



POLITEKNIK BANTING SELANGOR

AUTOMATIC FLOUR SIFTER

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POLITEKNIK BANTING SELANGOR

AUTOMATIC FLOUR SIFTER

This report is submitted to the Department of Mechanical Engineering as part of the requirements for the award of the Diploma in Mechanical Engineering

DEPARTMENT OF MECHANICAL ENGINEERING

SEASON II 2022/2023

DECLARATION OF AUTHENTICITY AND PROPERTY RIGHTS

AUTOMATIC FLOUR SIFTER

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2) I acknowledge that the 'Project Above' and the intellectual property contained therein are the result of my original work/invention, without taking or copying any intellectual property from third parties.

3) In order to fulfil the requirements for the award of a Diploma in Mechanical Engineering to me, I hereby agree to transfer ownership of the "Project" interlock property to "the Polytechnic."

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APPERICIATION

This appreciation goes to my supervisor Sir Mohd Hazwan Bin Mohamad Norli for helping us a lot. He also shared a lot of examples and information and gave a moral contribution to us to complete the project.

And many thanks to my parents for providing me with continuous emotional support. This is due to the fact that I was able to finish this task with the assistance of those who are concerned about my emotions. They either directly or indirectly helped me greatly by being by my side.

Not to mention a big thank you to my friends for helping me with this endeavor and sharing their knowledge. They helped me in terms of science and physical assistance. And I appreciate the help I receive from everyone, whether they help me directly or indirectly.

ABSTRACT

The use of flour as an ingredient is common in many food industries. Therefore, the best quality of the product is of the utmost importance when sifting flour. Automatic flour sifter is mainly used in integrated processing enterprises such as flour production lines, food processing plants, bakeries, boutique pastry processing enterprises, dried noodles, steamed buns, steamed buns, dumplings and other integrated processing enterprises. The main purpose is to prevent foreign matter from entering the next process and cause food safety problems. Whether you are a small artisan bakery or a large industrial flour mill, the commercial flour sifter can be used to safely remove contaminants and lumps from flour, sifting large quantities of any type of flour, including hard and soft wheat, semolina, corn flour, etc. The fully enclosed structure avoids flying powder, eliminates the problem of dust in the air, and manual interaction is pollution-free. The machine can be disassembled quickly without any tools and is easy to clean, thus increasing productivity and avoiding any chance of cross-contamination between batches. The compact size meets industrial and commercial needs with minimal headroom and floor space and can fit comfortably into any production line.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Flour is commonly used as a component in several food industries. As a result, when sifting flour, the best product quality is critical. Automatic flour sifters are mostly used by integrated processing enterprises. The purpose of the innovation is to produce a flour sifter with a rigidly attached screen that may vibrate to fast sift flour through it.

Another goal is to create a flour sifter of this type in which the screen is vibrated by the armature of a magnet equipped with an electric make and break device, allowing the screen to be vibrated swiftly and furiously. A flour sifter is a machine that removes agglomeration, foreign debris, and impurities from flour. Impurity content is typically around 5%. It is ideal for screening big amounts of powder. It is utilized in food manufacturers and flour manufacturing lines for fine safety screening and inspection screening of flour. Improve material quality prior to packaging.

1.2 PROJECT BACKGROUND

Flour is widely employed in a variety of food-related sectors. As a result, when sifting flour, the best product quality is critical. Integrated processing firms are the most common users of automatic flour sifters. The concept is to design a flour sifter with an easily adjustable screen that vibrates to quickly sift flour through it. Another ambition is to develop a flour sifter with a similar construction, but with the screen vibrated by the magnet's armature via an electric make-and-break mechanism, allowing for fast, strong vibrations. A flour sifter is used automatically to purify flour of contaminants, foreign particles, and agglomeration. It is great for screening large amounts of powder. It is utilized in food manufacturers and flour manufacturing lines for fine safety screening and inspection screening of flour. Before packaging, raise the material and product quality.

1.3 PROBLEM STATEMENT

Basic flour sifter still uses human power and can only filter flour in small quantities, so this is tiring and slows down the work. So we made an innovation that makes it easier to filter flour even in large quantities while also being able to advance production.

1.4 PROJECT OBJECTIVE

- To automate the sifting of flour, decreasing the requirement for manual labor and enhancing the baking process's efficiency.
- To eliminate any lumps or debris from the flour, resulting in a smooth and uniform texture and improved product quality.

1.5 PROJECT SCOPE

Automatic flour sifters are versatile tools that can be used by home bakers, and individuals with physical limitations. They offer convenience, consistency, and efficiency in the flour sifting process, improving the quality of baked goods.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

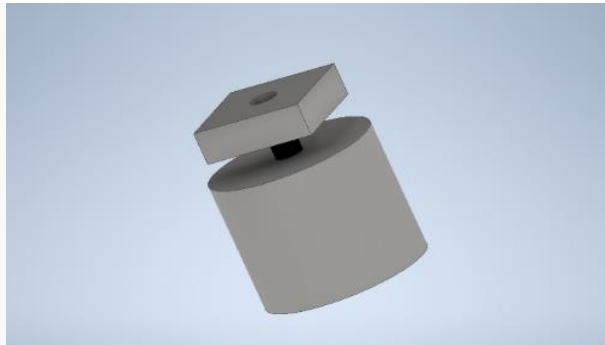
When compared to other fields of food processing and kitchen equipment, automatic flour sifters are a somewhat obscure topic in the literature. There are, however, some sites that address the concept, functionality, and benefits of automatic flour sifters. Here are a few ideas to get you started:

Automatic flour sifters are frequently lauded for their capacity to save time and labor during the baking process. They have the ability to sift huge amounts of flour fast and consistently, which is especially useful in industrial baking operations when time and production efficiency are critical.

