

THE IMPACT OF EMPLOYEES' SAFETY TRAINING PRACTICES ON THE  
RELATIONSHIP BETWEEN SAFETY CLIMATE AND SAFETY PERFORMANCE

MOHAMED SALEM MAHJOUR

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*Dedicated with love:*

*To my beloved daddy; Mahjoub Mohamed Salem*

*To my adore mom; Roukhaya Mohamed Maouloud*

*To my dear brothers*

*To my sister*

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## ABSTRACT

This research focuses on safety climate, safety performance and safety training practices. The main purpose of this research is to investigate the mediating impact of safety training practices on the relationship between safety climate and safety performance. A hundred ninety questionnaires which contain sixty five items were distributed to site workers in Mauritanian for Construction and Equipment (MCE-SA), however only a hundred and fifty four questionnaires were returned. Descriptive statistics, Pearson correlation and multiple regression analysis methods were used to analyze the collected data. The result of this study shows that the site workers in MCE-SA do have a moderate level of safety climate, safety performance and safety training practices. Besides, this study found that safety climate has a positive relationship with safety performance, and also a positive relationship between safety climate safety training practices was found. However, this study found that there is no relationship between safety training practices and safety performance. It was also found that safety training practices is mediating the relationship between safety climate and safety performance. Lastly, recommendations for MCE-SA, other industries and for future studies were presented.

## ABSTRAK

Kajian ini memberi tumpuan kepada iklim keselamatan, prestasi keselamatan dan amalan latihan keselamatan. Tujuan utama kajian ini adalah untuk menyiasat kesan pengantara amalan latihan keselamatan kepada hubungan antara iklim keselamatan dan prestasi keselamatan. Seratus sembilan puluh soal selidik yang mengandungi enam puluh lima item telah diedarkan kepada pekerja tapak di Mauritania untuk Pembinaan dan Peralatan (MCE-SA), namun hanya seratus lima puluh empat soal selidik telah dikembalikan. Statistik deskriptif, korelasi Pearson dan kaedah analisis regresi berganda telah digunakan untuk menganalisis data yang dikumpul. Hasil kajian ini menunjukkan bahawa para pekerja di tapak MCE-SA mempunyai tahap sederhana terhadap iklim keselamatan, prestasi keselamatan dan amalan latihan keselamatan. Selain itu, kajian ini mendapati bahawa iklim keselamatan mempunyai hubungan yang positif dengan prestasi keselamatan. Hubungan yang positif juga dapat dilihat antara iklim keselamatan dan amalan latihan keselamatan. Walau bagaimanapun, kajian ini mendapati bahawa tiada hubungan antara amalan latihan keselamatan dan prestasi keselamatan. Ia juga mendapati bahawa amalan latihan keselamatan dapat mengantara hubungan antara iklim keselamatan dan prestasi keselamatan. Akhir sekali, cadangan kajian masa hadapan untuk MCE-SA dan organisasi lain telah dibentangkan.

## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	<b>TITLE</b>	<b>i</b>
	<b>DECLARATION</b>	<b>ii</b>
	<b>DEDICATION</b>	<b>iii</b>
	<b>ACKNOWLEDGEMENT</b>	<b>iv</b>
	<b>ABSTRACT</b>	<b>v</b>
	<b>ABSTRAK</b>	<b>vi</b>
	<b>TABLE OF CONTENTS</b>	<b>vii</b>
	<b>LIST OF TABLES</b>	<b>xiii</b>
	<b>LIST OF FIGURES</b>	<b>xv</b>
	<b>LIST OF ABBREVIATION AND SYMBOLS</b>	<b>xvi</b>
<b>CHAPTER 1</b>		<b>1</b>
<b>1.1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.2	Research Background	1
1.3	Problem Statement	5
1.4	Research Questions	8
1.5	Research Objectives	8
1.6	Hypotheses	9

