POLITEKNIK MALAYSIA

SULTAN SALAHUDDIN ABDUL AZIZ SHAH

DJJ 50193 PROJECT 2

FINAL REPORT

DUSTBIN COMPACTOR

GROUP MEMBERS	MATRIC NO.
RAGUVARAN A/L RAHES	08DKM19F1142
MUHAMMAD ZULHUSNI BIN OTHMAN	08DKM19F1136
MUHAMMAD KHAIRUL AIMAN BIN KAMARUDIN	08DKM19F1133

This report is submitted to the Department of Mechanical Engineering in partial fulfilment of the requirements for Diploma in Mechanical Engineering

MECHANICAL ENGINEERING DEPARTMENT

1 2021/2022

DECLARATION OF ORIGINAL WORK AND INTELLECTUAL PROPERTIES

TITLE : DUSTBIN COMPACTOR

SESSION : 1 2021/2022

We, **RAGUVARAN A/L RAHES (08DKM19F1142), MUHAMMAD ZULHUSNI BIN OTHMAN (08DKM19F1136), MUHAMMAD KHAIRUL AIMAN BIN KAMARUDIN (08DKM19F1133)** is a final year student in **Diploma in Mechanical Engineering, Mechanical Engineering Department, Politeknik Sultan Salahuddin Abdul Aziz Shah, of Persiaran Usahawan, 40150 Shah Alam, Selangor.**

2. I acknowledge that the 'Project above' and its intellectual property are the original work/copy of our work without taking or imitating any intellectual property from others.
3. I agree to give up the intellectual property ownership of 'The Project' to the Polytechnic in order to meet the requirements for awarding us Diploma in Mechanical Engineering.

Made and truly recognized by)
MUHAMMAD ZULHUSNI BIN OTHMAN) ……
(IC No.:981228565843),) MUHAMMAD ZULHUSNI BIN OTHMAN

RAGUVARAN A/L
RAHES)
(IC No.: 011113101005),) RAGUVARAN A/L RAHES

MUHAMMAD KHAIRUL AIMAN BIN
KAMARUDIN) ……
(IC No.: 010123060601),) MUHAMMAD KHAIRUL AIMAN BIN KAMARUDIN

ACKNOWLEDGEMENT

In the name of Allah, the Most Merciful and Gracious. We would like to express our sincere appreciation to our project supervisor especially, Puan Zetty Rohaiza Binti Mohd Sahak@ISHAK for the guidance and discussions given during the duration of the project. The support our supervisor gave motivate us to complete this study. Without the guidance and their cooperation, we will not be able to make this project very well.

We would also like to express our sincere appreciation to Politeknik Sultan Salahuddin Abdul Aziz Shah for giving us this opportunity to make use our knowledge. May God brings them a succeed, honors and peace in their lives.

ABSTRACT

A prototype of a garbage compressor utilizing a motorized system is produced to facilitate waste management whereby garbage needs to be compressed in order to free up space to enable the binding of the garbage bag. The present compressor uses the manual way by pressing down on it using manpower. If the garbage is too much, then the energy needed to compress it increases. Therefore, the purpose of this project is to replace manpower with electrical power so as to reduce the workload in managing garbage. This compressor will operate through motorized systems by using switches and the linear actuators will be key components used in this project. The application of this project allows garbage management to become much easier by compressing garbage without using manpower and not having to touch the garbage. The development of this fabricated prototype involves several methods used such as drilling, wiring and connectivity. As a result of this project, it is proven that this garbage compressor can compress waste better than using manpower. It can indirectly facilitate the handling of waste. Improvements can be made with this project by adding sensors to detect garbage levels and automatically compress them to a preset level. In addition, the rubbish bins used in this project can be replaced with stronger materials in order to cope with higher pressures. The production of this prototype is one of many equipment design ideas that can aid in the improvement of waste management.

ABSTRAK

Satu rekabentuk prototaip pemampat sampah yang menggunakan sistem bermotor telah dihasilkan dalam memudahkan pengendalian pengurusan sampah dimana sampah perlu dimampatkan supaya dapat membina ruang bagi memudahkan mengikat plastik sampah. Pemampat yang sedia ada menggunakan kaedah manual dengan menekannya menggunakan tenaga manusia. Jika sampah terlalu banyak, maka tenaga yang diperlukan untuk memampatkannya menjadi tinggi. Oleh itu, projek ini adalah untuk menggantikan tenaga manusia dengan kuasa elektrik supaya dapat mengurangkan beban kerja dalam menguruskan sampah. Pemampat ini akan menggunakan sistem bermotor untuk beroperasi dengan menggunakan suis dan penggerak linear akan menjadi komponen utama untuk digunakan dalam projek ini. Aplikasi projek ini menjadikan pengurusan sampah lebih mudah dengan memampatkan sampah tanpa menggunakan tenaga manusia dan tidak perlu menyentuh sampah untuk memampatkannya. Pembangunan fabrikasi prototaip ini melibatkan beberapa kaedah yang telah digunakan seperti penggerudian, pendawaian dan penyambungan. Hasil projek ini, dapat dilihat bahawa pemampat sampah ini dapat memampat sampah dengan lebih baik berbanding menggunakan tenaga manusia. Ia secara tidak langsung dapat memudahkan dalam pengendalian pengurusan sampah. Penambahbaikan yang boleh dibuat dengan projek ini dengan menambahkan sensor untuk mengesan tahap sampah dan memadatkan ia pada tahap yang ditetapkan secara automatik. Selain itu, tong sampah yang digunakan dalam projek ini boleh digantikan dengan bahan yang lebih kuat supaya dapat menampung tekanan yang lebih tinggi. Penghasilan prototaip ini menjadi salah satu idea reka bentuk peralatan yang dapat membantu untuk menambahbaik pengendalian pengurusan sampah.