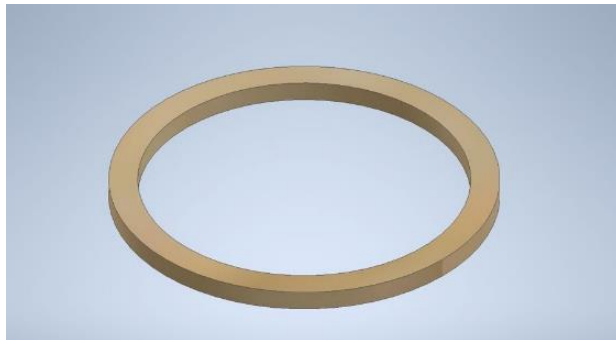
Ergonomics and user-friendliness: The ergonomic design and user-friendliness of automatic flour sifters may be discussed in some literature. This can include things like ease of use, changeable settings, and safety elements that improve the user's overall experience.

A variety of software programs are available that can be used to make 3D designs and are frequently created to produce 3D printing. There are examples outside for Inventor, Autodesk 123, Catia, and programs like these. Every 3D design program available has a unique mix of advantages and disadvantages. Designers may build their designs more quickly with the use of 3D design tools. The ideas of 3D design software are depicted in:

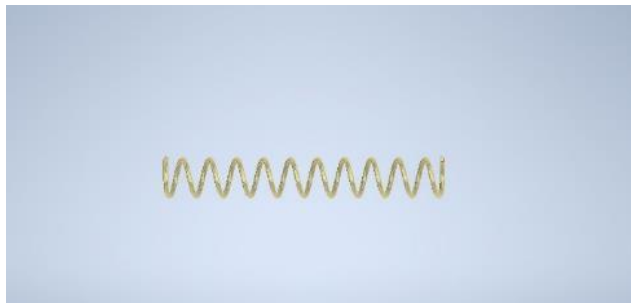
2.2 BASIC 3D SOFTWARE



Part 1



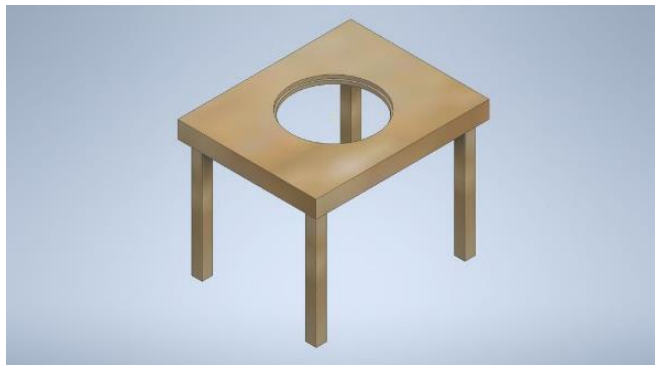
Part 2



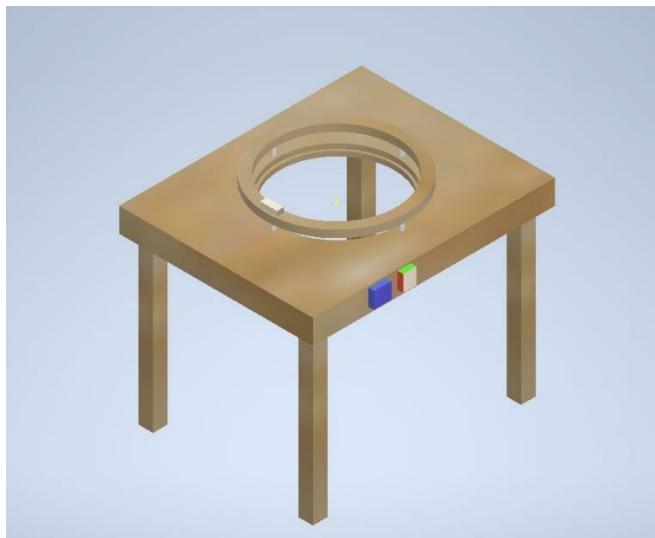
Part 3



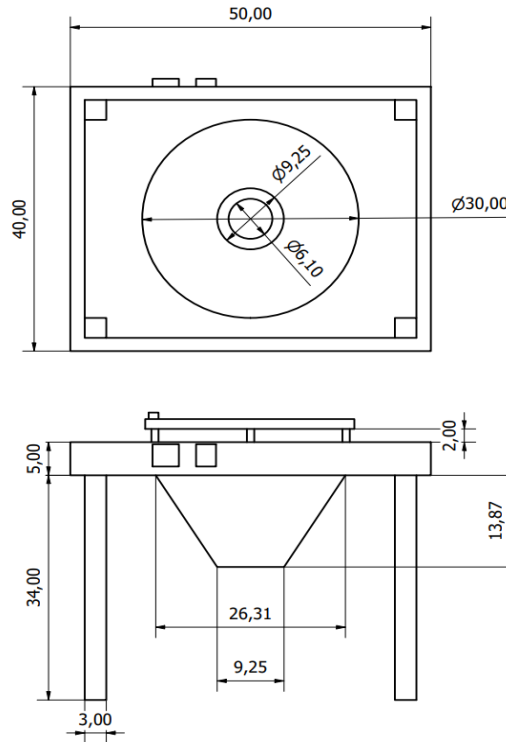
Part 4



Part 5



Assembly



Assembly Part

Here are the fundamentals of 3D design software that is available. After examining each available piece of software, we decided on "Autodesk Inventor" because it has more features and is simpler to use. Additionally, to accelerate 3D design, have an established base.

rapid sketching. This software includes simple-to-understand design fundamentals, making it perfect for beginners. Because of this, a person can easily finish the task successfully. However, this software has drawbacks. For instance, it lacks a "Toolbar" that AutoCAD offers. AutoCAD has more features than competing software, as is well known. But because the 'Tool' in AutoCAD is more detailed, the software is typically utilized by novices.