1.7	Significance of the Study	9
1.8	Scope of the Study	10
1.9	Limitation of Study	11
1.10	Conceptual and Operational Definitions	12
1.11	Conclusion	14
<b>CHAPTER 2</b>		<b>15</b>
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>15</b>
2.1	<b>Introduction</b>	<b>15</b>
2.2	Safety Climate	15
2.2.1	Safety Climate Dimensions	17
2.2.1.1	Management Commitment	17
2.2.1.2	Individual Involvement	18
2.2.1.3	Safety Management System	19
2.2.1.4	Risk and Safety Control	19
2.2.1.5	Work Pressure	20
2.2.1.6	Employee Competency	21
2.2.1.7	Safety Rules	22
2.2.1.8	Communication	22
2.2.1.9	Accountability	23
2.2.2	Safety Culture versus Safety Climate	24
2.2.3	Safety Climate as a Leading Indicator	25
2.2.4	Measuring Safety Climate	26
2.2.5	Summary	28

2.3	Safety Performance	29
2.3.1	Improving Safety Performance	30
2.3.2	Safety Performance Measurement	31
2.3.3	Summary	33
2.4	Safety Training Practices	33
2.4.1	The Importance of Safety Training	34
2.4.2	Safety Training in the Work Site	36
2.4.3	Management Support in Safety Training	37
2.4.4	Summary	38
2.5	The Relationship between Safety Climate and Safety Performance	38
2.6	The Relationship between Safety Climate and Safety Training Practices	41
2.7	The Relationship between Safety Training Practices and Safety Performance	43
2.8	The Mediating Impact of Safety Training Practices on the Relationship between Safety Climate and Safety Performance	45
2.9	Previous Research	48
2.10	Summary	54
2.11	Conclusion	55
	<b>CHAPTER 3</b>	<b>56</b>
3	<b>RESEARCH METHODOLOGY</b>	<b>56</b>
3.1	<b>Introduction</b>	<b>56</b>
3.2	Research Design	56
3.3	Population and Sampling	57
3.4	Place of Study	58



3.5	Data Collection	59
3.5.1	Primary Data	59
3.5.1.1	Research Instrument	60
3.6	Pilot Study	65
3.7	Data Analysis	66
3.7.1	Descriptive Statistics	67
3.7.2	Inferential Statistics	67
3.7.2.1	Correlation Analysis	67
3.7.2.2	Regression Analysis	69
3.8	Summary	71
<b>CHAPTER 4</b>		<b>73</b>
<b>4</b>	<b>ANALYSIS AND RESULTS</b>	<b>73</b>
<b>4.1</b>	<b>Introduction</b>	<b>73</b>
4.2	Descriptive Statistics	74
4.2.1	Background Information	74
4.3	Research Objectives and Hypothesis Testing	76
4.3.1	Objective 1: To determine the level of safety climate as perceived by employees in MCE-SA.	76
4.3.1.1	Management commitment	77
4.3.1.2	Individual Involvement	78
4.3.1.3	Safety Systems	79
4.3.1.4	Risk Perception and Safety Control	80
4.3.1.5	Work Pressure	81
4.3.1.6	Employee Competence	82

4.3.1.7	Safety Rules	83
4.3.1.8	Communication	84
4.3.1.9	Individual Accountability	85
4.3.2	Objective 2: To examine the level of safety performance and safety training practices in MCE-SA	87
4.3.2.1	Level of Safety Performance	87
4.3.2.2	Safety Training Practices	89
4.3.3	Objective 3: To examine the relationship between safety climate and safety performance	90
4.3.4	Objective 4: To determine the relationship between safety climate and safety training practices	92
4.3.5	Objective 5: To find out the relationship between safety training practices and safety performance	93
4.3.4	Objective 6: To determine the impact of safety training practices the relationship between safety climate and safety performance	95
4.4	Summary	97
	<b>CHAPTER 5</b>	<b>98</b>
<b>5</b>	<b>DISCUSSION AND CONCLUSION</b>	<b>98</b>
<b>5.1</b>	<b>Introduction</b>	<b>98</b>
5.2	Discussions of Findings	98
5.2.1	Objective 1: To determine the level of safety climate as perceived by employees in MCE-SA	99
5.2.2	Objective 2: To examine the level of safety performance and safety training practices in MCE-SA	104
5.2.2.1	The Level of Safety Performance	104
5.2.2.2	The Level of Safety Training Practices	106

