and policies companies impose on their workers. As a result, these safety climate definitions are certainly associated with the ones of safety culture.

Guldenmund F (2000), suggests that climate and culture may be comprehended as a sphere along with three layers. In the center, the factors are commonly related to culture; the fundamental assumptions presented by the organization. These assumptions refer to the human behavior understanding and relationships with the work nature. This model middle layer pertains to what is frequently introduced as safety climate. It shows the specific attitudes, and values expressed relating to safety and protection.

These values and attitudes could be seen in training approaches, procedures, policies, and formal communication. The final, external layer contains what is

introduced to as artifacts. All these artifacts are the safety climate results (level 2), and even contain things, for example “accidents” and occurrences, using personal protecting equipment PPE, the existence of bulletins and posters, and some other safety-related objects and behavior. An instance of how these three layers happen to be interlinked. The fact is that an organization has a primary assumption that deaths and accidents are the consequence of bad luck.

The assumption results throughout an attitude of “safety training will not stop accidents” or “it will not happen to me” This attitude after that manifests itself in the behavior of risk, for instance, not following protected work procedures or possibly not employing the appropriate PPE.

Guldenmund (2010), highlights that provided aspects are anxious in each definition. The primary differences among these definitions are that unlike safety, culture is indicated by shared fundamental attitudes, beliefs, and values towards work and the business generally, safety climate seems to be closer towards procedures, and is classified through day-to-day awareness towards the working practices, working environment, management, and organizational policies.

2.2.1 Safety Climate’s Influence on Safety

Zohar (1980), find the eight dimensions of safety climate: perform safety administration attitude, along with the impact upon the safety interests, the results required workplace safety, the status of the safety committee, the status of safety officers, the effect of the safe conduct of the promotion, the level of risk at the workplace, social status.

Brown & Holmes (1986), examined the factor structures of a short version of the measurement of (Zohar, 1980) using the analysis of the factors of the symptoms, and the need to identify three factors: physical risk, management actions, and management of indecision. In a climate of safety running of the study factors in two of the various organizations using the same instrument.

Coyle et al (1995), has outlined seven factors pertaining to one company and six factors of other companies; again, factor structure in the two companies is different from the structure of the components found in a previous study. As such, Coyle et al (1995), concluded that the coming safety climate structure was stable and unpredictable.

Cox & Flin (1998), recommend that the structure factor can be industry`specific. This example, they have developed an instrument includes 18 items to assess the safety climate within the gas industry organization. Research they have found five factors: individual responsibility, private doubts, safeness environment handling, personal immunity and managing competencies related to safety.

Cheyne et al (1998), dependent on the questionnaire designed by Cox & Cox (1991), carried out a safety climate research in the sector of manufacturing, and has determined five safety climate factors: communication, safety management, safety goals and standards, individual responsibility, and personal involvement. Except for individual responsibility, the outcomes of Cheyne et al (1998), fluctuate from the study of (Cox and Cox in 1991).

Little research has particularly examined for the mechanisms through safety climate impact on safety outcomes (Neal et al, 2000; Guldenmund, 2000).

Neal et al (2000), applied Structural Equation Modeling (SEM) to analyze the pathways through safety climate affects specified outcomes within a large hospital in Australia. The study pointed out that safety climate affected knowledge about motivation and safety to behave safely. Both these two factors subsequently influenced safety participation and compliance. He suggested that safety climate has an effect on compliance with safety rules and procedures, for example, utilizing the equipment of personal protective, by having an influence on whether the individuals have the necessary knowledge about safety as well as by giving sufficient motivation for the rules. An assumption of a great safety climate can also be thought to motivate participation in activities, which cannot directly affect the personal safety, but positively influence the company safety in general. These activities might include, for instance, participation in safety monitoring, safety planning, and also tool box talks.

Greater research concentration has been provided to the different factors that contribute and comprise to safety climate. Generally, the majority of research has observed which safety culture is identified by the ability, commitment, communication and leadership styles of management; and the competency, training, participation, attitudes and behavior of individual workers (Guldenmund, 2000; Glendon & Stanton, 2000; Neal & Griffin, 2006; Farrinton-Darby, 2005).

DeJoy et al (2004), determined that 55% of safety climate perception in a retail company was described by environmental circumstances, safety-related programs and policies, as well as organizational climate in general.

Environment conditions related to workplace conditions, for example, noise, heat, hazardous and chemical's tools along with equipment. Safety policies programs related with the directives' existence revealing the value an organization's management positioned on safety. General climate involved an individual's assumption of different aspects of their organization, such as areas, including leadership, organizational support, communication, innovation and participation. The study identified that safety programs, and policies placed the highest correlation along with safety climate, through organization and communication support becoming the second greatest factor. This finding reveals that safety communication, policies, and organizational support could play the most powerful role in identifying safety climate.

Dedobbeleer & Beland (1991), discussed safety environment for the construction industry in America and discovered that two factors showed the construct: workers' participation in safety, along with management commitment towards safety.

Neal and Geiffin, (2000), the employee's perception on the organizational procedures, policies, and practices associated with safety includes the safety climate.

Flin et al (2000), Despite the lack of stability safety factor structure, studies done through the scale of 18 climate security that come from various industries revealed that there are five dimensions. Most often occur in relation with the management or supervision, risk, security systems, efficiency and stress.

Mohammed (2002), discovered four independent variables identified safety climate: safety, management, competence and risk.

Cooper & Phillips (2004), every structure is exclusive to each population within consideration, in addition to the factors developed in a single industry are not able to be generalize to other industries. Early factor structure prediction is impossible.

Zohar (2010), Safety climate can be gauged on a periodic basis and easily with the help of established review questionnaire-considered a key indicator of the safety

organization. It helps to determine the potential issues regarding the management of organizations, which can lead to the critical accident.

In the construction industry context, various notable safety climate studies have been carried out: (Dedobbeleer and Béland, 1991; Mohamed, 2002; Glendon and Litherland, 2001; Choudhry et al., 2009; Fang et al., 2006; Zhou et al., 2011; Lingard et al., 2005)

Safety climate factors comparison in the industry of coaching just six all this study specifically concerned with pieces rather than safety climate elements had been selected (Mohamed, 2002; Dedobbeleer & Béland, 1991; Zhou et al., 2011; Glendon & Litherland, 2001; Choudhry et al., 2009; Fang et al., 2006).

The studies of Glendon & Litherland (2001) and Dedobbeleer & Béland (1991) had been run in the coaching industry by using safety climate matter initially raised with regards to other industries. Three other studies have been conducted by investigators in the construction industry.

Mohamed (2002), could be among the earliest researchers throughout construction to evaluate construction safety environment. The studies of Choudhry et al. (2009), Fang et al. (2006), and Zhou et al. (2011) are directly relevant studies leading to the latest safety climate research in the industry of construction.

2.2.2 Dimensions of Safety Climate

Many researchers try to develop the safety climate dimensions.

Zohar (1980), The first efforts made by who analyzed eight factors: perform safety administration attitude, along with the impact of the safety interests, the results required workplace safety, the status of the safety committee, the status of safety officers, the effect of the safe conduct of the promotion, the level of risk in the workplace, social status.

Donald & Canter (1993), produced in Safety from the Attitude Questionnaire (SAQ) to measure the attitude, which consists of sixteen scale. Explanation is the measurement of attitudes of worker safety, using the questionnaire as an instrument of measurement, seem to be comparable to the audit of safety management. It has been used for the study of safety in an organization more than 40 during six years,

and found that the instrument is reliable and valid in the expected safety performance.

Coyle et al (1995), recommended that no universal number of these safety climate factors are existed.

The United Kingdom (UK) produced a Safety and Health Survey Tool that include ten factors: line management commitment‹ organizational communication and commitment, personal role, supervisor's role ‹competence, fellow worker influence ‹risk-taking behavior along with some contributory influences, permit-to-work, some hurdles to safe behavior ‹as well as reporting of injuries and near misses (HSE, 1999).

Guldenmund, F (2000), SC dimensions are the main levels or features of SC. In addition; the outcomes of reviewed fifteen safety studies were risk, training, management, procedures, work pressure, and safety arrangements.

Williamson et al (1997), came to the conclusion a safety climate evaluated, for example, four perceptions and four measuring attitudes.

Dedobbeleer & Beland (1991), examined two-factor models. In the first factor model, it was named management commitment in order to safety as well as contains: individuals' assessment of administration's attitude to workers' safety and safety practices, workers; foremen's behavior perception, equipment available, and safety training in the time of preliminary employment. The next factor was workers' participation in safety consists of: employees perceived susceptibility to injuries in the coming year, risk-taking in the work, personal control about protection at work, and also the existence of standard job safety meeting.

Flin et al (2000), determined the popular SC features by reviewing eighteen safety climate studies that are published between1980 and 1998. Through these reports, he discovered that the regularity applied themes for explaining the safety climate dimensions were safety system, management, risk, procedures, competence, and work pressure.

Glendon & Litherland (2001), discovered the SC in the industry of road construction. As a result of factor analysis, it has been discovered that the dimensions of SC were: adequacy of procedures, communication and support ‹personal protective equipment, work pressure ‹relationships, and safety regulations.

Mohamed (2002), outlined 10 dimensions to explain the SC in the environment at the construction site. These ten dimensions were: communication, commitment, safety procedures and rules, supervisory environment, supportive environment ،risk personal understanding, workers' involvement, appraisal of work risks, competence, and work pressure.

Fang et al (2006), outlined ten SC factors, including: management commitment and safety attitude, safety training and safety consultation, worker's role and supervisor's role, safety resources, risk-taking behavior, appraisal of work risk and safety procedure, worker's involvement, improper safety procedure, competence, and worker's influence.

The Table A-1 shows some researchers concerning safety climate and its dimensions and some advantages and disadvantage. All details in appendix A.

2.3 Safety Performance (SP)

These studies that have focused on rate and type of accidents, SP records, and associated lost time and cost (Everett & Frank, 1996; Hinze, 1994; Tang et al., 1997; Smallwood, 1997; De la Garza et al., 1998).

Safety research in the construction sector determines eight essential factors that drive to the performance of safety. El-Mashaleh et al (2010), record these factors in addition to summarize major statements as shown in Table 2.2:

Table 2.2: Safety Performance Factors

Factors	Research	Key statement
Organization safety policy	Hinze & Wilson (1999); Sawacha et al. (1999); Wong et al. (1999)	Organizational safety policy is indeed a major driver safety performance far better in the construction industry.
	Jaselisks et al. (1996)	Better safety achievements including the development of the written Safety programs more comprehensive.
Safety training	Construction Industry Institute (CII) (1993)	Safety training course is one of the five high impact really no accident techniques.
	Hinze & Wilson (1999)	Employee training is important for enhanced security performance.
	Huang & Hinze (2003)	The safety training lack is usually a contributing factor for many falls.
Safety meetings	Jaselisks et al. (1996)	To improve safety performance in this stage of the project, it is proposed to increase the number of correct safety meeting along with supervisor.
Safety equipment	Chi et al. (2005)	Fall related to lack of unguarded openings guarded, scaffolds in compliance with the coverage to be inappropriate, improper disposal and protection using personal protective equipment (PPE).
	Duncan & Bennett (1991)	Each steps of passive and active measures needed to reduce accidents falls.
	Toole (2002)	Some due to an injury due to construction facts safety equipment to carry out the work safely exist on site work.

Table 2.2: Safety Performance Factors (cont.)

Factors	Researcher	Key statement
Safety Inspection	Hinze & Wilson (1999)	Site visit work much more is needed to improve safety performance.
	Jaselisks et al. (1996); Wong et al. (1999)	Safety performance is influenced by site security assessment.
Safety Incentives and penalties	CII (1993)	Safety incentives tend to be among the best five high-impact really no accident.
	Jaselisks et al. (1996)	There is a request to increase the fine to workers with bad Safety achievements.
	Tam & Fung (1998)	The tender safety should be used to improve safety performance.
Workers' attitude towards safety	Abdelahamid & Everett (2000); Toole (2002); Hinze (1994); Aksorn & Hadikusumo (2008);	People who work ' attitude towards security is absolutely one of the main reasons of the accident.
Labor turnover rates	Harper & Kohen (1998); Hinze & Gambatese (2003)	Higher proceeds rates are related to higher injury rates.
	Hinze (1981)	New employees are more afflicted by accidents.

2.3.1 Measures Safety Performance

There are many measures to measure safety performance. This study will use two of them in our study, which is accident rate, and occupational injuries, and these measures are:

- Injuries (Huang et al., 2006)

-Safety Participation (Neal & Griffin, 2006)

-Safety Compliance (Mohamed, 2002)

-Accident rate (Tam and Fung (1998)

-Incidence rate (Jaselskis EJ, Anderson SD, and Russell JS. (1996))

Incident: An unplanned, undesirable event that prevents achievement of a task and might cause illness, injury, property damage or maybe some combination coming from all three in different degrees from minimal to catastrophic. Unsought and unplanned do not mean; incapable of prevent. unsought and unplanned, likewise, do not imply; unable to prepare with regard to Crisis planning is certainly how we get ready for serious incidents, which occur the required response for minimization.

Near Miss: A part of incidents which can get resulted in illness, injury, or property damage, in case given a diverse set of occasions, but did not. It is also identified as 'closecalls'.calls'.

Accident: It can be defined similar to the incident, however, supports the mentality that it cannot have been eliminated. An accident is certainly the reverse of the basic intentions of a protection program, which can be to obtain hazards, prevent incidents, and fix hazard. When we admit that accidents don't have any cause, we presume that they can happen again.

2.4 Models and Frameworks

Safety Climate model is needed in the following conditions.

• By Measuring SC could be a beneficial leading indication of SP.

• The SC rating utilized to proactively as the leading indicator, change before injuries or about miss occurs.

•The benchmark of SC applied to organizational safety after some time and against sectors of industry.

The initial explicit research to climate produced in an organization setting in the leadership study impact on ‘social climate’ within men groups, even though they did not establish this concept.

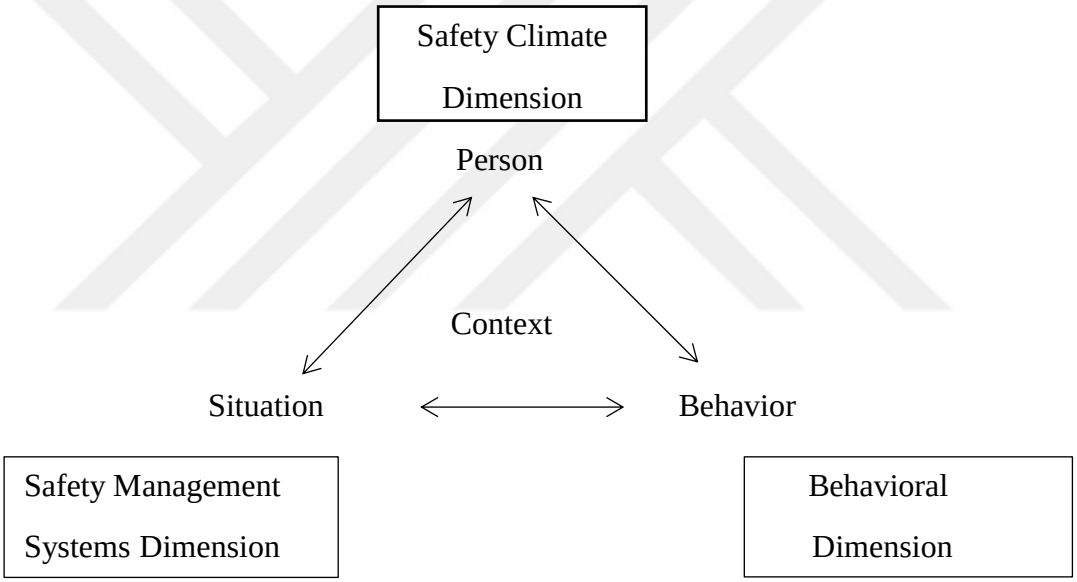

Figure 2.1: Reciprocal Model of Safety Culture (Cooper M., 2000).

Kenny (2009), proposed the next model which is the mediation model, this model explains the relation among the independent variable with the outcome variable, and examine if there is a mediation path between them see Figure 2.2.

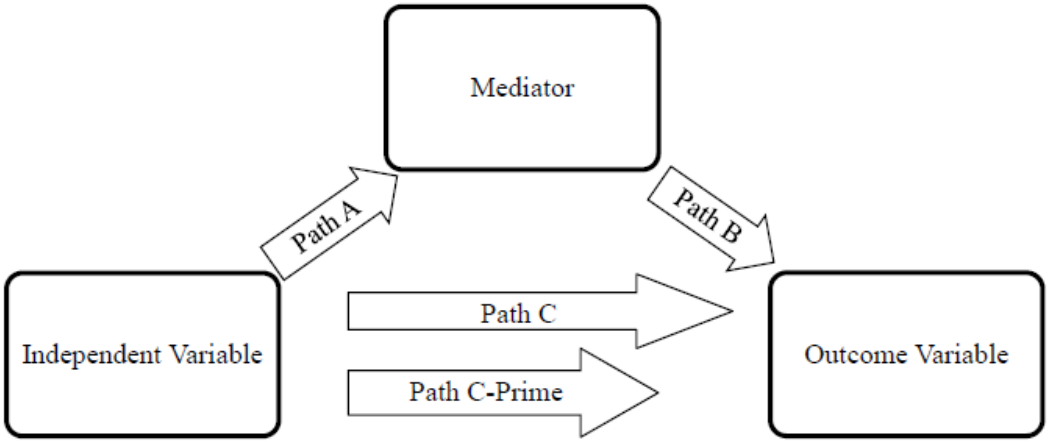

Figure 2.2: Mediation Model (Kenny, 2009).

This model was widely used in SC modeling and used by many researchers see Figure 2.3.

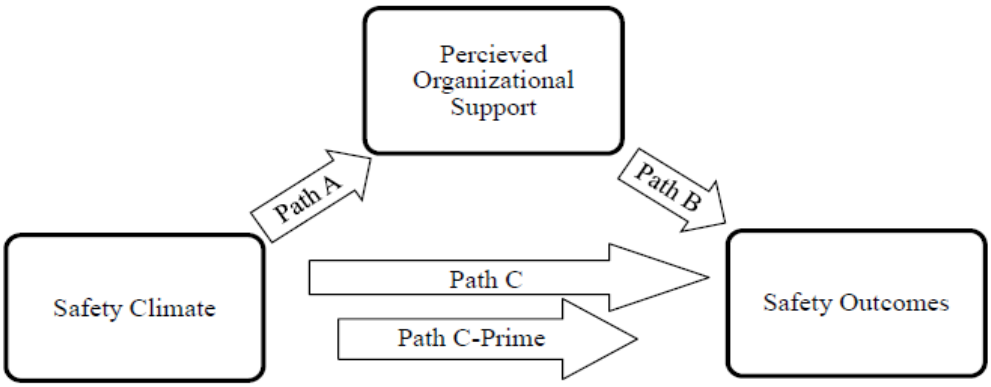

Figure 2.3: Deploying Mediation Model in Safety Climate.

From the literature review of models in previous studies, many attributes affecting safety outcomes were found. Kenny 2009, proposed two models in the final model he found there are two paths of relation some attribute affect directly in safety outcomes while the other cross through mediation path that means the relation not directly.

As example of this type, see Figure 2.4:

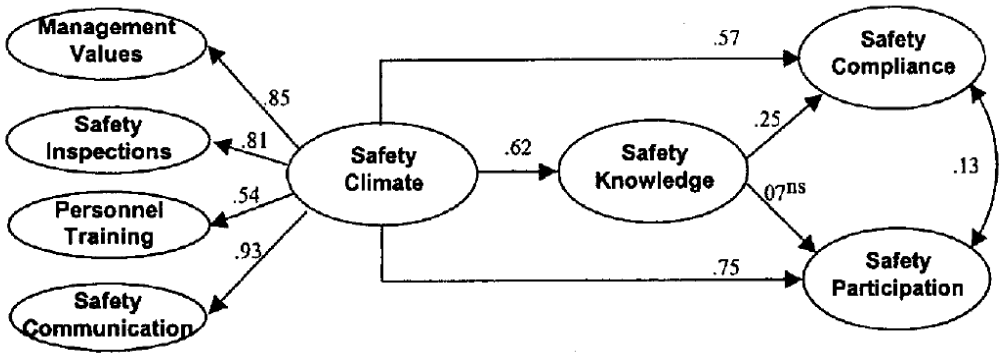

Figure 2.4: Mediation Model (Neal & Griveein, 2000).

Neal & Griveeien (2000), they used the same idea of the model that proposed by the researcher (Kenny, 2009). They suggested safety climate as a moderate variable between safety climate attributes and safety performance that represented by safety compliance and safety participation, in our model we used same safety climate factors that are communication and training.

As the software develop a structural models widely used it becomes a fashionable method (Siu et al, 2004) the Figure 2.5 shows a model developed by this researcher.

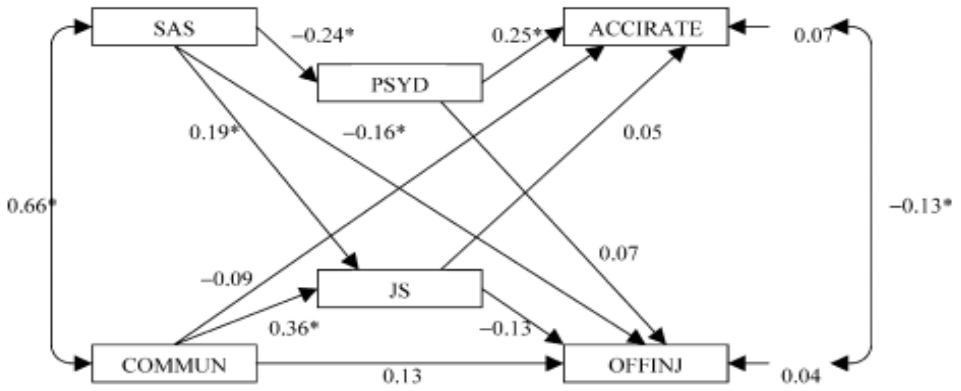

Fig. 2. The finalized model with path coefficients. Standardized structural parameters are reported.

Figure 2.5: Common Structural Model.

Siu et al (2004), used Structural Equation Model (SEM) to approve the relation between safety climate factors and safety performance factors (accident rate and occupational injuries) and they can approved a direct relation between safety attitudes and occupational injuries, psychological distress with accident rate and important relation between accident rate with occupational injuries .in this thesis, we used the same factors of safety performance (accident rate and occupational injuries) therefore, the questions of safety performance that used from this researcher adopted as a source of thesis questionnaire.

CHAPTER THREE

RESEARCH METHODLOGY

3.1 Introduction

This chapter offers a path map for the research design and processes of data collection and data analysis as figured in Figure 3.1. To explain whole planning in the study. The phases 1 (proposal) consist of three chapters can consider the basis for this project, which are introduction, literature review and lastly methodology. Through these stages will get the problem statement for project, objectives (research objectives), scopes, and any data that have the relationship with the project which gathering from different sources and propose the model or method that will find the solution for the research problem. Whilst the phases 2 of the study, the actual interpretation and analyzing as well as suggestions with regard to enhancement are going to be complete, should be there is the relationship between methodology and objectives for the project that will help to flow the project smoothly. (The chapter provides a detail discussion about sample selection, data tool, and design to the study, data-collection, and data-analysis procedure).

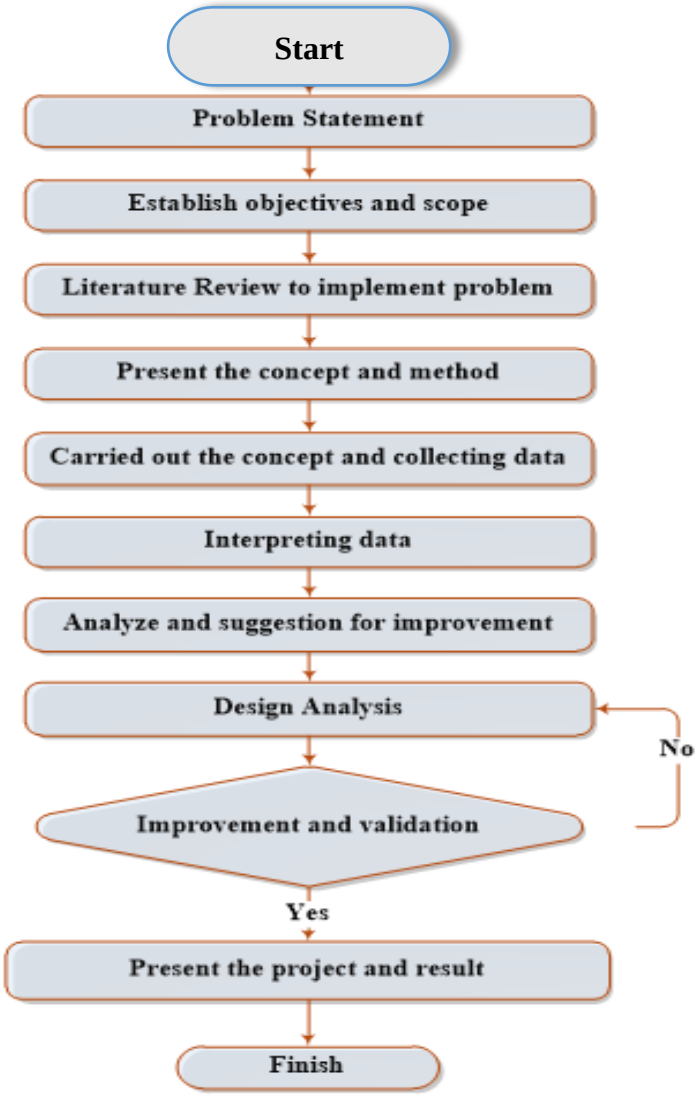

Figure 3.1: The Flow Chart for Project

3.2 Research Approaches

The definition of research approach is referred as a logical and systematic procedure to solve a problem using the assistance of facts and details (Yin 2003). Stake, (2000) and Patton (2002), state that research includes the analysis of data and the assortment of related variables regarding which reliable and valid information is gathered, analyzed, and recorded.

Liu & Fellows (2003), present in their research, there are two main methods to research namely; quantitative approach and qualitative approach. However، Creswell (2003), determined a third method which known as it mixed technique approach.

3.2.1 Quantitative Research Approach

The quantitative research approach adopts as a deductive study in addition to the objective view that often is indicated by concrete data, for instance, counts, mass, weight, and some other physical procedures (Fellows & Liu, 2003). This normally includes the research of frequencies and various measurable variables by making use of the aim of describing a particular phenomenon. The basic features would be cause-and-effect considering and thinking, questions and hypotheses, and the usage of measurements, as well as it is prepared to be deductive; this means that it is testing theory (Yin, 2003).

This type of research method is typically dependent on two research techniques namely experimentation and survey. Experimentation, observation of the phenomenon occurs under intentionally controlled conditions developed by the researcher. The required of a survey is either interviewing or using questionnaires from respondents of the research sample.

One of the quantitative approach advantages is that measuring the reactions of numerous people using a restricted set of questions, therefore, assisting comparisons as well as statistical aggregation regarding the data, besides the results could be generalized.

