DECLARATION OF POSTGRADUATE CAPSTONE PROJECT REPORT AND COPYRIGHT

Author’s full name: NORMAN BIN MD. RABANI

Date of birth: 25 JANUARY 1974

Title: IMPROVING SAFETY CONTROL OF PWD PROJECT THROUGH THE INCLUSION OF SAFETY REQUIREMENT IN THE BILL OF QUANTITY

Academic Session: 2010/2011

I declare that this capstone project report is classified as:

☐ CONFIDENTIAL (Contains confidential information under the Official Secret Act 1972)*

☐ RESTRICTED (Contains restricted information as specified by the organization where research was done)*

☐ OPEN ACCESS I agree that my capstone project report to be published as online open access (full text)

I acknowledged that Universiti Teknologi Malaysia reserves the right as follows:

1. The capstone project report is the property of Universiti Teknologi Malaysia.
2. The Library of Universiti Teknologi Malaysia has the right to make copies for the purpose of research only.
3. The Library has the right to make copies of the capstone project report for academic exchange.

Certified by:

__________________________________________
SIGNATURE                      SIGNATURE OF SUPERVISOR
NORMAN MD. RABANI               PROF. MADYA DR. ROSLI MOHD ZIN
(740125-01-6043)                 NAME OF SUPERVISOR

Date: 6 December 2010            Date: 6 December 2010

NOTES: * If the report is CONFIDENTIAL or RESTRICTED, please attach with the letter from the organization with period and reasons for confidentiality or restriction.
‘I/We* hereby declare that I/we* have read this project report and in my/our* opinion this project report is sufficient in terms of scope and quality for the award of the degree of
Master of Project Management

Signature : ....................................................
Name Of Supervisor : Prof. Madya Dr. Rosli Mohd Zin
Date : .........................................................

* Delete as necessary
IMPROVING SAFETY CONTROL OF PWD PROJECT THROUGH THE INCLUSION OF SAFETY REQUIREMENT IN THE BILL OF QUANTITY

NORMAN BIN MD. RABANI

A capstone project report submitted in partial of the requirements for the award of the degree of Master of Project Management

Faculty of Civil Engineering
Universiti Teknologi Malaysia

December, 2010
I declare that this project report entitled “Improving Safety Control of PWD Project through the Inclusion of Safety Requirement in the Bill of Quantity” is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .................................
Name : NORMAN BIN MD. RABANI
Date : 6 DECEMBER, 2010
To my beloved parents and wife
ACKNOWLEDGEMENT

First and foremost I would like to appreciate the God for giving me the opportunity to pursue my master’s degree in Project Management at the University of Technology Malaysia. I also would like to express my sincere appreciation to my project supervisor, Ir. Dr. Rosli Mohamad Zin of the Faculty of Civil Engineering, University Technology Malaysia, for his generous advice, patience, guidance and encouragement during the years of my study.

This capstone project would not have been possible without the contribution of many people and organisations. Special thanks to the experts providing me with highly informative information during the interview sessions. Other than that, I would like to express my sincere thanks to the Safety Officer in-charge who generously spent their precious time to participate in the interview for the data collection of my project and sincerely giving feedbacks of my work. Their ideas and feedbacks are very useful indeed.

Finally, I am most grateful and indebted to my parents and my beloved wife called Mrs. Aniza Hj. Wamin and family for their support and encouragement given to me consistently during the period of my study for the Master of Project Management until I have successfully completed the project report.