5.2.3	Objective 3: To examine the relationship between safety climate and safety performance	108
5.2.4	Objective 4: To determine the relationship between safety climate and safety training practices	109
5.2.5	Objective 5: To find out the relationship between safety training practices and safety performance	111
5.2.6	Objective 6: To determine the impact of safety training practices on the relationship between safety climate and safety performance	112
5.3	Recommendation	114
5.3.1	Recommendations to MCE-SA	114
5.3.2	Recommendation for Future Studies	116
5.4	Conclusion	117
5.6	REFERENCES	119
6.7	APPENDICES	134

**LIST OF TABLES**

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
3.1	Likert Scale	62
3.2	Safety Climate	63
3.3	Level Safety Performance	63
3.4	Level of Safety Training Practices	65
3.5	Reliability Result	66
3.6	Correlation Coefficient Pearson	68
3.7	Statistical Methods for the Data Analysis	72
4.1	Demographic Findings	75
4.2	Safety climate dimension-Management Commitment	77
4.3	Safety Climate Dimension-Individual Involvement	78
4.4	Safety Climate Dimension-Safety Systems	79
4.5	Safety Climate Dimension-Risk and Safety Control	80
4.6	Safety Climate Dimension-Work Pressure	81

4.7	Safety Climate Dimension-Employee Competence	82
4.8	Safety Climate Dimension-Safety Rules	83
4.9	Safety Climate Dimension-Communication	84
4.10	Safety Climate Dimension-Individual Accountability	85
4.11	Summary of the Safety Climate Dimensions	86
4.12	Level of Safety Performance	88
4.13	Level of Safety Training Practices	89
4.14	Relationship between Safety Climate and Safety Performance	91
4.15	Relationship between Safety Climate and Safety Training Practices	92
4.16	Relationship between Safety Training Practices and Safety Performance	94
4.17	The Mediating effect of Safety Training on the Relationship between Safety Climate and Safety Performance	96
4.18	Summary Results of the Hypotheses Testing	97

**LIST OF FIGURES**

<b>FIGURE NO.</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	Research Framework	48
3.1	The basic causal chain between independent and dependent variables	70
3.2	The basic causal chain involved in mediation	70

## LIST OF ABBREVIATION AND SYMBOLS

AMSL-Group	-	Ahmed Saleck Mohamed Lemine Group
BLS	-	Bureau of Labor Statistics
CSB	-	Chemical Safety Board
HSE	-	Health and Safety Executive
MCE-SA	-	Mauritanian Construction and Equipment
NSC	-	National Security Council
OHS	-	Organization Health and Safety
OSHA	-	Organization Safety and Health Administration
OSHAS	-	Occupational Health and Safety Advisory Services
QHSE	-	Quality, Health, Safety and Environment
SAWS	-	State Administration of Work Safety
SMS	-	Safety Management System
SOCSSO	-	Social Security Organization
SPSS	-	Statistical Package Science
ISO	-	International Organization for Standardization
WHO	-	World Health Organization

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

This research is an effort to investigate the relationship between safety climate, safety performance and safety training practices which are embedded in construction companies. More specifically, this study aims to investigate the mediation impact of safety training for employees regarding the relationship between safety climate and safety performance. Therefore, it suggests that conducting safety training will increase employee's performance towards safety, because creating a safe culture in the organization enhances the level of safety performance by carrying out safety training programs (Neal *et al.*, 2000).

#### **1.2 Background of the Study**

Safety and health of the employments are a concern in the world of employees and their families (WHO, 2011). It is a continuing struggle between workers fighting for the protection and prevention measures and the employees wish



to deny or reduce their liability for work-related illnesses and injuries (WHO, 2011). It is estimated that each year there are 160 million new cases and 1.1 million deaths associated with work-related illnesses and injuries around the world, which is almost equal to the total annual malaria deaths worldwide (WHO, 2011). Injuries and accidents in the workplace have become a main issue across the world (Jiang *et al.*, 2010). For example, 112,822 workers lost their lives in a 627,158 workplace accident in 2006. This means that in general averages of 320 workers are dying every day (State Administration of Work Safety, 2007). Additionally, in 2011, almost 3.0 million workers experienced nonfatal workplace injuries and illnesses were recorded by private organizations (Bureau of Labor Statistics, 2007).

