

**DESIGN AND FABRICATION CAN CRASHER**

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## ABSTRACT

Creativity of idea is very important in design. It is because, idea is very important to produce a quality, interesting and unique product. As a new product for customer, this can crusher is design followed need characteristic such as easy to handle, multifunction and attractive. In this project, main objective is to create and design a new product based on the existing product in the market. This project are using of various kind of mechanism that have in UMP mechanical laboratory such as mild steel plate, grinding and welding. These can crusher project are used multiple method like measurement, marking, cutting, joining and assembly process. This processes are important because its involve student skill of using a tool and machine. Beside that, it also can make a student learn something new to increase a creativity of thinking and think to produce interesting product for the future market. This product also must have a characteristic like toughness. These projects make the student more discipline, punctuality, create a leadership skills and have a good planning in order that can practice it in real situation at the work place.

## ABSTRAK

Merekebentuk sesuatu benda memerlukan idea yang kreatif. Ini adalah kerana idea begitu penting bagi memastikan produk yang dikeluarkan adalah berkualiti, menarik dan mempunyai sesuatu yang unik. Sebagai suatu benda yang baru kepada pengguna, "can crusher" yang direka ini hendaklah menepati ciri-ciri yang dikehendaki seperti mesra pengguna, pelbagai fungsi serta menarik. Dalam projek ini objektif utama adalah untuk mencipta serta mereka bentuk suatu benda yang baru berpandukan kepada produk yang sudah wujud di pasaran. Projek ini menggunakan pelbagai jenis bahan yang ada di makmal kejuruteraan mekanikal UMP seperti plat besi lembut, kimpalan dan mesin canai. Projek mencipta "can crusher" ini memerlukan banyak kaedah meliputi pengukuran, penandaan, pemotongan, penyambungan dan pemasangan. Proses ini adalah penting kerana ia melibatkan kemahiran pelajar itu sendiri dalam menggunakan peralatan serta mesin. Selain itu juga, pelajar juga dapat mempelajari sesuatu perkara yang baru serta menjana pemikiran dengan memikirkan perkara yang lebih menarik supaya produk yang dihasilkan bakal mendapat tempat di masa akan datang. Produk yang dihasilkan perlu tahan lasak. Projek ini juga menumpukan pelajar supaya lebih berdisiplin, menepati masa, mempunyai kemahiran memimpin dan merancang supaya ia dapat dipraktikkan apabila berhadapan dengan situasi sebenar di tempat kerja kelak.

## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENTS	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xi
	LIST OF FIGURES	xii
<b>1</b>	<b>INTRODUCTION</b>	
	1.1 General Project Synopsis	1
	1.2 Problem Statement	2
	1.3 Specific Project Synopsis	2
	1.4 Project Scopes	2
	1.5 Project Objectives	3
	1.5.1 General Objectives	3
	1.5.2 Specific project objectives	3

## **2 LITERATURE STUDY**

1.1	Introduction	4
1.2	Introduction Can Crasher	4
1.3	Definition	5
1.3.1	12oz Can Crasher	5
1.3.2	D-zine Can Crasher	6
1.3.3	Can Ram Can Crasher	7
1.3.4	The Crasher Can Crasher	7
1.3.5	Recycled Plastic Food Can Crasher	8
2.4	Advantages and Disadvantages	9
2.4.1	12oz Can Crasher	9
2.4.2	D-zine Can Crasher	10
2.4.3	Can Ram Can Crasher	11
2.4.4	The Crasher Can Crasher	11
2.4.5	Recycled Plastic Food Can Crasher	12
2.5	Limitation	12
2.6	Material	13
2.7	Target Market	13
2.8	Design for Manufacture (DFM)	14
2.9	Conclusion	15

## **3 RESEARCH METHODOLOGY**

1.4	Introduction	16
1.5	Research Design	16
1.6	Research Methodology	19
1.7	Research Tools	21
1.8	Research Planning	23

**4 DESIGN AND EVALUATION**

4.1	Introduction	25
	4.1.1 Design Manufacture	25
	4.1.2 Evaluation Introduction	25
4.2	Conceptual Of the Design	26
4.3	Pugh Concept Selection Method	26
	4.3.1 Result	28
4.4	Design Concept	29
	4.4.1 Concept 1	29
	4.4.2 Concept 2	30
	4.4.3 Concept 3	31
	4.4.4 Conclusion	32
4.5	Final Design	32
	4.5.1 Part of Design	34
	4.5.1.1 Can Holder	34
	4.5.1.1.1 Part 1	35
	4.5.1.1.2 Part 2	36
	4.5.2 Body	37
	4.5.3 Leaver	38
	4.5.4 Foot Holder	39
	4.5.5 Crasher Holder	40
	4.5.6 Product Specification	41
	4.5.6.1 Can Holder	41
	4.5.6.2 Body	41
	4.5.6.3 Leaver	41
	4.5.6.4 Spring	41
4.6	Material Selection	42
4.7	Conclusion	42