Without the contribution of all the people mentioned above, this work could not have been successfully produced.
Public Work Department (PWD) is the leading implementer of Government project in Malaysia. One of the common issues during the project implementation that has been highlighted by various parties is the inadequate of safety standard at the construction site. In view of this problem, this study is carried out with the aim to improve the safety standard of the PWD projects through the inclusion of safety requirement in the bill of quantity. The study was carried out in three phases. Phase 1 involved determination of the aim, objectives and literature review; phase 2 consisted of data collection through document study and interviews while phase 3: is comprised of analysis, discussion, conclusions and recommendations. The data collected through the interview was analysed using content analysis. The findings from this document study indicate that the safety items in the specification and Bill of Quantities are not comprehensive, not well-organised and inconsistent where it would cause inconvenience to the contractor during the construction stage. Ultimately the weaknesses lead to the contractor absorbing the extra cost of safety. Through the interview exercise, several recommendations of safety elements to be considered in construction project were established. This has enabled a safety elements checklist to be developed and verified by the experts. Based on the safety elements checklist, a sample of Bill of Quantities that is more safety sensitive has been formulated.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>THESIS TITLE</td>
<td>i</td>
</tr>
<tr>
<td></td>
<td>DECLARATION</td>
<td>ii</td>
</tr>
<tr>
<td></td>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td></td>
<td>ACKNOWLEDGEMENT</td>
<td>iv</td>
</tr>
<tr>
<td></td>
<td>ABSTRACT</td>
<td>v</td>
</tr>
<tr>
<td></td>
<td>ABSTRAK</td>
<td>vi</td>
</tr>
<tr>
<td></td>
<td>TABLE OF CONTENTS</td>
<td>vii</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLES</td>
<td>xiv</td>
</tr>
<tr>
<td></td>
<td>LIST OF FIGURES</td>
<td>xv</td>
</tr>
<tr>
<td></td>
<td>LIST OF APPENDICES</td>
<td>xvi</td>
</tr>
</tbody>
</table>

## 1 INTRODUCTION

1.1 Introduction 1
1.2 Problem Statement 2
1.3 The Aim 4
1.4 The Objectives 4
1.5 Scope of Study 5
1.6 Methodology of Study 5
   1.6.1 Phase 1: Determination of the Aim, Objectives and Literature Review. 5
   1.6.2 Phase 2: Data Collection. 6
2  LITERATURE REVIEW

2.1 Introduction 7
2.2 Definitions 7
  2.2.1 Safety 8
  2.2.2 Incident 8
  2.2.3 Accident 9
  2.2.4 Near Miss 9
  2.2.5 Unsafe Conditions 10
  2.2.6 Unsafe Act 10
  2.2.7 Hazard 10
  2.2.8 Danger 10
  2.2.9 Risk 11
2.3 Safety Standards and Regulations 11
  2.3.1 Occupational Safety and Health Act 154 (OSHA) 11
  2.3.2 Factories and Machinery Act, 1967 (FMA) 12
2.4 Safety Policy 12
2.5 Contract Document 13
2.6 Safety Culture 15
2.7 Site Safety Management Plan 16
2.8 Employment of Safety Officer 17
2.9 Site Safety Meeting 18
2.10 Toolbox Meeting 18
2.11 Site Safety Audit 18
2.12 Training and Awareness 19
2.13 First Aid 20
2.14 Risk Management 21
2.15 Emergency Response Plan and Recovery Measure 22
2.16 Personnel Protective Equipment (PPE) 23
2.17 Temporary Facilities 23
3 RESEARCH METHODOLOGY

3.1 Introduction 27
3.2 Phase 1: Determination of The Aim, Objectives and Literature Review 29
  3.2.1 Determine the Aim and Objectives 29
  3.2.2 Literature Review 29
3.3 Phase 2: Data Collection 30
  3.3.1 Document Study 30
  3.3.2 Interview 31
  3.3.3 Discussion with Expertise 32
3.4 Phase 3: Data Analysis 32
  3.4.1 Content Analysis 33
  3.4.2 Document Study 33
  3.4.3 Interview 33
  3.4.4 Discussion with Expertise 34
3.5 Conclusion and Recommendations 35

4 DATA COLLECTION AND ANALYSIS

4.1 Introduction 35
4.2 Project Information 35
  4.2.1 Project A: Building Project
    4.2.1.1 Introduction 36
    4.2.1.2 Scope of project 37
4.2.1.3 Summary of project