However, in the construction sector in which this study is focusing on, ensuring safety in the workplace is not an easy task. The construction industry has the highest rate of accidents (including death and disabling injury) compared to other industries (Ahmed *et al.*, 2000; Koehn *et al.*, 1995). Statistics have shown that the highest number of accidents and deaths are found in the construction industry worldwide (Ahmed, *et al.*, 2000; Choudhry and Fang, 2008; Koehn, *et al.*, 1995; Sawacha *et al.*, 1999; Wiegmann *et al.*, 2004). For example, in 2008 the largest number of deaths in the workplace in the United States occurred in the construction industry. The construction industry alone accounted for approximately 19% of total deaths were recorded. In addition, construction workers are two to three times more likely to die on the job than workers in other industries, while the risk of serious injury is almost three times higher (Heng, 2006). The industry has been unresponsive to these conditions; recognizes that consistent success in worker safety requires a concerted effort on the part of all those involved in construction-related activities (Rowlinson, 2003). The facts show that the construction is a dangerous industry. The tragic incident shows that the construction industry is only paying lip service to safety (Star Press, 2005). Director of the Department of Safety and Occupational Health of Malaysia, Abu Bakar Che Man stated that only 30% of the construction site have a satisfactory safety assessment or low (Bernama Press, 2006).

According to the statistics in a developed country like the United States, every year around 4.1 million works that related to illnesses and injuries are being reported (Bureau of Labor Statistics, 2007). This number shows that there is a rate of about 4.4 cases per 100 full-time employees. In the United States as well, work-related injuries cost the country economic about USD125 billion in 2001, which make the business struggle to face the increase in the health care costs (Goetzel *et al.*, 2002). Likewise, in the United Kingdom economy between £14.5 and £18 billion is spent on the cost of the work-related illnesses and injuries (HSE, 2000). The number of injuries reported in the UK in 2007 was 299000 which caused 34 million working days lost (HSE, 2008). Furthermore, according to the Health and Safety Executive statistics on fatal injuries in the workplace 2011/2012 in Britain, there were 49 deadly injuries to employees in the construction sector alone. This was lower than the average number of 59 workers in the last five years. The rate of fatal injury in construction was 2.3 per 100.000 workers, compared to the last five-year which is 2.5 per 100.000 workers (HSE, 2011).

In the developing countries the statistics are worst however there is a slight improvement in the construction sector. According to the statistics reported by the Social Security Organization (SOCSO), the number of fatality cases in the construction industry among the ten categorized industries, has only dropped from second highest ranking in the year 2000 to fourth highest ranking in the year 2004. In addition, according to Malaysian Labor and Human Resources Statistics, in construction sector there are 124 fatal accidents in 1994 compared to 102 fatal injuries in 2008. Thus, it is still being regarded as a highly risky and hazardous sector in the country. Certainly, there is a need to look into some ways and methods in improving its tarnished image. Furthermore, in the UAE which considers as one of the developing countries, approximately four million workers suffer work-related injuries on an annual basis. According to a report in 2009 from Build Safe UAE, a safety statistics analyst, there were 530 lost-time incidents and 10 fatalities in the UAE from a sample of 67 member organizations. The Health-Authority of Abu Dhabi reported 108 construction site deaths in 2009 in Abu Dhabi alone. More specifically, safety issues have always been a problem and a major concern plaguing the construction industry in many countries (Teo and Phang, 2005).

On the other hand, the working conditions for industrial workers today have grown rapidly. Opportunities worker who was killed in an industrial accident is less than half of what it was 60 years ago (Minter, 1998). According to the National Security Council (NSC), the present death rate of work-related injuries is approximately 4 per 100,000 workers, or less than one-third of the value of 50 years ago (NSC, 2008). Up to now, improvements in safety have been the result of pressure for legislation to promote safety and health, the steadily increasing costs associated with accidents and injuries, and the professionalization of safety as an occupation (HSE, 2009). Improvements in the future may come as a result of the higher consciousness effectiveness and cost competitiveness alloys derived from labor that is safe and healthy (HSE, 2009). Considerable improvement in occupational health and safety (OHS) was created in the construction and engineering industries worldwide for decades ago (Goh *et al.*, 2011).

Therefore, much improvement is still needed in the field of safety. There comes the role of safety training practices in order to develop and maintain effective risk and hazard control activities which will reduce the exposure to danger within any organization. According to Langford *et al.* (2000), worker safety training practices is very important in order for them to operate safety awareness and therefore enhance the safety performance within the organization. In addition, training is an efficient human resource tool in reducing accidents in construction site (Tam *et al.*, 2002). This is because training helps to improve the skills and abilities to identify hazards. Therefore, this study in an attempt to examine the impact of safety training practices on enhancing safety climate and therefore improving safety performance in the Mauritanian for Construction and Equipment (MCE-SA).