3.2.2 Qualitative Research Approach

Alternatively, qualitative research explores the inductive along with subject view of the real world awareness. This views organizations or individuals in an alternative manner instead of hypotheses and isolated variables. Cresswell (2003), detected that qualitative data give details in depth using direct quotations together with a careful explanation of situations, programs, interactions, people, events, and noticed behavior. Yin (2003), suggests that the qualitative approach presents the respondent possibility to talk freely end conveniently, which may give essential data, which might not be attained by the quantitative approach. Creswell further concerns that typically the qualitative needs use diverse knowledge claims, methods of inquiry and strategies for data collection and data analysis.

3.2.3 Mixed Research Approach

This particular approach of mixed research is actually a mixture and combination of both qualitative method and quantitative method to data collection, then data analysis, and other research process phases (Morgan, 2006; Creswell & Clark, 2007). The assumptions fundamental the mixed approach symbolizes bipolar extremes, compared with it has a tendency to focus on both the deductive-objective-generalizing approach and inductive-subjective-contextual approach (Morgan, 2006). The following approach has a tendency to base knowledge states on pragmatic grounds, by which research problems could be realized better by using both approaches rather than by employing only one approach (Creswell, 2003). This method consists of collecting both text and numeric information, either sequentially or simultaneously, therefore, as to best comprehend research problems, through the final database that represent both qualitative data and quantitative data (Clark & Creswell, 2007).

This study considered Quantitative Research Approach for many reasons that explain below.

The quantitative method is looking for causes and facts from the perspective on the relationship between variables so that interpretation of cause and effect between these variables. This case we searched where it was to examine the relationship between safety climate and safety performance.

The quantitative method aims to test hypotheses in a standard way, in this study aim to check out the impact of the variables.

Quantitative research design study and develop hypotheses and a description of variables when preparing the draft study and before starting to collect data in reverse Qualitative Research [http://Kenanaonline.com/users/wageehelmorssi].

3.3 Research Methodology Process

The research procedure consist of seven stages. The research procedure requires a sequence of stages used. Below Figure 3.2 refers to the stages throughout this research process.

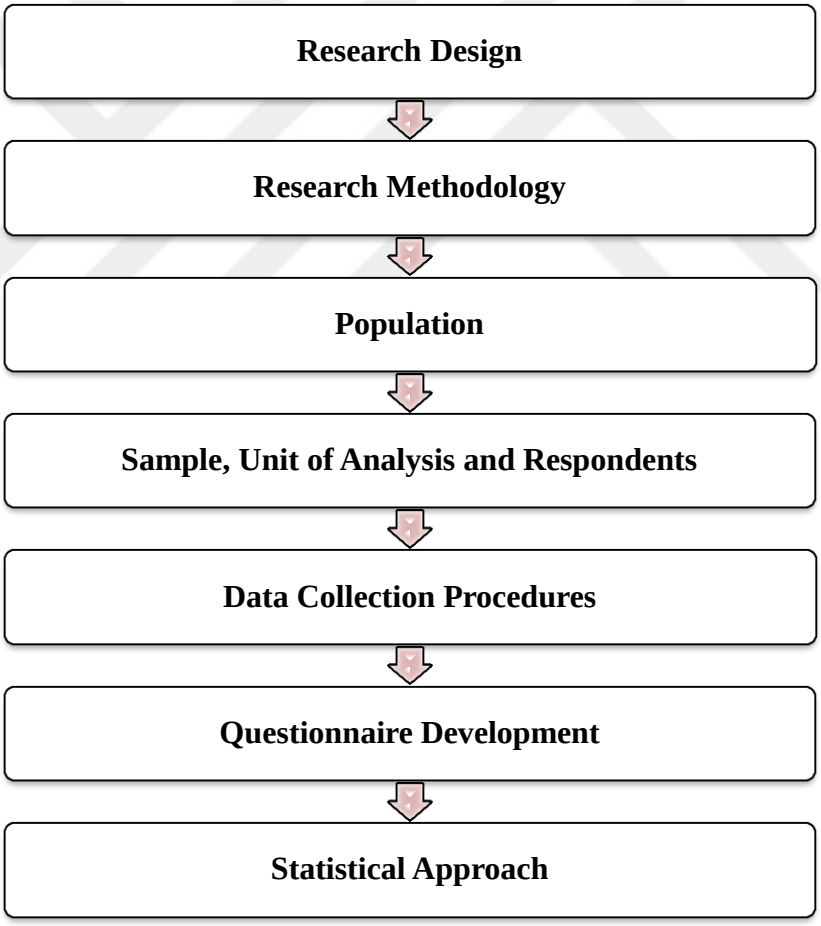

Figure 3.2: Research Methodology Process

3.3.1 Research Design

This research has been designed as a field study utilizing survey methodology, to determine the relationship between the safety climate and safety performance.

Configure the exploration to refer to the order to seize and use information so that find data that can be obtained with sufficient exactness. This study will get an overview of the cross-sectional review approach. This is an approach in which the data of the people gathered at the place alone at the time that is to say, in this situation. Occupancy inspection procedures (sometimes known as grab, convenience sampling or opportunity sampling) to be used for information gathering (Scott et al, 2010).

Occupancy inspection is a system non-examining the possibility where the subject chosen in view of the availability of advantages and nearness to their experts. This investigation unit are construction companies in Iraq.

Sampling Methods

Screening techniques is the possibility by or nonprobability. The probability of specimen, every Member they have non-zero possibility known to browse. The strategy includes examining the possibility of irregular, analytical examination and testing of arbitrary stratified. In examining nonprobability, individuals will be selected from the population of how arbitrary. This includes examining, examining offices, think the type of test and inspection of snowballs quantity. The possibility of inspection of the Upsides is that check error can be calculated. Error checks is how many instances may differ from people. At a time when its residents, make up for the revenue accounted for including or reduce the error checks. In examining nonprobability, how much unique specimens they are still obscure.

Random sampling is the examination of the possibility of the most presentable. Every Member they have the same door open and known to browse. At the point when there is a vast population, it is always inconvenient or difficult to distinguish each of their members, so the subject Assembly accessible to be a predisposition.

Systematic sampling more frequent use of arbitrary inspections. It is also known as the system of selection of Nth. After that time required specimens have

been described, every Nth record selected from individual string from its residents. Any period of time that the string does not contain any sort of test procedure, shrouded this is in the same class as irregular inspections. The upside of those only through irregular examinations was straightforward in effortlessness. Efficient test is often used to select a range of records of document's PC.

Stratified sampling techniques are generally used to higher odds for irregular checks on the grounds that it lessens the test error. Strata is a part of those who share no less than basic trademarks. Cases of stratums might be men and women, or heads and managers free of charge. Scientists first distinguish stratums and their representation in pure people. Irregular test was then used to select a satisfactory number of subjects from each Stratum. "Enough" refers to the example size is spacious enough for us to continue to be wisely that the Strata was talking to people. Irregular stratified test is often used when at least one stratums in the populace has a low occurrence inconsistent with replacement stratums.

Convenience sampling used as part of research where experts are busy with getting shoddy for authentication. As the name suggests, choose in the test because it is clear and simple. Non probability strategy frequently used as part of the shift of basic examinations to get net revenue under review, without obtaining cost or time is expected to choose a specimen that is not proper.

Judgment sampling is a typical non probability strategy. Scientist specimen in the premises of the judgment. This is usually and expansion of testing office. For example, an analyst may choose to reverse the entire example from the one "agents," although its residents cover all urban areas. At a time when using this strategy, the analyst must make sure that the determination of the specimen is really talking to the entire people.

Quota sampling is proportional to the quantity of non-probability inspections, stratified. Stratified inspections, as analysts first recognize the stratums and how far they are because they will speak to the people. At that time in the Office or the judgment of inspection is used to select the required number of subjects from each Stratum. This differs from stratified arbitrary test where the stratums that filled-in irregular checks.

Snowball sampling is an extraordinary nonprobability strategy is used when the attribute instance required is something exceptional. It can be made to how recent the inconvenience or cost tight to find the respondent in this case. Snowballs inspection depends on references from starting the subjects to create additional subjects. Despite the fact that this strategy can significantly reduce the cost of investigations, it comes to ruin presents the predisposition based on the fact that the procedure itself diminishes the possibility that example will talk to their eligible cross segment.

3.3.2 Research Methodology

Look into the procedure is to orderly arrangement of rules or exercise to help with researching a valid and reliable comes (Mingers, 2001). Although it is always either to choose the technique that strengthens the generalizability, authenticity and exactness (McGrath, 1982), all exploration system for its inconsistent damaged in some instances (Dennis & Valacich, 2001). Constraints using a study of the views can be inclined by using optional producing approach for other weaknesses. Kaplan and Duchon (1988), state that no one can deal with research can provide the data frame wealth as per needs creativity further headway (Kaplan & Duchon, 1988). Figure 3.3 below explain requires a sequence of stages used.

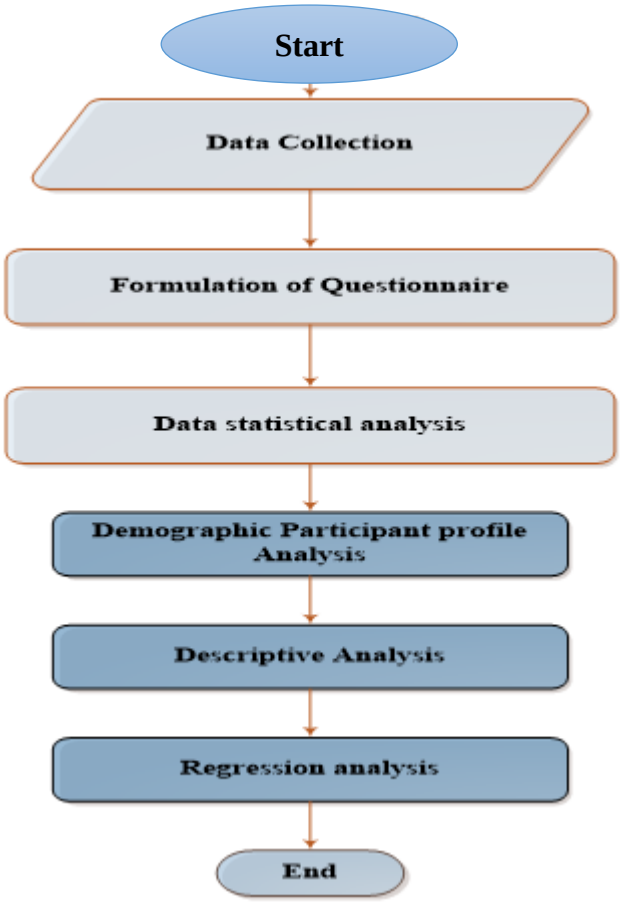

Figure 3.3: Data Collection Phase Operations Flow

The first step in the research methodology process is to design questionnaires, then collect the data from the target audience. After collecting data, run the analysis, to check demographic and descriptive values of surveyors.

3.3.3 Population

This study employs quantitative techniques to explore the factors that affect worker safety performance for construction companies in Iraq. The study involves the collection and analysis of quantitative data correlated to the construction companies search for support for the outcomes of the quantitative data analysis and to recognize additional factors that are not discovered. This chapter offers an overview of the approach employed to research methodology selection and describes that are developed to address the research question.

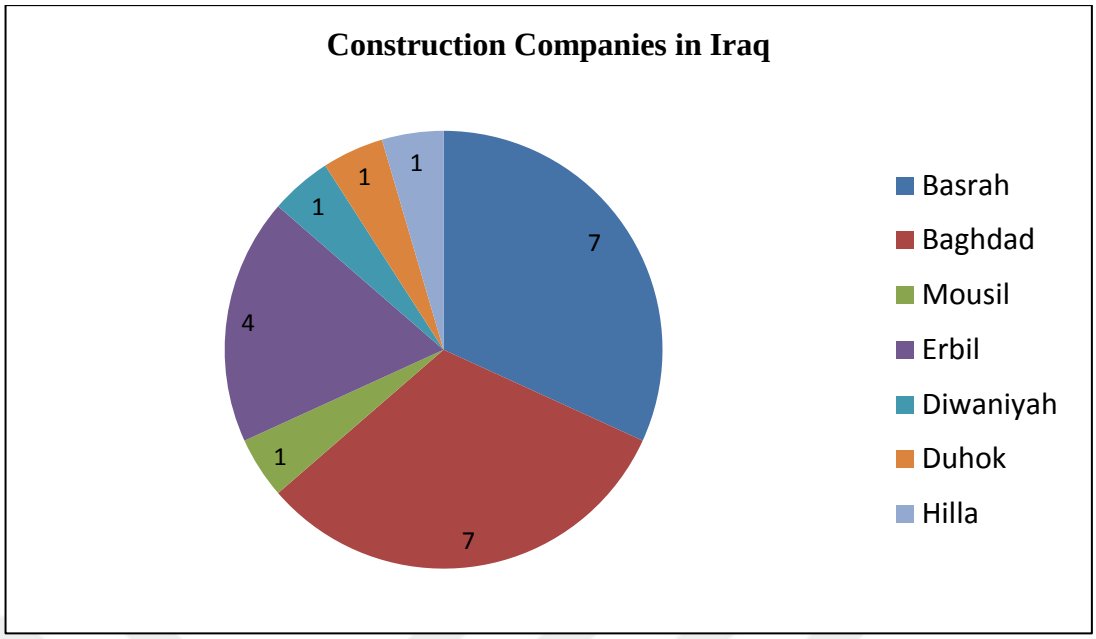

Figure 3.4: Pie Chart of Construction Companies in Iraq.

3.3.4 Sample, Unit of Analysis and Respondents

The sampling frame for this study consisted construction companies in Iraq. In this, study propose data collection and statistical analyses were conducted at the worker level. Therefore, the unit of analysis for this study will be the single person. The sample for this research is assessed by the method given by V. Krejcie and W. Morgan (1970) that is 190 out of 375 (Krejcie & Morgan, 1970).

$$S = X^2 NP(1-P) \div d^2(N-1) + X^2 P(1-P) \quad \textbf{(3.1)}$$

S = required sample size.

X^2= the table value of chi-square for 1 degree of freedom at the desired confidence level= (3.841).

1.96×1.96=3.8411

N = the population size (375).

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion=.05.

Table 3.1 shows the number of employees in each company and the total number of employees in seven construction companies represented the population size (N) and it's equal to 375.

Table 3.1: Construction Companies in Baghdad

Name	No. of permanent Employees
Company 1	50
Company 2	50
Company 3	25
Company 4	100
Company 5	100
Company 6	25
Company 7	25
Total	375

The number of questionnaires distributed to each company showed in Table 3.2 and this number based on the rate of employees to the total number of employees.

Table 3. 2: Number of Questionnaires Distributed

Name	Population	Percentage	Sampling Size
Company 1	50	13.33%	25
Company 2	50	13.33%	25
Company 3	25	6.67%	13
Company 4	100	26.67%	51
Company 5	100	26.67%	51
Company 6	25	6.67%	13
Company 7	25	6.67%	13
Total	375	100%	190

The returned of questionnaires from seven construction companies after omitted missing data was 180. The rate of responses shown in Table 3.3.

Table 3.3: Rate of Responses

Number of companies	Sample size	Returned after omitted missing data	Percentage
Seven construction companies in Baghdad	190	180	94.7%

Table 3.4 showed there are different percentage of responses and all these rates accepted. The average 60% and above, it's considered a good rate, so for this study, the percentage value is acceptable to continue.

Table 3.4: The Rate of Responses in Previous Studies

Name	Number of companies	Sampling size	Returned	Percentage
S.Mohamed ,1999 (Australia)	A number of Contracting organizations	57	36	63%
Tony et al.2000 (UK)	A number of construction companies	20	20	100%
Evelyn, Florence& Adrian, 2005	No limited	420	61	15%
Cooper,2004 (United states)	1(plant)	540	374	69%
Mohamed, S.2010 (Jordan)	Construction contractors	164	45	27%%
Alhajer, M.2011 (UAE)	Construction and oil sector in UAE	350	130	37%
Saeed et al, 2011 (Saudi Arabia)	18 companies	31	18	58%
Thomas et al, 2004 (Hong Kong)	Mix of construction participants	180	129	72%

Table 3.4: The Rate of Responses in Previous Studies (cont.)

Name	Number of companies	Sampling size	Returned	Percentage
Mehdi et al, 2011(Iran)	One of steel industries	85	85	100%
Salman et al, 2012 (Bakstan)	Construction firms	70	55	78.6%
Gizem et al ,2015 (Turkey)	Metal industries	1750	1066	61%

3.3.5 Data Collection Procedures

The information from this survey will be gathered through self-administrated questionnaires. The instrument will be used in this study is designed to measure model. The questionnaires will be distributed personally, through email and by post to the respondents at the workplace and got feedback from the targeted individuals. The questionnaire will be designed in three parts. Part 1 consists of the general information/demographic profile about respondents and part 2 consist of information of safety and dependent variables. Part 3 consists of independent variables (12 factors). All the respondents will be required to rate the questions in part 3 using five-point Likert- scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Five Likert scale is an appropriate instrument for evaluating as it is effective in measuring the organizational performance and strategic implementation because the five Likert scale is easy to assemble and manage. The questionnaire of this study will be designed in Arabic and shown in Appendix F.

3.3.6 Questionnaire Development

Extraordinary Accentuation will be given to operationalization in building the structure of the exam. Things will get especially from beforehand try overview instruments to exploit the entire try psychometric measures (Straub, 1989). Growing majority are operational by changing this scale has been approved, which immediately the use of previous instruments will not be a possibility in General.

In addition, creating each to be measured by using different indicators to capture hidden viably measurement theory.

This study will use the prior studies' lists of questionnaire items.

The questionnaire employed for this particular evaluation was selected after comparing of numerous safety climate instruments of questionnaire typically referenced in literature. These questionnaires selected for this research are known as the:

1- Nordic Occupational Safety Climate Questionnaire (NOSACQ-50).

The NOSACQ-50 has been developed to evaluate multi-level of SC, in addition, to be applied across countries and industries, as well as it was examined to be valid and applicable for construction industry in the beginning (Kines et al. 2011),(Nadhim et al. 2016).

- Contains 50 positively negated formulated items.
- Use 4-point Likert scales (Strongly disagrees, disagree, agree and strongly agree).
- Download for free but not to be used commercially.

2- Offshore safety climate assessment tool (UK).

This tool was performed throughout collaboration with the Overseas Safety Department of the HSE, Mexico Chevron Gulf, Chevron UK (Eugene Island or Ship Shoal), Mobil North Oryx and Sea UK (Cox & Cheyne, 2000). It is developed to measure the safety climate and culture within offshore companies.

- Contains 43 positively formulated and negated (reversed) items divided into 9 sections (dimensions).
- Use 5-point Likert scales (Strongly disagrees, disagree, neither disagree nor agree, agree and strongly agree).
- Download for free but not to be used commercially.
- There is a full user guide for how to use it.

The Pilot test will be done in order to produce better and more reliable questionnaire. The pilot test will be made through demonstration and discussion of the questionnaire with experts. Their notes will be careful before final distribution of the questionnaire. The questionnaire will be used 5-point Likert Scale. Likert Scales have the benefit of grounding each point in the rating to something tangible to the

respondent, as opposed to the numeric scales. Because of word association, Likert scales tend to work better than numeric scales. Nunnally and Bernstein (1994), McIver and Carmines (1981), and Spector (1992), argued the aims for using multi-item measures instead of one item for measuring psychological aspects (McIver & Carmines, 1981; Nunnally & Bernstein, 1994; Spector, 1992).

3.3.6.1 Safety Climate Dimensions (Independent Variable)

Table 3.5 below shows the dimensions and number of items for safety climate dimensions that used in the questionnaire of this thesis.

Table 3.5: Safety Climate Dimensions and Number of Items

No	Dimension	Positively formulated items	Reversed formulated items	No. of items
1	Owner/Client Involvement	OC11, OC12, OCI3		3
2	Leadership Involvement	LI1, LI2, LI4, LI5, LI6, LI7	LI3R	7
3	Safety valued and aligned with Production	SA1, SA7	SA2R, SA3R, SA4R, SA5R, SA6R, SA8R, SA9R	9
4	Management Commitment	MC1, MC2, MC5, MC7, MC8, MC10, MC11	MC3R, MC4R, MC6R, MC9R	11
5	Employee Involvement/ Empowerment	EIE1, EIE2, EIE3, EIE4, EIE5, EIE6, EIE8, EIE10	EIE7R, EIE9R	10
6	Communication	C1, C2, C3, C4, C5, C7, C8, C9, C10, C12, C13	C6R, C11R	13
7	Training/Education at all levels	TE1, TE2, TE3		3
8	Mutual Trust	MT1, MT2, MT4, MT5, MT7, MT8	MT3R, MT6R	8
9	Job planning	JP5, JP6	JP1R, JP2R, JP3R, JP4R	6

Table 3.5: Safety Climate Dimension and Number of Item (cont.)

No	Dimension	Positively formulated items	Reversed formulated items	No. of items
10	Programs, policies, procedures, and practices	PPPP1, PPPP2, PPPP3, PPPP4	PPPP5R, PPPP6R, PPPP7R	7
11	Safety and health programs/systems activity	SHP1,SHP2		2
12	General contractor/construction manager management of subcontractors	GC2, GC7	GC1R, GC3R, GC4R, GC5R, GC6R	7

3.3.6.2 Safety Performance Dimensions (Dependent Variable)

Table 3.6 below shows the dimensions and number of items for safety performance dimensions. Questionnaire used for safety performance dimensions are adopted from Siu, Phillips, and Leung (2004), and the details of questionnaire shown in appendix E

Table 3.6: Safety Performance Dimensions and Number of Items

No	Dimension	Positively formulated items	Reversed formulated items	No. of items
1	Accident Rates	ACR		1
2	Occupational Injuries	OI1, OI2, OI3, OI4, OI5, OI6, OI7		7

Independent Variable = Safety Climate

Dependent Variable = Safety Performance

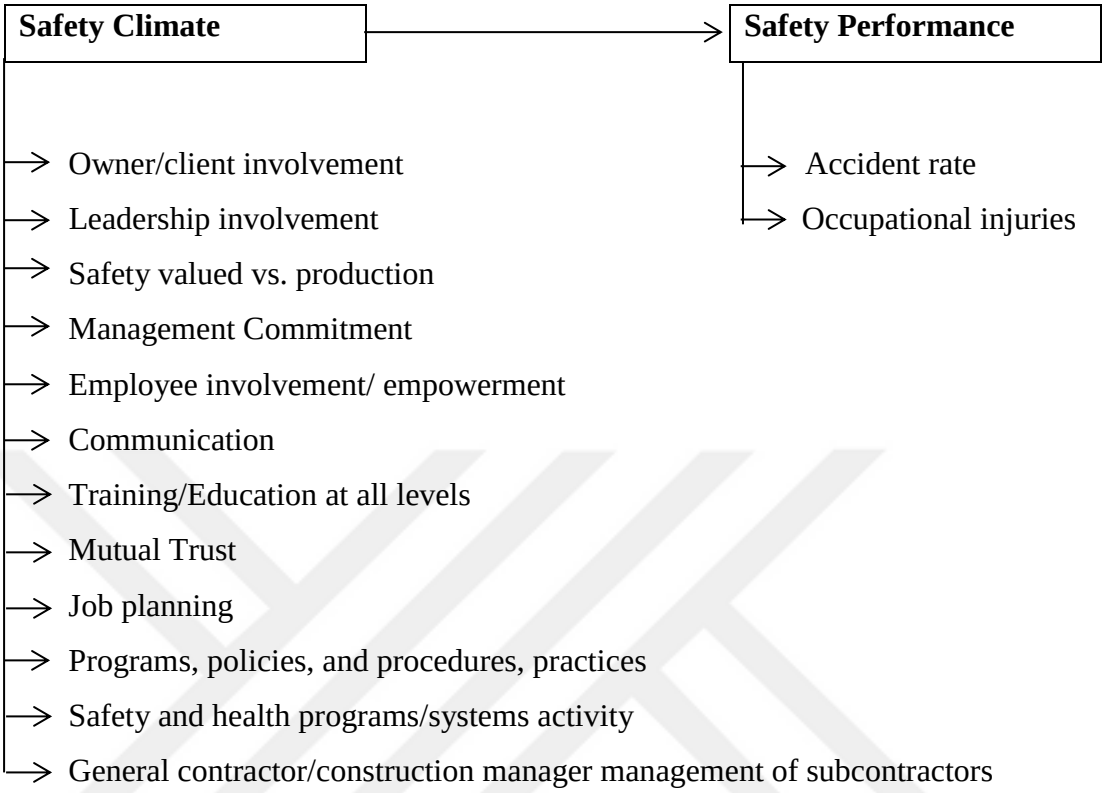

Figure 3.5: Research Model

The aim of building this model is to examine the effect of Safety Climate factors on Safety Performance in the construction industry and to discover the kind of relation by test the direct relation between them then determine the group of factors that has the highest influence on safety climate of contractors industry. This SC model has taken into account a number of factors related to safety climate that is pertinent to an organization and its project, two of them in Figure 2.4 and used from many researchers they were communication and training.

Construction literature includes several methods for assessing the Safety Performance of construction industry. Most commonly measure are (Accident Rate, Occupational Injuries) (Siu et al, 2004) therefore, thesis adopted from Figure 2.5 to be factors of safety performance in proposed model of the thesis. The results of the proposed model will be used to develop SC model suitable for use in the construction industry to improve the performance of safety.

3.3.7 Statistical Approach

For all intents and purposes, all inspections including some numerical information or contains information that is easily evaluated to answer proposed investigating address and meeting destination. This information will be crying and translated. There are various strategies that can be measured to check information by type review (Cooper & Schindler, 2003).

The measurable investigation will be conducted to test the relationship between the expected components (Factors) are used as part of the proposed module system relapse vary who viewed the relationship between factors to anticipate their behavior in the future. This method predicted the price at the variable in the premises of their confidence at a variety of factors. What's more, the procedure using the "dependent variable" factors that will affect some other "variables", the study will be used to create measurement SPSS programming vision and connections. SPSS is a Windows-based program used for survey information through tables and charts. SPSS is equipped to take care of a lot of information (Field, 2009). There are several system facts that will be used at all through this study; Demographic analysis, descriptive analysis, reliability analysis and regression analysis through SPSS.

3.3.7.1 Descriptive Analysis

The information of the provided situation needs to be distinguished through few statistical measures for the approximation or even comparison along with very similar information or making deduction regarding sample population to which information belong (Panneerselvam, 2004). The analysis of the data is generally entails decreasing gathered data to a size that is easy to manage, developing summaries, searching for designs as well as using statistical techniques. The questionnaires, as well as, the experimental instruments scaled responses, frequently need an analyst in order to obtain numerous functions, and in order to discover relationships between the variables (Cooper & Schindler, 2003).

3.3.7.2 Reliability Analysis

Statistically, the typical method to check out reliability is depending on the concept that each item (or set of items) must generate final results consistent within the questionnaire of the study. Reliability is just the capability of the questionnaire to produce exact results underneath the exact same conditions. It can be anticipated by various methods. One of the most known techniques in order to measure the reliability scale is the Cronbach's alpha.

Cronbach's Alpha is a measurement tool to determine a set of items are related. It is most commonly used when one has a scale of multiple Likert questions in a questionnaire and the goal is to define if this scale is reliable. The theoretical value of alpha differs from zero (0) to one (1) and higher values of alpha are more appropriate. the value of 0.70 or higher is recommended (Nunnally & Bernstein, 1994).The value of thesis study about Cronbach's Alpha is detailed in Table 4.14.