4.2.2 Project B: Building Project
4.2.2.1 Introduction
4.2.2.2 The scope of work
4.2.2.3 Summary of project

4.2.3 Project C: Building Project
4.2.3.1 Introduction
4.2.3.2 Scope of project
4.2.3.3 Summary of project

4.2.4 Project D: Road Project
4.2.4.1 Introduction
4.2.4.2 Scope of project
4.2.4.3 Summary of project

4.2.5 Project E: Road Project
4.2.5.1 Introduction
4.2.5.2 Scope of project
4.2.5.3 Summary of project

4.3 Current Practice in the Document Study

4.3.1 Specification
4.3.1.1 Project A: Building Project
4.3.1.2 Project B: Building Project
4.3.1.3 Project C: Building Project
4.3.1.4 Project D: Road Project
4.3.1.5 Project E: Road Project
4.3.1.6 Summary of specification of Contract Document

4.3.2 Bill of Quantities
4.3.2.1 Project A: Building Project
4.3.2.2 Project B: Building Project
4.3.2.3 Project C: Building Project
4.3.2.4 Project D: Road Project
4.3.2.5 Project E: Road Project
4.3.2.6 Summary of Bill of Quantities of Contract Document
4.3.3 Monthly Safety Report
   4.3.3.1 Project A: Building Project 61
   4.3.3.2 Project B: Building Project 62
   4.3.3.3 Project C: Building Project 65
   4.3.3.4 Project D: Road Project 65
   4.3.3.5 Project E: Road Project 66
   4.3.3.6 Summary of Monthly Safety Report of Document Study 66

4.3.4 Cost
   4.3.4.1 Project A: Building Project 68
   4.3.4.2 Project B: Building Project 69
   4.3.4.3 Project C: Building Project 70
   4.3.4.4 Project D: Road Project 71
   4.3.4.5 Project E: Road Project 72
   4.3.4.6 Summary of Cost of Contract Document 72

4.4 Findings of Safety Issues in Current Practice 73
   4.4.1 Specification
      4.4.1.1 Project A: Building Project 73
      4.4.1.2 Project B: Building Project 74
      4.4.1.3 Project C: Building Project 75
      4.4.1.4 Project D: Road Project 75
      4.4.1.5 Project E: Road Project 76
   4.4.2 Bill of Quantities
      4.4.2.1 Project A: Building Project 76
      4.4.2.2 Project B: Building Project 78
      4.4.2.3 Project C: Building Project 78
      4.4.2.4 Project D: Road Project 79
      4.4.2.5 Project E: Road Project 79
   4.4.3 Monthly Safety Report
      4.4.3.1 Project A: Building Project 79
      4.4.3.2 Project B: Building Project 80
      4.4.3.3 Project C: Building Project 81
      4.4.3.4 Project D: Road Project and
Project E: Road Project