### 1.3 Problem Statement

In all parts of the world, the subject of safety in the construction industry has always been a major issue (Chockalingam and Sornakumar, 2012). Ali *et al.* (2009), states that wherever reliable records are available, construction is found to be one of the most dangerous to safety, particularly in developing countries. He further claims that despite the fact that many improvements in construction safety have been achieved, the industry continues to stay behind most other industries in term of safety. Therefore, in developing countries safety rules usually do not exist, and if there is any, the authorities are usually very weak in applying the rules (Belel and Mahmud, 2012).

In Mauritania safety is not respected by the companies, this is because of the lack of government control over companies. Therefore, Mauritanian companies tend to hide their safety record and statistics related to safety accidents in the workplace. In spite of this, the Mauritanian Ministry of Labor recorded 601 accidents related to workplace in 2011 and 806 accidents in 2012 in both private and public sectors. Out of these numbers construction sector takes the second place after mining sector with 103 accidents in 2011 and 56 accidents in 2012. Although these are dangerous numbers in a small country like Mauritania, up to now there is no single research or investigation regarding the subject of safety in Mauritanian companies. On the other hand, MCE-SA is one of the few Mauritanian companies that give concern for safety in the workplace. According to the company statistics, there were 48 industrial accidents in 2011 compared to 36 industrial accidents in 2012. In addition, the number of lost time injuries was three injuries in 2011 compared to two injuries in 2012. Moreover, there were seven lost time incidents in 2011 and six incidents in 2012. The recorded injuries were three injuries in 2011 and two recorded injuries in 2012. However, there were 18 near misses in 2011 and 13 near misses in 2012. Therefore, a better understanding of the safety and its major determinants (variables) will definitely help the organization's strategic development to allocate resources and focus their efforts to ensure their overall safety performance improvement (Chinda and Mohamed, 2007). As a result, this study focuses on three

important safety variables that are believed to be influencing safety in the workplace, which are safety climate safety training practices and safety performance.

Safety climate in any organization consists of employees' attitudes and perceptions towards health and safety behaviors (Prasad and Reghunath, 2010). Among all sectors, the construction sector is considered as one with the worst safety record (Blockley, 1995). Therefore, it seems that trying to improve its safety record in any organization will not be completely succeeded if the safety climate is not taken into consideration (Blockley, 1995). Ho and Zeta (2004) established a series of key factors (behavior, environment, organization and people) that affect safety climate in the construction industry. They argue that the safety climate will fail if it does not have the support of the four factors. Having said that, it can be understood from the poor safety records in construction sector, that there is a need to examine the level of safety climate in construction companies. Therefore, the first objective of this study is to examine the level of safety climate in Mauritanian for Construction and Equipment (MCE-SA).

Besides safety climate, safety performance which is the second variable in this study is also an important task that can indicate the improvement in the organization safety climate. Therefore, poor safety conditions also affect the morale of employees which, in turn, affect their work performance (Koh and Rowlinson, 2011). Therefore, the prevention of occupational hazards not only starts from an increase in safety equipment, but it also had to implement an efficient safety management (Benavides *et al.*, 2005; Fuller, 2005; Krause *et al.*, 1999). Thus, safety performance could contribute to the organization's operational goals to create the indicators that assess the gaps in the overall safety within the organization. This study will take place in a construction company, in particular Mauritanian for Construction and Equipment (MCE-SA). For the concerned company, in MCE-SA leaders and managers have many responsibilities and one of them is to provide rules and regulations that protect their employees. Employees on the other hand are advised to fully take safety into consideration, in order to create a safe environment.

Having said that, not all employees respect the rules and regulations of safety in the company, which has eventually led to a poor safety record. This poor safety result is affecting the employees themselves, their colleagues, and the overall organization performance. Therefore, this study will examine the level of safety performance in MCE-SA.