TABLE OF CONTENT

CHAPTER	CONTENT	PAGE
	• FRONT PAGE • DECLARATION OF ORIGINAL WORK AND INTELLECTUAL PROPERTIES • ACKNOWLEDGEMENT • ABSTRACT • ABSTRAK • TABLE OF CONTENT • LIST OF TABLES • LIST OF FIGURES	1 2 3 4 5 6 7 7
1. INTRODUCTION	1.1. Introduction 1.2. Background of the Project 1.3. Problem Statement 1.4. Objectives 1.5. Conclusion	8 - 9
2. LITERATURE REVIEW	2.1. Introduction 2.2. Research About the Concept of Dustbin Compactor 2.2.1. Concept of Dustbin 2.2.2. Concept of Trash Compactor 2.2.3. Types of Trash Compactor 2.3. Chapter summary	10 -17
3. METHODOLOGY	3.1. Introduction 3.2. Product Design 3.2.1. Procedure of Project Development 3.2.2. Proposed Materials 3.3. Method of Data Analysis 3.4. Chapter summary	18 - 26
4. RESULT AND DISCUSSION	4.1. Introduction 4.2. Data Collection and Data Analysis 4.3. Discussion 4.4. Chapter summary	27 - 28
5. CONCLUSION AND RECOMMENDATION	5.1. Introduction 5.2. Conclusion 5.3. Recommendation 5.4. Project Limitation 5.5. Chapter summary	29 - 30

LIST OF TABLES

CONTENT	PAGE
Table 4.1 Data Comparison	27

LIST OF FIGURES

FIGURES	PAGE
2.1 Dustbin 2.2 Standard outdoor trash bin with handles 2.3 Step on garbage trash bins 2.4 Swing top garbage bins 2.5 Touch-Free Garbage Bin 2.6 Trash Compactor 2.7 Portable trash compactor 2.8 Hopper compactor 2.9 Manual trash compactors	10 - 17
3.1 Design Sketch 1 3.2 Design Sketch 2 3.3 Project Prototype 3.4 30 Litre Step Dustbin 3.5 Dual Directional PWM Speed Controller. 3.6 Switch 3.7 Linear Actuator 3.8 Power Supply 12V 3.9 Hand Drill 3.10 Base Compactor	19 - 26
4.1 Dustbin Compactor of operating system	28

1. Red text author by Zulhusni
2. Green text author by Raguvaran
3. Purple text author by Khairul Aiman

CHAPTER 1
INTRODUCTION

(Author by Khairul Aiman)

1.1 Introduction

The introduction of household rubbish bins in Britain dates back to 1875. In the past couple of years, some of these bins have begun to feature automated mechanisms that allow the user to empty the bin without touching it. Due to the increasing number of people living in urban areas, the environment is also becoming more unhygienic. The main challenge with the current society is that most of the people have less sense of responsibility, and this contributes to the waste management system in our society.

1.2 Background of the Project

A trash can is typically made of plastic or metal. In most cases, this type of container is used for household garbage.However, a trash compactor is a unique type of garbage can that allow you to separate the food and other items from the trash. Waste containers are containers for temporary storage of garbage and aregenerally made of metal or plastic. Home dustbin like in bathroom bin – small, simple, preferably covered. The material of dustbin should can withstand humidity andwater splashes.

1.3 Problem statement

- Existing dustbin cannot prevent bacteria.
- The quality of the dustbin that we have today is ordinary such as around the dustbin is dirty.
- Hands in contact with the existing compactor it will be risk your health.

1.4 Objectives

- To design a prototype for a trash compactor.
- To develop a prototype for the product.
- To test the system uses in the prototype.

1.5 Conclusion

The main focus of this proposed model was to improve the waste management process and improve the quality of the environment. It is often observed that the trash cans are uncovered and birds shed trash. Thecurrent method also solves this problem. There is a saying, “Clean after piety”.

CHAPTER 2
LITERATURE REVIEW

(Author by Raguvaran)

2.1 Introduction

This literature review is a systematic analysis and compression of books, articles scholarly and other resources related to a particular topic that provide a foundation knowledge of a topic. The study was also designed to identify and review existing critiques of the topic to justify innovation projects by revealing gaps in current research. A review of the literature should offer a critical analysis against current research on a topic and that analysis should directing the objectives of the project. This investigation is necessary provide an overview, summary, and critical evaluation of the work related to project problems and should also add knowledge the whole topic as well as showing how the project will fit in larger studies.

2.2 Research About the Concept of Dustbin Compactor

Diagram 2.1 Dustbin

The word dustbin – poubelle – comes from the man who invented them in France, Eugène Poubelle. He was the Préfet of the Seine from 1883 to 1896 and responsible for much of the day-to-day running of Paris. Collecting and getting rid of refuse was a problem and often people simply left it on the streets. On November 24 1883, he decreed that owners of buildings had to provide not just one, but three wooden containers, lined with metal and with a lid. One was for compostable material, one for

papers and cloth, and one for crockery, glass and oyster shells. Not only did he come up with the idea of a dustbin, but also recycling.