CHAPTER 3

METHODOLOGY/DESIGN

3.1 INTRODUCTION

The project must adhere to the timeline indicated by the Gantt chart and process flow chart to demonstrate the proper process flow and achieve the intended result. This project's essential phase occurs during the designing phase. The priority is to design the size of the frame and the wheel, particularly for the stairs. Material selection is a step in the design process for any physical thing in this project. The major objective of material selection in the context of product design is to minimize costs while achieving product performance goals. The qualities and costs of potential materials serve as the starting point for a methodical selection of the optimum material for a certain application.

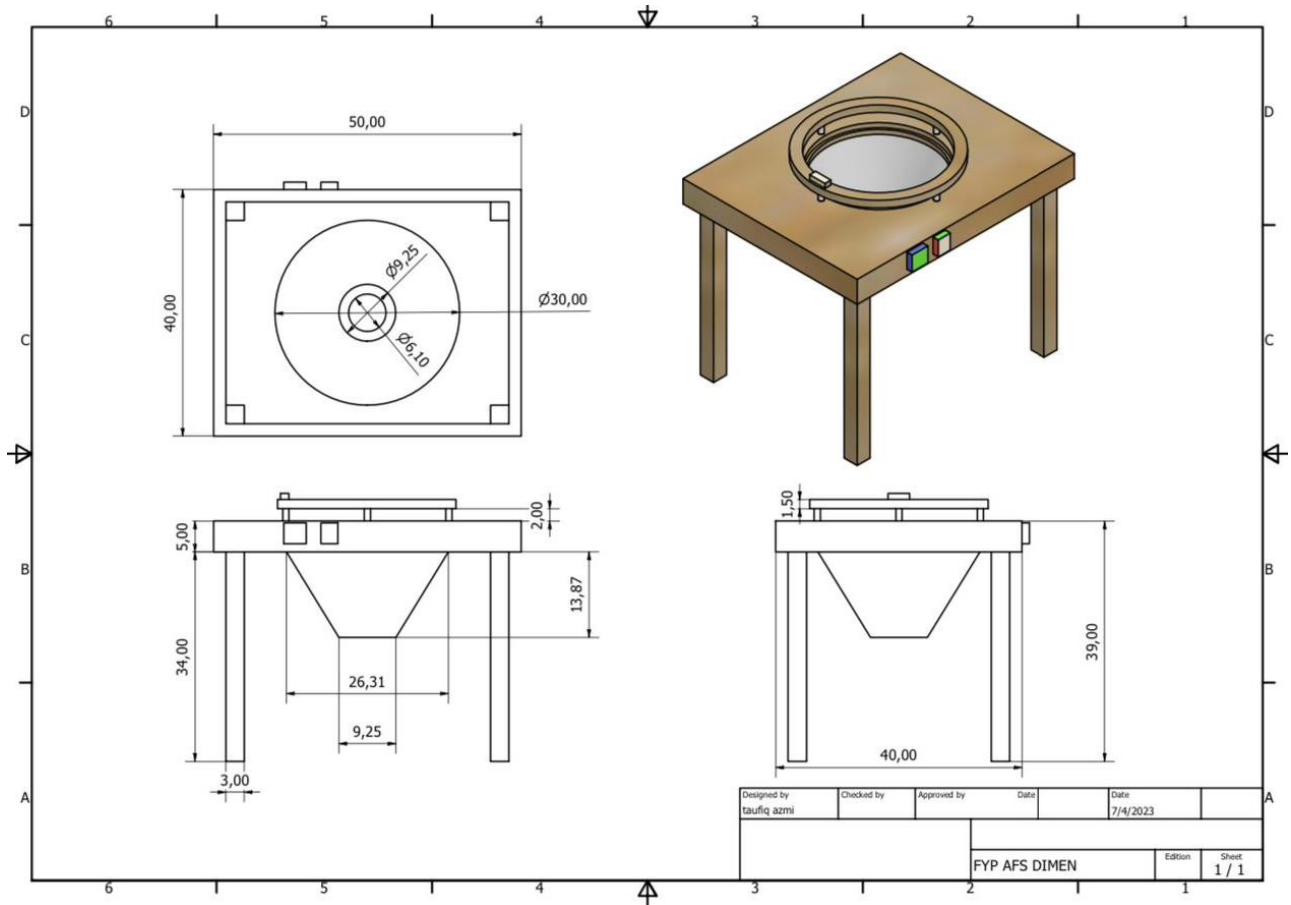
3.2 RESEARCH DESIGN

The function of the sifter was out of date if you want to compare today. It is very tiring to use and can only filter small quantities at a time. This will slow down the work if you want to produce something in large quantities.