3.3.7.3 Regression Analysis

Regression analysis is a statistical tool for the examination of relationships between variables where it controls for many alternative explanations and variables consecutively (Newman, 2003). This statistical method is really effective to check out the impact of the variables. It enables users to recognize exactly how many variables consecutively effect the other variable's values. These types of effects could be evaluated along with statistically calculated confidence degrees, whether these results come out because of some random occurrence or if this noticed effect occurred in a systematic way. Regression analysis utilized in this study assesses just how different associate characteristics affected the activities of the participation (Gray & Kraenzle, 1998).

Linear Regression Analysis

Linear regression is the most elementary and usually used predictive analysis. Regression estimates are used to define data and to explain the relationship between variables. Linear regression is the next step up after correlation. Linear Regression establishes a relationship between dependent variable (Y) and one or more independent variables (X) using a best fit straight line (also known as regression line). It is represented by an equation Y=a+b*X + e (James et al, 2013) where (a) is the intercept, (b) is the slope of the line and (e) is the error term. This equation can be used to predict the value of target variable based on given predictor variable(s).

Summary

As the conclusion, this chapter has discussed the research methodology process, research design, data collection procedures, Sample, Unit of Analysis and Respondents. Moreover, the questionnaire development has been discussed, and finally the statistical approach.

GHAPTER FOUR

RESULTS AND DISSCUTION

4.1 Introduction

This chapter provides deals of analysis and the findings of the study where the information was collected from the respondent from construction companies in Iraq, using the survey questionnaire which was later analyzed using the statistical software package SPSS V.20. This chapter consists of a description of participants, the classification, experience, size and the safety condition of the respondents. The findings lead to the understanding of the perception of the respondents with regards to SC towards SP.

4.2 Questionnaire for Data Collection

A quantitative research method was conducted in order to measure and test the relationship between diverse factors. Quantitative method is defined as ‘collecting numerical data that are analyzed utilizing mathematically based methods (in particular statistics) (Aliaga & Gunderson, 2000).

For this study distributed 190 questionnaires to total members of respondents. Eight questionnaires were not answered and received back. After inspection, the questionnaires removed 2 questionnaires because of too many lost values and wrong data provided. The final number of valid responses was 180 which mean that the response percentage is 94.7%.

4.3 Analysis of Demographic Profile

Question 3: How many years have your company in the construction field?

From the Table 4.1 it can be seen that the most companies in construction business 5 to 10 years followed by 10 to 15 years.

Table 4.1: Company Years in Construction Field Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 Years	39	21.7	21.7	21.7
	5 to 10 years	52	28.9	28.9	50.6
	10 to 15 years	45	25.0	25.0	75.6
	over 15 years	44	24.4	24.4	100.0
	Total	180	100.0	100.0	

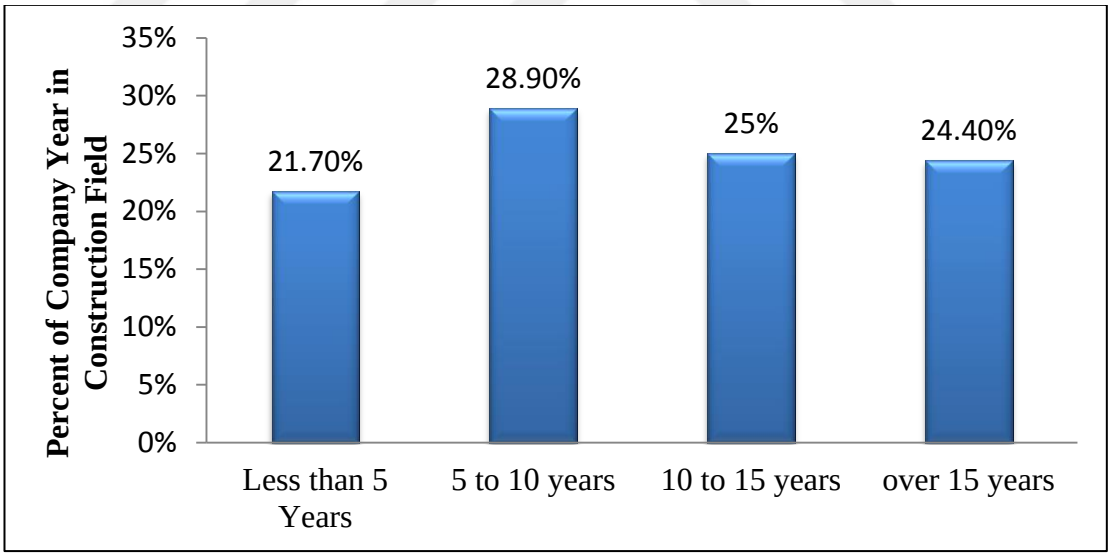

Figure 4.1: Company Years in Construction Field Responses

Figure 4.1 also showed the companies experience in construction field in percentage. From the selected population of construction companies have average 10 years of experience in their fields, with minimum ratio less than 5 years and maximum ratio between 5 to 10 years' experience.

Question 4: How many years you have been in the construction field?

From the Table 4.2, it can be seen that the 50% workers have 5 to 10 years' experience in construction field and only 3.3% workers have over 15 years' experience in the construction field. This showed that the workers have low to moderate working experience in construction field.

Table 4.2: Working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 Years	60	33.3	33.3	33.3
	5 to 10 years	90	50.0	50.0	83.3
	10 to 15 years	24	13.3	13.3	96.7
	over 15 years	6	3.3	3.3	100.0
	Total	180	100.0	100.0	

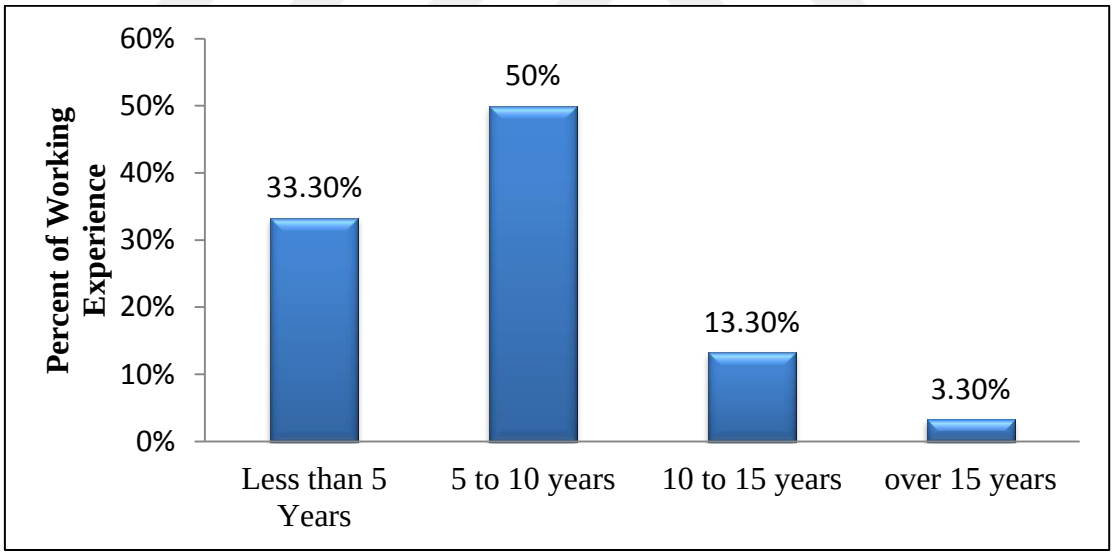

Figure 4.2: Working Experience

Figure 4.2 also showed the working experience of workers in construction field in percentage. From the selected population, it can observe that 90 workers have 5 to 10 years working experience in construction field, which is the heights ratio with 50%. On the other hand only 6 workers have over 15 years working experience in construction filed, which is lowest ration with 3.3%.

Question 5: How old are you?

Table 4.3, shows number of respondents related to their age group. It can be seen age group 25 to 34 years has highest percentage with (41.7%) and the lowest frequency for age over 45 years is accounted to 10.6%. This showed that the workers were young, and perfect for construction job.

Table 4.3: Age of Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16 to 24 years	30	16.7	16.7	16.7
	25 to 34 years	75	41.7	41.7	58.3
	35 to 44 years	56	31.1	31.1	89.4
	over 45 years	19	10.6	10.6	100.0
	Total	180	100.0	100.0	

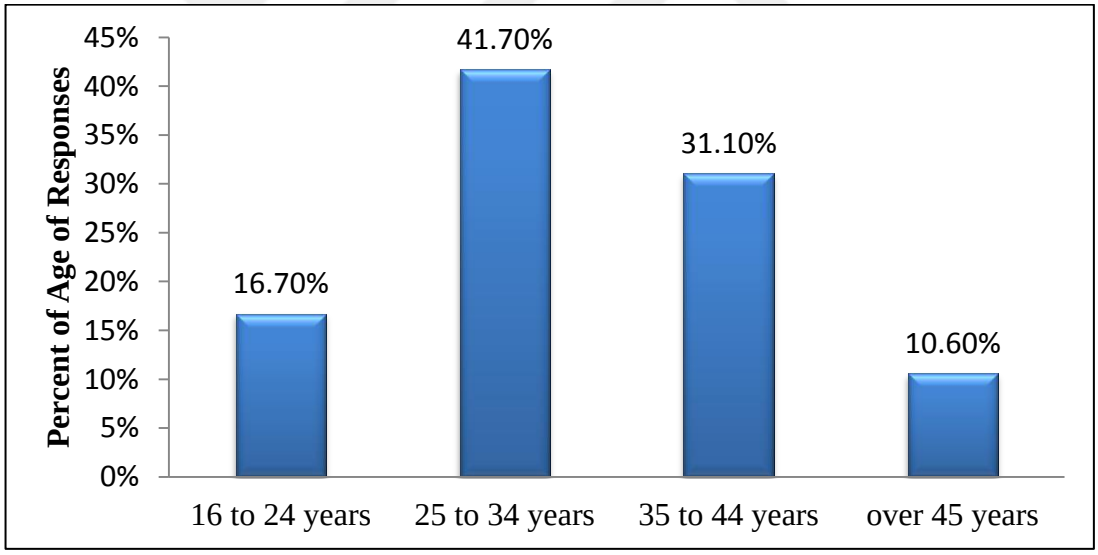

Figure 4.3: Age of Responses

Figure 4.3 also showed the age group of workers with the percentage. For construction work normally companies required young workers and the current study also observe the same trend. Collected date showed that highest ratio with 41.70% of age group between 25 to 34 years and lowest ration with 10.60% of age group over 45 years.

Question 6: What is your scientific qualification?

Table 4.4 shows Education background of respondents. From Table 4.4, it can be seen that most of the workers were holding a B.Sc. degree which was 46.7 % followed by the respondents having Diploma which was 28.9% indicating that most of the workers have the proper background to answer the questions of the survey.

Table 4.4: Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary	30	16.7	16.7	16.7
	Diploma	52	28.9	28.9	45.6
	B.Sc.	84	46.7	46.7	92.2
	Master	14	7.8	7.8	100.0
	Total	180	100.0	100.0	

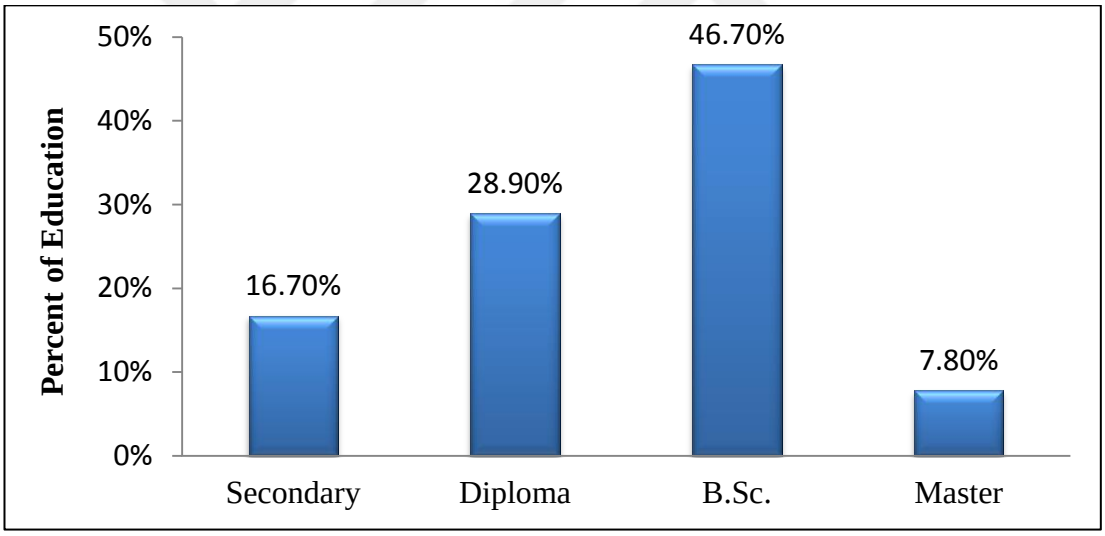

Figure 4.4: Education

Figure 4.4 also showed the education of workers with the percentage. This can lead to that the participants are in the management or leadership groups, which may give a bias to the management side.

Question 7: How many workers in your company?

From table 4.5 it can be seen that most of the construction companies have workers more than 75 which were 50.6%, followed by the construction companies have workers between 25 to 50 which were 47.8%. Figure 4.5 also showed the number of workers with the percentage.

Table 4.5: Size of Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 To 50	86	47.8	47.8	47.8
	51 To 75	3	1.7	1.7	49.4
	More than 75	91	50.6	50.6	100.0
	Total	180	100.0	100.0	

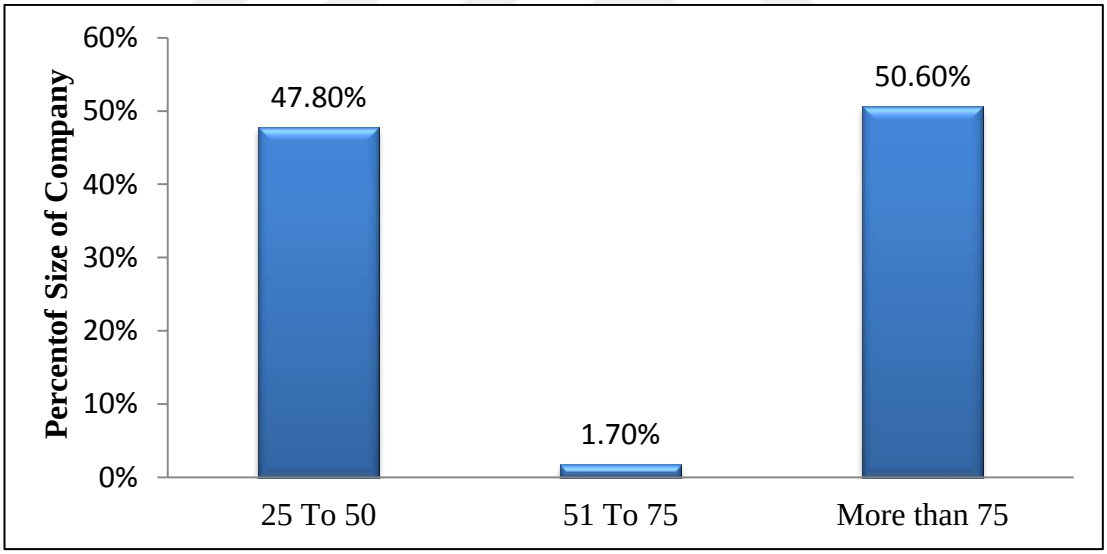

Figure 4.5: Size of Company

Figure 4.5 also showed the number of workers with the percentage. Construction companies in Iraq hired huge population of daily wages or part- time workers based on their project requirement. But their permanent or full-time workers are less. The same trend can be observed from Figure 4.5.

Analysis of Safety Information

Question 8: Does your company have a safety professional / department?

From Table 4.6 it can be seen that most of the construction companies have not properly safety departments. 55.6% respondents answered "NO" while 44.40% answered "YES" have.

Table 4.6: Safety Department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	80	44.4	44.4	44.4
	No	100	55.6	55.6	100.0
	Total	180	100.0	100.0	

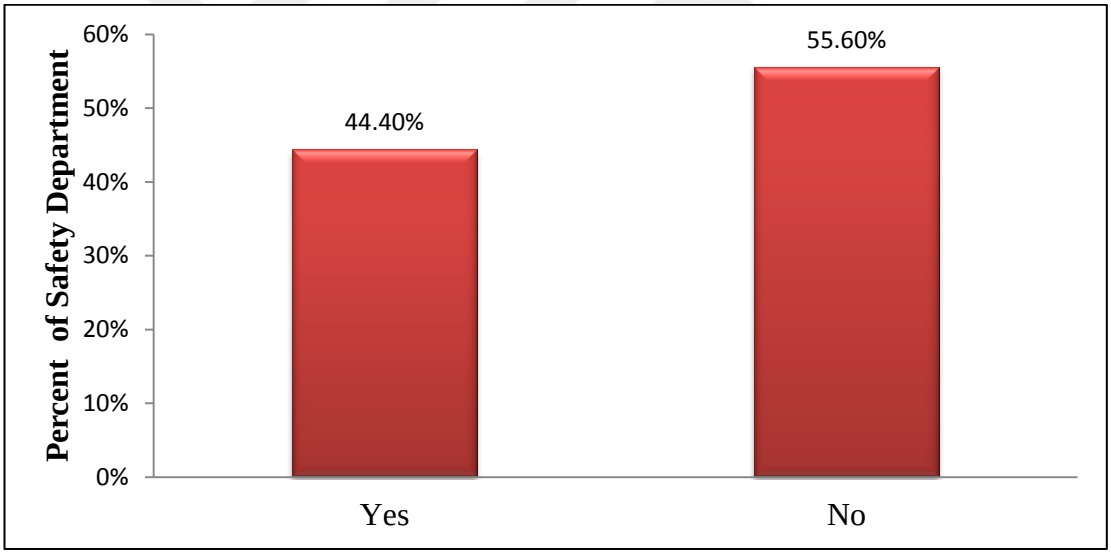

Figure 4.6: Safety Department

Figure 4.6 also shows the respondents answered in the graphical view, which show construction companies must focus on hiring safety professionals and develop safety departments for safety climate towards safety performance. This is alarming for the construction companies towards employee's safety.

Question 9: Does your company use a safety program or manual?

From Table 4.7 it can be seen that most of the construction companies partially adopt safety program or manual. The Figure 4.7 showed that 51.7% construction companies have the partially safety program or manual, followed by 26.7% construction companies have the proper safety program or manual, which shows a serious attention needed from construction companies to implement and teach their workers safety program or manual.

Table 4.7: Safety Program or Manual

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	26.7	26.7	26.7
	Partial	93	51.7	51.7	78.3
	No	39	21.7	21.7	100.0
	Total	180	100.0	100.0	

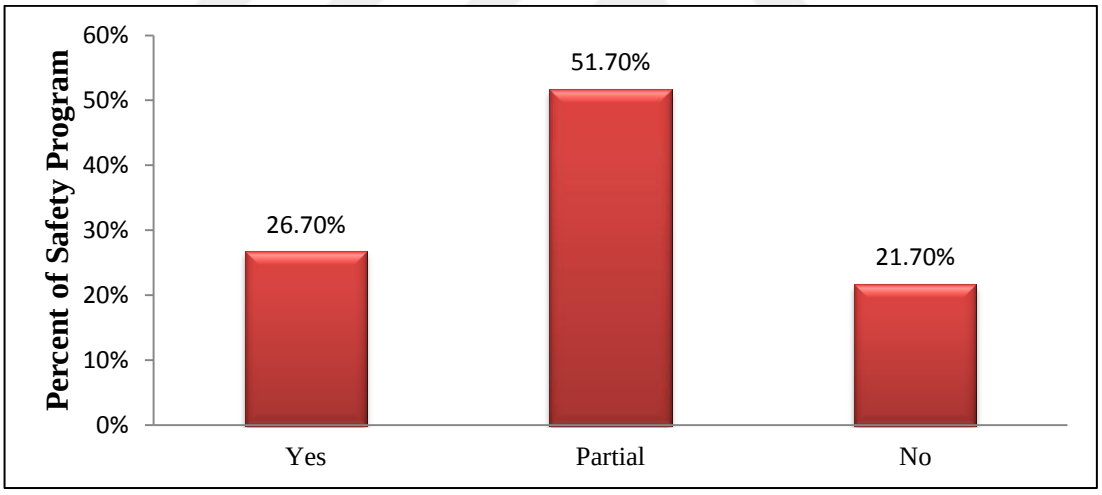

Figure 4.7: Safety Program or Manual

Question 10: Do you have knowledge of the safety conditions, specifications and provision?

From Table 4.8 it can be seen that most of the workers in construction companies partially have knowledge of the safety conditions, specifications, and provision. The Figure 4.8 showed that 60% workers have partially had knowledge of the safety conditions, specifications, and provision, followed by 22.8% workers don't have knowledge of the safety conditions, specifications and provision. This showed that a serious attention needed from construction companies to teach and train their workers on safety conditions, specifications, and provision.

Table 4.8: Safety Knowledge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	31	17.2	17.2	17.2
	Partial	108	60.0	60.0	77.2
	No	41	22.8	22.8	100.0
	Total	180	100.0	100.0	

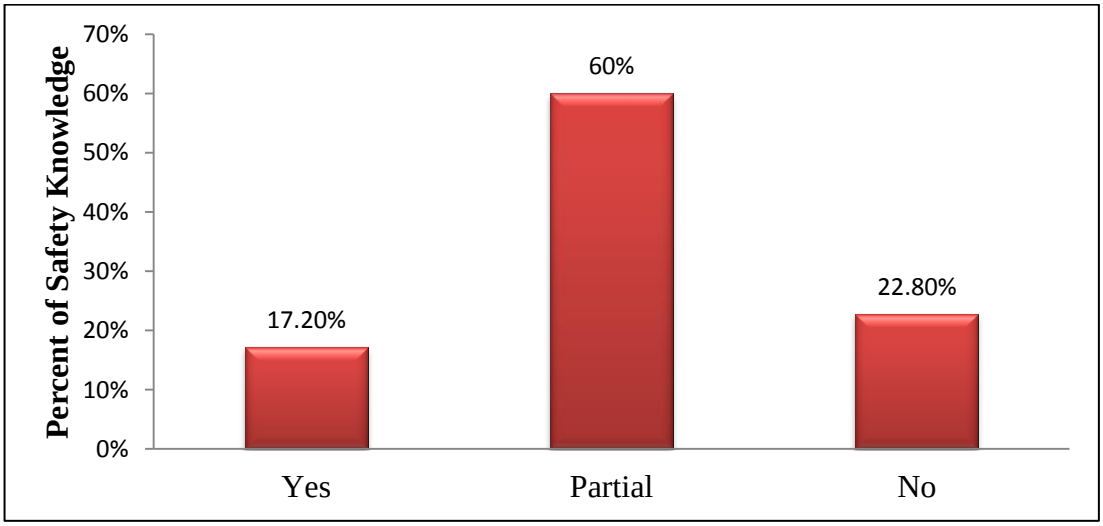

Figure 4.8: Safety Knowledge

Question 11: In your opinion, who should be responsible for lacking of safety during construction on site?

From Table 4.9 shows who should be responsible for lacking of safety during construction on site. The Table 4.9 showed that 27.2% Safety Engineer and Site Engineer are responsible for lacking of safety during construction on site, followed by 19.4% management. This showed that leadership should do proper planning for safety performance before start project.

Table 4.9: Responsible for Lacking of Safety During Construction on Site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Worker	20	11.1	11.1	11.1
	Safety Engineer	49	27.2	27.2	38.3
	Site Engineer	49	27.2	27.2	65.6
	Management	35	19.4	19.4	85.0
	Government	27	15.0	15.0	100.0
	Total	180	100.0	100.0	

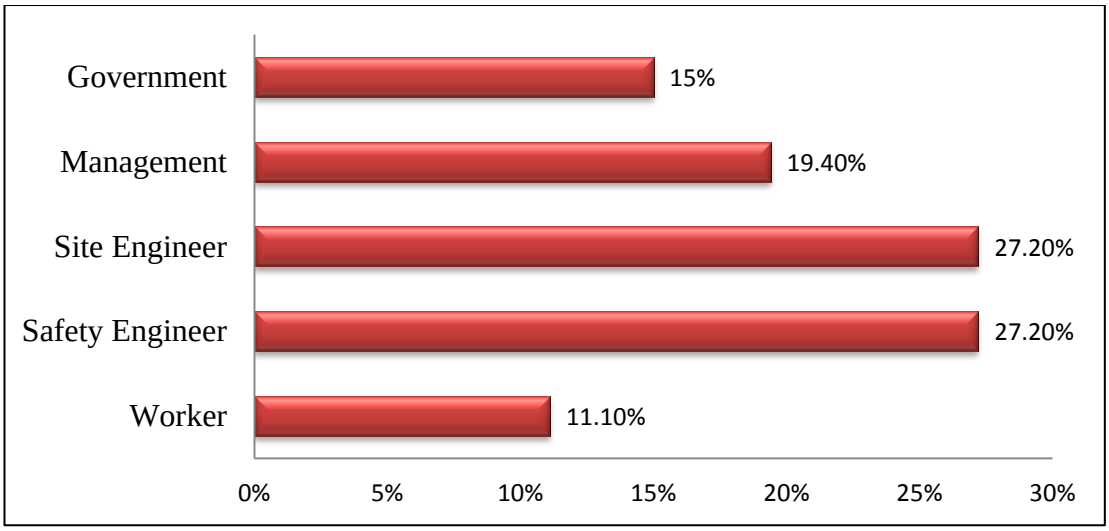

Figure 4.9: Responsible for Lacking of Safety during Construction on Site

From Figure 4.9 shows the ratio of who should be responsible for lacking of safety during construction on site. The results indicate that most of the time accidents

or injuries with workers due to the construction companies miss-management towards safety environment. Government check and balance towards safety procedure for workers in construction companies also a major factor after construction companies' leadership.

Question 12: Do you expect any financial saving by complying with safety conditions, specifications, and provisions?

From Table 4.10 it can be seen that construction companies sometimes do financial saving by complying with safety. The Figure 4.10 showed that 42.8% construction companies sometimes do financial saving by complying with safety, followed by 33.9% construction companies do financial saving by complying with safety.