4.4.4 Cost

4.5 Development of Safety Element Checklist.

4.5.1 Recommendations Bill of Quantities by Interviewer

4.5.2 Interview and Expert Panel Discussion

4.5.3 Development of a Safety-Sensitive Bill of Quantities

4.5.3.1 Safety Management Plan

4.5.3.1.1 Safety and Health Policy

4.5.3.1.2 Hazard Identification Risk Assessment Risk Control (HIRARC)

4.5.3.1.3 Job Safety Analysis (JSA)

4.5.3.1.4 Emergency Response Plan (ERP)

4.5.3.1.5 Chemical Safety Data Sheet (CSDS)

4.5.3.2 Safety Officer

4.5.3.3 Report

4.5.3.3.1 Safety and Health Committee (SHC)

4.5.3.3.2 Monthly Safety Report

4.5.3.3.3 Auditing

4.5.3.3.4 Site Safety Inspection

4.5.3.4 Personal Protective Equipment (PPE)

4.5.3.5 Equipment for Site Office

4.5.3.6 Signages

4.5.3.7 Scaffolding Works

4.5.3.8 Confined Space

4.5.3.9 Training and Awareness

4.6 Strategies to Improve Safety in Construction Workplace

4.7 Advantage of Safety Management Plan
## CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction  

5.2 Conclusions  

5.2.1 Objective (i): To Evaluate the Current Practice of Contract Document Preparation In Relation To Safety  

5.2.2 Objective (ii): To Establish A Checklist of Safety Elements in the Contract Document  

5.2.3 Objective (iii): To Establish Standard Bill of Quantity Based on the Established Checklist  

5.3 Recommendation for Further Study  

---

### REFERENCES

128

### APPENDICES A – F

130 - 135
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE NO.</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Summary of Specification of Contract Document</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>Summary of Bill of Quantity of Contract Document</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>Summary of Safety Cost of Project A</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Summary of Safety Cost of Project B</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>Summary of Safety Cost of Project C</td>
<td>70</td>
</tr>
<tr>
<td>7</td>
<td>Summary of Safety Cost of Project D</td>
<td>71</td>
</tr>
<tr>
<td>8</td>
<td>Summary of Safety Cost of Project E</td>
<td>72</td>
</tr>
<tr>
<td>9</td>
<td>Summary of Safety Cost of Projects</td>
<td>73</td>
</tr>
<tr>
<td>10</td>
<td>Summary of Recommendation Safety Elements</td>
<td>84</td>
</tr>
<tr>
<td>11</td>
<td>Safety Element Checklist</td>
<td>88</td>
</tr>
<tr>
<td>12</td>
<td>Safety-Sensitive Bill of Quantities</td>
<td>90</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE NO.</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flow Chart of Study Methodology</td>
<td>5, 28</td>
</tr>
<tr>
<td>2</td>
<td>Risk Process of Risk Management</td>
<td>96</td>
</tr>
<tr>
<td>3</td>
<td>Workplace Inspection Process</td>
<td>103</td>
</tr>
</tbody>
</table>
## LIST OF APPENDICES

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Occupational Accident by Sector for the Category of Death in 2008</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>Occupational Accident by Sector for the Category of Death in 2009</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>Bill of Quantity of Project A</td>
<td>57</td>
</tr>
<tr>
<td>D</td>
<td>Bill of Quantity of Project D</td>
<td>59</td>
</tr>
<tr>
<td>E</td>
<td>HIRARC</td>
<td>95</td>
</tr>
<tr>
<td>F</td>
<td>Job Safety Analysis</td>
<td>96</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

1.1 Introduction

In general, the development of a country is measured in terms of infrastructure development. The construction industry in Malaysia is the most important industry where it has contributed to the economic growth and advancement. Malaysia still pays attention to the construction sector in achieving Vision 2020 and the developing countries. However with the rapid development will lead to increased rates of accidents in the construction industry if not addressed properly.

Public Work Department (PWD) is the leading implementer agency in Malaysia has been charged with implementing government projects should play a vital role in addressing safety problems in construction site. PWD not only to implement and complete a project, but it has to ensure the involvement of all parties to address safety problems at the workplace as it is very important and each must strive to reduce the accident rate. Thus the level of safety in the workplace seems can be improved much.

According to Teo et al. (2004), construction sites are a complex area because it involves the use of sophisticated equipment, modern methods of construction, a variety of disciplines and task workforce. Therefore, an employer should be sensitive to issues of safety on construction sites to ensure the working place is safe and
comfortable at all times. We should have in our mind that safety is important and should be given more attention and there is no compromise in that matter.

Today, people are eager to find out the level of construction accidents that is increasing from day-to-day. Everyone knows that the construction project, whether building or road project will be exposed to risks such as risk of falling from high places, slipped and few others which were resulted from operational activities at height, using a lot of heavy equipment, machinery, equipment and etc. Indirectly, employees or other person in the vicinity will also be exposed to the hazards and risk.

1.2 Problem Statement

The construction industry is one of industries that is growing rapidly. However, referring to the Occupational Accident by Sector for the Category of Death in 2008 (Investigated) (Appendix 1) and Occupational Accident by Sector for the Category of Death until October 2009 (Investigated) (Appendix 2), it is found that the accident at the construction is increasing from day to day. To help address these problems, government bodies such as the Department of Occupational Safety and Health (DOSH) and National Institute for Occupational Safety and Health (NIOSH) were established to help address the problem of safety, health and welfare of employees at the site. Various efforts have been made by NIOSH and DOSH, but unfortunately accidents still occur. So the question often discussed on this issue is the reasons on why accidents are still occurring despite the efforts and measures that have been already undertaken.