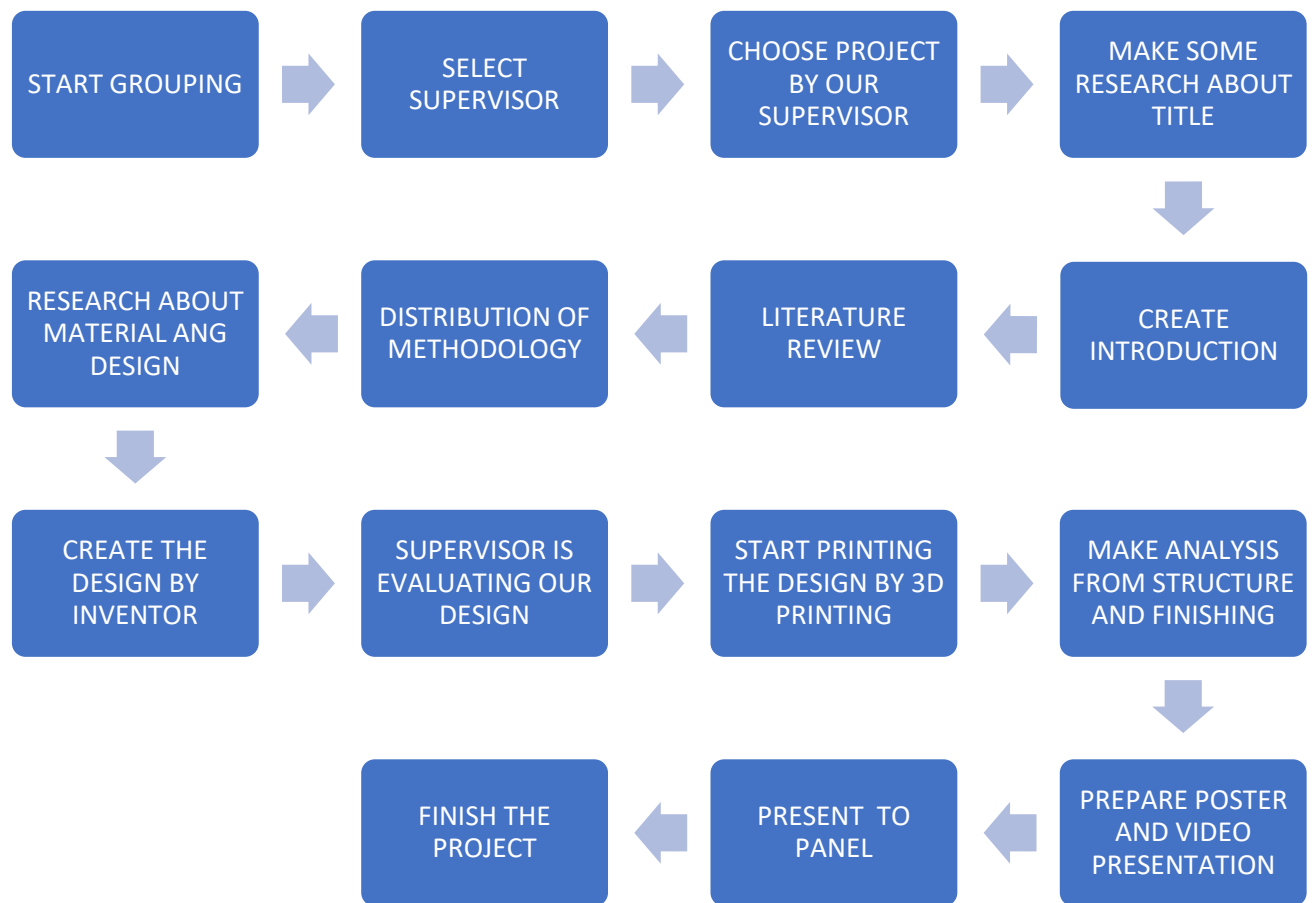


Example flour sifter on the market

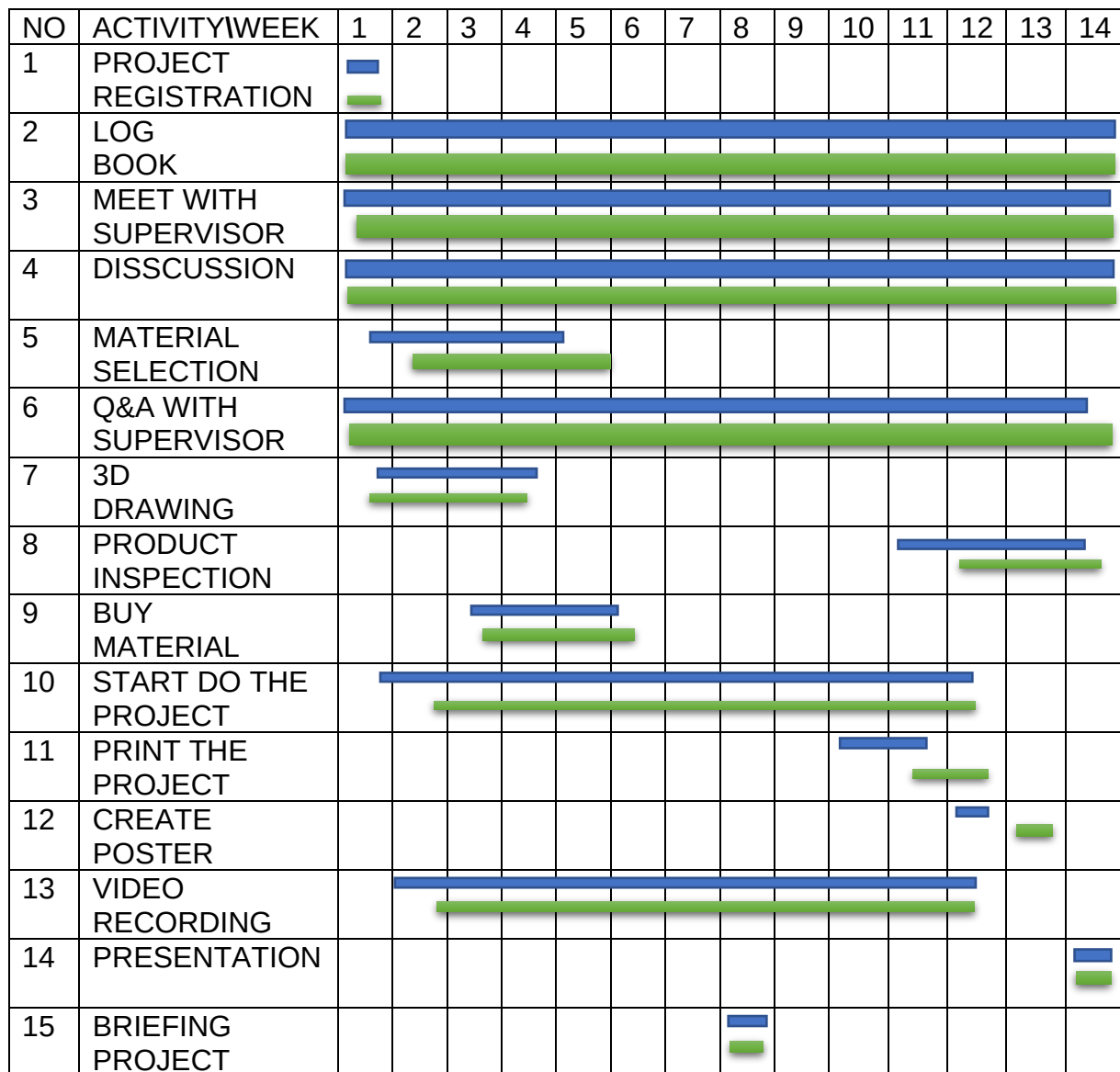
So, we designed a new automatic flour filter with a function that can solve the problem at hand.