Table 4.10: Financial Saving by Complying with Safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	61	33.9	33.9	33.9
	Sometimes	77	42.8	42.8	76.7
	No	42	23.3	23.3	100.0
	Total	180	100.0	100.0	

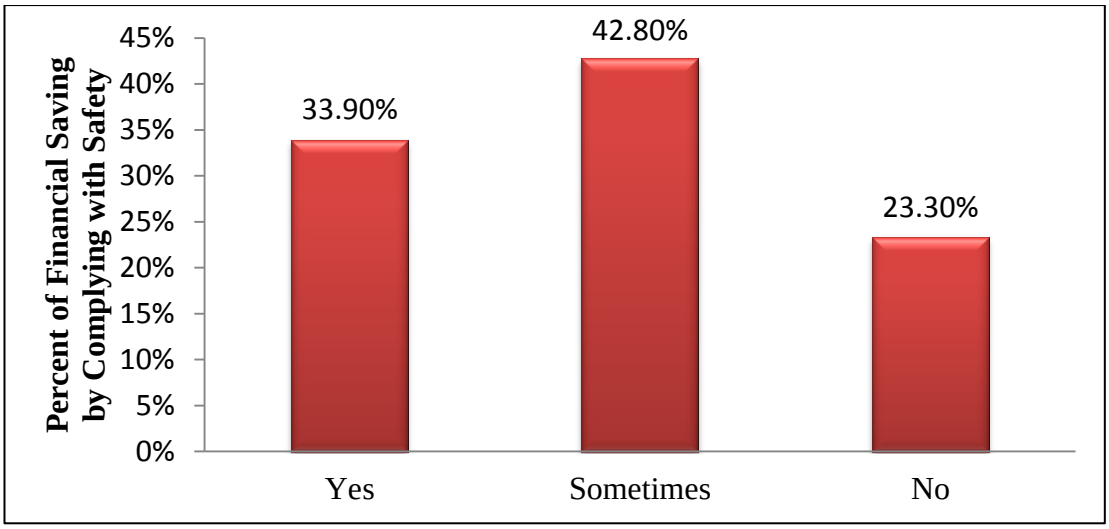

Figure 4.10: Financial Saving by Complying with Safety

Figure 4.10 showed that that construction companies do financial saving by complying with safety, which will affect the safety performance.

Question 13: What is the most significant impact of site accident on construction companies?

From Table 4.11 shows the significant impact on the worker of site accident in construction companies' site area. The Table 4.11 showed that 45% respondent answered "HIGH", increase cost with the impact of site accident on construction companies. 33.9% respondent answered "VERY HIGH", impairing the reputation of companies with impact of site accident on construction companies. 30% respondent answered "MODERATE", imposing the psychological burden on workers with the impact of site accident on construction companies. 30.6% respondent answered "HIGH", interrupting project's schedule with the impact of site accident on construction companies.

Table 4.11: Significant Impact of Site Accident

	Increase cost		Impairing reputation of companies		Imposing psychological burden on workers		Interrupting project's schedule	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Very Low			1	.6	10	5.6	12	6.7
Low	7	3.9	12	6.7	28	15.6	49	27.2
Moderate	30	16.7	50	27.8	54	30.0	40	22.2
High	81	45.0	56	31.1	52	28.9	55	30.6
Very High	62	34.4	61	33.9	36	20.0	24	13.3
Total	180	100	180	100	180	100	180	100

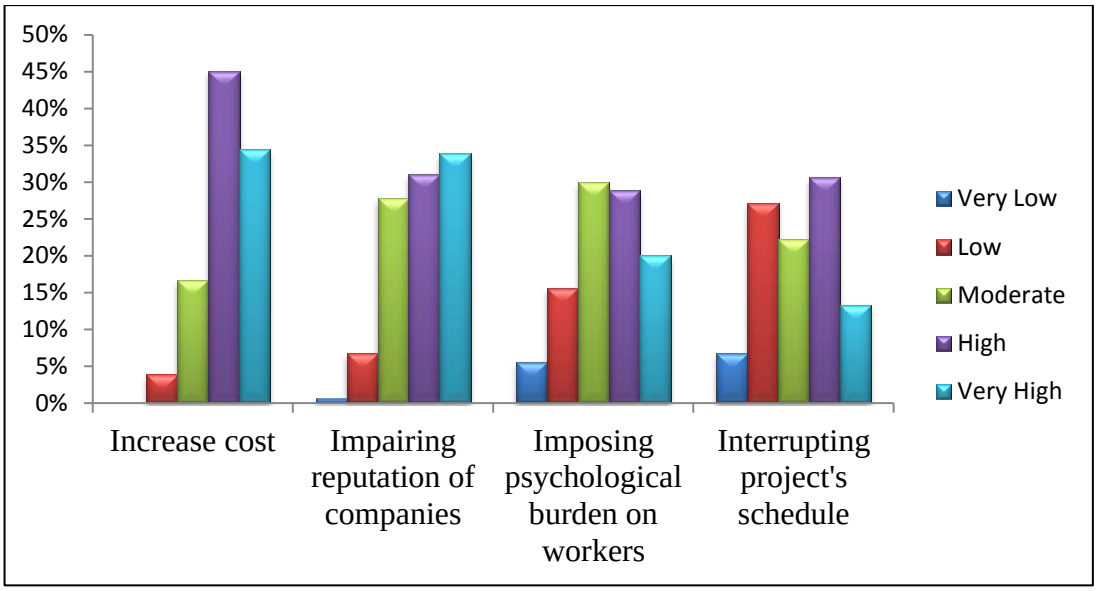

Figure 4.11: Significant Impact Rate of Site Accident

Figure 4.11 shows the significant impact on a worker of site accident in construction companies' site area. From the respondents answered, normally site accidents increase high cost with ratio 45% "HIGH" the industry of construction has come to identify the relationship between the management risk and returning on investment. At any time increasing cost of convalescent care, healthcare treatment, and the probable for cases all add up to greater insurance premiums, which often be likely to have a negative effect on a corporation's profit. On the side, the cost of accident present a serious drain of company's profit, organizations with higher accident rate are usually restricted from bidding regarding a certain kind of work. Therefore, throughout the company's welfare to take, whatever indicates necessary to deal with safety on the site of work (Koehn, Kothari, & Pan, 1995).

Followed by 34.40% "VERY HIGH", affect company reputation with ratio 31.10% "HIGH" and 33.90 "VERY HIGH", psychological burden on workers with ratio 28.90% "HIGH" and 20% "VERY HIGH", and interrupting the project schedule with ration 30.60% "HIGH" and 13.20% "VERY HIGH". All these factors, badly delay project and impact psychologically employees behaviors towards their jobs. This is alarming for construction companies and they need to reduce these factors through the properly implementation of safety structure and equipment.

The reduction in above alarming factors will reduce the accidents expanses, improve their reputation, and companies will able to complete their projects on time.

Question 14: I take safety education attending certificate program?

From Table 4.12 shows the ratio of safety certificate attended by respondents. The Table 4.12 showed that 47.2% respondents don't have the proper education or certificate for safety, which is a drawback for construction companies. On the other hand, only 30% respondents only attended First Aid/CPR certificate, which is very basic level.

Table 4.12: Safety Certificate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FIRST AID / CPR Certification	54	30.0	30.0	30.0
	Public Sector Safety and Health Fundamentals	13	7.2	7.2	37.2
	Specialist in Safety and Health	9	5.0	5.0	42.2
	Construction Safety and Health	13	7.2	7.2	49.4
	Specialized Equipment – Supplemental Training	6	3.3	3.3	52.8
	None	85	47.2	47.2	100.0
	Total	180	100.0	100.0	

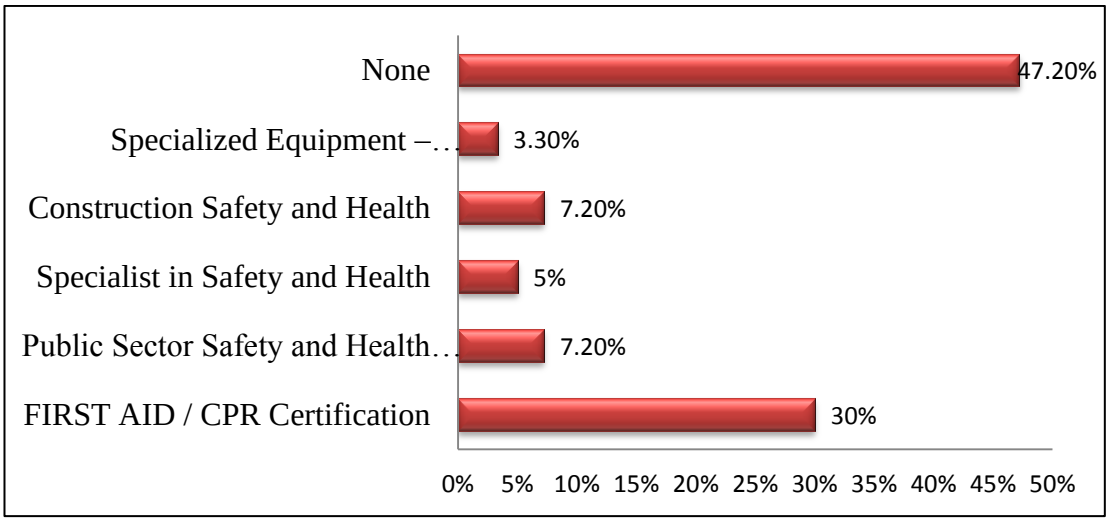

Figure 4.12: Safety Certificate

Figure 4.12 shows the ratio of safety certificate attended by respondents. From the respondent answered, about 47.2 % workers in construction companies, not aware and attendant any kind on certification course on “work safely”. On the other hand, out of whole selected population, only 30% workers answered that they attended “FIRST AID / CPR CERTIFICATION”. All these analyses showed that construction companies have no proper system to teach their workers about “work safely”. This will affect the company’s performance towards achieving their goals.

Question 18: Who was responsible for the accident?

From Table 4.13 shows which were responsible for the accident. The Table 4.13 showed that 43.3% workers answered none of the management is responsible for the accident. This showed that most of the accident happened due to worker's mistakes.

Table 4.13: Responsible for Accident

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Management	21	11.7	11.7	11.7
	Workmate	15	8.3	8.3	20.0
	Line manager	12	6.7	6.7	26.7
	Yourself	30	16.7	16.7	43.3
	Team Leader	11	6.1	6.1	49.4
	Contractor	13	7.2	7.2	56.7
	None	78	43.3	43.3	100.0
	Total	180	100.0	100.0	

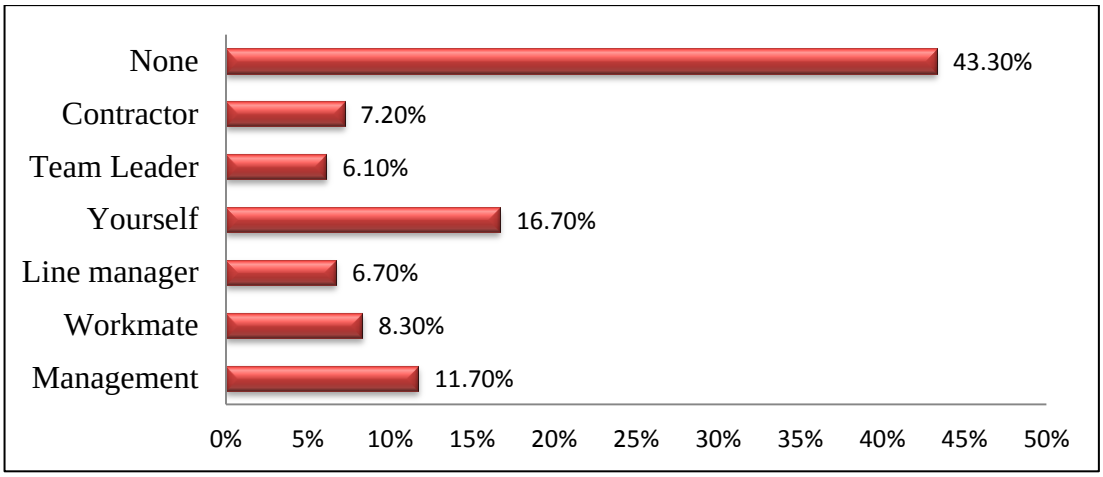

Figure 4.13: Responsible for Accident Construction on Site

From Table 4.13 shows which were responsible for the accident. The results showed the 43.30% respondents don't have any idea about who is responsible for the accidents or injury in the workplace which followed by 16.7% respondent answered accident or injury because of their own mistake. The construction companies need to reduce this trend through properly teaching their workers about for "work safely" at their work place, and this is a natural consequence of the absence of department and safety program in most of these companies.

4.4 Reliability Analysis

Table 4.14 shows the Cronbach's alpha reliability scores. If the internal reliability of the sample results from the group Cronbach's alpha provides a value about 0.7 or more this considered as an indicator of reliability (Cortina, 1993). An alpha of more than 0.7 would indicate that the items are homogeneous and measuring the same constant.

Table 4.14: Reliability Analysis

No.	Factor Name	Cronbach's alpha	Number of Items
1	Owner/Client involvement	0.703	3
2	Leadership involvement	0.712	7
3	Safety valued aligned with production	0.703	9
4	Management Commitment	0.705	11
5	Employee involvement/Empowerment	0.702	10
6	Communication	0.789	13
7	Training/Education in all levels	0.745	3
8	Mutual Trust	0.704	8
9	Job Planning	0.702	6
10	Programs, policies, procedures, and practices	0.704	7
11	Safety and health programs/systems activity	0.702	2
12	General contractor/construction manager management of subcontractors	0.705	7

4.5 Test of Normality

The most important assumption in parametric statistics. The (Normal Distribution) is one of the important distribution in statistics but is the basis for many mathematicians and theories plays an integral role in the statistical hypotheses, and confidence intervals, variously known as Bell Distribution.

Histogram, and P-P plot

The histogram is a graphical expression where the data is gathered into ranges (such as "40 to 49", "50 to 59", etc), and then plotted as bars. Similar to a Bar Graph, but in a Histogram, each bar is for a range of data. It is an estimate of the probability distribution of a continuous variable (Pearson, 1894).

In statistics, a P–P plot is a probability plot for evaluating how narrowly two data sets agree, which plots the two cumulative distribution functions against each other (Gibbons & Chakraborti, 2011)

Owner/Client involvement histogram which shows normal curve and P-P plot shows in Figure 4.14 and 4.15 respectively.

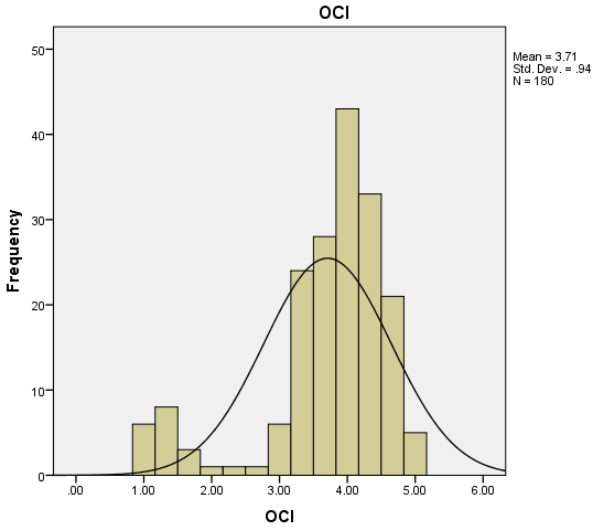

Figure 4.14: Histogram of Owner/Client Involvement

A normal curve is a smooth curve that is symmetric and bell-shaped. Data distributions that are mound shaped are often modeled using a normal curve, and say

that such a distribution is approximately normal. The mean of a normal distribution is located in the center of the distribution. Areas under a normal curve can be used to estimate the proportion of the data values that fall within a given interval.

In Figure 4.14 each bar represents Likert scale response rate between 1 to 5. From the above Figure, the bar above 40 represents response rate at average 3.71. The height of each bar represents the proportion of the respondent answered for Owner/Client involvement. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

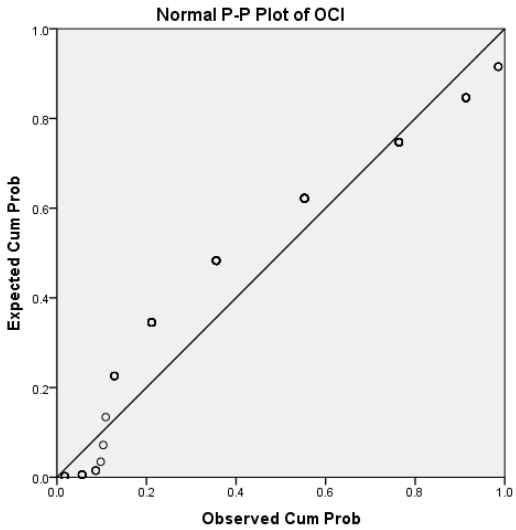

Figure 4.15: P-plot of Owner/Client Involvement

Leadership involvement histogram which shows normal curve and P-P plot shows in Figure 4.16 and 4.17 respectively.

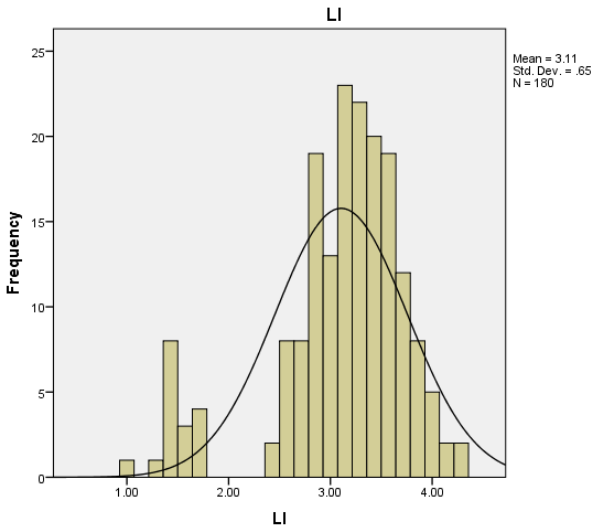

Figure 4.16: Histogram of Leadership Involvement

In Figure 4.16 each bar is represents Likert scale response rate between 1 to 5. From the above Figure, the bar above 20 represents response rate at average 3.11. The height of each bar represents the proportion of the respondent answered for Leadership involvement. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

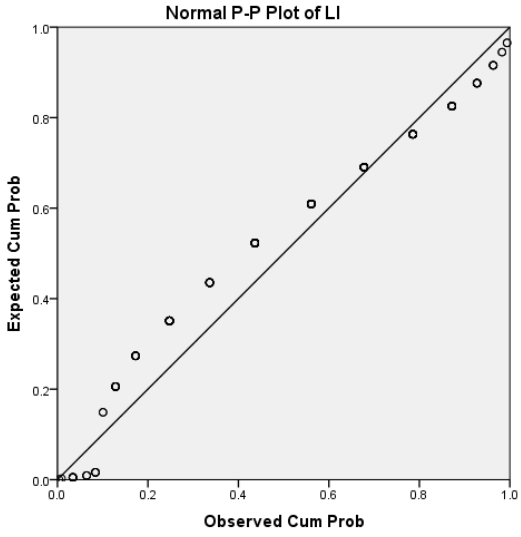

Figure 4.17: P-plot of Leadership Involvement

Safety valued vs. Production histogram which shows normal curve and P-P plot shows in Figure 4.18 and 4.19 respectively.

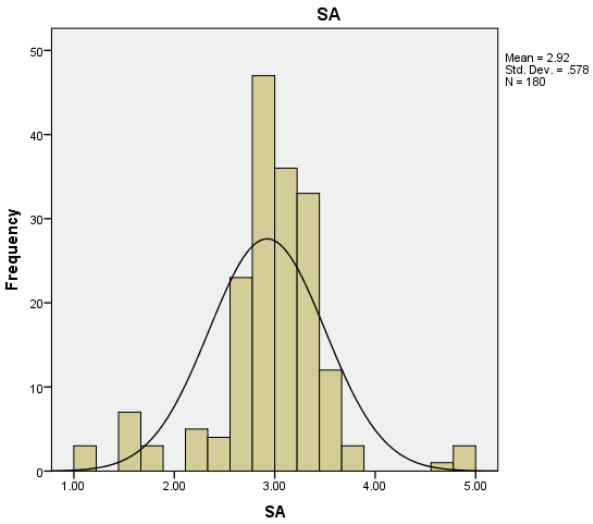

Figure 4.18: Histogram of Safety Valued vs. Production

In Figure 4.18 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar above 40 represents response rate at average 2.92. The height of each bar represents the proportion of the respondent answered for Safety valued vs. Production. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

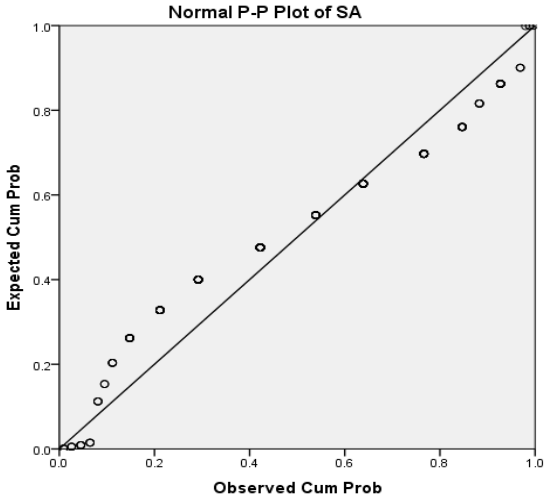

Figure 4.19: P-plot of Safety Valued vs. Production

Management Commitment histogram which shows normal curve and P-P plot shows in Figure 4.20 and 4.21 respectively.

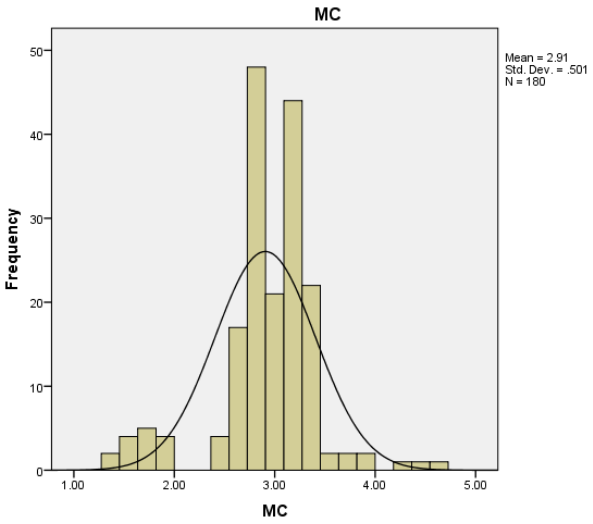

Figure 4.20: Histogram of Management Commitment

In Figure 4.20 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar above 40 represents response rate at average 2.91. The height of each bar represents the proportion of the respondent answered for Management Commitment. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

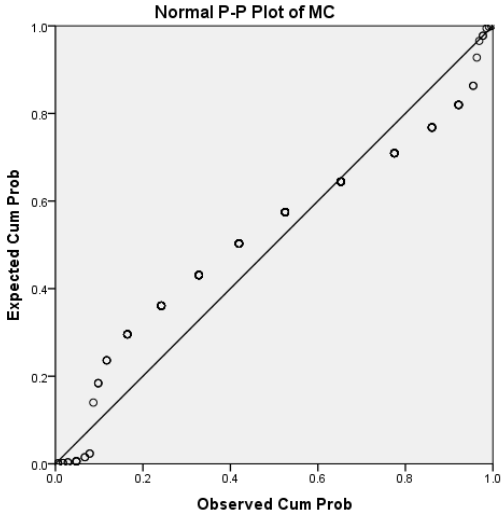

Figure 4.21: P-plot of Management Commitment

Employee involvement/Empowerment histogram which shows normal curve and P-P plot shows in Figure 4.22 and 4.23 respectively.

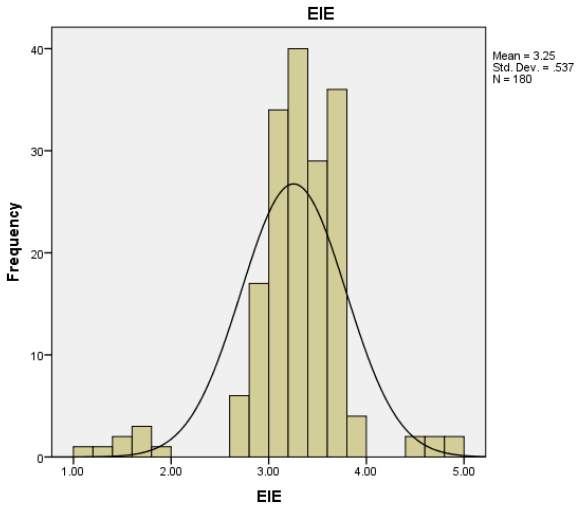

Figure 4.22: Histogram of Employee Involvement/Empowerment

In Figure 4.22 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar near to 40 represents response rate at average 3.25. The height of each bar represents the proportion of the respondent answered for Employee involvement/Empowerment. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

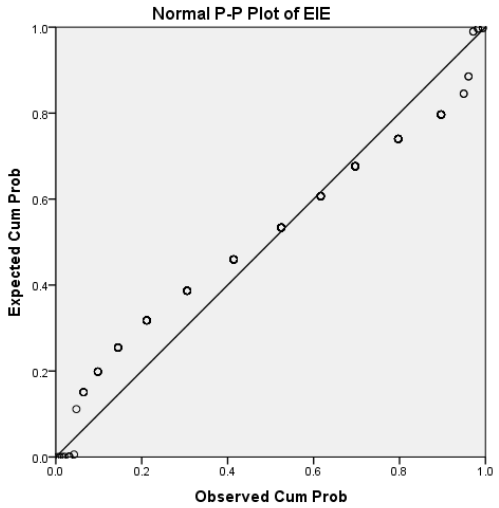

Figure 4.23: P-plot of Employee Involvement/Empowerment

Communication histogram which shows normal curve and P-P plot shows in figure 4.24 and 4.25 respectively.

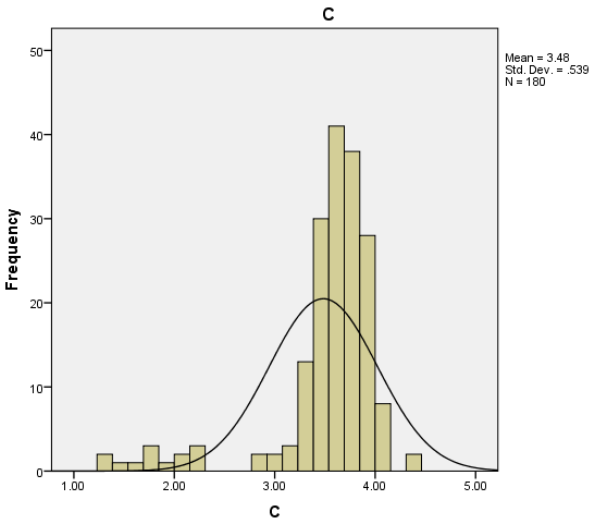

Figure 4.24: Histogram of Communication

In Figure 4.24 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar near to 40 represents response rate at average 3.48. The height of each bar represents the proportion of the respondent answered for Communication. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

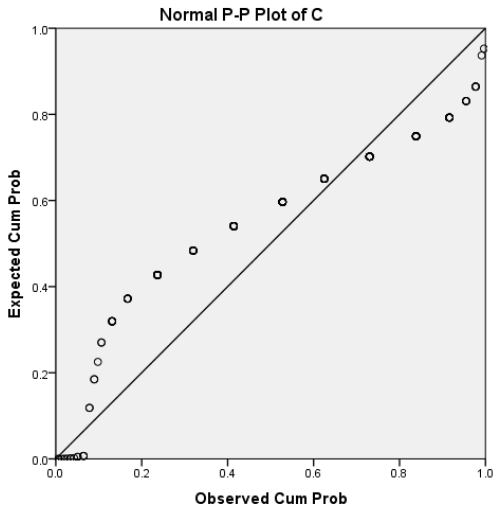

Figure 4.25: P-plot of Communication

Training and Education histogram which shows normal curve and P-P plot shows in Figure 4.26 and 4.27 respectively.