The PWD has taken note of the Current practice to deal with safety problems in the implementation of the project, and it has been implemented on the site. However, efforts to improve safety at the workplace should be improved. In order to increase the level of safety, there are some weaknesses and deficiencies that need to be corrected and overcome. Among the things that need attention and improvement are as follows:
1. Currently, several initiatives have been made to address safety issues in the PWD project, such as inserting the safety issues to the Bill of Quantities of the Contract Documents. However, most of the items added to the Bill of Quantity are too general with ambiguous requirements. In some cases the Bill of Quantity does not clearly explain the work activities and safety requirement that should be provided by employers. In other cases the safety items are being put as Lump Sum such as provision to provide safety and health officer for twenty-four (24) months and preparation of health and safety reports for twenty-four (24) months. Thus, if things were not stated and price for then the contractor should bear the costs. The problems arise when the contractor refused to provide what is contained or stipulated in the contract documents. Accordingly, the PWD has been facing difficulties to implement the safety requirement on site. This matter can be resolved by submitting a detailed Bill of Quantity, taking into account all safety requirements in the contract documents.

2. Under OSHA Act 514, Clause 3(b): Class or description of industries required to employ safety and health officer which any employer of any work of engineering construction where the total contract price of the project exceeds twenty million ringgit. From the statement, it clearly shows that the contractor should provide a safety officer. Unfortunately, with regards to the appointment of safety officers for a project, many contractors are not aware and ignore -the need to appoint a safety officer. Currently, many projects under the government are not emphasising the importance of appointing a safety officer for safety at construction sites. But instead, this rule applies only to projects in the private sector such as Petronas projects, -where safety issues are highlighted in all their daily activities.

3. According to Kartam et al (2000), government, consultants and contractors were aware that the safety at construction sites is important, but until now they could not maximise the effectiveness of the implementation of the safety. Among the factors that effectiveness cannot be achieved is due to the contractor that has many sub-contractors to perform work on site such as drainage works, pipe works, mechanical, electrical and others. Indirect employee’s of sub-contractors is under the supervision and responsibility of the main contractor. The number of sub-contractors
will cause more difficult to control the main contractor employees. Without strict control and close monitoring, the likelihood of an accident to occur is higher and more frequent. On the other hand, contractors are working to get more profit by reducing production costs and expenses as much as possible. For them, safety is usually regarded as the second most important priority in budget spending plan.

The statement of the problems mentioned above showed that the current practice of preparation of Bill of Quantity should be improved. Therefore, a comprehensive study should be conducted to overcome this problem.

1.3 The Aim

The aim of this study is to improve safety control at JKR construction site through the inclusion of a comprehensive safety requirement in the bill of quantity.

1.4 The Objectives

The specific objectives of this study are to:

1. evaluate the current practice of Contract Document preparation in relation to safety,
2. establish a checklist of safety elements to be included in the Contract Document,
3. establish standard Bill of Quantity based on the established safety elements checklist.
1.5 Scope of Study

The scope of work for this study will be focused on projects under supervision of PWD only. Project that will be used as a study has been identified and are all under construction. Those selected project will be studied based on safety requirement in other part of contract document other than Bill of Quantity which have not been covered.

1.6 Methodology of Study

In order to achieve the objectives of this study, the flow chart as shown in Figure 1: Flow Chart of the Methodology of the study illustrates the main steps in the methodology of this study. Generally this study consists of three phases which are:

Phase 1 - determination of the aim, objectives and literature review,
Phase 2 - collection of data through a document study and interviews,
Phase 3 - analysis, discussion, conclusions and recommendations.

1.6.1 Phase 1: Determination of the Aim, Objectives and Literature Review.

This phase involves the need to determine the aim, objective and the scope of study through the extensive readings that need to be done from the document study and literature review related to safety issues at the construction site. The main purpose of conducting literature review is to accomplish better understanding of safety issues and the effective control measures from Malaysian’s perspective. The literature review can be obtained through books, journals, working papers, conference papers, theses and on-line reading materials through the internet.
1.6.2 Phase 2: Data Collection.