3.3 FLOW CHART



3.4 GANTT CHART PROJECT



3.5 WORK MATERIAL/ MACHINE/ EQUIPMENT

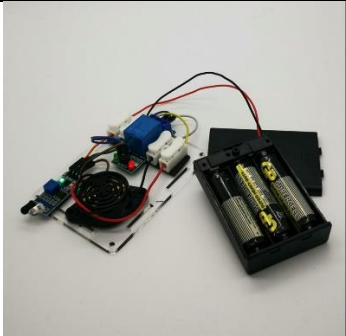
To start a project, the first step needs to be considered is the materials, machines and equipment's needed in this project. The explanation of materials, machines and equipment used are as below.

3.5.1 WORK MATERIAL

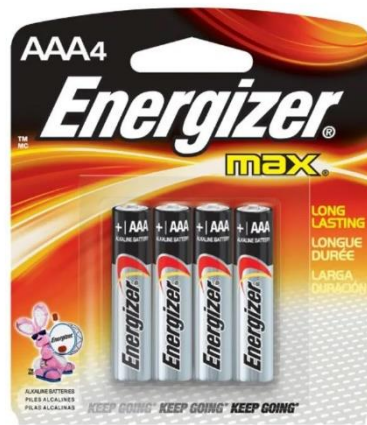
After making some discussion and survey, these are the raw materials that are needed to build up this project as shown in Table 3.5.1.

NO	PICTURE	DESCRIPTION
1.Pallet wood		It is employed in the construction of the flour shifter's body and frame.
2. Strainer (Flour)		To mix, aerate, and separate dry components like flour in order to separate and break up clumps.

3. Nail		The wood was joined together with the help of the nails.
4.Wood glue		used to firmly bind wood components together.
5.Vibrator motor 2V-5V Dc		A small, noiseless coreless DC motor is utilized to vibrate and alert users of the signal's reception.
6.4 X AAA Batery holder		To safely and securely hold cells in place as power is transferred from the batteries to the gadget.

7. IR Sensor		Output is activated by means of an electrical sensor and relay.
8.Jumper wire		Utilizing a breadboard to transmit electrical signals to any location.
9.Screw		The screw's functions are to secure the two workpieces together and to connect them.
10.Double tape		Any pressure-sensitive tape that has an adhesive coating on both sides is referred to as double-sided tape.

11. Battery AAA



small electronics with a reliable power source and minimal power requirements.

3.5.2 WORK MACHINE

NO	PICTURE	DESCRIPTION
1. Handsaw Machine		Utilized to mold wood into various forms.
2. Hand Drilling Machine		a compact, hand-operated drilling device that looks like a breast drill and is similar to one.
3. Grinder		A portable power tool called an angle grinder can be used for several manufacturing tasks, such as cutting, grinding, deburring, finishing, and polishing.

4. Butane gas frame gun		Butane is a hydrocarbon that can be quickly liquefied and is a highly flammable, colorless, and odorless gas.
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3.5.3 EQUIPMENT

NO	PICTURE	DESCRIPTION
1. Measuring Tape		A flexible tool for measuring length is a measuring tape.
2. L-Shape ruler		To square your work and measure exact 90-degree angles and straight lines, pick an L-Square ruler. Perfect for designing, cutting, and measuring patterns.

3. Screwdriver		A type of hand tool used for inserting and removing screws is the screwdriver.
4. Hammer		A hammer is a tool, typically a hand tool, that has a weighted "head" attached to a long handle that can be swung to strike a nail.
5. Steel ruler		used as cutting guides if they are hard enough and as guides for drawing lines.
6. Pencil		For stenography or taking notes, it is primarily utilized for artistic sketching and drawing. Its advantages include ease of use and the ability to erase anything you've created with an eraser.