In addition to safety climate and safety performance, safety training practices is one of the most significant methods that can develop employees' knowledge, improve their skills and enhance their attitude towards making them competent in carrying out their work with regards to safety (HSE, 1997). Many studies have shown that safety training practices is negatively related to work site accidents and injuries (Dong *et al.*, 2004; Johnson, 2007; Kaminski, 2001; Kinn *et al.*, 2000; Zierold and Anderson, 2006). Therefore, the efficiency of safety training practices in construction could be one of the best ways to improve the safety performance of the site. In a study done by Dingsdag *et al.* (2008) identified safety training practices in construction as a necessary element that improves safety performance. Hence, organizations should ensure the safety of their employees and drive them ready for possible danger as well as coaching them ways to avoid any harm by providing safety training programs (Dave, 2008). Having said that, in MCE-SA accidents happen frequently because there is indifference in taking safety seriously in the workplace. This issue is believed to be due to the lack of safety training given to the employees as the company rarely conducts safety training programs (every six months). According to Zierold and Anderson, (2006), safety training should be an on-going process in any organization. Therefore, it is one of the study objectives to examine the level of safety training practices in the studied company (MCE-SA).

To summarize, this thesis examines the relationship between safety climate and safety performance, and especially focuses on the possible mediating role of safety training practices on the relationship between safety climate and safety performance. This study uses data from an extensive survey, filled in by employees at Mauritanian for Construction and Equipment (MCE-SA). More precisely, this thesis will answer the following research questions:

## **1.4 Research Questions**

In addressing the underlying issues pertaining in this study, the following questions are raised:

- 1- What is the level of safety climate as perceived by employees in MCE-SA?
- 2- What is the level of safety performance and safety training practices in MCE-SA?
- 3- What is the relationship between safety climate and safety performance?
- 4- What is the relationship between safety climate and safety training practices?
- 5- What is the relationship between safety training practices and safety performance?
- 6- What is the mediating effect of safety training practices on the relationship between safety climate and safety performance?

## **1.5 Objectives of the Study**

Objectives are made based on the research questions. Thus, the objectives of this study are:

- 1- To determine the level of safety climate as perceived by employees in MCE- SA.
- 2- To examine the level of safety performance and safety training practices in MCE-SA.
- 3- To examine the relationship between safety climate and safety performance.
- 4- To determine the relationship between safety climate and safety training practices.

- 5- To find out the relationship between safety training practices and safety performance.
- 6- To determine the impact of safety training practices on the relationship between safety climate and safety performance.

## 1.6 Hypotheses

The following hypotheses are formulated according to literature support and will be elaborated in Chapter 2.

- **Hypothesis 1:** There is a positive relationship between safety climate and safety performance.
- **Hypothesis 2:** There is a positive relationship between safety climate and safety training practices.
- **Hypothesis 3:** There is a positive relationship between safety training practices and safety performance.
- **Hypothesis 4:** There is a mediating effect of safety training practices on the relationship between safety climate and safety performance.

## 1.7 Significance of the study

This study focused on the mediating impact of safety training practices on the relationship between safety climate and safety performance. Therefore, there are many benefits that this research established. Theoretically, this study tried to fill the knowledge gap on whether safety climate directly affects safety performance or there is a mediating impact of safety training practices on this relationship.



On the other hand, there is a practical importance of this study which is to provide information for approaching the issues of workplace safety in MCE-SA. In addition, this research would assist the necessary area for improvement in safety aspects in MCE-SA. This can be done based on safety climate factors that need attention by the management. Finally, the survey addressed problems by synthesizing the existing literature on safety climate in order to develop a better understanding of its nature, dimensions, and impact on operational safety in MCE-SA.

Hopefully, this study would contribute to the body of knowledge by investigating the mediating effect of safety training for the employee on the relationship between safety climate and safety performance in the construction sector.

## **1.8 Scope of the study**

This study will review the existing literature in the implementation of safety management throughout the world, and in particular three aspects of safety management which are safety climate, safety training practices, and safety performance. Practically, this study aims to identify the relationship between safety climate and safety performance with the mediating of safety training practices. The independent variable is safety climate which includes; management commitment, individual involvement, safety management system, risk and safety control, work pressure, employees' competency, safety rules, communication, accountability. However, the dependent variable is safety performance and the mediator variable is safety training practices. The targeted industry is construction industry and the company is located in the capital city of Mauritania, Nouakchott. This study is a quantitative study in which data is collected via questionnaires. Participants

consisted of 147 employees who are the site employees of the company Mauritanian for Construction and Equipment (MCE-SA), Nouakchott, Mauritania.