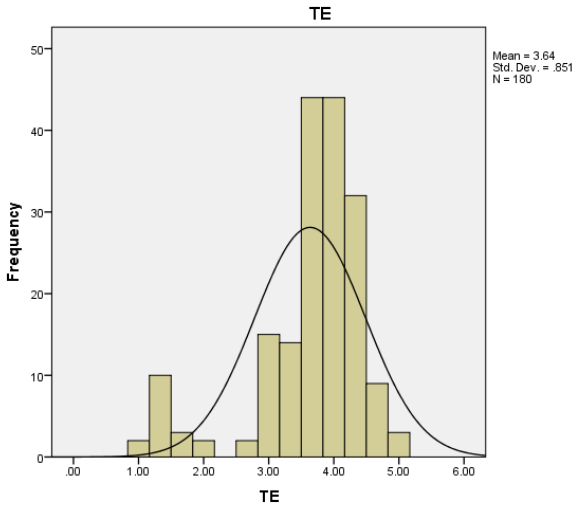

Figure 4.26: Histogram of Training/Education

In Figure 4.26 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar above 40 represents response rate at average 3.64. The height of each bar represents the proportion of the respondent answered for Training/Education at all level. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

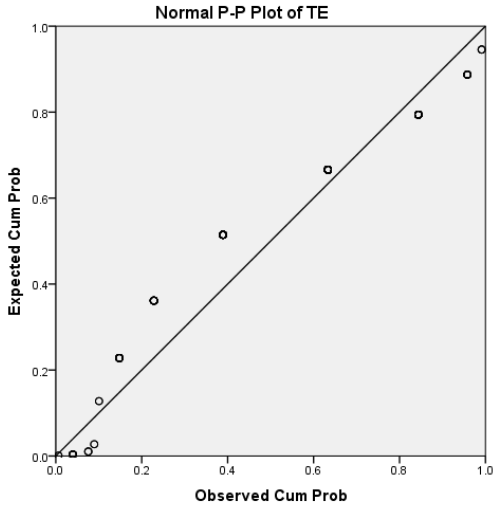

Figure 4.27: P-plot of Training/Education

Mutual Trust histogram which shows normal curve and P-P plot shows in Figure 4.28 and 4.29 respectively.

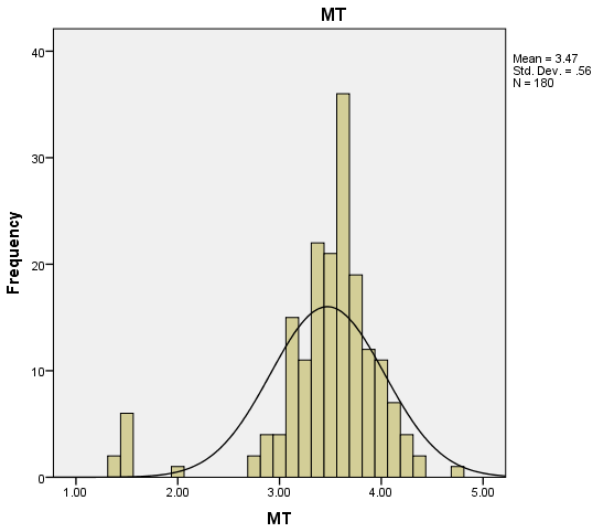

Figure 4.28: Histogram of Mutual Trust

In Figure 4.28 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar above 30 represents response rate at average 3.47. The height of each bar represents the proportion of the respondent answered for Mutual Trust. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

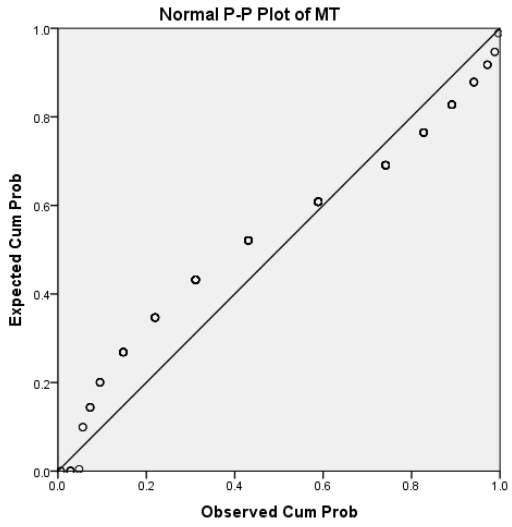

Figure 4.29: P-plot of Mutual Trust

Job Planning histogram which shows normal curve and P-P plot shows in Figure 4.30 and 4.31 respectively.

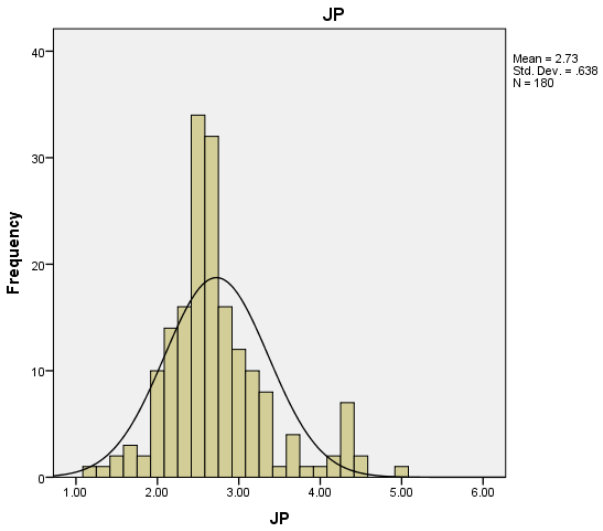

Figure 4.30: Histogram of Job Planning

In Figure 4.30 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar above 30 represents response rate at average 2.73. The height of each bar represents the proportion of the respondent answered for job planning the shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

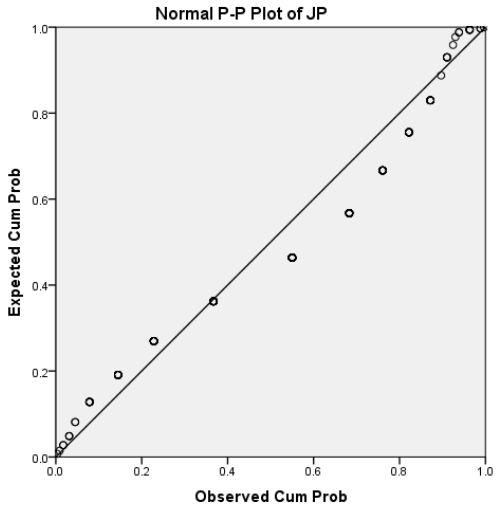

Figure 4.31: P-plot of Job Planning

Programs, Polices, procedure, and practices histogram which shows normal curve and P-P plot shows in Figure 4.32 and 4.33 respectively.

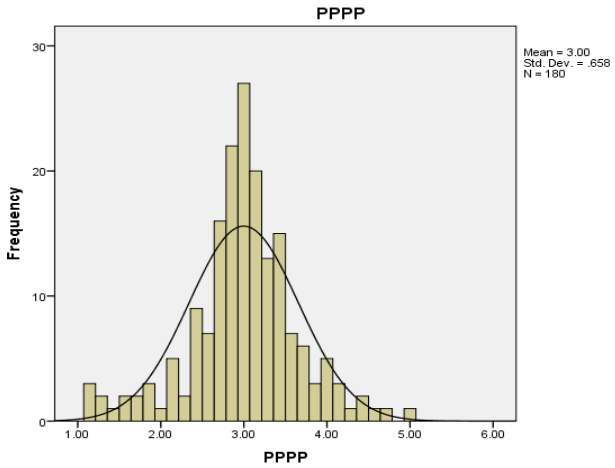

Figure 4.32: Histogram of Programs, Polices, Procedure, and Practices

In Figure 4.32 each bar represents Likert scale response rate between 1 to 5. From the above figure, the bar near to 30 represents response rate at average 3. The height of each bar represents the proportion of the respondent answered for Programs, Polices, Procedure, and practices. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

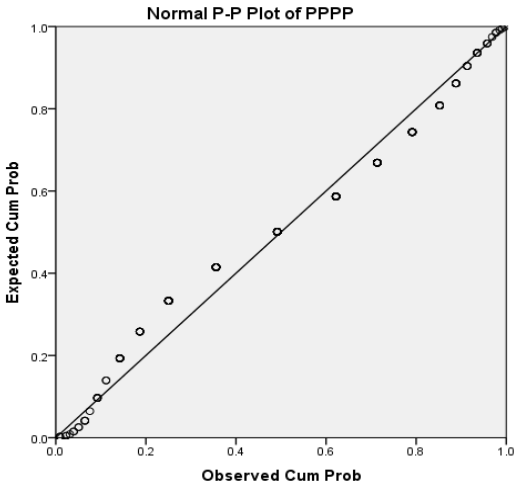

Figure 4.33: P-plot of Programs, Polices, Procedure, and Practices

Safety and Health Programs histogram which shows normal curve and P-P plot shows in Figure 4.34 and 4.35 respectively.

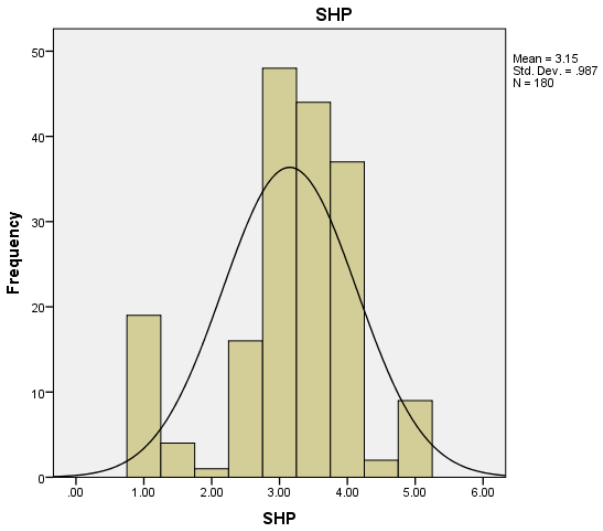

Figure 4.34: Histogram of Safety and Health Programs

In Figure 4.34 each bar represents Likert scale response rate between 1 to 5. From the above Figure, the bar near to 50 represents response rate at average 3.15. The height of each bar represents the proportion of the respondent answered for Safety and Health Programs. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

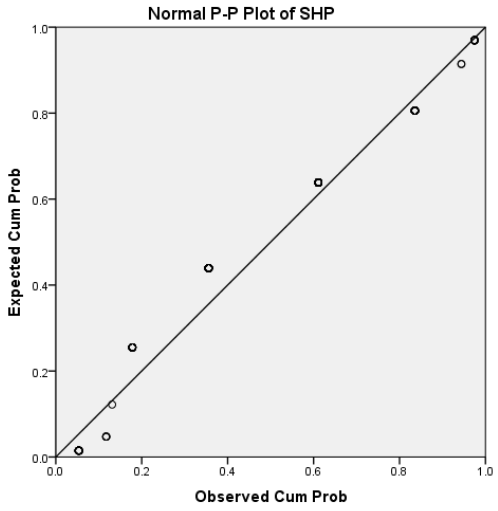

Figure 4.35: P-plot of Safety and Health Programs

General contractor/ construction manager management of subcontractor histogram which shows normal curve and P-P plot shows in Figure 4.36 and 4.37 respectively.

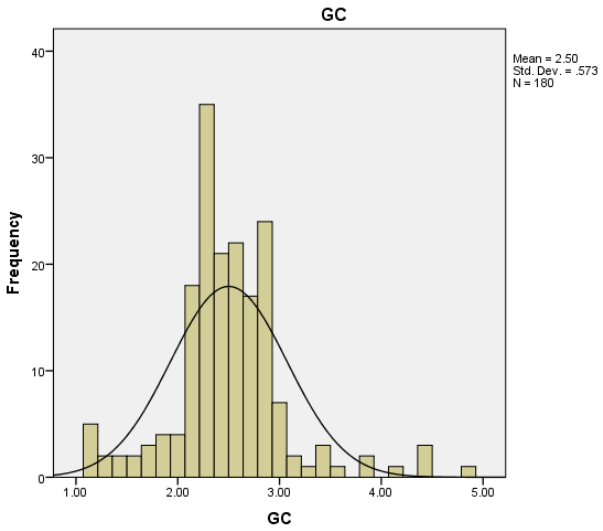

Figure 4.36: Histogram of General Contractor/ Construction Manager Management of Subcontractor

In Figure 4.36 each bar represents Likert scale response rate between 1 to 5. From the above Figure, the bar above 30 represents response rate at average 2.50. The height of each bar represents the proportion of the respondent answered for General contractor/ construction manager management of subcontractor. The shape is skewed in the middle. A normal curve would be the best curve to model the distribution.

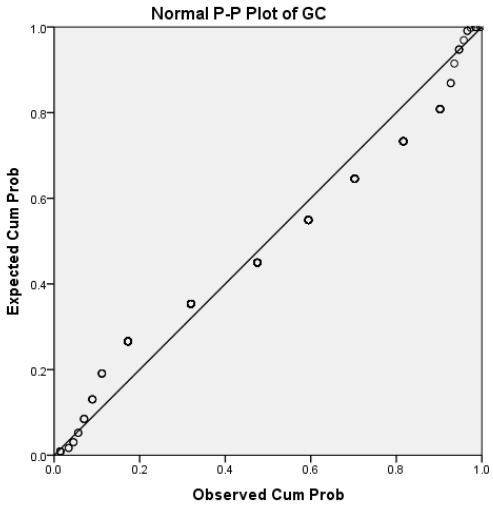

Figure 4.37: P-plot of General Contractor/ Construction Manager Management of Subcontractor

4.6 Correlations, Mean, and Standard Deviation

Figure B.1 reveals the relationship between the variables used in this study. The correlations value ranges between -1 and + 1 and the value of the dependent variable is generally one. Correlation analysis is the basic technique to check the relationship between independent and dependent variables, but in correlation analysis we use all variables together, that why we cannot see the 100% pure relationship between independent and dependent variables, which they are effecting between each other. The correlation results from Figure B.1 showed that Owner/Client involvement ($r = -0.223$, $p < 0.05$), Leadership involvement ($r = -0.253$, $p < 0.05$), Safety valued vs. Production ($r = -0.159$, $p < 0.05$), Management Commitment ($r = -0.166$, $p < 0.05$), Communication ($r = -0.165$, $p < 0.05$), Training/Education ($r = -0.194$, $p < 0.05$), Mutual Trust ($r = -0.203$, $p < 0.05$), Safety and Health Programs ($r = -0.158$, $p < 0.05$) and General Contractor/ construction manager management of subcontractor ($r = -0.151$, $p < 0.05$) were negatively and significantly associated with Accident Rate.

On the other hand, Employee involvement/ Empowerment ($r = -0.064$, ns), Job Planning ($r = 0.053$, ns), and Programs and Polices ($r = -0.045$, ns) were not associated with Accident Rate.

In-addition, the correlation results from Figure B.1 showed that Owner/Client involvement ($r = -0.294$, $p < 0.05$), Leadership involvement ($r = -0.345$, $p < 0.05$), Management Commitment ($r = -0.225$, $p < 0.05$), Communication ($r = -0.227$, $p < 0.05$), Training/Education ($r = -0.255$, $p < 0.05$), Programs, Polices, Procedure and Practices ($r = -0.170$, $p < 0.05$), Safety and Health Programs ($r = -0.147$, $p < 0.05$) and General Contractor/ construction manager management of subcontractor ($r = -0.165$, $p < 0.05$) were negatively and significantly associated with Occupational Injuries.

On the other hand, Safety valued vs. Production ($r = -0.138$, ns), Employee involvement/ Empowerment ($r = -0.105$, ns), Mutual Trust ($r = -0.134$, ns), and Job Planning ($r = 0.045$, ns) were not associated with Occupational Injuries. All details in appendix B.

Table 4.15 shows the mean and standard deviation of independent (12 Factors of safety climate), dependent (2 Factors of safety performance) variables

Table 4.15: Mean, and Standard Deviation

	Minimum	Maximum	Mean	Std. Deviation
Owner client involvement	1.00	5.00	3.7074	.93994
Leadership involvement	1.00	4.29	3.1056	.65009
Safety vs. production	1.11	4.89	2.9241	.57806
Management commitment	1.36	4.64	2.9056	.50129
Employee involvement	1.10	4.80	3.2544	.53684
Communication	1.31	4.38	3.4838	.53914
Training /Education	1.00	5.00	3.6352	.85126
Mutale trust	1.38	4.75	3.4708	.56044
Job planning	1.17	5.00	2.7250	.63848
Programs, polices procedure and practices	1.14	5.00	2.9984	.65804
Safety and Health programs	1.00	5.00	3.1500	.98721
General contractor construction manager management of subcontractor /	1.14	4.86	2.5008	.57252
Accident Rate	1	9	5.24	2.389
Occupational Injuries	1.43	2.29	1.8516	.17826

Note: N= 180, Owner/Client involvement = OCI, Leadership involvement = LI, Safety valued vs. Production = SA, Management Commitment = MC, Employee involvement/Empowerment = EIE, Communication = C, Training/Education = TE, Mutual Trust = MT, Job Planning = JP, Programs, Polices, Procedure and Practices = PPPP, Safety and Health Programs = SHP, General Contractor/ construction manager management of subcontractor = GC, Accident Rate = ACR, Occupational Injuries = OI.

4.7 Control Variable

One-way ANOVA is used to examine mean differences between two or more groups. It is a bivariate test with one independent and one dependent. The independent must be categorical, and the dependent must be continuous. The ONEWAY ANOVA statistic was used to check the control variable.

4.7.1 Effect of Company Experience towards Safety Performance

H0: There is no difference to the safety performance (Accident Rate, Occupational injuries) due to company years in construction field at the significant level a = 0.05.

$$H_0: \mu_1 = \mu_2 = \cdots = \mu_k$$

H1: There is a difference to the safety performance (Accident Rate, Occupational Injuries) due to company years in construction field at the significant level a = 0.05.

H1: One of the means at least different from others.

Table 4.16:The Relation of Company Experience toward Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	14.138	3	4.713	.824	.482 > 0.05
	Within Groups	1007.107	176	5.722		
	Total	1021.244	179			
OI	Between Groups	.085	3	.028	.893	.446 > 0.05
	Within Groups	5.603	176	.032		
	Total	5.688	179			

The relation between company experience toward safety performance (Accident Rate and Occupational Injuries) not significant because it's more than 0.05.

4.7.2 Effect of Working Experience towards Safety Performance

H0: There is no difference to the safety performance (Accident Rate, Occupational Injuries) due to working experience at the significant level a = 0.05.

$$H_0: \mu_1 = \mu_2 = \cdots = \mu_k$$

H1: There is a difference to the safety performance (Accident Rate, Occupational Injuries) due to working experience at the significant level a = 0.05.

H1: One of the means at least different from others.

Table 4.17:The Relation of Working Experience towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	15.814	3	5.271	.923	.431 > 0.05
	Within Groups	1005.431	176	5.713		
	Total	1021.244	179			
OI	Between Groups	.054	3	.018	.558	.643 > 0.05
	Within Groups	5.635	176	.032		
	Total	5.688	179			

The relation between working experience toward safety performance (Accident rate and Occupational injuries) not significant because it's more than 0.05.

4.7.3 Effect of Age of Responses towards Safety Performance

H0: There is no difference to the safety performance (Accident Rate, Occupational Injuries) due to age of responses at the significant level a = 0.05.

$H_0: \mu_1 = \mu_2 = \cdots = \mu_k$

H1: There is a difference to the safety performance (Accident Rate, Occupational Injuries) due to age of responses at the significant level a = 0.05.

H1: One of the means at least different from others.

Table 4.18:The Relation of Age of Responses towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	12.296	3	4.099	.715	.544 > 0.05
	Within Groups	1008.949	176	5.733		
	Total	1021.244	179			
OI	Between Groups	.019	3	.006	.201	.895 > 0.05
	Within Groups	5.669	176	.032		
	Total	5.688	179			

The relation between age of responses toward safety performance (Accident Rate and Occupational Injuries) not significant because it's more than 0.05.

4.7.4 Effect of Education towards safety performance

$H_0: \mu_1 = \mu_2 = \cdots = \mu_k$

H1: One of the means at least different from others

Table 4.190:The Relation of Education towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	22.909	3	7.636	1.346	.261 > 0.05
	Within Groups	998.336	176	5.672		
	Total	1021.244	179			
OI	Between Groups	.083	3	.028	.874	.456 > 0.05
	Within Groups	5.605	176	.032		
	Total	5.688	179			

The relation between education toward safety performance (Accident rate and Occupational injuries) not significant because it's more than 0.05.

4.7.5 Effect of Size of Company towards Safety Performance

$H_0: \mu_1 = \mu_2 = \cdots = \mu_k$

H1: One of the means at least different from others.

Table 4.20:The Relation of Company Size towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	2.335	2	1.167	.203	.817 > 0.05
	Within Groups	1018.910	177	5.757		
	Total	1021.244	179			
OI	Between Groups	.239	2	.120	3.887	.022 < 0.05
	Within Groups	5.449	177	.031		
	Total	5.688	179			

The relation between the size of the company toward safety performance (Accident Rate) not significant because it's more than 0.05, while the relation with (Occupational Injuries) significant because it's less than 0.05.

The results of ONEWAY ANOVA showed that demographic variable (Size of the company) a significant influence on the dependent variable. Below Table 4.21 shows the results of One-way ANOVA. Based on below results, this study controlled the demographic effect on the dependent variable and showed a size of the company as a control variable. A control variable is another factor in an experiment; it must be held constant.

Table 4.21: ONEWAY ANOVA

	Accident Rate		Occupational Injuries	
Demographic Variables	F	Sig	F	Sig
Company years in construction field responses	.824	NS	.893	NS
Working Experience	.923	NS	.558	NS
Age	.715	NS	.201	NS
Education	1.346	NS	.874	NS
Size of company	.203	NS	3.887	S

NS= not significant, S = significant at level (0.05)

4.7.6 Effect of Safety Professional/Department towards Safety Performance

From the analysis of comparison between have safety professional /department towards safety performance, the respondents answered, strongly agreed regarding the existing of the relationship safety professional/department (7.397) towards accident rate and safety professional/department (8.021) towards occupational injuries.

Table 4.22: The Relation of Safety Professional /Department towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	40.747	1	40.747	7.397	.007<0.05
	Within Groups	980.498	178	5.508		
	Total	1021.244	179			
OI	Between Groups	.245	1	.245	8.021	.005< 0.05
	Within Groups	5.443	178	.031		
	Total	5.688	179			

The relationship is observed to be statistically significant. This relationship showed that having of safety professional /department will reduce the accident rate and occupational injuries.

4.7.7 Effect of Safety Program or Manual towards Safety Performance

From the analysis of the comparison between safety program towards safety performance, the respondents answered, strongly agreed regarding the existing of the relationship safety program or manual (3.577) towards accident rate and safety program (5.943) towards occupational injuries.

Table 4.23: The Relation of Safety Program or Manual towards Safety Performance

		Sum of Squares	Df	Mean Square	F	Sig.
ACR	Between Groups	39.675	2	19.838	3.577	.030<0.05
	Within Groups	981.569	177	5.546		
	Total	1021.244	179			
OI	Between Groups	.358	2	.179	5.943	.003<0.05
	Within Groups	5.330	177	.030		
	Total	5.688	179			

The relationship is observed to be statistically significant. This relationship showed that increase in awareness of safety program or manual will reduce the accident rates and occupational injuries.

4.8 Hypothesis

For integration between research hypotheses, questionnaire components, and data analysis, the proper statistic methods were used to test the significance between independent variables and dependent variables. Table 4.24 shows relation between research hypotheses, independent variables, dependent variables and statistical methods.

Table 4.24: The Relation between Research Hypotheses Variables

Research hypothesis	Independent Variables	Dependent Variables	Statistical Methods
H1	Safety climate	Accident Rate	Liner Regression
H2	Safety climate	Occupational Injuries	Liner Regression

In the follows, the researcher comes up with the hypothesis's evaluation. Accordingly, 2 major and 24 sub- hypotheses for this research are evaluated using linear regression testing.

4.8.1 Major Hypothesis

H1: Safety climate is significantly associated with Accident Rate

H2: Safety climate is significantly associated with Occupational Injuries

4.8.2 Sub Hypothesis

H1a: Owner/Client Involvement is negatively related with Accident Rate

H1b: Leadership Involvement is negatively related with Accident Rate

H1c: Safety valued aligned with production is negatively related with Accident Rate

H1d: Management Commitment is negatively related with Accident Rate

H1e: Employee involvement/ empowerment is negatively related with Accident Rate

H1f: Communication is negatively related with Accident Rate

H1g: Training/Education at all levels is negatively related with Accident Rate

H1h: Mutual Trust is negatively related with Accident Rate

H1i: Job planning is negatively related with Accident Rate

H1j: Programs, policies, procedures, and practices is negatively related with Accident Rate

H1k: Safety and health programs/systems activity is negatively related with Accident Rate

H1l: General contractor/construction manager management of subcontractors is negatively related with Accident Rate

H2a: Owner/client Involvement is negatively related with Occupational Injuries

H2b: Leadership Involvement is negatively related with Occupational Injuries

H2c: Safety valued aligned with production is negatively related with Occupational Injuries

H2d: Management Commitment is negatively related with Occupational Injuries

H2e: Employee Involvement/ Empowerment is negatively related with Occupational Injuries

H2f: Communication is negatively related with Occupational Injuries

H2g: Training/Education at all levels is negatively related with Occupational Injuries

H2h: Mutual Trust is negatively related with Occupational Injuries

H2i: Job planning is negatively related with Occupational Injuries

H2j: Programs, policies, procedures, and practices is negatively related with Occupational Injuries

H2k: Safety and Health programs/systems activity is negatively related with Occupational Injuries

H2l: General contractor/construction manager management of subcontractors is negatively related with Occupational Injuries

4.8.3 Hypothesis Testing

H1: Safety climate is significantly associated with Accident Rate.

The first linear regression testing is between safety climate and accident rate. From the analysis of respondents answered, strongly agreed regarding the existing of the relationship Owner/Client involvement (-.226), Leadership involvement (-.253), Safety valued vs. Production (-.156), Management Commitment (-.165), Communication (-.155), Training /Education (-.193), Mutual Trust (-.202), Safety and Health Programs (-.155), General contractor/construction manager management of subcontractors (-.153) towards Accident Rate. The relationship is observed to be statistically significant. On the other hand, the relationship Empowerment (.076), Job Planning (.047), and Programs, Polices, Procedure and Practices (-.048) towards Accident Rate were not supported. Therefore, the research hypothesis first is partially accepted.

Results of regression analysis are shown in Table 4.26. Where R-Square. This is the proportion of variance in the dependent variable which can be explained by the independent variables. This is an overall measure of the strength of association and does not reflect the extent to which any particular independent variable is associated with the dependent variable.

