



**UNIVERSITY TECHNOLOGY MARA**

**DESIGN AND MANUFACTURE OF A PLASTIC DRESSING  
FORCEPS USING CAD/CAM TECHNIQUE**

**By:**

**ZAINILA BINTI SALAM**

**96623453**

**SAMSON MICHAEL**

**98027864**

**B. ENG (HONS) MECHANICAL ENGINEERING  
UNIVERSITY TECHNOLOGY MARA**

**APRIL 2001**

## **1.0 Introduction**

The evolution of plastic technology and the improvement in the quality of the plastic products changed many people opinion on plastic goods. It is more accepted now due to these changes. More and more plastic material, whether it is a recyclable or not, is being used in our daily life.

Plastics are petroleum product and they cannot be used in state of raw material. Most all of them are once molten and then form to require shape by some method or other or subjected to further processing before it is delivered as commercial goods.

### **1.1 Objective of the project**

Plastic forceps is becoming more and more essential in the medical setting nowadays. More doctors or medical practitioners are moving their interest from the conventional stainless steel forceps to the disposal plastic Forceps.

It is clear that to manufacture stainless steel forceps will need high investment thus this will increase the cost of these products. Most Stainless steel Forceps in Malaysia are imported goods and most of these good are imported from the United States, Italy, England and Pakistan.

The objective of this project is to find ways how to produce Dressing Plastic Forceps locally. By producing it locally, we believe that it is possible to lower the cost of this product.

We also believe that by doing this, we can be independent in plastic goods production, hence, this will pave the way for future plastic technology in the country, contributing further to the vibrant and dynamic economy.

## **1.2 A medical doctor's perspective.**

Dr. Ainal Fuadi Said MBBS of WeCare Clinic in USJ, Subang Jaya holds the view that disposable plastic forceps is important in the current medical field. As a Physician practicing in this ever-competitive new millennium, a balance must be achieved between correct medical ethics and the patient's well being.

As they entrust you with the care and their welfare and the economics of establishing and maintaining a business venture, which must seamlessly integrate, proves to an ever-challenging prospect for any medical healthcare.

No two persons are alike, yet we try to accommodate medical care in the very best way we can not forsaking efficiency, proper and prompt diagnosis and following effective and safe treatment protocols.

The Medical equipment involved in the day-to-day usage in a modern clinical setting has to meet rigorous criteria and does contribute to the overall success of the clinical venture. The scope of equipment is vast from basic run of the mill items to hi tech items that seems like out of a Sci Fi movie, any clinical set up considers them a necessity rather than a luxury.

I consider one of the basic items that are indispensable is the forceps and hold the view that disposable plastic forceps is important in the medical field.

A relatively simple straight forward instrument the disposable plastic forceps which is usually taken for granted yet facing a situation without one brings horror and fear to the doctors, nurses and patients alike.

Though simple, the forceps has and is still an item, which proves its weight in gold for any medical situation and can either be made from, stainless steel, titanium and even plastics. The task from handling cotton swabs, cleaning of wounds, to handling delicate tissues while bringing the skin together, to the fine delicate forceps required to hold blood vessels while the doctor utilizes his or her dexterous skills to seal them, the forceps is undoubtedly an instrument of immense importance.

## TABLE OF CONTENT

	PAGE
ACKNOWLEDGEMENT	
1.0 INTRODUCTION	
1.1 OBJECTIVE OF THE PROJECT	1
1.2 A MEDICAL DOCTOR'S PERSPECTIVE	2
1.3 TYPE OF AVAILABLE FORCEPS IN MEDICAL FIELD	4
1.4 SCOPE OF WORK	7
2.0 LITERATURE SURVEY	
2.1 CAD SYSTEM	
2.1.1 MERITS OF CAD SYSTEM	9
2.1.2 CAD INTRODUCTION	11
2.1.3 TWO-DIMENSIONAL CAD SYSTEM	12
2.1.4 THREE-DIMENSIONAL CAD SYSTEM	12
2.2 EFFICIENT CAM	
2.2.1 CONCEPT OF CAM SYSTEM	15
2.2.2 CAM SYSTEM INTRODUCTION	16
2.2.3 INTRODUCTION OF SURFCAM	17
2.3 INJECTION MOLDING	
3.0 PRODUCT DESIGN	
3.1 INTRODUCTION	26
3.2 MAIN POINTS OF PRODUCT DESIGN	27
3.2.1 PARTING LINE	27
3.2.2 GATE	28
3.2.3 SHRINKAGE FACTOR	28
3.2.4 DRAFT	30
3.2.5 UNIFORM WALL THICKNESS DESIGN	30
3.2.6 REINFORCEMENT AND PREVENTION OF STRAIN	32

	PAGE
4.0 MOULD DESIGN	
4.1 DESIGN PROCEDURE	33
4.2 CALCULATION	38
4.3 DESIGN OF MOULD ELEMENTS	
4.3.1 CAVITY AND CORE CONSTRUCTION	40
4.3.2 CONSTRUCTION OF CAVITY SECTION	41
4.3.3 GATE	42
4.3.4 RUNNER	48
4.3.5 EJECTOR MECHANISM	52
4.3.6 LOCATING RING	57
4.3.7 SPRUE BUSH	58
4.3.8 MOULD COOLING	60
5.0 PRODUCTION OF MOULD	
5.1 WIRE-CUT	68
5.2 G-CODE PROGRAMMING	70
5.3 ELECTRICAL DISCHARGE MACHINE	72
6.0 COSTING	
6.1 ESTIMATION OF MOULD COST	86
6.2 RAW MATERIAL COST	88
6.3 MANUFACTURING COST	89
6.4 TOTAL PRICE/PIECE	89
7.0 DISCUSSION	91
7.1 PROBLEM ENCOUNTERED	92
7.2 FUTURE PLANNING	92
8.0 CONCLUSION	95