## **1.9 Limitation of Study**

There are some inevitable limitations surfaced in this study. Therefore, future researches that will be conducted in the same area are recommended to take note of these limitations to avoid the same mistake to be repeated.

In addition, this study has some potential limitations. Data and information is based solely on the answers from the employees of Mauritanian for Construction and Equipment (MCE-SA). Besides that, this study might not be the same for different organizations as it focuses more on the construction sector. Therefore, it is not recommended for application in other sectors unless the content is the same job.

Other than that, the only methods used to look at the respondent's perception, is the survey method which might not be comprehensive enough to acquire the opinions of respondents. However, several limitations, including time consumption, respondent's unavailability, difficulties and high cost of other methods, have prohibited the application of other methods such as interview and observation.

## **1.10 Conceptual and Operational Definitions**

### **1.10.1 Conceptual Definitions**

#### **Safety Climate**

Safety climate is a particular type of organizational climate that reflects workers' perceptions of the relative importance of safety behaviors that in the conduct of their work. This may totally differ from positive to neutral level and its average stage reflects the safety climate in a particular organization (Zohar, 1980). However, Flin *et al.*, (2000) state that safety climate is the surface features of the safety culture discerned from the workforce's attitudes and perceptions at a given point in time. As Cooper and Phillips (2004) underlined, Safety climate refers to the degree to which employees believe the true priority is given to organizational safety performance, and its measurement is thought to provide an early warning of potential safety system failure. According to Kath *et al.*, (2010), safety climate is defined as employees' perceptions pertaining to safety policies, procedures, and practices.

#### **Safety Performance**

According to Wu (2001), safety performance has been defined as the overall performance of an organization's safety management system in safe operations. In addition, Wu *et al.*, (2008), mentioned that safety performance can be considered as a subset of the total performance of an organization. However, safety performance in the workplace can be defined as how good or bad organization of survivors of sanctions for damage, injury, danger, or risk to employees while performing their duties or responsibilities.

## **Safety Training Practices**

Safety training is defined as a formal or an informal method to help individuals in attaining knowledge, changing attitudes, or performing safe work behaviors (Johnston *et al.*, 1994). Hare and Cameron (2011) stated that safety training is the process in which employees gain or expand knowledge to use it professionally and becoming skilled in new areas, or acquiring incentive to perform a job in a specific way to work safely. While, Cooper and Cotton (2000) claim that employees' safety training is the company's first line defense against accidents and dangerous situations.

### **1.10.2 Operational Definitions**

#### **Safety Climate**

As this study is examining the relationship between safety climate and safety performance by using safety training as a mediator, this study will be more on the term safety climate rather than safety culture. Therefore, this study is adopting safety climate definition by Cai (2005): safety climate is defined as the surface features of the safety culture discerned from the workforce's attitudes and perceptions at a given point in time. This research studied nine safety climate dimensions which are: management commitment, individual involvement, safety management system, risk and safety control, work pressure, employee competency, safety rules, communication, individual accountability. These dimensions are measured by using a questionnaire developed by Cai (2005).

## **Safety Performance**

In this thesis, safety performance is defined as the quality of work that leads to a good safety record. This quality work can be regarded as the efforts made by employees to achieve a safe construction site. According to Hinze and Godfrey (2003), safety performance is the indication of how well a construction project is doing in the area of safety. Safety performance in this research is measured using a questionnaire designed by Hinze and Godfrey (2003).

## **Safety Training Practices**

In this thesis, safety training practices is defined as the method that can help MCE-SA employees to improve their behavioural skills in order for them to perform safely in the construction sites. To measure safety training practices this research used a questionnaire designed by Vinodkumar and Bhasi (2002).

### **1.11 Conclusion**

The introductory chapter of this thesis presents the background of the research. It also outlines the objectives, statement of research problem, statement of purpose, research questions and significance of the study. In addition to that, it provides important definitions of key terms of the study. Chapter two however, is devoted to a review of the concepts of safety culture, climate, performance, and training. A conceptual model that will be predominantly used in this research is presented towards the end of chapter two. In addition, the third chapter provides an overview of research methods, research design and research sampling framework.

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