Table 4.25: Results of Linear Regression Analysis (Safety Climate towards Accident Rate)

Hypothesis	Independent Variables	(β)	R Square	▲ R Square	Sig
H1a	Owner/Client involvement	-.226	.053	.051	0.002 < 0.05
H1b	Leadership involvement	-.253	.066	.064	0.001<0.05
H1c	Safety valued vs. Production	-.156	.026	.024	0.37<0.05
H1d	Management Commitment	-.165	.030	.027	0.027<0.05
H1e	Employee involvement/ Empowerment	.076	.008	.006	0.320 (NS)
H1f	Communication	-.155	.026	.024	0.039 < 0.05
H1g	Training/Education	-.193	.040	.037	0.009 <0.05
H1h	Mutual Trust	-.202	.043	.041	0.007 < 0.05
H1i	Job Planning	.047	.004	.002	0.538 (NS)
H1j	Programs, Polices, Procedure and Practices	-.048	.005	.002	0.524 (NS)
H1k	Safety and Health Programs	-.155	.026	.024	0.038 < 0.05
H1l	General contractor/ construction manager management of subcontractor	-.153	.026	.023	0.041< 0.05

Correlation is significant at the 0.05 level ($p < 0.05$) NS = not significant

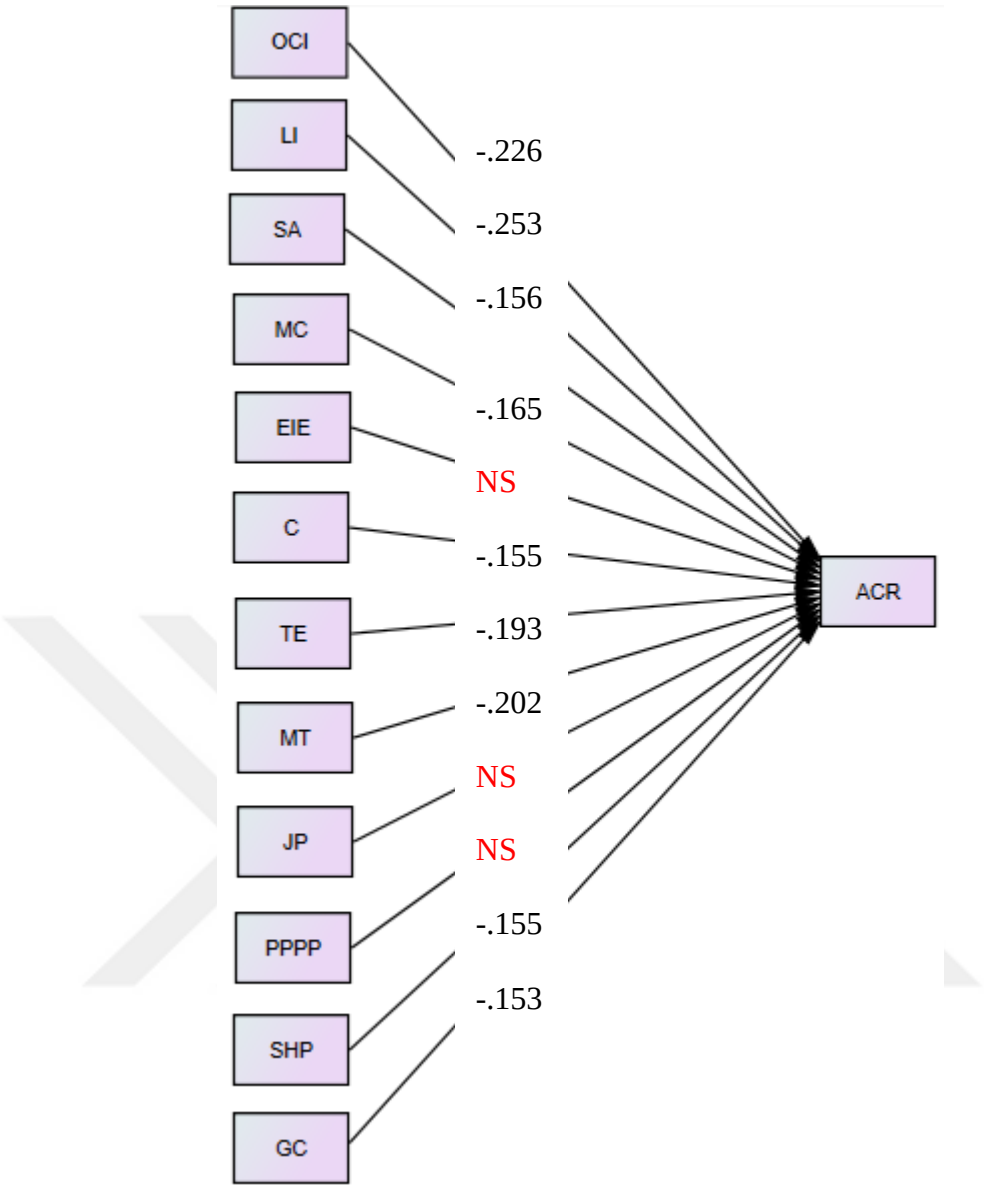

Figure 4.38: Model of Safety Climate Factors with Accident Rate

Owner/Client involvement = OCI, Leadership involvement = LI, Safety valued aligned with Production=SA, Management Commitment =MC, Employee Involvement/Empowerment = EIE, Communication = C, Training/Education = TE Mutual Trust = MT, Job Planning = JP, Programs, polices, Procedure and practices =PPPP, Safety and Health Programs = SHP, General Contractor/construction manager management of subcontractor= GC, Accident rate= ACR.

Result: From the model, this study found that Owner/Client involvement, Leadership involvement, Safety valued vs. Production, Management Commitment, Communication, Training and education at all level, Mutual Trust, Safety and Health

Programs, and General contractor/ construction manager management of subcontractor have a strong and significant effect towards Accident Rate. However the relationship Employee involvement /Empowerment, Job Planning, and Programs, Polices, Procedure and Practices have not been the significant effect towards Accident Rate.

H2: Safety climate is significantly associated with Occupational Injuries

The second linear regression testing is between safety climate factors and occupational injuries. From the analysis of respondents answered, strongly agreed regarding the existing of the relationship Owner/Client involvement (-.285), Leadership involvement (-.343), Safety valued vs. Production (-.157), Management Commitment (-.226), Communication (-.237), Training/Education at all level (-.258), Programs, Polices, Procedures and Practices (-.159), Safety and Health Programs (-.161), General contractor/ construction manager management of subcontractor (-.157) towards Occupational injuries. The relationship is observed to be statistically significant. On the other hand, the relationship Employee involvement Empowerment (.069), Mutual Trust (-.139), and Job Planning (.076) towards Occupational injuries were not supported. Therefore, the research hypothesis second is partially accepted.

Table 4.26: Results of Linear Regression Analysis (Safety climate towards Occupational Injuries)

Hypothesis	Independent Variables	(β)	R Square	▲ R Square	Sig
H2a	Owner/Client Involvement	-.285	.119	.081	0.000 <0.05
H2b	Leadership Involvement	-.343	.156	.118	0.000 <0.05
H2c	Safety valued aligned with Production	-.157	.062	.025	0.033 <0.05
H2d	Management Commitment	-.226	.089	.051	0.002 <0.05
H2e	Employee Involvement/ Empowerment	.069	.042	.005	0.363 (NS)
H2f	Communication	-.237	.094	.056	0.001< 0.05
H2g	Training/Education	-.258	.104	.067	0.000 <0.05
H2h	Mutual Trust	-.139	.057	.019	0.058 (NS)
H2i	Job Planning	.076	.043	.006	0.310 (NS)
H2j	Programs, Polices, Procedures and Practices	-.159	.063	.025	0.031 <0.05
H2k	Safety and Health Programs	-.161	.064	.026	0.029 <0.05
H2l	General contractor/ construction manager management of subcontractor	-.157	.062	.025	0.033 <0.05

Correlation is significant at level 0.05 (P < 0.05) NS= not significant

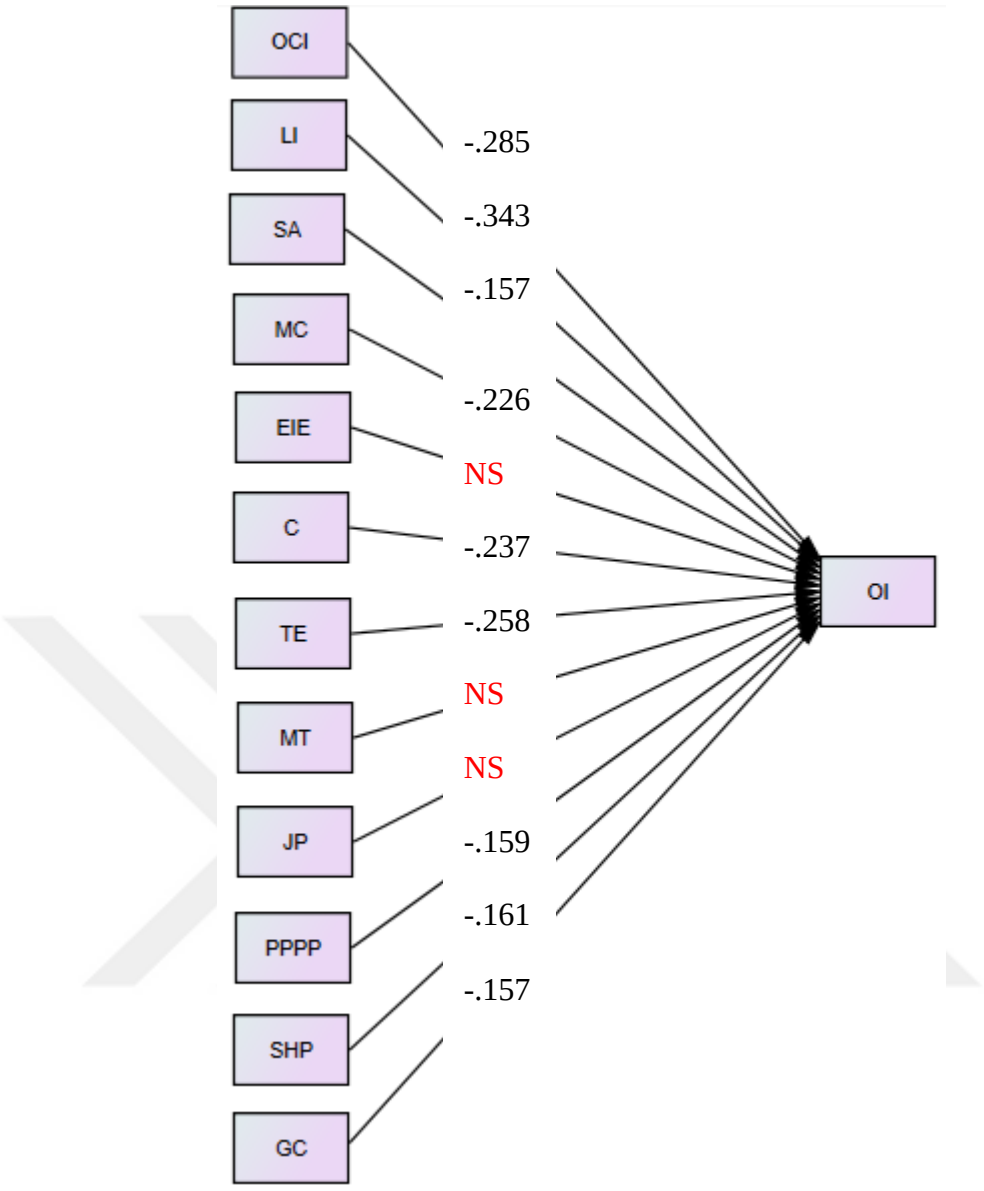

Figure 4.39: Model of Safety Climate Factors with Occupational Injuries

Owner/Client Involvement = OCI, Leadership Involvement = LI, Safety valued vs. Production = SA, Management Commitment = MC, Employee involvement/ empowerment = EIE, Communication = C, Training/Education = TE, Mutual Trust = MT, Job Planning = JP, Programs, Polices, Procedures and Practices = PPPP, Safety and Health Programs = SHP, General contractor/ construction manager management of subcontractor = GC, Occupational injuries = OI

Result: From the model, this study found that Owner/Client, Leadership, Safety valued vs. Production, Management Commitment, Communication, Training,

Programs, Polices, Procedures and Practices, Safety and Health Programs, and General contractor/ construction manager management of subcontractor have a strong and significant effect towards Occupational injuries. However the relationship Employee involvement /Empowerment, Mutual Trust, and Job Planning have not been the significant effect towards Occupational Injuries.

Research Model and Summary of Hypotheses Tested

A hypothetical model was designed to measure safety climate towards safety performance in construction companies in Iraq. Table 4.27 presents the result of hypotheses testing with their status of acceptance or rejection. From Table 4.27, it can be seen that the out of 24 sub hypotheses are accepted for this study.

Table 4.27: Summary of Hypotheses Testing

Hypothetical Factors	Result
H1a: Owner/client involvement is negatively related with Accident rate	Supported
H1b: Leadership involvement is negatively related with Accident rate	Supported
H1c: Safety valued aligned with production is negatively related with Accident rate	Supported
H1d: Management Commitment is negatively related with Accident rate	Supported
H1e: Employee involvement/ empowerment is negatively related with Accident Rate	Not Supported
H1f: Communication is negatively related with Accident Rate	Supported

Table 4.27: Summary of Hypotheses Testing (cont.)

Hypothesis	Result
H1g: Training/Education at all levels is negatively related with Accident Rate	Supported
H1h: Mutual Trust is negatively related with Accident Rate	Supported
H1i: Job planning is negatively related with Accident Rate	Not Supported
H1j: Programs, policies, procedures, and practices is negatively related with Accident Rate	Not Supported
H1k: Safety and health programs/systems activity is negatively related with Accident Rate	Supported
H1l: General contractor/construction manager management of subcontractors is negatively related with Accident Rate	Supported
H2a: Owner/client involvement is negatively related with Occupational Injuries	Supported
H2b: Leadership involvement is negatively related with Occupational Injuries	Supported
H2c: Safety valued aligned with production is negatively related with Occupational Injuries	Supported
H2d: Management Commitment is negatively related with Occupational injuries	Supported
H2e: Employee involvement/ empowerment is negatively related with Occupational injuries	Not Supported
H2f: Communication is negatively related with Occupational injuries	Supported

Table 4.27: Summary of Hypothesis Testing (cont.)

Hypothetical Factors	Result
H2g: Training/Education at all levels is negatively related with Occupational injuries	Supported
H2h: Mutual Trust is negatively related with Occupational injuries	Not Supported
H2i: Job planning is negatively related with Occupational injuries	Not Supported
H2j: Programs, policies, procedures, and practices is negatively related with Occupational injuries	Supported
H2k: Safety and health programs/systems activity is negatively related with Occupational injuries	Supported
H2l: General contractor/construction manager management of subcontractors is negatively related with Occupational injuries	Supported

4.9 Safety Climate Factors

The frequency analysis showed that the variation on the results of safety climate factors. This study did the comparison using mean, median, standard divination, and range values statistically (Muhammad et al, 2012). From Table 4.29 and Figure 4.38, it can see that Owner /client involvement is an important factor among other's factor. Give responses on the questionnaire (sample) owner /client involvement (OCI) variable's attention with all values of arithmetic variables on mean deviation over (3) and average mean (3.7) that refers to agree in Likert scale. However, they are responsible for implementing and promoting the safe environment in order to work in construction companies. Then followed by Training and Education in all levels (TE) with mean (3.6). However the management obligation to support environment intended for training, continuous verification of training,

ensuring that training is presented to all employees and that training is evaluated correctly. Communication (C) and mutual trust (MT) have the Third and Fourth rank respectively with mean near from (3.5).

Table 4.28: Safety Climate Factors

	Valid N	Range	Minimum	Maximum	Mean	Std. Devotion	Variance
OCI	180	4.00	1.00	5.00	3.7074	.93994	.883
LI	180	3.29	1.00	4.29	3.1056	.65009	.423
SA	180	3.78	1.11	4.89	2.9241	.57806	.334
MC	180	3.27	1.36	4.64	2.9056	.50129	.251
EIE	180	3.70	1.10	4.80	3.2544	.53684	.288
C	180	3.08	1.31	4.38	3.4838	.53914	.291
TE	180	4.00	1.00	5.00	3.6352	.85126	.725
MT	180	3.38	1.38	4.75	3.4708	.56044	.314
PPPP	180	3.86	1.14	5.00	2.9984	.65804	.433
SHP	180	4.00	1.00	5.00	3.1500	.98721	.975
GC	180	3.71	1.14	4.86	2.5008	.57252	.328

Note: N= 180, Owner/Client Involvement = OCI, Leadership Involvement = LI, Safety valued vs. Production = SA, Management Commitment = MC, Employee Involvement Empowerment = EIE, Communication = C, Training / Education = TE, Mutual Trust = MT, Job Planning = JP, Programs, Polices, Procedures and Practices = PPPP, Safety and Health Programs = SHP, General contractor/ construction manager management of subcontractor = GC

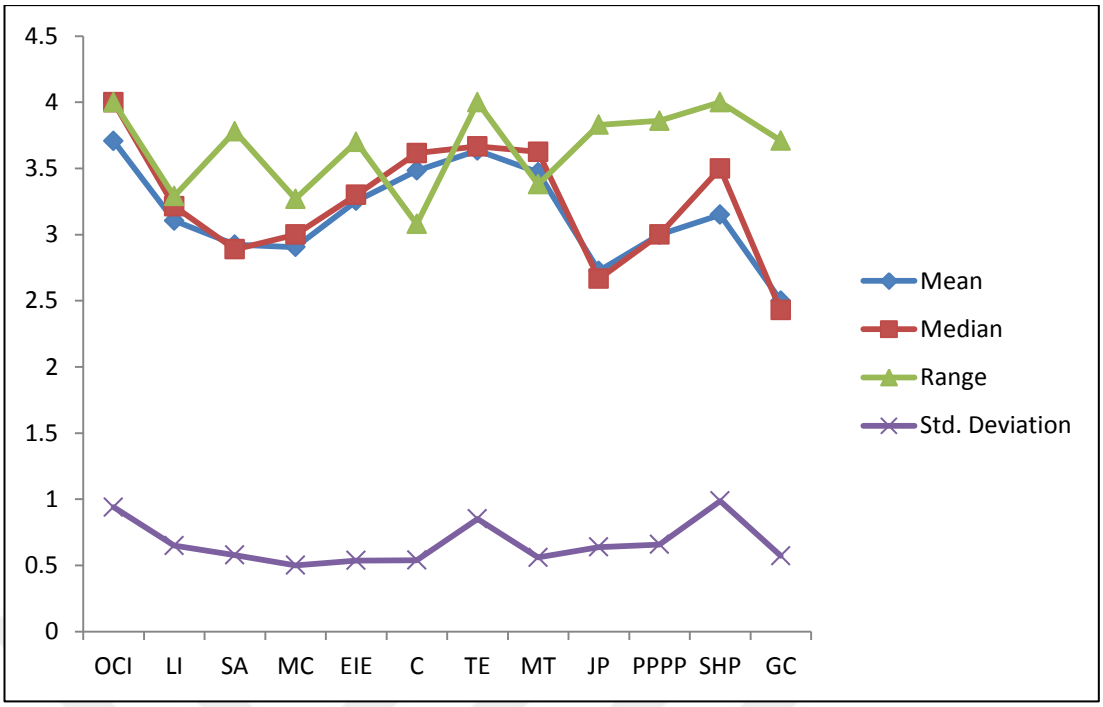

Figure 4.40: Safety Climate Factors

The Figure 4.40 showed the comparison between safety climate factors. The mean value of all factors represented in blue color line shows that Owner/Client Involvement have the biggest mean value followed by Training/Education on all level. The lowest mean value gets for General contractor/ construction manager management of subcontractor.

This study found that for the implementation and awareness programs for safety within the workplace the involvement and interest of Owners /clients are very important. They appoint proper leaders or superior for the train or look after all risks in the workplace. Front-line supervisors are the linchpin of any safety program. They have the power to address hazards before anyone gets hurt. Their ability to lead and communicate with workers about safety issues is critical to achieving a strong safety climate.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study confirms that the relationship between SC and SP in the construction Company in Iraq with the decision of the majority of the material. There was variation among the results, depending on which this study could show the direct impact climate factors dimension safety is currently being tested, on safety performance. These results support the idea. Reason for integrating the SC with SP because it supports human factors controlled by human error, and reaches a maximum level of safety, it appears the role of management practices that are also a key factor in achieving safety performance. Human factors and management practices if working in one direction for the organization can achieve better safety performance. This safety performance can affect the behavior of employees to prevent accidents.

Safety devices developed for this study can be regarded as practical techniques to evaluate and improve the safety performance with the company. This is used to compare the company's safety performance and practice with the different construction company in order to identify areas that need to be considered to enhance safety at construction sites.

SC questionnaire shows reasonable properties; it has good reliability and almost sufficient validity. While studies using quantitative approach and therefore, addressed the SC was under construction. This study focuses on evaluating the relationship between SC and construction safety measure's objective outcomes such as the incident. This is very important to establish criteria for the validity of the questionnaire.

In this study, we approved that can use SC model to assessment the SP (self-reporting of accident rate and occupational injuries) directly in construction companies.

The resultant measures individual attitudes and perception of safety and organizational behaviors (including commitment management, leadership involvement, owner/client involvement, safety valued aligned with production, safety and health program (safety activity) and construction manager.

What found during this study and success SC to evaluate SP needed from organization to develop action plans for continuous improvement of SC, where everyone in the organization needs to participate in some safety activates to support the process or improve the aspect of safety.

In this study the second critical steps to measure SC were to identify the most important factors or leading indicator and also the specific characteristics or aspect of those factors, wherever this study showed Owner/Client involvement the important factors (3.707± 0.93) followed by Training and Education on all level (3.635± 0.851), then Communication (3.483±0.536) and Mutual Trust (3.470±0.560) respectively, on the other hand, there are many studies approved these factors which can help to prevent workplace injuries(Cabrera et al., 2007; Cox et al., 2004; Tharaldsen, Mearn & Knudsen, 2009) hence is not enough to identified factors, it needs to be addressed and improved to show how safety climate can be useful to improve safety outcomes like injuries.

5.2 The Findings from the Descriptive Analysis

The Iraqi construction industry seems to suffer from a general inability to manage workplace health and safety, which found during this study showed a high rate of the accident with the minimum one time and maximum nine times and the statistical mean(5.24±2.389), and occupational injuries under any kinds at least one time with statistical mean (1.85±0.178).

The majority of the organizations that were analyzed to have not a professional safety and/or division, whilst some others have such as position or section. Furthermore, the most participated organizations were had a partial safety program or manual represented by 51.70%. This could be concluded that the organizations without protection professionally or department, and maybe they don't have the safety program actually.

This study could improve the significant relation between safety program toward safety performance (accident rate and occupational injuries), so the successful

implementation of the safety program will reduce the accuracy of the accident, and injuries happened to the worker

The parties that possess the principal responsibility of inadequate safety for the duration of the construction in sites according to the respondents are site engineer, safety engineer, and management respectively. This showed the leadership should proper planning for improved safety before start project and be sure to implement the plan within the project.

Most of the respondents agree that there are a financial conserving and saving by making sure that you comply with safety conditions. On the other hand, the most significant impact of site injuries on construction organizations is increased on cost. So if we encourage the contractors to realize they are paying for their own losses and medical treatment, which often are likely to have the negative effect on a corporation's profit, they may have increased the incentive to improve their safety performance. The other significant are impairing the reputation of organizations, imposing psychological pressure on employees and interrupting project's schedule it means the respondents were, in general, more concerned about the cost, rather than internal distress of company image, the morale, and the humanitarian aspect, and time.

The accident's records of the most companies are either not properly documented or that data considered as confidential and not allowed to others, as they are afraid of a bad reputation or further legal responsibility even though these data were for scientific research only.

Statistic's results showed that 60% of a respondent have a partially knowledge of the safety conditions, specification, and provision, it may be not enough to have good knowledge in safety, and 22.8% didn't have this affects the results, so to overcome the matter; this showed that a serious attention from construction companies to teach and train their worker on safety conditions, specifications and provision.

The results showed that 47.20% of a respondent does not have safety certificated and 30% have first AID, it a Preliminary certificate that explains why most of the response does not have enough knowledge of safety.

The result showed that 43.30% of a respondent answered none of the managements is responsible for the accident, and 16.70% answered themselves. This showed the accident happened either worker mistake, or they frightened from punishment or expulsion.

Most of the respondent's experience on the construction field was either 5 to 10 years or less than 5 years, so it is reasonable to say they have been low to moderate experience.

Education of respondents was concentrated at "B.Sc.", with a share of about 46.7%, which gave us an indicator that the participants were high educated. This can lead to that the participants are in the management or leadership groups, which may give a bias to the management side.

The most respondents were from small to the mid-company, and found that most of these companies do not work with insurance and health companies.

5.3 Recommendations

Based upon the conclusions determined earlier, and the results attained from this study, the following points can certainly be highly recommended:

- There is a need from the responsible authority to develop to the "Full safety programs" and enforce applying them.
- Therefore, there is a need from the responsible authority to enforce the training for safety.
- It is recommended to study the safety outcomes, by trying to reach recorded data if available to get findings that are more accurate.
- Encourage the companies to record accident data to improve their safety, in the future.
- Prominences should be done on investigation the indirect costs of accidents. These costs in addition of being greater than the direct costs, which usually covered by insurance, they buried into project costs, increasing the cost of construction. The costs of accidents present a serious drain of company’s profit. Therefore, more attention must be paid to the

economic investment in safety if the contractor realizes the fact that the costs of accidents are higher than the cost of safety.

- The government together with the engineering societies need to show a significant role to use the safety rules by issuing the regulations, codes, standards and legally enforced the companies to follow them with adequate strict penalties for noncompliance.
- Research could be conducted to estimate the safety cost and to correlate this kind of cost with the accidents cost to encourage the organizations to consider safety seriously.
- Future studies may focus on bigger companies if any exist.
- Future studies may investigate; to any level, safety programs adopted in companies to locate or specify the word "Partial Safety Program."
- I recommended directing the future studies to target the workers, because this study biased to the layer of engineers and managers.

REFERENCES

Abdelahamid, T., & Everett, J. (2000). Identifying root causes of construction accidents. J Constr Eng Manag, 126(1), pp. 52–60.

Aksorn, T., & Hadikusumo, B. (2008). Critical success factors influencing safety program performance in Thai construction projects. Safety Society, 46, pp. 709–727.

Alhajeri, M. (2011). Health and safety in the construction industry: challenges and solutions in the UAE. Unpublished Thesis. Coventry: Coventry University.

Aliaga, M., & Gunderson, B. (2000). Introduction to Quantitative research.

Argent, P., & Forman, J. (2002). The Power of Corporate Communication: Crafting the Voice and Image of Your Business. New York: McGraw-Hill.

Brown, R. L., & Holmes, H. (1986). The use of a factor analytic procedure for assessing the validity of an employee safety climate model. Accident Analysis and Prevention, 18, pp. 455-470.

Cabrera, D, Fernaud, HE & D´ıaz, R (2007). An evaluation of a new instrument to measure organizational safety culture values and practices. Accident Analysis and Prevention, vol.39, pp.1202–1211.

(CPWR 2013), the Center for Construction Research and Training. (June 2013).

Cheyne, A., Cox, S., Oliver, A., & Tomas, J. M. (1998). Modeling safety climate in the prediction of levels of safety activity. Work and Stress, 12, pp. 255–271.

Chi, C., Chang, T., & Ting, H. (2005). Accident patterns and prevention measures for fatal occupational falls in the construction industry. Appl Ergon, 36, pp. 391–400.

Choudhry, R. M., Fang, D., & Lingard, H. (2009). Measuring safety climate of a construction company. Journal of Construction Engineering and Management, 135(9), pp. 890-899.