This phase involves data collection through a document study, interviews and discussion with experts. The document study, a structured interview is used to collect detailed information about the current practice of safety implementation in PWD projects. A number of respondents from various discipline, task and position were identified to accommodate this study.

1.6.3 Phase 3: Data Analysis

Finally, all the information and data obtained through document study and interviews will be analyzed to produce safety element checklist and standard bill of quantity. A more detailed description of the methodology of this study will be explained further in Chapter 3.

1.7 Expected Findings

From this study, the expected findings based on the objectives are as follows:

1. The study will provide benefits and profits to the PWD and contractors in the implementation of safety in construction projects,

2. Establishment of checklist of safety element for inclusion in the contract document and standard Bill of Quantity based on the establish checklist,

3. Awareness to the department and the contractor is self-importance of addressing safety issues in all projects PWD,

4. Bill of Quantity produced will become part of the contract document and applicable to all projects.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

According to Elbeltagi and Hegazy (2002), the construction industry involves many operations that can be risky, dangerous and unhealthy. The number of injuries, accident, and work related illness will contribute to additional costs and delays on projects.

According to Kartam et al. (2000), management in government, owners and contractors all recognize the importance of safety in construction, but cannot be fully implemented and effective. It was observed that the problem arise due to: (1) disorganized labor; (2) poor accident record keeping and reporting system; (3) extensive use of foreign labors; (4) extensive use of subcontractors; (5) lack of safety regulations and legislation; (6) the low priority given to safety; (7) the small size of most construction firms; and (8) competitive tendering.

2.2 Definition

The following are the definition for some of the common term used in this study
2.2.1 Safety

Safety is a condition of being safe which absence from danger or risk, of injury, or loss to personnel and/or property, whether caused deliberately or by accident.

2.2.2 Incident

Incident is an unexpected, unplanned event in a sequence of events that occurs through a combination of cause which result in physical harm such as injury, ill, health or disease to an individual, damage to property, a near miss, a loss or any combination of these effects.

Incident does not necessarily mean an event that cause immediate injury or damage to equipment or property; for example someone falling off a ladder and breaking his back or a forklift dropping load causing equipment or goods breakages. An incident can also cause long- term injuries which may or may not be detected immediately. An example is hearing loss or an illness resulting from exposure to chemicals or mineral dust.

These are some of the reasons why we need to prevent an incident:

i. Legal reasons

OSHA 1994 specifically requires employers to prevent accident and ill – health in the workplace.
ii. Moral issue

Incidents will cause suffering not only for the individual workers involved but also to their families. Employers should not willingly cause suffering to its workers and also the community from where it gets its income from. Today workers and the public are aware of their right and may not allow employers to exploit them as they did before. Many nations are not happy with organizations that do not look after the welfare of their employees.

iii. Business reason

Incidents lower the productivity and therefore profitability of an organization. Incident can involve organization with litigation which may not only cost the organization its profit but also its image.

2.2.3 Accident

An accident is an unplanned, undesired event which may or may not result in injury or property damage, which interferes with the completion of an assigned task.

2.2.4 Near Miss

An unplanned event that did not result in injury, illness, or damage but had the potential to do so. Only a break in the chain of events prevented an injury, fatality or damage. Other familiar terms for these events is a "close call", or in the case of moving objects, "near collision".
2.2.5 Unsafe conditions

Unsafe conditions are hazardous conditions or circumstances that could lead directly to an accident.

2.2.6 Unsafe act

An action occurs when a worker ignores or is not aware of a standard operating procedure or safe work practice designed to protect the worker and prevent accidents.

2.2.7 Hazard

The term “hazard” in reference to Oxford Advanced English Dictionary (Fourth Edition) means danger or risk. A hazard in this study shall be defined as a source or situation with a potential for harm in terms of human injury or ill-health, damage to property, damage to the environment or a combination of these.

2.2.8 Danger

Relative exposure to hazard.