2.2.1 Concept of Dustbin

By the way there is to type of dustbin which dustbin that for outside home and inside home.

Diagram 2.2 Standard outdoor trash bin with handles

Standard outdoor trash bin with handles (diagram 2.2) is one of the most typical outdoor trash bins that people buy are the plastic bins that have handles. These types of bins can usually hold around two large trash bags inside. You'll be able to store your trash in the bin until garbage pickup day rolls around.

Diagram 2.3 Step on garbage trash bins

There are some garbage bins that are made to be as convenient as the indoor models. This step on garbage bin as show on diagram 2.3 is a good example of an outdoor garbage can that has indoor conveniences. You'll be able to step on the lever located at the bottom of the bin to open up the lid.

Diagram 2.4 Swing top garbage bins

Much like the touch-free garbage bin mentioned above, the swing top models are much less commonly used outside than they are indoors. Even so, there are swing top garbage bins that are made to be used outdoors. If you want to put this type of garbage bin outside of your home, then it will work nicely on your patio.

Diagram 2.5 Touch-Free Garbage Bin

For us this kind of recycle bin is also known as SMART DUSTBIN. Touch Free Recycle Bin you may have heard of. One of your friends may have seen one of these trash cans. It is a garbage container that can be opened without touching it with your hands. There are motion sensors that can be used to detect what is in front of someone. Some touch-free models require you to wave over the trash can to open it. In any case, you don't actually have to touch the trash when throwing things away. Keep this kind of trash can in the courtyard or deck.

2.2.2 Concept of Trash Compactor

Diagram 2.6 Trash Compactor

There are various types of trash compactors and the first trash compactors that were invented and used were meant for industrial and commercial uses. The patent for the first trash compactor was done in 1941 by MS Wells. This was meant for crushing the oil cans. Even before that, trash compactors may have been around; however, patents were not filed for them. It was much later in the 1970s that the trash compactors that are used for residential purposes were used. Diagram 2.6 shows an example of a trash compactor.

2.2.3 Types of Trash Compactor

Diagram 2.7 Portable trash compactor

Portable trash compactor (diagram 2.7) have a 'high-tech' design with a built-in cart to help with space and safety considerations. Typically, this style of compactor is placed in a utility area or main trash area. A built-in shopping cart (carrying a sturdy poly bag) collects compacted trash. When the compactor is full, simply roll the cart into the bin area and press a button, and the electric lift mechanism will start (garbage can be empty in the bin). The compactor can compact about 750 gallons of collapsing waste before it is empty (this equates to almost 4 cubic yards).

Diagram 2.8 Hopper compactor

Diagram 2.8, Hopper compactors are great for situations where the trash needs tube loaded into the compactor from a dock versus ground level. They can be used for wet waste or dry waste. With this style of Hopper Compactors, they are tipped onsite with either a Front Load or Rear Load Hauler truck. They can also be adapted for a 17 Yard Roll-Off Container.

Diagram 2.9 Manual trash compactors

STANDARD FEATURES: -

This easy to use product is designed for compacting the contents of 30- and 55-gallon drums. Manual ratcheting mechanism will generate up to 7,000 lbs. of compacting force. Compacting plate direction (up or down) is adjusted with selector levers. Shipped on a 40" x 48" pallet x 20" high, minor assembly required. Ratchet lever is secured in the UP position with locking pin. Includes (2) wheels for tilt-and-roll portability of unit when empty. Rugged steel construction with blue powder coat painted finish.

2.3 Chapter Summary

The summary of this chapter 2 indicate that several studies have been conducted to be a reference to produce a solution to a problem and trigger objectives for this dustbin compactor. Also, there are a few bursts of ideas to fabricate in terms of materials and methods to be used for dustbin compactor. This study can also explain more clearly one by one about materials, methods, concepts and theories. this study was conducted using the internet to get more information related to build this dustbin compactor prototype like 24ikipedia, google, e-library and blog.

CHAPTER 3
METHODOLOGY

(Author by Raguvaran)

3.1 Introduction

What is the methodology? A methodology is an attack plan, especially if the attack plan is iterative. This may be obvious, but the word methodology is related to the word method. In reality, a methodology is a system of methods that are consistently followed. For example, scientists use a variety of methodologies when conducting experiments. The world may seem nothing but chaos and disorder. But in reality, there may be a way to this madness. And sometimes there is a methodology. This chapter contains a lot of information about the entire process and journey of creating our final project. There will be flow chart showing the process of us making the whole project. This flow chart will explain the processes we took. Next, is the Gantt Chart, which will show the actual and planning throughout all the 13 weeks of our final year project journey.