Chua, D. K., & Goh, Y. M. (2004). Incident Causation Model for Improving Feedback of Safety Knowledge. Journal of Construction Engineering and Management, 130(4), pp. 542-551.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of applied psychology, 78(1), 98.

Construction Industry Institute (CII). (1993). Zero accident techniques. Document 86, Construction Industry Institute, Austin, Texas.

Cooper, M. (2000). Towards a model of safety culture. *Safety Sc, 36*(2), pp. 111–136.

Cooper, D. R., & Schindler, P. S. (2003). Business research methods.

Cooper, M. D., & Phillips, R. A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. Journal of Safety Research, 35(5), pp. 497-512.

Cox, & Cheyne. (2000). Offshore Safety Climate Assessment Toolkit; User's Guide. Co-Operative project; Offshore Safety Division of the HSE, Chevron UK, Chevron Gulf of Mexico (Ship Shoal/Eugene Island), Mobil North Sea and Oryx UK.

Cox, S., & Flin, R. (1998). Safety culture: Philosopher's stone or man of straw? Work Stress, 12, pp. 189-201.

Cox, S, Jones, B & Rycraft, H (2004), Behavioral approaches to safety management within UK reactor plant', Safety Science, vol. 42, pp. 825–839.

Coyle, I. R., Sleeman, S. D., & Adams, N. (1995). Safety Climate. Journal of Safety Research, 26, pp. 247–254.

Creswell, J. W. (2003). Research Design. Qualitative, Quantitative and Mixed Methods Approach (2 Ed.). Omaha: University of Nebraska, SAGE Publications.

Creswell, J. W., & Clark, V. L. (2007). Designing and Conducting Mixed Methods Research. Sage Publications, Thousand Oaks.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests (3ed. Vol. 16). Psychometric.

De la Garza, J., Hancher, D. E., & Decker, L. (1998). Analysis of safety indicators in construction. Journal of Construction Engineering and Management, 124, pp. 312-314.

Dedobbeleer, N., & Beland, F. (1991). A safety climate measure for construction sites. Journal of Safety Research, 22, pp. 97-103.

DeJoy, D. M., Schaffer, B. S., Wilson, M. G., Vandenberg, R. J., & Butts, M. M. (2004). Creating safer workplaces: assessing the determinants and role of safety climate. Journal of Safety Research, 35, pp. 81-90.

Dennis, A. R., & Valacich, J. S. (2001). Conducting experimental research in information systems. Communications of the association for information systems, 7(1).

Donald, I., & Canter, D. (1993). Attitudes to safety: psychological factors and the accident plateau. Health Safety Information. Bull, 215, pp. 5–8.

Duncan C, B. R. (1991). Fall protection and debris containment during construction, Preparing for construction in the 21st century. (C. LM, Ed.) New York: ASCE.

El-Mashaleh, M., Rababeh, S., & Hyari, K. (2010). Utilizing data envelopment analysis to benchmark safety performance of construction contractors. International Journal of Project Management. Retrieved from Doi:10.1016/j.ijproman.2009.04.002

Enshassi, A. (2003). Factors Affecting Safety on Projects Construction. CIB Working Commission W99. Brazil.

Everett, J. G., & Frank, P. B. (1996). Costs of accidents and injuries to the construction industry. Journal of Construction Engineering and Management, 122, pp. 158-164.

Evelyn,A,.Florence ,Y.,Adrian ,F,.(2005) .Framework for project managers to manage construction safety .jornal of project management ,23.pp 329-341 .

Fang, D. P., Chen, Y., & Louisa, W. (2006). Safety climate in construction industry: A case study in Hong Kong. Journal of Construction Engineering and Management, 132(6), pp. 573-584.

Fang, D. P., Xie, F., Huang, X. Y., & Li, H. (2004). Factor Analysis-Based Studies on Construction Workplace Safety Management in China. International Journal of Project Management, 22(1), pp. 43-49.

Fang, D., Chen, Y., & Wong, L. (2006). Safety climate in construction industry: A case study in Hong Kong. J. Construction Engineering and Management, 132(6), pp. 573-584.

Fang, D., Huang, X., & Hinze, J. (2004). Benchmarking Studies on Construction Safety Management in China. Journal of Construction Engineering and Management, 130(3), pp. 424-432.

Farrington-Darby, T., Pickup, L., & Wilson, J. R. (2005). Safety culture in railway maintenance. Safety Science, 43, pp. 39-60.

Farooqui, R., Arif, F. and Rafeeqi, S. F., Safety Performance in Construction Industry of Pakistan. Ed. First International Conference on Construction in Developing Countries, 2008 Karachi, Pakistan.

Fellows, R., & Liu, A. (2003). Research Methods for Construction (2ed.). Cornwall:Blackwell Science Ltd.

Findley, M., Smith, S., Gorski, J., & O'neil, M. (2007). Safety climate differences among job positions in a nuclear decommissioning and demolition industry:

Employees' self-reported safety attitudes and perceptions. Safety Science, 45, pp. 875–889.

Field, A. (2009). Discovering statistics using SPSS: Sage publications.

Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: Identifying the common features. Safety Science, 34, pp. 177-192.

Flin, R., Mearns, K., O'connor, P., & Bryden, R. (2000). Measuring safety climate: identifying the common features. Safety Science, 34(1-3), pp. 177-192.

Fung, I. W., Tam, C. M., Tung, K. C., & Man, A. S. (2005). Safety Cultural Divergences among Management, Supervisory a Worker Groups in Hong Kong Construction Industry. International Journal of Project Management, 23(7), pp. 504-512.

Gibbons, J. D., & Chakraborti, S. (2011). Nonparametric statistical inference: Springer.

Gizem, A.,Serpil, A,. Nurettin ,Y,.Oguzhan,C,.Ahmet,G.,&Ulviye, T.(2015).Perceived safety culture and occupational risk factors in metal industries Procedia Manufacturing,3,pp.4956-4963.

Glendon, A. I., & Litherland, D. K. (2001). Safety climate factors, group differences, and safety behaviour in road construction. Safety Science, 39, pp. 157-188.

Glendon, A. I., & Stanton, N. A. (2000). Perspectives on safety culture. Safety Science, 34, pp. 193-214.

Gray, T. W., & Kraenzle, C. A. (1998). Member participation in agricultural cooperatives: A regression and scale analysis: United States Department of Agriculture, Rural Development, Rural Business-Cooperative Service.

Guldenmund, F. (2000). The Nature of Safety Culture: A Review of Theory and Research. Safety Science, 34, pp. 215-257.

Guldenmund, F. W. (2010). Understanding and exploring safety culture. Thesis (PhD), Delft University, the Netherlands.

Harper, R., & Koehn, E. (1998). Managing industrial construction safety in southeast Texas. J Constr Eng Manag, 124(6), pp. 452–459.

Hassona, A. (2005). Improving Safety Performance in Gaza Strip. Palestine: Islamic University of Gaza.

Health and Safety Excutive (HSE). (2004). Improving Health and Safety in the Construction Industry. London: The Stationery Office.

Health and Safety Executive (HSE). (1999). Summary Guide to Safety Climate Tools. Prepared by MaTSU,Offshore Technology Report NO:063.

Hinze, J. (1981). Human aspects of construction safety. J Constr Div, 107(1), pp. 61–72.

Hinze, J. (1994). Quantification of the indirect costs of injuries. Proceedings of the Fifth Annual Rinker International Conference Focusing on Construction Safety. (pp. 521-534). University of Florida, Gainesville, October.

Hinze, J., & Gambatese, J. (2003). Factors that influence safety performance of specialty contractors. J Constr Eng Manag, 129(12), pp. 159–64.

Hinze, J., & Wilson, G. (1999). Moving toward a zero injury objective. J Constr Eng Manag, 126(5), pp. 399–403.

Health and Safety Executive (1974). Health and Safety at Work Act.

Huang, X., & Hinze, J. (2003). Analysis of construction worker fall accidents. J Constr Eng Manag, 129(3), pp. 71-262.

Huang, Y., Smith, G. S., Ho, M., & Chen, P. Y. (2006). The relationship between safety climate and injury rates across industries: The need to adjust for injury hazards. Accident Analysis and Prevention, 38, pp. 556–562.

Hughes, Phil, & Ed Ferrett. (2008). Introduction to Health and Safety in Construction.

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). Chapter 3: Linear Regression. In An Introduction to Statistical Learning with App in R (pp. 74-94). New York: Springer Science+Business Media.

Jannadi, O. and Assaf, S. (1998) Safety Assessment in the Built Environment of Saudi Arabia, Safety Science Journal, Vol. 29, No. 1, pp. 15-24.

Jaselskis, E., Anderson, S., & Russell, J. (1996). Strategies for achieving excellence in construction safety performance. Journal of Construction Engineering and Management, 121(1), pp. 61–70.

Jill, W. and John, H., 2010. Promoting Construction Health and Safety through Procurement: A briefing note for developing countries. Institution of Civil Engineers.

Jung, Y., Kang, S., Kim, Y. S., & Park, C. (2008). Assessment of safety performance information systems for general contractors. Journal Safety Science, 46(4), pp. 661–674.

Kartam, N.A. and Bouz, R.G. (1998) Fatalities and Injuries in Kuwait Construction Industry.

Kartam, N. A., Flood, I. and Koushki, P. 2000. Construction Safety in Kuwait: Issues, Procedures, Problems, and Recommendations. Safety Science, 36 (3), 163-184.

Kaplan, B., & Duchon, D. (1988). Combining qualitative and quantitative methods in information systems research: a case study. MIS quarterly, 571-586.

Kenny, D. A. (2009). Mediation: Issues and questions. Retrieved from http://www.davidakenny.net/cm/mediate.htm

Kines, P., Lappalainen, J., Mikkelsen, K. L., Olsen, E., Pousette, A., Tharaldsen, J., Törner, M. (2011). Nordic Safety Climate Questionnaire (NOSACQ-50): A new tool for diagnosing occupational safety climate. International Journal of Industrial Ergonomics, 41(6), 634-646.

Kines, (2011). Nordic occupational safety climate. Retrieved from http://www.arbejdsmiljoforskning.dk/en/publikationer/spoergeskemaer/nosacq-50 (accessed 10 February 2016).

Kirchsteiger, C. (2005). A new Approach to Quantitative Assessment of Reliability of Passive Systems. Journal of Safety Science, 43(10), pp. 771-777.

Koehn, E., Kothari, R. K., & Pan, C.-S. (1995). Safety in Developing Countries: Professional and Bureaucratic Problems. Journal of Construction Engineering and Management, 121(3), pp. 261-265.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educ Psychol Meas.

Lingard, H., & Rowlinson, S. M. (2005). Occupational Health and Safety in construction project management. UK: Taylor & Francis.

McGrath, J. (1982). Evidence for more than one type of post-junctional α-adrenoceptor. Biochemical pharmacology, 31(4), 467-484.

McIver, J., & Carmines, E. G. (1981). Unidimensional scaling: Sage.

Mingers, J. (2001). Multimethodology: Mixing and matching methods.

Mearns, K., Whitaker, S. M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. Safety Science, 41, pp. 641-680.

Mehdi, R., Saeed, A., &Hassan, D. (2011). Studying of safety climate assessment: A case study at steel industry .Journal of Management& Marketing, volume IX, issue 2/2011.

Muhammad, A.,Usman, R., Wendy, D., Dave, B. (2012). Combined Effects of Perceived Politics and Psychological Capital on Job Satisfaction, Turnover Intentions, and Performance. Journal of Management.

Mohamed, S. (2002). Safety Climate in Construction Site Environment. Journal of Costruction Engineering and Management, 128(5), pp. 375-384.

Mohamed, S. Shaher, M., Khalied, H. (2010). Utilizing data envelopment analysis to benchmark safety performance of construction contractor's .journal of project management, 28.pp 61-67.

Morgan, D. L. (2006). Practical Strategies for Combining Quantitative and Quantitative Methods:Applications to Health Research. In Emergent Methods in Social Research (pp. 165-182). London, Sage Publications Inc.

Nadhim, Evan A., Hon. (2016).Investigating the relationship between safety climate and safety performance of retrofitting work .In AUBEA.

Neal, A., & Griffin, M. A. (2000). A Framework for Linking Safety Climate to Safety Performance, Knowledge, and Motivation. Journal of Occupational Health Psychology, 5(3), pp. 347-358.

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and injuries at the individual and group levels. Journal of Applied Psychology, 91, pp. 946–953.

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. Safety Science, 34, pp. 99-109.

Newman, M. E. (2003). The structure and function of complex networks. SIAM review, 45(2), 167-256.

Niskanen, T. (1994). Safety climate in the road administration. Safety Science, 17, pp. 237–255.

Ng, S.T., Cheng, K.P. and Skitmore, R.M. (2005) A framework for evaluating the safety performance of construction constructors, Building and Environment 40, pp. 1347–1355.

Nunnally, J. C., & Bernstein, I. (1994). The assessment of reliability. Psychometric theory, 3(1), 248-292.

Patton, M. (2002). Qualitative Research and Evaluation Methods. Thousand Oaks: Sage.

Panneerselvam, K. (2004). LEAD ISOTOPE CONSTRAINTS ON THE ORIGIN OF PROTEROZOIC SEDIMENT-HOSTED COBALT-COPPER ORES OF CENTRAL IDAHO. Paper presented at the 2004 Denver Annual Meeting.

Petersen, D. (1971). Techniques of Safety Management. McGraw-Hill, Book Company.

Pearson, K. (1894). Contributions to the mathematical theory of evolution. Philosophical Transactions of the Royal Society of London. A, 71-110.

Pousette, A., Larson, S., & Torner, M. (2008). Safety climate cross-validation, strength and prediction of safety behaviour. Safety Science, 46(3), pp. 398-404.

Sawacha E, N. S. (1999). Factors affecting performance on construction sites. International Journal of Project Management, 17(5), pp. 309–15.

Scott M. Smith and Gerald S. Albaum, an Introduction to Marketing Research, © 2010

Siu, O.-l., Phillips, D. R., & Leung, T.-w. (2004). Safety climate and safety performance among construction workers in Hong Kong: the role of psychological strains as mediators. Accident Analysis & Prevention, 36(3), 359-366.

Salman,A., Amna,S., Rafiq M.(2012) Establishing a Center of Excellence to Promote Construction Safety Research, Education and Training in Pakistan.

Smallwood, J. (1997). The cost of accidents in the South African construction industry. Australian Institute of Building.

Smith, N., Merna, T., & Jobling, P. (2006). Managing Risk in Construction Projects. UK: Blackwell.

Spector, P. E. (1992). Summated rating scale construction: An introduction: Sage.

Stake, R. (2000). Case Studies. In: Handbook of Qualitative Research. (N. K. Denzin, & Y. S. Lincoln, Eds.) London: Sage Publications, Inc.

Straub, D. W. (1989). Validating instruments in MIS research. MIS quarterly, 147-169.

S.Mohamed. (1999). Empirical investigation of construction safety management activities and performance in Australia .Safety Science, 33.pp 129-142.

Saeed, A., K, Panuwatwanich. (2011).Critical success factors for safety program implementation among construction companies in Saudi Arabia. Science Direct 14, pp.148-155.

Tam CM, F. W. (1998). Effectiveness of safety management strategies on safety performance in Hong Kong. Construction Management and Economics, 16, pp. 49–55.

Tam, C. M., Zing, S. X., & Deng, Z. M. (2004). Identifying Elements of Poor Construction Safety Management in China. Safety Science, 42(7), pp. 569-586.

Tang, S. L., Lee, H. K., & Wong, K. (1997). Safety cost optimisation of building projects in Hong Kong. Construction Economics and Management, 15, pp. 177-186.

Teo, E. A., Ling, F. T., & Chong, A. F. (2005). Framework for Project Managers to Manage Construction Safety. International Journal of Project Management, 23(4), pp. 329-341.

Thomas Nga, S., Kam Pong Chenga, R., & Martin Skitmore, S. (2004). A framework for evaluating the safety performance of construction contractors. Building and Environment. Retrieved from www.elsevier.com/locate/buildenv

Tony, B., & Owain,J.(2000).Construction design and management safety regulations in practice-progress on implementation .Journal of project management ,18,pp.33-40.

Toole, M. (2002). Construction site safety roles. J Constr Eng Manag, 128(3), pp. 10-203.

Toolkit, S. C. A. Safety Climate Measurement: User Guide and Toolkit. Loughborough University Business School, Loughborough Available at http://www lboro ac uk/departments/bs/safety/document pdf (accessed 15 February 2016).

Williamson, A. M., Feyer, A., Cairns, D., & Biancotti, D. (1997). The development of a measure of safety climate: The role of safety perceptions and attitudes. Safety Science, 25, pp. 15–27.

Wong, K., Chan, P., & Lo, K. (1999). Factors affecting the safety performance of contractors and construction sites. Proceedings of the second international conference of CIB working commission W99, (pp. 19–23). Honolulu/Hawaii.

Wu, T. C., Chen, C. H., & Li, C. C. (2008). A correlation among safety leadership, safety climate and safety performance. Journal of Loss Prevention in the Process Industries, 2, pp. 307-318.

Yin, R. (2003). Case Study Research, Design and Methods (3 ed., Vol. 5). Thousand Oaks:Sage.

Yranheikki, E. and Savolainen, H. (2000), Occupational safety and health in Finland, Journal of Safety Research 31 (4), pp. 177–183.

Zhipeng, Z., Yang, M., Qiming, L. (2015). Overview and analysis of safety management studies in the construction industry. Journal of Safety Science, 72, pp.337-350.

Zhou, Q., Fang, D., & Mohamed, S. (2011). Safety climate improvement: Case study in a Chinese Construction Company. Journal of Construction Engineering and Management, 137(1), pp. 86-95.

Zohar, D. (1980). Safety climate in industrial organizations: theoretical and applied implications. Journal of Applied Psychology, 65, pp. 96–102.

Zohar, D. (2002). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. Journal of Applied Psychology, 87, p. 156−163.

Zohar, D. (2010). Thirty years of safety climate research: Reflections and future directions. Accident Analysis and Prevention, 42(5), pp. 1517-1522.

APPENDIX A

Table A.1: Comparison between Safety Climate Studies

Researcher	Research	Factors	Positive	Negative	Comment
Zohar, (1980)	Safety climate in industrial organizations	(8) The significance of safety, outcomes of required place of work on safety, safety committee status, safety officer status, safe conduct effects on promotion, risk level in the work place, administration attitudes to safety, along with the impact of safety perform on social status	The first attempt	Industrial field.	Just reference because it was old.
Dedobbeleer and Beland (1991)	A safety climate measure for construction sites	(2) Management commitment workers' involvement		Only two factors.	Not suitable

Table A.1: Comparison between Safety Climate Factors Studies (cont.)

Researcher	Research	Factors	Positive	Negative	Comment
Donald and Canter, (1993)	Attitudes to safety: psychological factors and the accident plateau	(16) Safety Attitude Questionnaire		Workers attitudes towards safety. Not clear.	Employee perceptions about the value of safety; more clear
Coyle et al, (1995)	Safety Climate	Nursing and Social Workers	It is the truth	no universal set of safety climate factors	Not useful in our work
Williamson et al.(1997)	The development of a measure of safety climate	(4) Risk justification Positive safety practice Fatalism Personal motivation regarding safe behavior Optimism		Too little factors	
HSE (1999)	Summary Guide to Safety Climate Tools	Suitable for our work, and there is a SCQ.		Not free	This study used another SCQs.

Table A.1: Comparison between Safety Climate Studies (cont.)

Researcher	Research	Factors	Positive	Negative	Comment
		Taking behavior along with some contributory influences, permit-to-work, some hurdles to safe behavior ، as well as reporting of injuries and near misses.	Suitable for our work, and there is a SCQ	Not free	This study used another SCQs.
Guldenmund, F, (2000)	The Nature of Safety Culture	(6) Management, procedures, risk, safety arrangements, , work and training pressure	Useful in safety culture		Not suitable for safety climate.
Flin et al.(2000)	Measuring safety climate	(6)Management, risk, safety system, competence, work pressure, and procedures	Good	Too little factors	Some factors shared with others.
Glendon and Litherland(2001)	Safety climate factors	Adequacy of procedures, support and communication, work	Safety Climate Questionnaire		Some factors shared with others.

Table A.1: Comparison between Safety Climates Studies (cont.)

Researcher	Research	Factors	Positive	Negative	Comment
		Pressure, relationships, personal protective equipment, and safety rules			
Mohamed, (2002)	Safety Climate in Construction Site Environments	(10) Communication, commitment, safety procedures and rules, supervisory environment, supportive environment ،risk personal understanding, workers' involvement, appraisal of work risks, competence,	There are common factors		Some factors used in common.

APPENDIX B

Correlations

		OCI	LI	SA	MC	EIE	C	TE	MT	JP	PPPP	SHP	GC	ACR	OI
OCI	Pearson Correlation	1	.702**	.312**	.536**	.024	.670**	.694**	.290**	-.365**	.151*	.280**	.059	-.223**	-.294**
	Sig. (2-tailed)		.000	.000	.000	.753	.000	.000	.000	.000	.044	.000	.433	.003	.000
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
LI	Pearson Correlation	.702**	1	.243**	.521**	.142	.692**	.628**	.378**	-.368**	.126	.211**	.013	-.253**	-.345**
	Sig. (2-tailed)	.000		.001	.000	.057	.000	.000	.000	.000	.091	.004	.861	.001	.000
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
SA	Pearson Correlation	.312**	.243**	1	.324**	-.042	.405**	.405**	.074	-.414**	-.174*	.045	.319**	-.159*	-.138
	Sig. (2-tailed)	.000	.001		.000	.572	.000	.000	.321	.000	.020	.548	.000	.033	.064
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
MC	Pearson Correlation	.536**	.521**	.324**	1	-.039	.426**	.519**	.153*	-.288**	.115	.270**	.105	-.166*	-.225**
	Sig. (2-tailed)	.000	.000	.000		.601	.000	.000	.040	.000	.123	.000	.159	.026	.002
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
EIE	Pearson Correlation	.024	.142	-.042	-.039	1	.229**	.095	.116	-.100	.007	-.007	-.088	.064	.105
	Sig. (2-tailed)	.753	.057	.572	.601		.002	.202	.121	.181	.921	.925	.242	.396	.161
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
C	Pearson Correlation	.670**	.692**	.405**	.426**	.229**	1	.656**	.158*	-.434**	-.056	.236**	.164*	-.156*	-.227**
	Sig. (2-tailed)	.000	.000	.000	.000	.002		.000	.034	.000	.456	.001	.028	.036	.002
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
TE	Pearson Correlation	.694**	.628**	.405**	.519**	.095	.656**	1	.255**	-.430**	.159*	.219**	.132	-.194**	-.255**
	Sig. (2-tailed)	.000	.000	.000	.000	.202	.000		.001	.000	.032	.003	.076	.009	.001
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
MT	Pearson Correlation	.290**	.378**	.074	.153*	.116	.158*	.255**	1	-.071	.247**	.038	-.274**	-.203**	-.134
	Sig. (2-tailed)	.000	.000	.321	.040	.121	.034	.001		.346	.001	.616	.000	.006	.072
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
JP	Pearson Correlation	-.365**	-.368**	-.414**	-.288**	-.100	-.434**	-.430**	-.071	1	.166*	-.231**	-.011	.053	.045
	Sig. (2-tailed)	.000	.000	.000	.000	.181	.000	.000	.346		.026	.002	.881	.481	.549
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
PPPP	Pearson Correlation	.151*	.126	-.174*	.115	.007	-.056	.159*	.247**	.166*	1	.104	-.115	-.045	-.170*
	Sig. (2-tailed)	.044	.091	.020	.123	.921	.456	.032	.001	.026		.164	.123	.549	.022
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
SHP	Pearson Correlation	.280**	.211**	.045	.270**	-.007	.236**	.219**	.038	-.231**	.104	1	-.015	-.158*	-.147*
	Sig. (2-tailed)	.000	.004	.548	.000	.925	.001	.003	.616	.002	.164		.841	.034	.049
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
GC	Pearson Correlation	.059	.013	.319**	.105	-.088	.164*	.132	-.274**	-.011	-.115	-.015	1	-.151*	-.165*
	Sig. (2-tailed)	.433	.861	.000	.159	.242	.028	.076	.000	.881	.123	.841		.043	.027
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
ACR	Pearson Correlation	-.223**	-.253**	-.159*	-.166*	.064	-.156*	-.194**	-.203**	.053	-.045	-.158*	-.151*	1	.464**
	Sig. (2-tailed)	.003	.001	.033	.026	.396	.036	.009	.006	.481	.549	.034	.043		.000
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
OI	Pearson Correlation	-.294**	-.345**	-.138	-.225**	.105	-.227**	-.255**	-.134	.045	-.170*	-.147*	-.165*	.464**	1
	Sig. (2-tailed)	.000	.000	.064	.002	.161	.002	.001	.072	.549	.022	.049	.027	.000	
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure B.1: Correlations Analysis

APPENDIX C

NORD50 Safety Climate Assessment tool (Questions and numbers)

1. Management encourages employees here to work in accordance with safety rules -even when the work schedule is tight.
2. Management ensures that everyone receives the necessary information on safety.
3. Management looks the other way when someone is careless with safety.
4. Management places safety before production.
5. Management accepts employees here taking risks when the work schedule is tight.
6. We who work here have confidence in the management's ability to deal with safety.
7. Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately.
8. When a risk is detected, management ignores it without action.
9. Management lacks the ability to deal with safety properly.
10. Management strives to design safety routines that are meaningful and actually work.
11. Management makes sure that everyone can influence safety in their work
12. Management encourages employees here to participate in decisions which affect their safety.
13. Management never considers employees' suggestions regarding safety.
14. Management strives for everybody at the worksite to have high competence concerning safety and risks.
15. Management never asks employees for their opinions before making decisions regarding safety.
16. Management involves employees in decisions regarding safety.
17. Management collects accurate information in accident investigations.
18. Fear of sanctions (negative consequences) from management discourages employees here from reporting near-miss accidents.
19. Management listens carefully to all who have been involved in an accident.
20. Management looks for causes, not guilty persons, when an accident occurs.

21. Management always blames employees for accidents.
22. Management treats employees involved in an accident fairly.
23. We who work here try hard together to achieve a high level of safety.
24. We who work here take joint responsibility to ensure that the workplace is always kept tidy.
25. We who work here do not care about each other's safety.
26. We who work here avoid tackling risks that are discovered.
27. We who work here help each other to work safely.
28. We who work here take no responsibility for each other's safety.
29. We who work here regard risks as unavoidable.
30. We who work here consider minor accidents to be a normal part of our daily work.
31. We who work here accept dangerous behavior as long as there are no accidents.
32. We who work here break safety rules in order to complete work on time.
33. We who work here never accept risk-taking even if the work schedule is tight.
34. We who work here consider that our work is unsuitable for cowards.
35. We who work here accept risk-taking at Work.
36. We who work here try to find a solution if someone points out a safety problem.
37. We who work here feel safe when working together.
38. We who work here have great trust in each other's ability to ensure safety.
39. We who work here learn from our experiences to prevent accidents.
40. We who work here take each other's opinions and suggestions concerning safety seriously.
41. We who work here seldom talk about safety.
42. We who work here always discuss safety issues when such issues come up.
43. We who work here can talk freely and openly about safety.
44. We who work here consider that a good safety representative plays an important role in preventing accidents.
45. We who work here consider that safety rounds/evaluations have no effect on safety.
46. We who work here consider that safety training to be good for preventing accidents.
47. We who work here consider early planning for safety as meaningless.

