



## **STUDY ON TOWER CRANE**

**NURUL HAYATI BINTI ABDUL HALIM  
(2000604166)**


**MASTURA BINTI YAAKOB  
(2000483317)**

**AINUN BINTI MANSOR  
(2000483157)**

**DIPLOMA IN MECHANICAL ENGINEERING  
MARA UNIVERSITY OF TECHNOLOGY (UiTM)**

**APRIL 2003**

“ We declared that this thesis is the result of our work except the ideas and summaries which we have clarified their sources. The thesis has not been accepted for any diploma and is not concurrently submitted in candidature of any degree”

Signed :  .....

Date : 07 MEI 2003 .....

**Nurul Hayati Binti Abdul Halim**

UiTM No: 2000483166

Signed :  .....

Date : 07 MEI 2003 .....

**Mastura Binti Yaakob**

UiTM No: 2000483317

Signed :  .....

Date : 07 MEI 2003 .....

**Ainun Binti Mansor**

UiTM No: 2000483157

## **ABSTRACT**

A nation that moves towards development, industrialization cannot avoid using machines as part of the devices of operations. In the construction industry, tower crane is widely used as an important devise for the operations. The purpose of this project is to study the concepts of tower crane in terms of their functions requirement, performances, purpose of design, economics and many more. We also considered safety measures and improvement in the quality of the machine's operations.

# TABLE OF CONTENTS

CONTENTS	PAGE
PAGE TITLE	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	v
LIST OF FIGURES	vi
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Introduction	1
1.2 Types of Tower Cranes	2
1.3 Requirements Review on Tower Crane	3
1.4 Safety Factors On Tower Crane	4
<b>CHAPTER 2 MATERIAL OF TOWER CRANE</b>	
2.1 Material Used For Tower crane	12
2.2 Material Properties	13
2.2.1 Mechanical Properties	14
2.2.2 Chemical Properties	17
2.2.3 Physical Properties	18
<b>CHAPTER 3 BASIC CONCEPTS AND COMPONENTS OF TOWER CRANE</b>	
3.1 Major Component of Tower Crane and Their Function	19
3.1.1 Boom	19
3.1.2 Tower	19
3.1.3 Prime Mover	21
3.1.4 Hydraulic Pumps	21
3.1.5 Winch	21
3.1.6 Cabin	21
3.1.7 Controls	21
3.1.8 Portal	25

3.2	Basic Concepts of Tower Crane	25
3.2.1	The Basic Hoisting Concepts	25
3.2.2	Drum, Hoists and Sheaves	26
3.2.3	Wire Rope and Fitting	27
3.2.4	The Basic Luffing Mechanism	28
3.2.5	The Basic For Load Rating	29
3.3.	Indicator And Safety Equipments	29
3.3.1	Power System Monitor	30
3.3.2	Crane Safety System	30
3.3.3	Maintenance	31
3.3.4	Surface Protection	31
3.3.5	The Driver	31

#### **CHAPTER 4 OPERATING PROCEDURE FOR TOWER CRANES**

4.1	Operating Procedure	32
4.1.1	Slinging The Load	33
4.1.2	Handling The Load	34
4.2	Loads And Forces Analysis	35
4.2.1	Static Loading	36
4.2.2	Primary Loading	37
4.2.3	Lifted Loading	37
4.2.4	Dead Load	37
4.2.5	Load Secondary	38
4.2.6	Dynamic Load	38
4.2.7	Linear Motion	39
4.2.8	Rotational Motion	39
4.2.9	Wind Load	39

#### **CHAPTER 5 TOWER CRANE CONFIGURATIONS**

5.1	Tower Configuration	41
5.2	Boom Configuration	41
5.2.1	Saddle Boom	42
5.2.2	Luffing Boom	42
5.2.3	Articulated Boom	43
5.3	Mounting Configuration	43
5.3.1	Static Base Climbing	43
5.3.2	Travelling Base	44
5.3.3	Climbing Tower Crane	44