7. Wire cutter		Cutting copper, brass, iron, aluminum, and steel wire is a popular use for wire cutters.
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3.5.4 SAFETY EQUIPMENT

NO	PICTURE	DESCRIPTION
1.Safety goggles		Keep your eyes clean and safe from risks like wood dust.
2.Safety boots		Keep your feet safe from any workplace dangers or barriers that could cause a foot-related harm.

3.Safety jacket		enables them to continue to be vigilant for any workers who may be nearby and in immediate danger of being struck by vehicles or industrial machinery.
4.Gloves		Gloves assist in maintaining clean hands and reduce your exposure to potentially contagious microorganisms.

3.6 COST ESTIMATION

No.	Item	Quantity	Cost per item (RM)	Total (RM)
1	Spring mild steel	3	13.00	39.00
2	Vibrator motor 2V-5V DC	1	5.50	5.50
3	Sensor set	1	34.00	34.00
4	Strainer flour 24.5cm	1	8.50	8.50
5	Screw	16	0.20	3.20
6	Wooden glue	1	6.50	6.50
7	Wood pallet L10inchx T1inchx W4inch	20	10.00	200.00
8	Plastic funnel 3.2cm	1	7.80	7.80
Total (RM)				304.50

3.7 DATA GATHERING METHOD

Through online questionnaires, in-person interviews, and field observations, we gather data for Automatic flour sifter. an online survey first. We use a tool like Google Forms to build an online survey. A survey was developed to gather data regarding the usage, preferences, and experiences of wheel hoe users. Field notes are the following. To gather field information about the use of wheel hoes, visit public gardens, farms or gardening festivals. Keep an eye out for how individuals utilize wheel hoes, the jobs they use them for, and any issues they encounter. Take notes and make a note of any illuminating or fascinating remarks. The image below shows an example question from our Google Form survey.

The image shows a Google Form survey with four questions. Questions 1 and 2 are on the left, and questions 3 and 4 are on the right. Each question is in a separate box with a light purple border.

1. On a scale of 1 to 5, how satisfied are you with the performance of the automatic flour sifter in sifting flour?

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

2. Did the automatic flour sifter meet your expectations in terms of efficiency and ease of use?

☐ Yes

☐ Not sure

☐ No

3. How often do you use the automatic flour sifter?

☐ Everyday

☐ Once a week

☐ Once a month

☐ Never

4. Have you experienced any technical issues with the automatic flour sifter? If yes, please provide details.

☐ No

☐ Yes

☐ Lain-lain: _____

5. How easy was it to clean and maintain the automatic flour sifter?

☐ Very easy

☐ Easy

☐ Hard

6. Did the automatic flour sifter produce consistent and fine flour texture?

☐ Yes

☐ No

☐ Maybe

7. Did the automatic flour sifter meet your expectations in terms of noise level during operation?

☐ Yes

☐ No

☐ Maybe

8. How would you rate the durability and quality of the automatic flour sifter? Rate 1 to 5

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

9. Did automatic flour sifter looks futuristic in nowadays?

☐ Ya

☐ Not sure

☐ No

10. Would you recommend the automatic flour sifter to others?

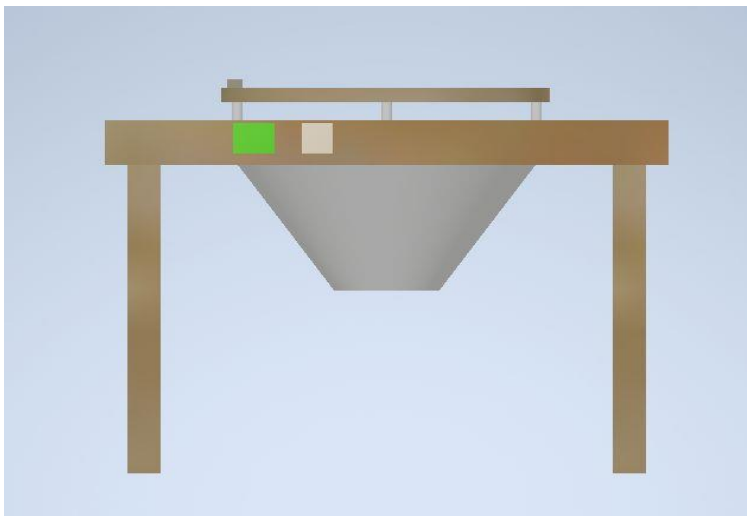
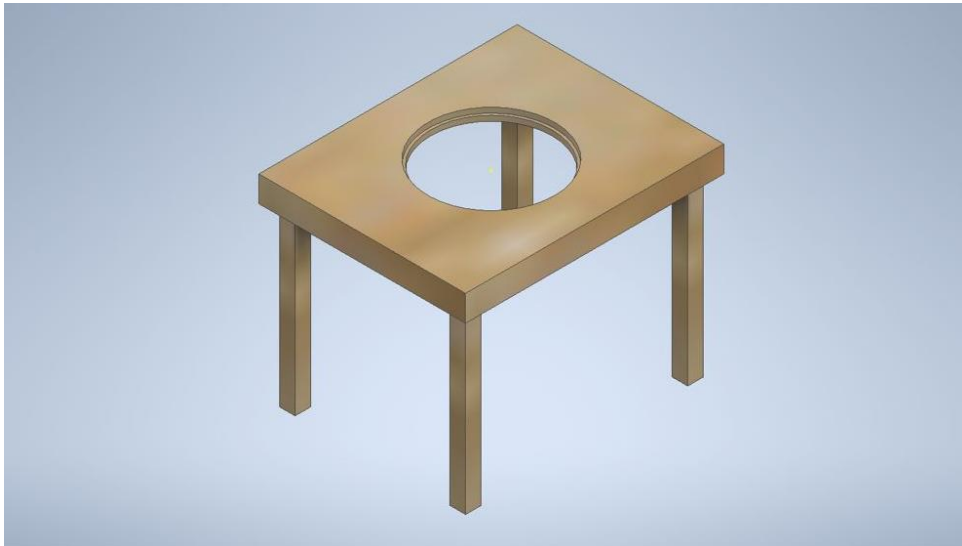
☐ Yes