**5 MANUFACTURING PROCESSES**

5.1	Introduction	43
5.2	Process Planning	43
5.3	Fabrication Process	44
5.3.1	Cutting Material	44
5.3.2	Welding Process	44
5.3.3	Drilling Process	46
5.3.4	Removing Chip	46
5.3.5	Surface Cleaning	47
5.3.6	Painting Process	47
5.4	Costing	48
5.5	Conclusion	49

**6 DISCUSSION AND CONCLUSION**

6.1	Introduction	50
6.2	Problem and conclusion	51
6.2.1	Literature review Problem	51
6.2.2	Design and Sketching Problem	51
6.2.3	Material Preparation Problem	51
6.2.4	Fabrication Process Problem	52
6.2.5	Budget Problem	52
6.3	Further Work	53
6.4	Conclusion	53

<b>REFERENCES</b>	<b>54</b>
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<b>APPENDIXES</b>	<b>55</b>
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**LIST OF TABLE**

<b>NO. TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
3.1	Research Design	17
3.2	Research Methodology	19
3.3	Research Tools	21
3.6	Research Planning	24
4.1	Pugh Concept Selection Method	27
5.4	Cost of Components	48



## LIST OF FIGURE

NO. FIGURE	TITLE	PAGE
2.1	12oz Can Crasher	5
2.2	D-zine Can Crasher	6
2.3	Can ram Can Crasher	7
2.4	The Crasher Can Crasher	7
2.5	Recycled Plastic Food Can Crasher	8
2.6	12oz Can Crasher	9
2.7	D-zine Can Crasher	10
2.8	Can Ram Can Crasher	11
2.9	The Crasher Can Crasher	11
3.0	Recycled Plastic Food Can Crasher	12
4.1	Datum Product	26
4.2	Concept 1	29
4.3	Concept 2	30
4.4	Concept 3	31
4.5	Final Design	33
4.6	Solidwork Final Design	33
4.7	Can Holder	34
4.8	Part 1	35
4.9	Part 2	36
4.10	Body	37
4.11	Leaver	38
4.12	Foot Holder	39
4.13	Crash Holder	40
5.1	Welding Process 1	45
5.2	Welding Process 2	45
5.3	Removing Chip Process	46

5.4	Painting The Can Crasher 1	47
5.5	Painting The Can Crasher 2	48

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 General Project Synopsis**

The project involves designing and fabricating a can crusher. This can crusher would be entirely different from existing can crushers. As the Diploma final year project allocates the duration of 1 semester, this large man-hour project therefore requires significant number of students to participate. Basically the entire can crusher could be divided into 2 divisions, namely the chassis development, body development and force to flatten the can.

This project is important to train and increase student capability in research, data gathering, analysis making and then solve a problem by skills or scientific research. This project also will improve the student in communication like in a presentation and educate them to defend their research in the presentation.

The project will encourage students to have capability to make a good research report in thesis form or technical writing. This project also can produce and train student capability working work with minimal supervisor and more independent in searching, detailing and expanding the knowledge and experiences. As the conclusion, this project will acquire the skills of design and fabrication.

## **1.2 Problem statement**

The common can crusher in the market can crush one can at the time. The conventional way to reduce the size of the can drinks is not effective and not economical. With the new design of this project, it can counter the conventional problem in the market today.

## **1.3 Specific Project Synopsis**

My project title is design and fabrication of can crusher. The project involves the fabrication of make can crusher function and designs the can crusher. Modification is requiring improving function of can crusher. With the newly designed and fabricated the can crusher design, tests are required to be conducted and to verify the design. The projects prerequisites are static, industrial design and strength of material. As a conclusion, this project will develop the skills of design, analysis, fabrication and testing.

## **1.4 Project Scope**

The scope of the project as limited to the below parameters:

- a) To fabricate product that at least 2kg for weight.
- b) To design competitive product that cheaper than existing products in the market.
- c) To fabricate this a product that can crush at least two cans at the same time.