3.2 Project Design

Design Sketching 1:

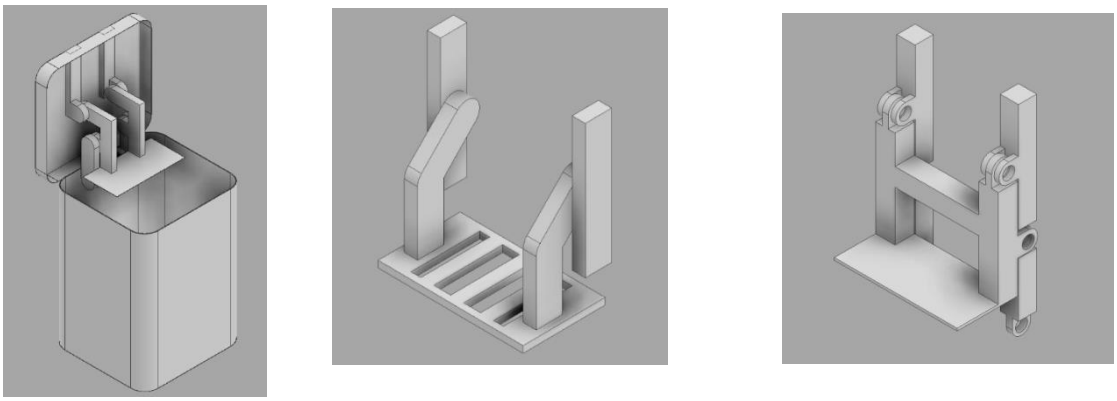
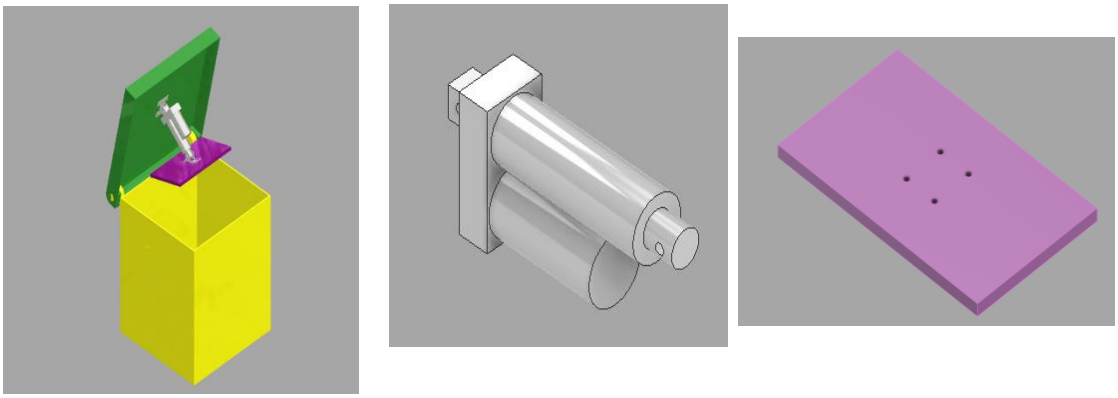


Diagram 3.1 Design Sketch 1

First design is considered to the foldable design which is the compactor will be installed at under the dustbin cover and it would fold whenever we open and close the dustbin cover to compress down the trash.

Design Sketching 2:



Width: 360 mm

Height: 375 mm

Length: 450 mm

Stroke: 50 mm

Speed: 10 mm/s

Load: 700 N

Length: 250 mm

Width: 150 mm

Thickness: 10mm

Diagram 3.2 Design Sketch 2

Design 2 Is considered to do the compactor with a motion system which is by using linear actuator. The linear actuator will compress down the trash when switch is on with 10mm/s speed. It can compress the trash with 700N Force.

Prototype product:

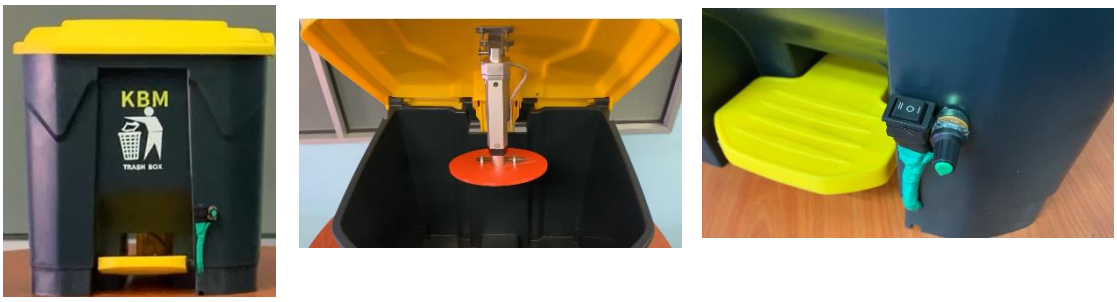


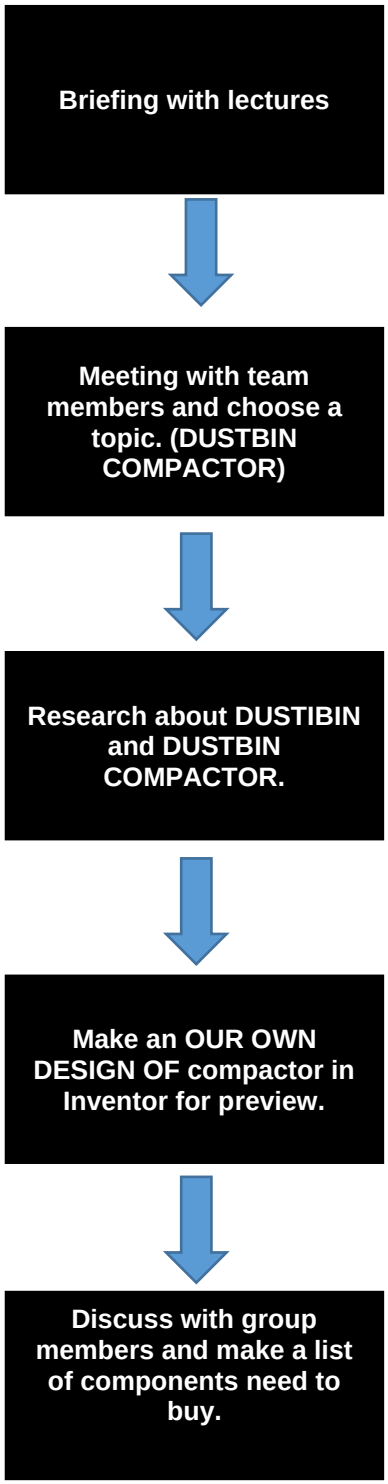
Diagram 3.3 Project Prototype

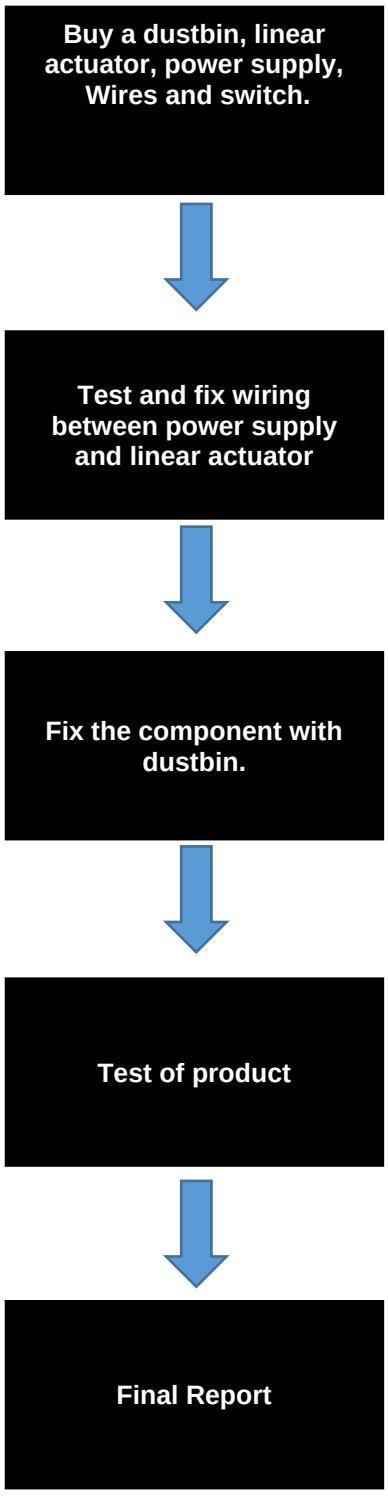
Diagram 3.3 show the finished prototype in this project. This prototype is the final fabrication of this project. The linear actuator will be attached on the lid of the dustbin. The lid will be drill with four holes for the attachment with bolt and nut. The dual directional PWM Speed Controller is put under the dustbin. Then, the switch is stick in front of the dustbin. Finally, the wire cables will be connected from the controller to the linear actuator, switch and the power supply.

3.2.1 Procedure of Project Development

The DUSTIN COMPACTOR is designed and completed by the complete methodology which were our guideline throughout this project.

Flow chart




Buy a dustbin, linear actuator, power supply, Wires and switch.
Test and fix wiring between power supply and linear actuator
Fix the component with dustbin.
Test of product
Final Report

3.2.2 Proposed Materials

1. 30 Litre Step Dustbin

Diagram 3.4

Diagram 3.4 shows the 30-litre step on garbage bin, and it is made from thermoplastic. So, it could screw and hold the linear actuator without any problem.

2. Dual directional PWM Speed Controller.

Diagram 3.5

From diagram 3.5, this material is used because the linear actuator will function with the dc motor support. The speed of a DC motor can be controlled by this dual directional speed controller: By varying the supply voltage.

3. Switch

Diagram 3.6

The switch that is shown in diagram 3.6 is an electrical component that can disconnect or connect the conducting path in an electrical circuit, interrupting the electric current or diverting it from one conductor to another. So, this is used to conduct the speed directional controller.

4. Linear Actuator

Stroke: 50 mm

Speed: 10 mm/s

Load: 700 N

Diagram 3.7

Diagram 3.7 show a linear actuator that creates motion in a straight line, in contrast to the circular motion of a conventional electric motor. This linear actuator will used because the stroke size is compatible with the dustbin length.

5. Power Supply 12V

Diagram 3.8

Diagram 3.8 show a 12V power supply (or 12VDC power supply). This power supply is one of the most common power supplies in use today. ... Linear regulated 12VDC power supplies regulate the output using a dissipative regulating circuit. They are extremely stable, and have very low ripple. So, this material would be the main source of energy to the project.

6. Hand drill

Diagram 3.9

Diagram 3.9, hand drills are used to drill holes or secure two objects together. They can also be used for drilling concrete, steel and other construction materials, depending on the bit used.

