

**UNIVERSITI TEKNOLOGI MARA**

**A COMPARATIVE STUDY ON MUSCULAR-  
SKELETAL DISORDERS (MSDs) DEVELOPMENT  
AMONG TOWER CRANE OPERATORS AND  
MOBILE CRANE OPERATORS**

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**Thesis submitted in fulfillment of the requirements  
for the degree of  
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## Declaration by Student

Project entitled "A comparative study on Muscular-Skeletal Disorders (MSDs) development among tower crane operators and mobile crane operators" is my own original research work. Whenever contribution of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Mr K. Subramaniam as my Project Supervisor and Mr Nasaruddin Abd. Rahman as Co-Supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENT</b>	i
<b>LIST OF TABLES</b>	ii
<b>LIST OF FIGURES</b>	iii
<b>LIST OF APPENDICES</b>	iv
<b>LIST OF ABBREVIATION</b>	v
<b>ABSTRACT</b>	vi
<b>TITLE</b>	1
<b>CHAPTER ONE: INTRODUCTION</b>	2
1.1 Background Information	2
1.2 Problem statement	3
1.3 Study Justification	5
1.4 Study Objectives	6
1.5 Study Hypothesis	6
1.6 Conceptual Framework	7
1.7 Conceptual and Operational Definitions	8
<b>CHAPTER TWO: LITERATURE REVIEW</b>	
2.1 Statistics on accidents involving cranes	13
2.2 Legal requirement	14
2.2 Type of Cranes	16
2.3 MSDs Risk Factors	17
<b>CHAPTER THREE: METHODOLOGY</b>	
3.1 Study Location	19
3.2 Study design	19
3.3 Study Variables	20

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## Abstract

### A Comparative Study on Muscular-Skeletal Disorders (MSDs) Development among Tower Crane Operators and Mobile Crane Operators.

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**Introduction:** Cranes, which come in numerous different configurations is the most critical component for the construction work. It has contributed to as much as one-third of all construction and maintenance fatalities and injuries which resulting in permanent disability (MacCollum & David, 2002). Crane operators are exposed to Muscular-skeletal Disorders, MSDs risk factor during their working hour. Muscular-skeletal Disorders, MSDs is one of the occupational disease highly concerned. Occupational disease may be defined as a disease contracted as a result of an exposure to risk factors arising from work activity, such as operating a crane (DOSH, 2007).

**Method:** Data collection was made using administered questionnaires which has been developed by taking Standardized Nordic Questionnaire, SNQ, Dutch Musculoskeletal Questionnaire, DMQ, and Manual Task Risk Assessment, ManTRA Version 2.0 and REBA as a references. The questionnaires also attached with MSDs discomfort checklist form to evaluate which body-parts affected and determined the impact of MSDs score they perceived. The measurement of the study subject's blood pressure, pulse rate and Body Mass Index, BMI are also taken along with their individual pictures while operating the cranes. The study subject's individual pictures were used to analyze their anthropometry data using a protractor. This anthropometry data were used to generate their REBA score. All the data obtained further analyze with normality test, frequencies, percentages, independent t-test, and chi-square test by using SPSS version 16 software.

**Results:** The result shows that there is a significant difference ( $p < 0.05$ ) between mobile and tower crane operator's REBA score ( $p = < 0.001$ , 95% CI -1.6774, -0.7893), Systolic blood pressure ( $p = < 0.001$ , 95% CI -33.73, -24.34), Break times ( $p = < 0.001$ , 95% CI 4, 7), and Length of working hours ( $p = < 0.001$ , 95% CI -12.9969, -3.6698). From the result, we could determine that there is a significant association ( $p < 0.05$ ) between awkward postures and MSDs development ( $p = 0.015$ ,  $X^2 = 5.930$ ). As for the physiological stress, there is a significant association ( $p < 0.05$ ) between Systolic blood pressure and MSDs development ( $p = 0.002$ ,  $X^2 = 9.774$ ), as well as for break times and MSDs development ( $p = 0.001$ ,  $X^2 = 13.125$ ).

**Conclusion:** This study on tower crane operators ( $n=60$ ) have found that tower crane operators ( $n=30$ ) were more at risk of developing MSDs compare to mobile crane operators ( $n=30$ ) since they are exposed to awkward postures with high risk level of REBA (8 to 10), high blood pressure with systolic blood pressure of more than 140 and less than four break times in a day.

**Keywords:** *Muscular-skeletal Disorders, MSDs, Systolic blood pressure, Awkward posture, Rapid Entire Body Assessment, REBA*