## **1.5 Project Objective**

### **1.5.1 General objective**

Diploma final year project objective is to practice the knowledge and skill of the student that have been gathered before in solving problem using academic research, to develop an engineer that have enough knowledge and skill. This project also important to train and increase the research capability, data gathering, analysis making and then solve a problem by research or scientific research.

The project also will educate the student in communication skills like in a presentation and educate them to defend their research in the presentation. The project also will generate students that have capability to make a good research report in thesis form or technical writing. This project also produces and train student to capable of doing work with minimal supervisor and independent in searching, detailing and expanding the experiences and knowledge.

### **1.5.2 Specific Project Objective**

Basically this project is base on this objective:

- a) To produce product according to engineering method
- b) To compare with current product in market

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter includes about general can crusher, definition of can crusher, advantages and disadvantages, limitation of can crusher, material used and also target market of can crusher.

#### **2.2 Introduction Can Crusher**

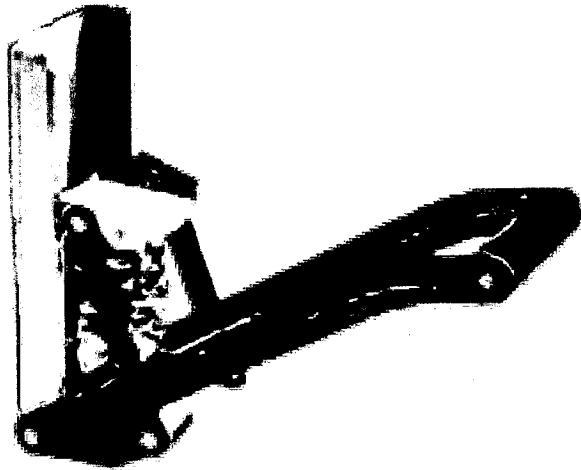
The new can crusher is developing to be user friendly, light weight and interesting. Nowadays the can crusher is the most important thing and in market demand because the can crusher is helps to promote recycling activities by the government. In market, the can crushers have more shape and produced by difference material.

This can crusher commonly produces by steel. These items criteria chosen based on strength, toughness, easy to fabricate, long life. The can crusher also commonly fabricate using welding method such as MIG welding to joining part using steel and rivet pop to join lever with foot holder. This method chosen because can produce the toughness can crusher, clean and interesting.

## 2.3 Definition

The previous topic has discussed about the can crusher in general, therefore in this topic the discussions are concentrated on the requirement for this project. This is a 5 types of can crusher have been identified for analysis. The 5 types of can crusher are:

### a) 12oz Can Crusher



**Figure 2.1:** 12oz Can crusher

This can crusher usually used in house. This product is easy to use. It is safe for user to use because it has no sharp edge. This product is very reliable because of its easy to use by all type of people including children. To use this product, just mount it to solid, wall or table [1].

**b) D-zine Can crusher**

**Figure 2.2: D-zine Can crusher**

This product has the same design as 12oz can crusher. The different between this product and 12oz can crusher is it unique design. It doesn't require any batteries and no power needed to make it function and environmental friendly. It can compress a can up to 20% of its original size [2].



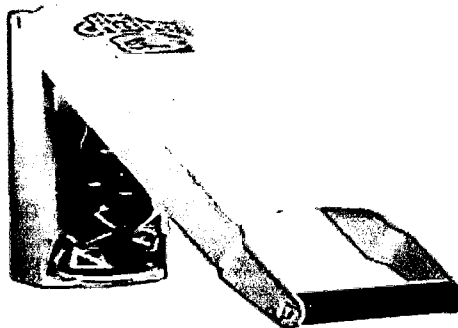
c) **Can Ram Can Crasher**



**Figure 2.3: Can Ram Can Crasher**

This is can ram can crusher. It is made from high density nylon. This product can crush up to 8 cans in one time. It reduces a can up to 1 inch thick. Disadvantage of this product is its size that is very large; requires large space and it is heavy. Price of this product is also expensive [3].