7. Base Compactor

Diagram 3.10

Diagram 3.10 show the base compactor that was use to make the prototype. It made using 3D printing. The choice of material for this 3D printing is ABS (**Acrylonitrile Butadiene Styrene)** which is valued for its strength and safety. Diameter for this base compactor is 150 mm and about RM 12 for the cost.

3.5 Method of Data Analysis

The prototype will be compared to the existing manual trash compactor. From the result, we can collect all of the data for each compactor which can made the analysis with the differentiation.

3.7 Chapter Summary

In conclusion, having taken many steps while carrying out the production of the product has been proven form in carrying out this project.

CHAPTER 4

RESULT OF DATA ANALYSIS AND DISCUSSION

(Author by Zulhusni)

4.1 Introduction

This chapter describes the data and research for our project. The results of our study show that the trash compacter has already been created and has been used. Existing trash compacter are more common to be of industrial use than in commercial use. In our study for the project, we gather all the data and information for trash compacter.

4.2 Data Collection and Data Analysis

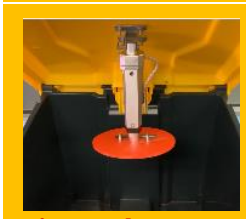
TYPE	SYSTEM OPERATING TYPE	DESIGN CONCEPT	METHOD
 **Linear Actuator DC motor compactor**	Automatic	Designed as an automatic dustbin compactor using linear actuator.	Switch button to attract and detract the linear actuator.
 **Manual press Compactor**	Manual	Designed as a tool to compact the trash by using own strength.	Attach the compactor to the dustbin and press it manually.

Table 4.1 Data Comparison

Table 4.1 show the data comparison between two compactors in this project. We compared the finished prototype with an existing compactor for a final result.

4.4 Discussion

1. Why a linear actuator is use in this project?

Linear actuator is easy to get as it has already been invented. As we are in a lockdown, to make a self-invented compactor will be very difficult. We already have a design for the self-invented, but it proves to be difficult in this time.

2. The target market of this project.

Our prototype is made in small size to make it compatible in commercial use. As for the industry, they already have a large trash compactor that use hydraulic system.

3. Explain the system work in the prototype.

The Dustbin Compactor is considered to do the compactor with a motion system which is by using linear actuator. The linear actuator will compress down the trash when switch is on with 10mm/s speed. It can compress the trash with 700N Force. This shows that the system is more to motorized system. As the result, this motorized system can provide a better outcome than manual system compactor.

4. Dustbin Compactor of operating system.

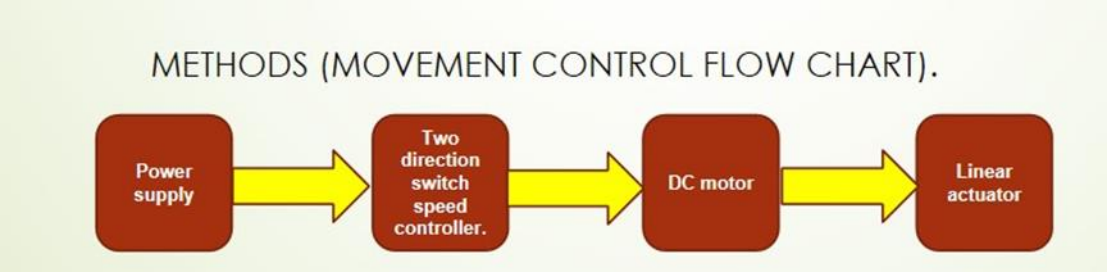


Diagram 4.1

The diagram 4.1 shows the operating system of the trash compactor. Where when you switch on the power button automatically the power supply start reacts toward to electricity and then dc motor start to function and finally the linear actuator will start to moving down by following the speed adjusted.

4.4 Chapter Summary

In conclusion, our objective for the project still hasn't been achieved yet. The project still in phase of testing and fix wiring for our compacter. After that, when the testing finally finished, we will start fabricating our product to examine if the compacter can compact the trash in the dustbin.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

(Author by Zulhusni)

5.1 Introduction

The aim of this chapter is to present the conclusions drawn from the results of the analysis of the questionnaires, interviews and focus group discussions and then make recommendations for further research.

5.2 Conclusion

The aim in this project is to design a prototype for a trash compactor. Using the design produce, we develop a prototype for the product. After the prototype is finish, the system uses in the prototype will be test out and compared with the existing manual trash compactor. Data will be record and analyse at the end of the project. This compactor will make the existing dustbin prevent bacteria. Then, it can increase the quality of the dustbin that we have today.

5.3 Recommendation

1. Redesign the compactor for it to compatible with Smart Dustbin.
2. Apply Arduino UNO ultrasonic sensor for code execution, use for sensing the quantity of trash in the dustbin then compact automatically.
3. Redesign the prototype using a portable concept.

5.4 Project limitation

- Due to the size of base compactor, the whole area in the dustbin cannot be cover when compact.
- The linear actuator max force makes it difficult to compact a harder object.

- Due to the design of this compactor, it is not suitable to use it outside door.

5.5 Summary

In conclusion, this project may not be a common topic, it can be used to improve our everyday live. While the project still needs an adjustment, using the recommendation given, the project will have a variety of product that make a huge development in waste managing.