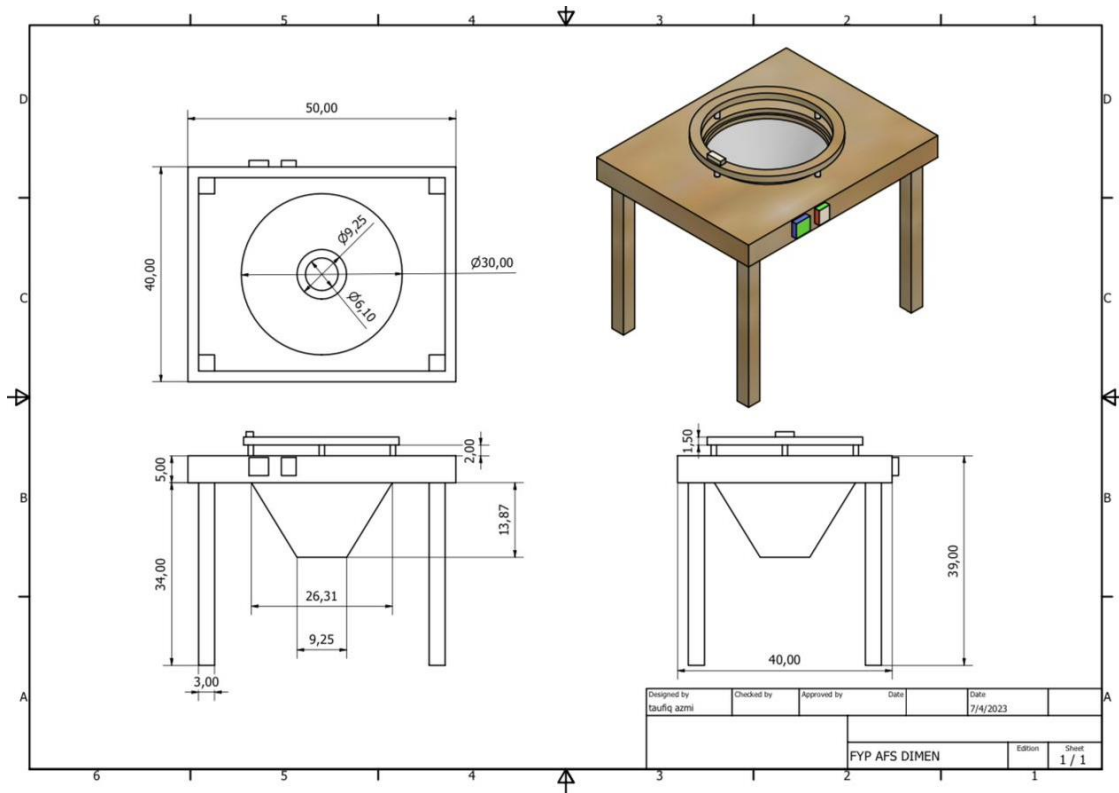
☐ NO

☐ Not sure

Here is a summary of how to use Google Forms to collect information regarding Automatic flour sifter. Make a survey using Google Forms with the specific objective of learning more about Automatic flour sifter. Form questions can ask about the participants' level of expertise, usage frequency, work done, favorite brand or model, key characteristics, challenges faced, and suggestions for improvement. Distribute a personalized version of the form via email, social media, gardening discussion boards, or in conjunction with gardening organizations.

3.8 PROJECT DESIGN





3.9 LIST OF MATERIAL

SPRING MILD STEEL

Spring mild steel is used to help shake and shake the strainer so that the flour falls faster and more evenly.

VIBRATOR MOTOR DC

This vibrator motor produces strong vibration, suitable for massage machine and etc. You may simply use it by direct connect to power supply.

SENSOR SET

A motion sensor detects movement in an area by utilizing one or more technologies. When a sensor detects motion, it sends a signal to the vibrator motor DC.

STRAINER FLOUR

To separate and break up clumps by mixing, aerating, and separating dry components such as flour.

SCREW

Screws are primarily used to secure wooden materials together. complete with shanks to prevent wood splint, twin threads for effective drive, and tips that eliminate the need for pre-drilled holes.

WOODEN GLUE

Wooden glues are ideal for use with porous materials like wood. Wood glue adhesive is specially formulated to penetrate wood fibers, resulting in glue bonds that are stronger than the wood itself. Wooden glues make strong joints and keep wood looking good.

WOOD PALLET

We use pallet wood because it is easy to cut and design. One of the most notable advantages of wooden pallets is their high level of friction on virtually all surfaces.

PLASTIC FUNNEL

To channel flour from strainer to tray. Apart from that it is used so that the flour does not get spread when it goes down.