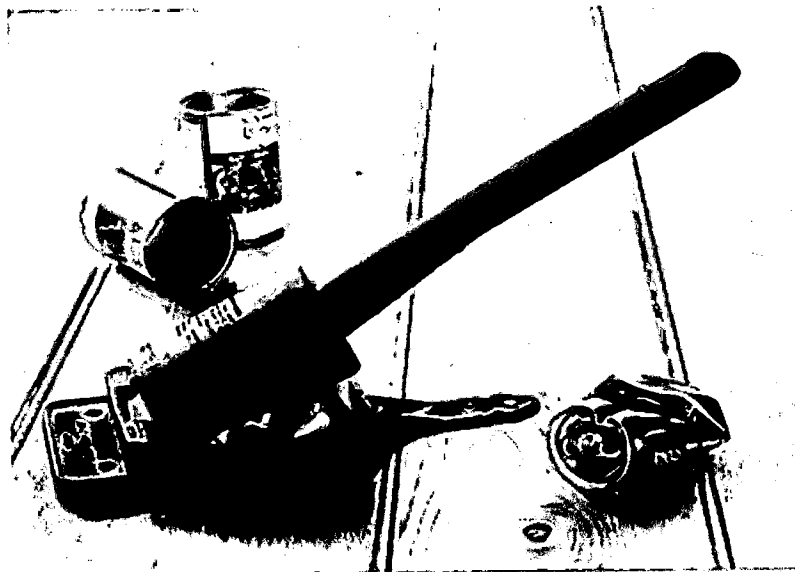
d) **The Crasher Can Crasher**



**Figure 2.4: The Crasher Can Crasher**

This product is name the crusher. It has solid design and no sharp edge for safety of children. It has safety neoprene handle, for comfortable use of its user. It has wider walled that place can to make a can crush with flat surface top and below [4].

e) **Recycled Plastic Food Can Crasher**



**Figure 2.5: Recycled Plastic Food Can Crasher**

This is recycled plastic food can crusher. It is made from high quality plastic. This product is portable that can be use anywhere. It has long handle to help applying more pressure if needed. It can also crash steel food can other than drink can. It crash can at vertical surface. It reduces size up to 60% of it original size [5].

## 2.4 Advantages and disadvantages

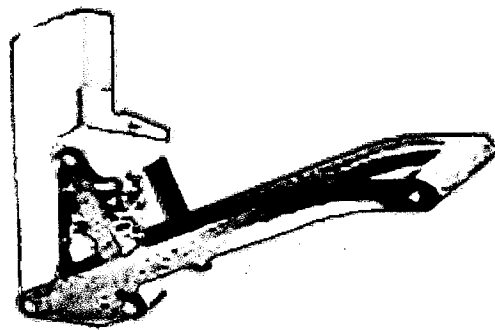
These are several strength that have been identified with the use of these can crusher.

The advantages are:

- a) Portable, so user can bring this product to anyway.
- b) This product is a safety for all user especially the children.
- c) More grid to crush the can
- d) Easy to use for all user especially the children

To get more understanding and analysis of these products, the advantages and disadvantages had been discussed one by one. The advantages and disadvantage of these products are:

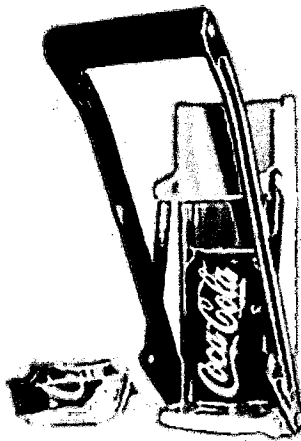
### a) 12oz Can Crusher



**Figure 2.6:** 12oz Can Crusher

Advantages	Disadvantages
<ol style="list-style-type: none"> <li>1. Easy to use</li> <li>2. Easy to move</li> </ol>	<ol style="list-style-type: none"> <li>1. Only one can</li> <li>2. Using too many force</li> </ol>

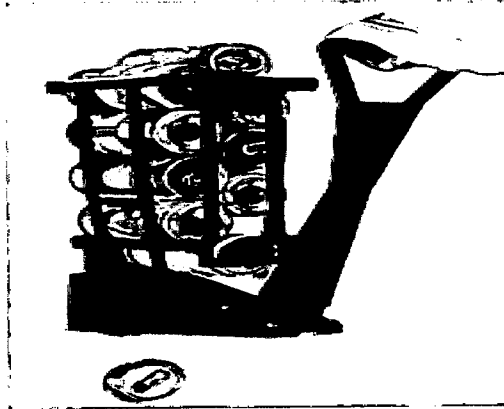
**b) D-zine Can Crasher**



**Figure 2.7: D-zine Can Crasher**

Advantages	Disadvantages
<ol style="list-style-type: none"> <li>1. Easy to move</li> <li>2. Easy to handle</li> </ol>	<ol style="list-style-type: none"> <li>1. Only one can</li> <li>2. Using too many force</li> </ol>