48. We who work here consider that safety rounds/evaluations help find serious hazards.
49. We who work here consider safety training to be meaningless.
50. We who work here consider it important to have clear-cut goals for safety.

APPENDIX D

Offshore Safety Climate Assessment tool (Questions and numbers)

Management Commitment

1. Management acts decisively when a safety concern is raised.
2. Management acts only after accidents have occurred.
3. Corrective action is always taken when management is told about unsafe practices.
4. In my workplace management acts quickly to correct safety problems.
5. In my workplace management turn a blind eye to safety issues.
6. In my workplace managers/supervisors show interest in my safety.
7. Managers and supervisors express concern if safety procedures are not adhered to.

***Communicatio*n**

8. Management operates an open door policy on safety issues
9. My line manager/supervisor does not always inform me of current concerns and issues.
10. I do not receive praise for working safely.
11. Safety information is always brought to my attention by my line manager/supervisor.
12. There is good communication here about safety issues which affect me.

Priority of Safety

13. I believe that safety issues are not assigned a high priority.
14. Management clearly considers the safety of employees of great importance.
15. Safety rules and procedures are carefully followed.
16. Management considers safety to be equally as important as production.

Safety Rules and Procedures

17. Sometimes it is necessary to depart from safety requirements for production's sake.
18. Some health and safety rules and procedures are not really practical.
19. Some safety rules and procedures do not need to be followed to get the job done safely.

Supportive Environment

20. Employees are not encouraged to raise safety concerns.
21. Co-workers often give tips to each other on how to work safely.
22. I am strongly encouraged to report unsafe conditions.
23. When people ignore safety procedures here, I feel it is none of my business.
24. A no-blame approach is used to persuade people acting unsafely that their behavior is inappropriate.
25. I can influence health and safety performance here.

Involvement

26. I am involved in informing management of important safety issues.
27. I am never involved in the ongoing review of safety.
28. I am involved with safety issues at work.

Personal Priorities and Need for Safety

29. Safety is the number one priority in my mind when completing a job.
30. Personally I feel that safety issues are not the most important aspect of my job.
31. I understand the safety rules for my job.
32. It is important to me that there is a continuing emphasis on safety.
33. A safe place to work has a lot of personal meaning to me.

Personal Appreciation of Risk

34. I am rarely worried about being injured on the job.

35. In my workplace the chances of being involved in an accident are quite large.

36. I am sure it is only a matter of time before I am involved in an accident.

37. I am clear about what my responsibilities are for health and safety.

Work Environment

38. I cannot always get the equipment I need to do the job safely.

39. Operational targets often conflict with safety measures.

40. Sometimes conditions here hinder my ability to work safely.

41. Sometimes I am not given enough time to get the job done safely.

42. There are always enough people available to get the job done safely.

43. This is a safer place to work than other companies I have worked for.

APPENDIX E

The purpose of this questionnaire is to get your view on safety at this workplace. Your answers will be processed on a computer and will be dealt with confidentially. No individual results will be presented in any way. Although we want you to answer each and every question, you have the right to refrain from answering any one particular question, a group of questions, or the entire questionnaire.

I have read the above introduction to the questionnaire and agree to complete the questionnaire under the stated conditions	Yes ☐

PART I: GENERAL INFORMATION

Please write or check the most appropriate answer for the following questions

1. Name of your company (optional) ----------			
2. What is your job title (optional)? ----------			
3. How many years have your company in the construction field?			
☐ Less than 5 Years	☐ 5 to 10 years	☐ 10 to 15 years	☐ over 15 years
4. How many years you have been in the construction field?			
☐ Less than 5 Years	☐ 5 to 10 years	☐ 10 to 15 years	☐ over 15 years
5. How old are you?			
☐ 16 to 24 years	☐ 25 to 34 years	☐ 35 to 44 years	☐ over 45 years
6. What is your scientific qualification?			
☐ Secondary	☐ Diploma	☐ B.Sc.	☐ Master
7. How many workers in your company?			
☐ 25 to 50	☐ 51 to 75	☐ More than 75	
PART II: INFORMATION OF SAFETY			
8. Does your company have a safety professional / department?			
☐ Yes	☐ No		
9. Does your company use a safety program or manual?			
☐ Yes	☐ Partially	☐ No	
10. Do you have knowledge of the safety conditions, specifications and provision?			
☐ Yes	☐ Partially	☐ No	
11. In your opinion, who should be responsible for lacking of safety during construction on site? (You can select more than one answer for this question)			

☐ Worker	☐ Safety Engineer	☐ Site Engineer	☐ Management
☐ Government	☐ Other (Specify)----		

12. Do you expect any financial saving by complying with safety conditions, specifications and provisions

☐ Yes	☐ Sometimes	☐ No

13. What is the most significant impact of site accident on construction companies?

	Very Low	Low	Moderate	High	Very high
Increase cost.					
Impairing reputation of companies.					
Imposing psychological burden on workers.					
Interrupting project's schedule.					

14-I take safety education attending certificate program:

	FIRST AID / CPR Certification		Public Sector Safety and Health Fundamentals		Specialist in Safety and Health		Construction Safety and Health
	Specialized Equipment – Supplemental Training		None				

15- Have you ever been involved in an accident, or near miss incident, of any kind at work, but did not require absence from work in the last 6 months?

☐ Yes ☐ No

16-If yes, how many times: ----------.

17- How many times have you suffered from the following injuries, which require absence from work for three consecutive days, in the last 6 months?

Items score	None	One time	Two times	Three times	Four times	Five times or more
Strains or sprains	1	2	3	4	5	6
Cuts or lacerations	1	2	3	4	5	6
Burns	1	2	3	4	5	6
Bruises or contusions	1	2	3	4	5	6
Fractured bone	1	2	3	4	5	6
Dislocated joint	1	2	3	4	5	6
Other injuries	1	2	3	4	5	6

18-Who was responsible about the accident?

☐ Management ☐ Workmates ☐ line manager ☐ Yourself
☐ Team leader ☐ Contractor ☐ None

PART III: SAFETY CLIMATE

	1- Owner/client involvement (3 Items)	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	1.1 My job is quite safe					
2	1.2 In those dangerous jobs, there are always measures to prevent accidents					
3	1.3 In my work there is a schedule to support safety					
	2- Leadership involvement (7 Items)					
4	2.1 Management encourages employees here to work in accordance with safety rules -even when the work schedule is tight.					
5	2.2 Management ensures that everyone receives the necessary information on safety.					
6	2.3 Management looks the other way when someone is careless with safety.					
7	2.4 In my work everywhere, I go such as the general work area, lunch and break rooms, rest rooms, and meeting rooms I see something talking about safety.					
8	2.5 Our leaders play a strong and visible role in driving the safety and health in my work place.					
9	2.6 Our leaders practice what they are asking us to do in safety.					
10	2.7 Whenever I see safety regulations being broken, I report it.					
	3- Safety valued and aligned with production (9 Items)					

11	3.1 Management places safety before production					
12	3.2 Management accepts employees here taking risks when the work schedule is tight					
13	3.3 We who work here regard risks as unavoidable					
14	3.4 We who work here consider minor accidents to be a normal part of our daily work					
15	3.5 We who work here accept dangerous behavior as long as there are no accidents					
16	3.6 We who work here break safety rules in order to complete work on time					
17	3.7 We who work here never accept risk-taking even if the work schedule is tight					
18	3.8 We who work here consider that our work is unsuitable for cowards					
19	3.9 We who work here accept risk-taking at work					
	4- Management Commitment: (11 Items)					
20	4.1 We who work here have confidence in the management's ability to deal with safety					
21	4.2 Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately					
21	4.2 Management ensures that safety problems discovered during safety rounds/evaluations are corrected immediately					

22	4.3 When a risk is detected, management ignores it without action					
23	4.4 Management lacks the ability to deal with safety properly					
24	4.5 Management acts decisively when a safety concern is raised					
25	4.6 Management acts only after accidents have occurred					
26	4.7 Corrective actions is always taken when management is told about unsafe practices					
27	4.8 In my workplace management acts quickly to correct safety problems					
28	4.9 In my workplace management turn a blind eye to safety issues					
29	4.10 In my workplace managers/supervisors show interest in my safety					
30	4.11 Managers and supervisors express concern if safety procedures are not adhered to					
	5- Employee involvement/ empowerment: (10 Items)					
31	5.1 Is there an effective system to ensure accountability for safety roles and responsibilities?					
32	5.2 Are the following aware of their safety responsibilities? 1. Managers 2.Supervisors 3. Workers					
33	5.3 Do you know what are your responsibilities regarding safety?					

34	5.4 Management strives to design safety routines that are meaningful and actually work					
35	5.5 Management makes sure that everyone can influence safety in their work environment					
36	5.6 Management encourages employees here to participate in decisions which affect their safety					
37	5.7 Management never considers employees' suggestions regarding safety					
38	5.8 Management strives for everybody at the worksite to have high competence concerning safety and risks					
39	5.9 Management never asks employees for their opinions before making decisions regarding safety					
40	5.10 Management involves employees in decisions regarding safety					
	6- Communication: (13 items)					
41	6.1 We who work here try to find a solution if someone points out a safety problem					
42	6.2 We who work here feel safe when working together					
43	6.3 We who work here have great trust in each other's ability to ensure safety					
44	6.4 We who work here learn from our experiences to prevent accidents					
45	6.5 We who work here take each other's opinions and suggestions concerning safety seriously					
46	6.6 We who work here seldom talk about safety					

47	6.7 We who work here always discuss safety issues when such issues come up					
48	6.8 We who work here can talk freely and openly about safety					
49	6.9 Management operates an open door policy on safety issues					
50	6.10 My line manager/supervisor does not always inform me of current concerns and issues					
51	6.11 I do not receive praise for working safely					
52	6.12 Safety information is always brought to my attention by my line manager/supervisor					
53	6.13 There is good communication here about safety issues which affect me					
	7-Training/Education at all levels: (4 Items)					
54	7.1 I am trained in safety knowledge					
55	7.2 Safety training fits my job					
56	7.3 There is no well or enough safety education in my organization.					
	8- Mutual Trust: (8 Items)					
57	8.1 Mistakes corrected without punishment and treated as a learning opportunity.					
58	8.2 People hired for their ability and willingness to work safely.					
59	8.3 Employees are not encouraged to raise safety concerns					

60	8.4 Co-workers often give tips to each other on how to work safely					
61	8.5 I am strongly encouraged to report unsafe conditions					
62	8.6 When people ignore safety procedures here, I feel it is none of my business					
63	8.7 A no-blame approach is used to persuade people acting unsafely that their behavior is inappropriate					
64	8.8 I can influence health and safety performance here					
	9-Job planning: (6 Items)					
65	9.1 I cannot always get the equipment I need to do the job safely					
66	9.2 Operational targets often conflict with safety measures					
67	9.3 Sometimes conditions here hinder my ability to work safely					
68	9.4 Sometimes I am not given enough time to get the job done safely					
69	9.5 There are always enough people available to get the job done safely					
70	9.6 This is a safer place to work than other companies I have worked for					
	10- Programs, policies, and procedures, practices (7 Items)					

71	10.1 In our work place, we feel that our leaders saying: The safety and health of our employees is the most important consideration in the operation of this business.					
72	10.2 In our work place, there is a detailed instruction to operate equipment safely.					
73	10.3 In our work place, there is a special care for personal protective equipment (PPE).					
74	10.4 In our work place, there are wall-size posters describing safety placed wherever everyone can see it.					
75	10.5 Sometimes, it is necessary to depart from safety requirements for production's sake.					
76	10.6 Some health and safety rules and procedures are not really practical					
77	10.7 Some safety rules and procedures do not need to be followed to get the job done safely					
	11- Safety and health programs/systems activity: (2 Items)					
78	11.1 Does the contractor's insurance provide adequate cover?					
79	11.2 Do you receive any kind of medical or health support in your work?					
	12- General contractor/ construction manager management of subcontractors: (7 Items)					
80	12.1 Do you believe that the management selects the contractors with low cost instead of high safety expectations?					
81	12.2 The management work together with contractor and subcontractors to achieve safety in our work place.					
82	12.3 Are materials and/or hazardous equipment to be stored on site?					

83	12.4 Are portable electrical tools or other powered machinery used on site?					
84	12.5 Are members of the public or other third parties going to have access to the work area?					
85	12.6 Are you, other employees or other contractors at risk due to the work to be carried out?					
86	12.7 Do the contractor's safe systems of work and method statements provide sufficient detail of the procedures that will be followed?					

If you wish to elaborate on some of your answers, or if you have any comments regarding the study, you are welcome to write them here.
Comments:
_____
_____
_____
_____
____

.

Appendix F

يهدف هذا الاستبيان إلى الحصول على وجهة نظركم عن السلامة في موقع العمل هذا، إذ سيتم إدخال إجاباتكم إلى جهاز كمبيوتر والتعامل معها بسرية تامة، كما لن يتم عرض أية نتائج فردية بأي شكل من الأشكال .وعلى الرغم من أننا نريد منك أن تجيب على كافة الأسئلة دون استثناء، غير انه لديك الحق في الامتناع عن الإجابة عن أي سؤال محدد أو مجموعة من الأسئلة أو عدم الإجابة على كافة أسئلة الاستبيان.

لقد قرأت مقدمة الاستبيان وأوافق على الإجابة عليه وفق الشروط المنصوص عليها	نعم		

الرجاء كتابة أو اختيار الإجابة الأكثر ملائمة من وجهة نظركم:

القسم الأول: معلومات عامة عن الشركة وعن الشخص الذي سوف يملأ الاستبيان

1-اسم الشركة التي تعمل بها (اختياري)----------

2-ماهو المسمى الوظيفي لك في الشركة؟ ----------

3-ماهو تصنيف الشركة في مجال البناء ؟							
	مباني		طرق		صرف صحي		أخرى----------
4-كم عدد سنوات تواجد الشركة في مجال الإنشاءات؟							
	أقل من 5 سنوات		من 5-10 سنوات		من 11-15 سنة		أكثر من 15 سنة
5-كم هو عمرك؟							
	من 16-24 سنة		من 25-34 سنة		من 35-44 سنة		أكثر من 45 سنة
6-ماهي درجتك العلمية؟							
	ثانوية		معهد متوسط		بكالوريوس		ماجستير
7-ماهو عدد عمال الشركة؟							
	25- 50		من 51-75		اكثر من 75		
القسم الثاني: معلومات عن السلامة في شركتكم							
8-هل يوجد لدى الشركة مهندس /قسم للسلامة؟							
	نعم		لا				
9-هل يوجد لدى الشركة برنامج أو مرجع للسلامة؟							
	نعم		جزئي		لا		
10-هل لديك إلمام بشروط ومواصفات وبنود السلامة؟							
	نعم		بشكل جزئي		لا		
11-على من تقع مسؤولية القصور في تطبيق شروط ومواصفات وبنود السلامة في موقع العمل؟							
	العامل		مهندس السلامة		مهندس الموقع		إدارة المشروع
	الحكومة		آخرين (يرجى التحديد)				

12-هل تتوقع أي توفير مالي في حال تطبيق شروط ومواصفات وبنود السلامة؟

نعم		أحيانا		لا	

13-ماهو تأثير إصابات العمل على شركات الإنشاءات؟

	منخفض جدا	منخفض	متوسط	عالي	عالي جدا
زيادة التكاليف					
إضعاف سمعة الشركة					
خلق عبء نفسي على العمال					
اختلال جدولة المشروع					

14-اتلقى تدريبا على ثقافة السلامة

شهادة اسعافات أولية		شهادة أساسيات السلامة والصحة العامة		متخصص في السلامة والصحة		السلامة والصحة في مواقع البناء	
متخصص في المعدات والمزودات		لا شيء مما سبق					

15- هل في أي وقت مضى تعرضت لحادث، أو لحادثه ، من أي نوع في مكان العمل، ولكن لم يتطلب الغياب عن العمل في الأشهر الستة الماضية؟

نعم: ---------- كلا: ----------

16- اذا كان الجواب نعم كم عدد المرات :----------

17- كم مرة عانيت من الإصابات التالية خلال الأشهر الستة الماضية والتي تطلبت الغياب من العمل لمده ثلاثة ايام متتاليه ؟

نفاط الفقرات

	ولا مره	مرة واحدة	مرتان	ثلاث مرات	اربع مرات	خمسه او اكثر
اجهاد او الالتواء	1	2	3	4	5	
جروح او تمزقات	1	2	3	4	5	6
حروق	1	2	3	4	5	6
كدمات او رضوض	1	2	3	4	5	6
كسور العظام	1	2	3	4	5	6
خلع مفصل	1	2	3	4	5	6
اصابات اخرى	1	2	3	4	5	6

18-من برأيك المسؤول الرئيسي عن الحادثة؟

الإدارة		زملاء العمل		المدير المباشر		أنت	
قائد الفريق		المتعهد		لا يوجد			

القسم الثالث: العوامل المؤثرة على السلامة

م	الرجاء حدد الخانة التي تحدد مدى موافقتك على السؤال	اعارض بشدة	اعارض	عادي	اوافق	اوافق بشدة
	1-تدخل المالك /العميل (3 بنود)					
1	اعتقد أن عملي آمن تماما					
2	أثناء المهام الخطرة توجد دوما مقاييس لمنع الحوادث					
3	يوجد في مكان عملي جدول واضح لدعم السلامة					
	2-تدخل الإدارة (7 بنود)					
4	تشجع الإدارة العاملين هنا على العمل وفق قواعد السلامة حتى لو كان جدول العمل ضيقا					
5	تتأكد الإدارة من أن الجميع يتلقى المعلومات الضرورية المرتبطة بالسلامة					
6	تدير الإدارة ظهرها عندما ترى أحدا ما غير مهتما بالسلامة					
7	في مكان عملي حيثما ذهبت مثل منطقة العمل والمطعم وغرف الاستراحة والاجتماعات أرى شيئا ما يتحدث عن السلامة					
8	تلعب الإدارة دورا قويا وظاهرا في قيادة السلامة في مكان عملي					
9	تعد إدارتنا قدوة لنا في تنفيذ ماتطلبه منا في مجال السلامة					
10	أقوم بإعلام الإدارة عندما يتم خرق أنظمة السلامة					
	3-قيمة السلامة مقارنة بالإنتاج (9 بنود)					
11	تضع الإدارة السلامة قبل الإنتاج					
12	تقبل الإدارة مخاطرة العاملين عندما يكون جدول العمل ضيقا					
13	نحن العاملين هنا نعتبر أنه لا يمكن تجنب المخاطر					
14	نحن العاملين هنا نعتبر أن الحوادث تعد جزءا من عملنا اليومي					

15	نحن العاملون هنا نقبل السلوكيات الخطرة طالما لم يكن هناك حادث					
16	نحن العاملون هنا نكسر قواعد السلامة لإنجاز العمل في وقته					
17	نحن العاملون هنا لا نقبل المخاطرة حتى لوكان جدول العمل ضيقا					
18	نحن العاملون هنا نعتبر أن عملنا غير مناسب للجبناء					
19	نحن العاملون هنا نقبل المخاطرة في العمل					
	4-الثقة بالإدارة (11 بند)					
20	نحن العاملون هنا لدينا الثقة بقابلية الإدارة على التعامل مع موضوع السلامة					
21	تتأكد الإدارة من تصحيح مشاكل السلامة فورا عندما تكتشف أثناء الجولات والتقييم					
22	عندما يتم اكتشاف خطر ما تتجاهل الإدارة ذلك بدون فعل شيئ					
23	تفتقر الإدارة إلى القدرة على التعامل مع السلامة بشكل مناسب					
24	تتصرف الإدارة بحزم عندما يطرأ ما يمس السلامة					
25	تتصرف الإدارة فقط بعد حصول الحادثة					
26	الأفعال التصحيحية عادة تتخذ عندما يتم ابلاغ الإدارة بالممارسات غير الأمنة					
27	في مكان عملي تتصرف الإدارة بسرعة لتصحيح مشاكل السلامة					
28	في مكان عملي تتجاهل الإدارة الأمور المتعلقة بالسلامة					
29	في مكان عملي يبدي المدراء والمشرفون اهتماما بسلامتي					

30	يبدي المدراء والمشرفون قلقا إذا لم يتم اتباع إجراءات السلامة					
	5-مشاركة العمال / التشجيع (10 بنود)					
31	هل يوجد لديكم حيث تعملون نظاما فعالا لضمان المحاسبة على قواعد ومسؤوليات السلامة					
32	هل يضطلع كل من هؤلاء بمسؤولياته بموضوع السلامة 1. المدراء 2. المشرفون 3. العمال					
33	إلى أي مدى تعلم عن مسؤولياتك فيما يخص السلامة					
34	تكافح الإدارة لتصميم اجراءات سلامة ذات معنى وتعمل فعلا					
35	تتأكد الإدارة من أن الجميع يمكن أن يؤثر في السلامة في بيئة عملهم					
36	تشجع الإدارة العاملين هنا على المشاركة في القرارات التي تؤثر على سلامتهم					
37	لا تلقي الإدارة بالا لاقتراحات العمال المرتبطة بالسلامة					
38	تكافح الإدارة ليكون لأي شخص في مكان العمل قدرة عالية فيما يخص السلامة والمخاطر					
39	لا تأخذ الإدارة رأي العاملين قبل اتخاذ قرارات تتعلق بالسلامة					
40	تشرك الإدارة العاملين في القرارات المرتبطة بالسلامة					
	6-التواصل (13 بند)					
41	نحن العاملون هنا نحاول إيجاد حل إذا ما أشار أحد ما إلى مشكلة سلامة					
42	نحن العاملون هنا نشعر بالأمان عندما نعمل مع بعض					
43	نحن العاملون هنا لدينا ثقة كبيرة في قدرة بعضنا البعض لضمان السلامة					
44	نحن العاملون هنا نتعلم من خبراتنا لمنع الحوادث					
45	نحن العاملون هنا نأخذ رأي الآخرين ومقترحاتهم حول السلامة على محمل الجد					

46	نحن العاملون هنا نادرا ما نناقش أمور السلامة					
47	نحن العاملون هنا غالبا ما نناقش أمور السلامة عندما تحدث					
48	نحن العاملون هنا يمكننا الحديث بحرية وبشكل منفتح عن السلامة					
49	تترك الإدارة الباب مفتوحا لمناقشة سياسة السلامة					
50	غالبا لا يخبرني المدير أو المشرف المباشر عن المخاوف الحالية المرتبطة بالسلامة					
51	أنا لا أتلقى المديح من أجل العمل بسلامة					
52	غالبا ما يتم لفت نظري لمعلومات السلامة من قبل المدير أو المشرف المباشر					
53	يوجد في مكان عملي تواصل جيد فيما يخص السلامة التي تؤثر علي					
	7-التدريب / الثقافة (4 بنود)					
54	أنا شخص متدرب في معلومات السلامة					
55	التدريب المقدم لي من أجل السلامة مناسب لعملي					
56	لا يوجد في مكان عملي إرادة أو ثقافة سلامة كافية.					
	8-الثقة المتبادلة (8 بنود)					
57	يتم تصحيح الأخطاء بدون عقوبة وتعامل على أنها فرصة للتعلم					
58	يتم توظيف العاملين هنا بحسب قدرتهم وإرادتهم للعمل بسلامة					
59	لا يتم تشجيع العمال هنا لإبداء قلقهم فيما يخص السلامة					
60	غالبا ما يعطي زملاء العمل نصائح متبادلة عن كيفية العمل بسلامة					
61	يتم تشجيعي هنا للإعلام عن الشروط غير الآمنة					

62	عندما يتجاهل الناس السلامة هنا أعتقد أن هذا الأمر لا يعنيني					
63	تطبق سياسة عدم اللوم لإقناع العاملين هنا والذين يتصرفون بشكل غير آمن بأن سلوكهم غير مقبول					
64	أنا أستطيع التأثير في أداء الصحة والسلامة هنا					
	9-تخطيط العمل (6 بنود)					
65	لا أستطيع دوما الحصول على الأدوات اللازمة لأداء عملي بسلامة					
66	غالبا ما تتعارض الأهداف العملياتية مع مقاييس السلامة					
67	أحيانا الشروط هنا تعيق قدرتي على العمل بسلامة					
68	أحيانا لا يتم إعطائي الوقت الكافي لإنجاز عملي بطريقة آمنة					
69	يوجد عادة عدد كافي من العاملين لإنجاز العمل بطريقة آمنة					
70	يعد هذا المكان من أكثر الأماكن سلامة في العمل من الشركات الأخرى التي عملت بها					
	10-البرامج والسياسات والإجراءات والممارسات (7 بنود)					
71	في مكان عملي نشعر بأن الإدارة تقول: صحة وسلامة عاملينا هي أكثر الاعتبارات أهمية في تشغيل هذا العمل					
72	يوجد في مكان عملي تعليمات مفصلة لتشغيل المعدات بأمان					
73	يوجد في مكان عملي اهتمام خاص بأدوات الوقاية الشخصية PPE					
74	يوجد في مكان عملي لافتات وملصقات جدارية تصف السلامة بحيث يمكن للجميع أن يراها					
75	أحيانا يكون من الضروري التخلي عن متطلبات السلامة من أجل الانتاج					

76	بعض قواعد الصحة والسلامة والإجراءات ليست قابلة للتطبيق					
77	بعض قواعد وإجراءات السلامة لا داعي لاتباعها لتنفيذ العمل بسلامة					
	11-برامج السلامة والصحة (2 بند)					
78	هل يؤمن تأمين المتعهد تغطية مناسبة (التأمينات)					
79	هل تتلقى أي نوع من الرعاية الصحية أو الطبية					
	12-المتعهد/ادارة المشروع المتعهدون الفرعيون (7 بنود)					
80	هل تعتقد أن الإدارة تختار المتعهدين طبقا للتكلفة الأقل بدلا من معايير السلامة					
81	تتعاون الإدارة مع المتعهدين لإنجاز السلامة في مكان عملنا					
82	هل يتم تخزين المواد والمعدات الخطرة في مكان المشروع					
83	هل يتم استخدام الأدوات الكهربائية المحمولة أو الآلات الأخرى في الموقع					
84	هل يستطيع العامة أو أشخاص آخرون غير العاملين من المرور في موقع العمل					
85	هل هناك مخاطر تحيط بك أو بالعاملين أو المتعهدين الآخرين بسبب إجراء العمل					
86	هل أنظمة السلامة للمتعهد في العمل والطرائق تؤمن تفاصيل كافية عن الإجراءات التي يجب اتباعها					

إذا كنت ترغب في التوسع في بعض إجاباتك، او إذا كان لديك أي تعليقات بشأن الدراسة، الرجاء كتابتها هنا.
الملاحظات:

_____

_____

_____

نشكرك على المشاركة والإجابة على هذا الاستبيان، الرجاء التأكد من تأشير المربع على الصفحة الأولى والتي تشير إلى موافقتكم على المشاركة في هذه الدراسة.

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name : Elaf AL ZUBAIDI

Data and Place of Birth : 12.09.1983

Email : elaf19832014@gmail.com

Phone : 00905376872015

EDUCATION

Degree	Institution	Years of Graduation
High School	Demascus Preparatory School	2002
Bachelor degree	Civil Engineering	2006
M.SC	Engineering Management	2016

WORK EXPERIENCE

Year	Place	Enrollment
2007-2014	Iraqi Ministry of Higher Education	Civil Engineer