

FINAL YEAR PROJECT REPORT  
DIPLOMA IN MECHANICAL ENGINEERING  
SCHOOL OF ENGINEERING  
MARA INSTITUTE OF TECHNOLOGY  
SHAH ALAM

**CAD/CAM OF INDUSTRIAL PRODUCT**

BY  
ABDUL RAHMAN B. YUSOF  
&  
RASLI B. MUHAMAD

NOVEMBER 1996

# CONTENTS

	<b>Page</b>
<b>Acknowledgment</b>	
<b>Preface</b>	ii
<b>Introduction</b>	1
<b>CAD System</b>	
What is CAD?	2
Advantages and the use of CAD	3
How does it function	4
<b>Computer Numerical Control System</b>	
What is CNC machine?	7
Type of machine movement	10
Computer numerical control	10
Distributed and direct numerical control	11
Data preparation for numerical control	14
Manual programming	18
The program structure and block size	21
Programming with The AID of Computer	23
Automatically programmed tools	24
CAD/CAM in the programming process	26
Creating border for the cutter's passageway	28
Determining the passageway for the cutter	29
Modifying passageway for the cutter	30
Example of CAD/CAM	31
Machining Contoured Surfaces	32
Rapid prototyping	33
<b>The Process of Designing a Handicap</b>	
Introduction	34
Operation involved	35
Modeling process of unigraphics	38
Drafting	45
Creating a drawing	46
<b>Process of Producing G-Code Programme</b>	
Introduction	48
Process of generation cutter's passageway	48
Process of Moving 'nc.' file Into the Machine	54
Machining Process	55

## **ACKNOWLEDGMENT**

In the name of God the most gracious and merciful.

We would like to thank all that have been so helpful in completing our final project. Firstly, We would like to express our deep of gratitude and appreciation to Dr. P. N. Rao who initiated and supervised this project. His endless help and guidance throughout this project have made it possible to obtain the desired results.

We are also grateful to all staff members of the CADEM centre especially to En. Radzuan, En. Sukor and En. Razip who supplied us with various equipment, data and answers to all our queries relating to the project.

Finally, we would like to express our deepest gratitude to all our classmate and friend who are directly or indirectly involve in making this project a success.

Abdul Rahman Yusof

Rasli Muhamad

May God bless all of us.

## **PREFACE**

The Computer Aided Design and the Computer Aided Manufacturing CAD/CAM programming is the creation and manipulation of model or prototypes on a computer to assist in the design process. The purpose of this design process, analyzing and practical are to study on the CAD/CAM programming and machining process using the Computer Numerical Control (CNC) machine.

The design of a product by CAD modelling is a popular process nowadays. The process of modelling does not only makes producing easier but also it saves time and cost involved in the long-run. The product can be standardized and its quality preserved as long as the modelling used is not defect in any way.

Computer Aided Design (CAD) is a system which enables the user to create any shape they desire with the aid of a computer. With the modernized technology, the CAD system does not only makes the process of creating easier but its application is now in a growing process. The reason is to enable the system to communicate with other external system such as CNC machines so that it can interpret creating and designing information that has been done before.

## **INTRODUCTION**

From the origin process of designing to the testing of a product before being distributed to consumers, the use of computers plays an important role in the field of engineering .Parallel to the existing motivation towards the significance of increasing quality and decreasing time-scale of manufacturing a product, the use of computers become more important.

In the process of designing and manufacturing a product, the use of the computers has been recognised to give out impressive and up-to-date results. It helps engineers in increasing productivity parallel with the work they do. Through simulation or analysis it enables the achievement of a product to be examined before prototype is produced. it also helps in arranging complex system and changing information among different engineering groups. This application is called CAD / CAM : Computer Aided Design and Computer Aided Manufacturing.