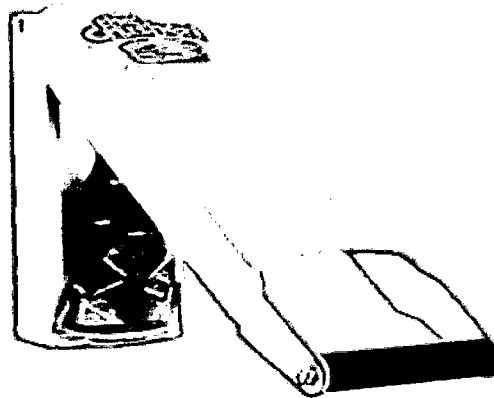
c) **Can Ram Can Crasher**



**Figure 2.8: Can Ram Can Crasher**

Advantages	Disadvantages
1. More one can 2. Easy to use	1. Lack of space 2. Using more energy

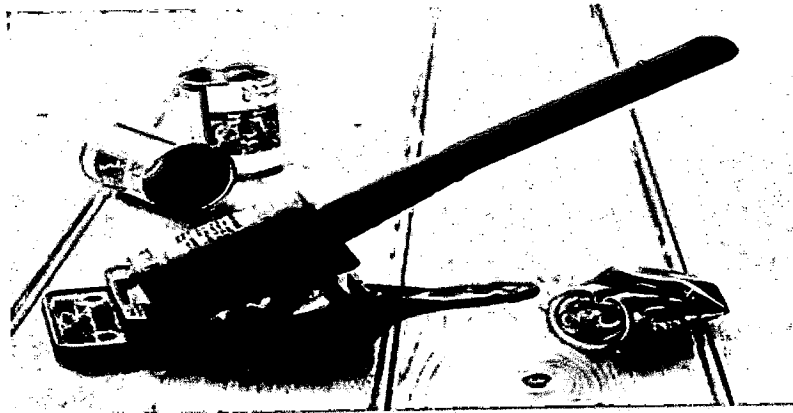
d) **The Crusher Can Crusher**



**Figure 2.9: The Crush Can Crusher**

Advantages	Disadvantages
<ol style="list-style-type: none"> <li>1. Safety grid</li> <li>2. Easy to move</li> </ol>	<ol style="list-style-type: none"> <li>1. Only one can</li> <li>2. Using too many force</li> </ol>

e) **Recycled Plastic Food Can Crusher**



**Figure 3.0: Recycled Plastic Food Can Crusher**

Advantages	Disadvantages
<ol style="list-style-type: none"> <li>1. Free standing</li> <li>2. Easy to move</li> </ol>	<ol style="list-style-type: none"> <li>1. Less toughness</li> <li>2. Using more force</li> </ol>

## 2.5 Limitation

In development of this project, there are several constrains that occurred. There are so many product founded in market but however many of them are focusing only one can to crusher. Besides that, there are several products did not passes the approval from supervisor such as electromagnetic can crusher which using electric to crush the can. So the limitation in

development of this product is can crusher can't use the electric to crush the can just mechanical only.

This product only can be used in the house, at the park, restaurant and office. So this product can help to promote recycling activities by the government.

## **2.6 Material**

Material selection is a important to produce the product. The selection of material must have several elements that will contribute to the hardness, life cycle, toughness and many more other characteristics. The elements that that should be taking care are:

- a) Material should easily use in production
- b) It must stand all environmental condition
- c) It should be resistant to wear and tear
- d) The uses of existing material so that a new material will not have to be develop

Steel can be heat-treated which allows parts to be fabricated in an easily-formable soft state. If enough carbon is present, the alloy can be hardened to increase strength, wear and impact resistance. Steels are softening wrought by cold-working methods, which is the shaping of metal through deformation at a low equilibrium or metastable temperature. [6]

## **2.7 Target Market**

The main objective of this product is for crushing the can. From the survey that that have been made, 98% of the houses doesn't have can crusher at their houses. The main target

of the product will be produced are middling people where the product should be cheap and interesting. Beside that, the other target market is for help government to promoter recycling activities.

## **2.8 Designs for Manufacture (DFM)**

The definition of designs of manufacturer (DFM) is the development of the manufacturing system of the product where the target is to produce product that will reduce cost of production without decrease the quality of the product.

In development of this product, an additional and improvement should be made to produce a better product when it been comparing with other product. All of the information about the product needs to be distinguished and planned clearly before the production the product. The steps that should be made are:

- a) Minimize the part so that it will reduce cost of manufacturing
- b) Simple design of part is important to ensure time of fabrication can be reduced.
- c) Avoid too small tolerance so that no need to use specified tolerance that are tight.
- d) Design multifunctional part is a good way to minimize part count.
- e) Standardize component where the cost a minimized and quality is enhanced.