REFERENCES

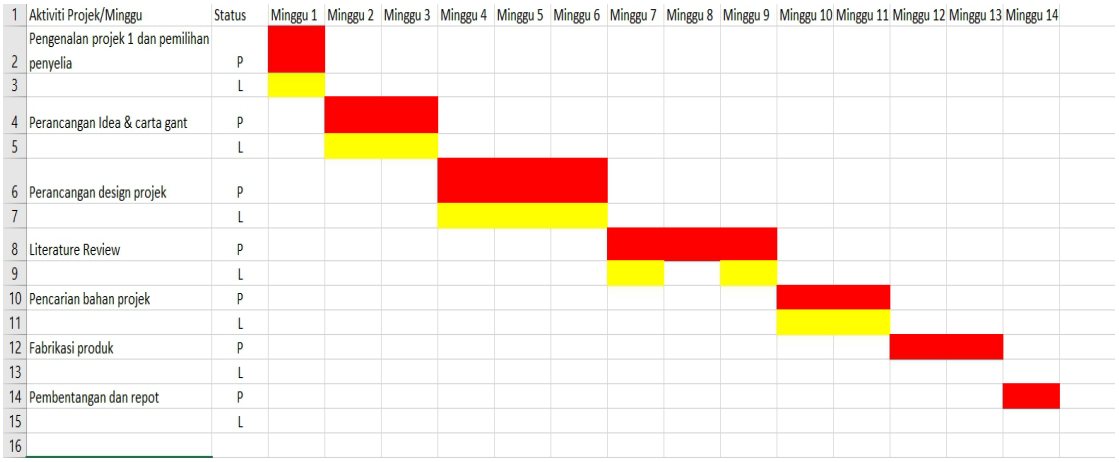
1. https://www.google.com/search?q=wooden+plank&rlz=1C1CHZN_enMY939MY939&hl=en&sxsrf=ALeKk02KzjIaKcuTpXEYmzueQzkrkpCz0A:1624374505735&source=lnms&tbm=isch&sa=X&ved=2ahUKEwizy5XLwqvxAhXkzTgGHaVfA1UQ_AUoAXoECAIQAw&biw=1920&bih=969#imgrc=QUrk5HYs1S4HrM

2. https://www.firgelliauto.com/blogs/news/how-does-a-linear-actuator-work

3. https://www.thomasnet.com/articles/instruments-controls/types-of-motor-controllers-and-drives/

ATTACHEMENT

GANT CHART PROJECT 1



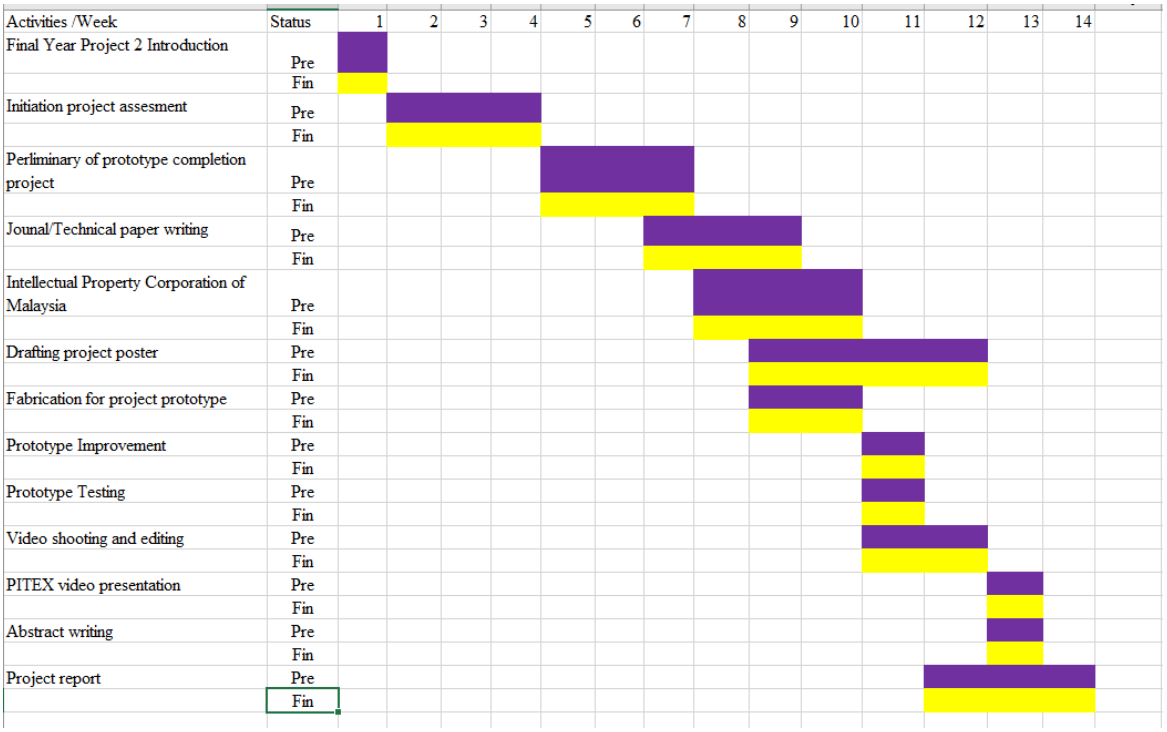
	Aktiviti Projek/Minggu	Status	Minggu 1	Minggu 2	Minggu 3	Minggu 4	Minggu 5	Minggu 6	Minggu 7	Minggu 8	Minggu 9	Minggu 10	Minggu 11	Minggu 12	Minggu 13	Minggu 14
1																
2	Pengenalan projek 1 dan pemilihan penyelia	P														
3		L														
4	Perancangan Idea & carta gant	P														
5		L														
6	Perancangan design projek	P														
7		L														
8	Literature Review	P														
9		L														
10	Pencarian bahan projek	P														
11		L														
12	Fabrikasi produk	P														
13		L														
14	Pembentangan dan repot	P														
15		L														
16																

PREPARATION

PLANNING

Section 1.01 **This Gantt Chart shows from group formation the first week of marchuntil the fourteenth week of June 2021**

GANT CHART PROJECT 2

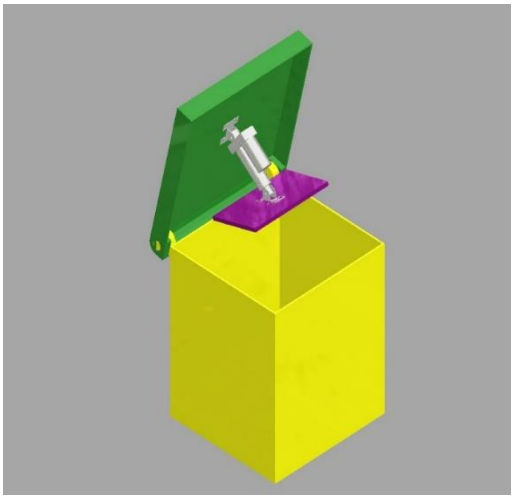


Activities /Week	Status	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Final Year Project 2 Introduction	Pre														
	Fin														
Initiation project assesment	Pre														
	Fin														
Perliminary of prototype completion project	Pre														
	Fin														
Jounal/Technical paper writing	Pre														
	Fin														
Intellectual Property Corporation of Malaysia	Pre														
	Fin														
Drafting project poster	Pre														
	Fin														
Fabrication for project prototype	Pre														
	Fin														
Prototype Improvement	Pre														
	Fin														
Prototype Testing	Pre														
	Fin														
Video shooting and editing	Pre														
	Fin														
PITEX video presentation	Pre														
	Fin														
Abstract writing	Pre														
	Fin														
Project report	Pre														
	Fin														

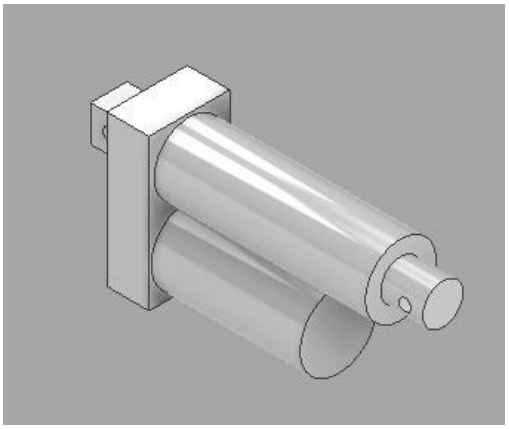
Preparation

Finish

INVENTOR SKETCH

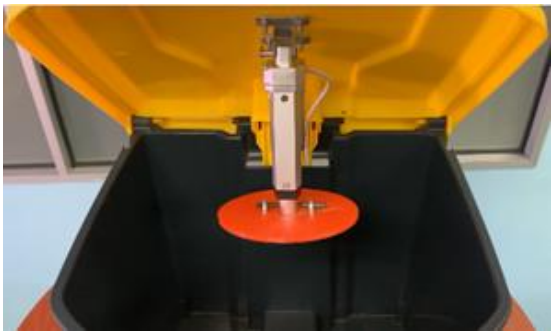


Width: 360 mm
Height: 375 mm
Length: 450 mm



Stroke: 50 mm
Speed: 10 mm/s
Load: 700 N

PROJECT PROTOTYPE



PROJECT COST

NO	MATERIALS	QUANTITY	PRICE RM
1	DUSTBIN 30LITRE	1	61.75
2	SWITCH + CONTROLLER	1	20
3	POWER SUPPLY 12V	1	60
4	LINEAR ACTUATOR	1	110
TOTAL			251.75

SELLING PRICE	**RM 280**
PROFIT BUDGET	**RM280 – RM 251.75 = RM 28.25**

SURVEY FORM

DUSTBIN COMPACTER

Borang kaji selidik

NAMA

Your answer

JANTINA

- LELAKI
- PEREMPUAN

UMUR

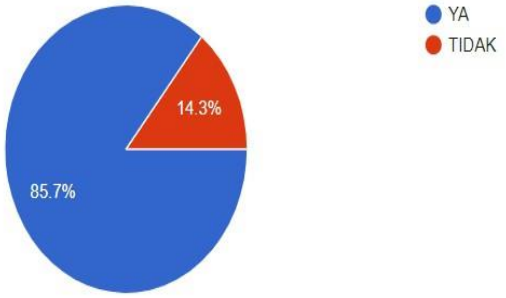
Your answer

JENIS TEMPAT TINGGAL

- TAMAN PERUMAHAN
- PANGSAPURI
- RUMAT FLAT

SURVEY RESULTS

7 responses



Adakah tong sampah anda mengeluarkan bau?

7 responses