CHAPTER 4

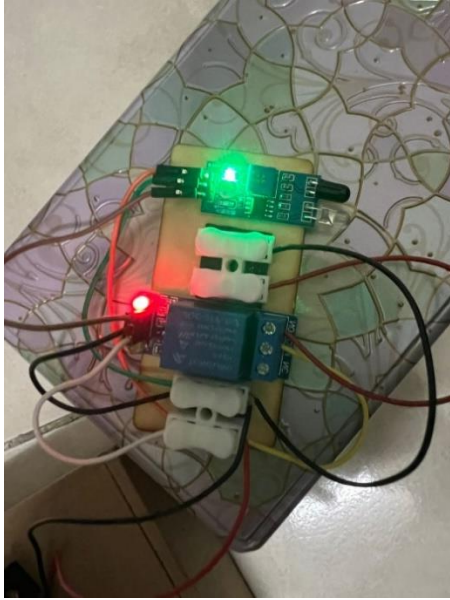
RESULT AND DISCUSSIONS

4.1 RESULT OF PROJECT

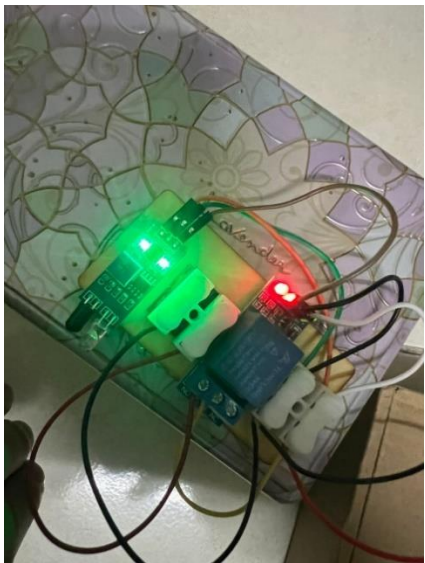
The following figures are the snapshots of result or output of prototype to turn on the vibrator when it hits the sensor then the vibrator will shake the flour filter.



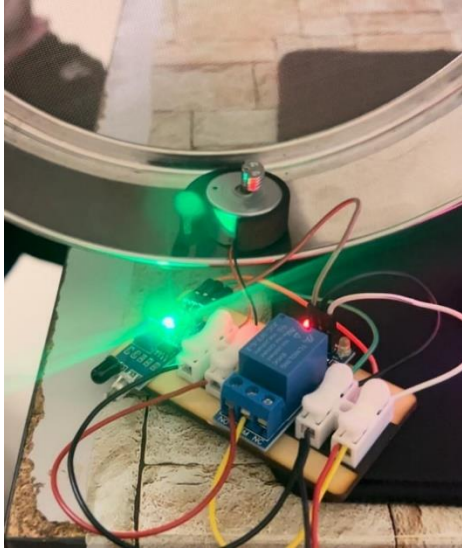
4.1.1 Place 4 triple A batteries



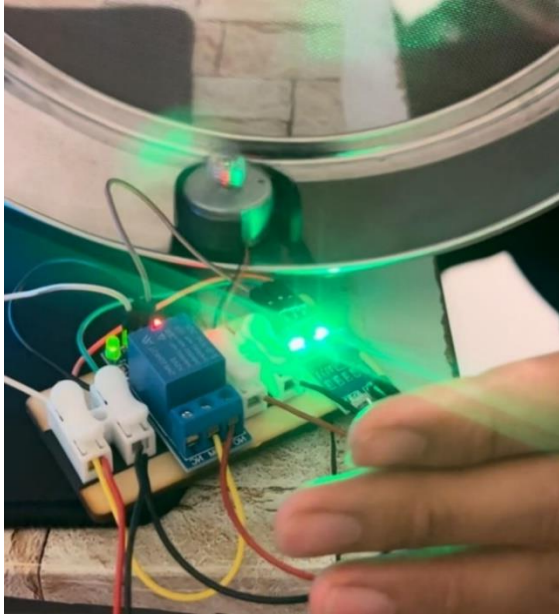
4.1.2 If the light is on then the sensor is running and when the green sensor only one is lit it means it has not hit any object



4.1.3 When there are two green sensors that light up, it means that the sensor is hit by an object.



4.1.4 The picture above shows that the sensor does not touch the object, so the vibrator does not turn on.



4.1.5 The picture above shows that the sensor hits an object and the vibrator turns on



4.1.6 To test, sieve the flour.



4.1.7 Place your hand on the sensor to activate the vibrator to shake the flour to sift the flour.



4.1.8 The flour will fall through the funnel, so it doesn't get messy

4.2 DATA COLLECTION METHOD

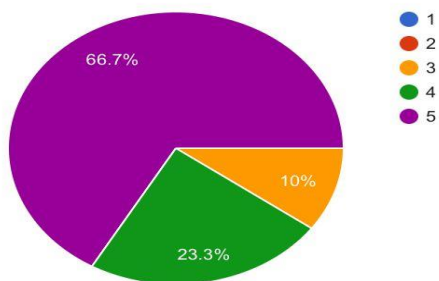
We'd like to get feedback from everyone on what they think about our project, the automatic flour sifter. **This is a question we ask.**

4.2.1 Pie Chart for respondents

1. On a scale of 1 to 5, how satisfied are you with the performance of the automatic flour sifter in sifting flour?

30 jawapan

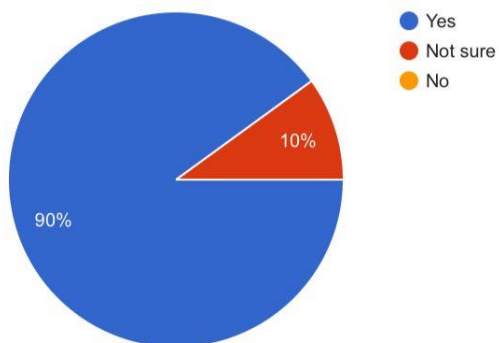
 Salin



2. Did the automatic flour sifter meet your expectations in terms of efficiency and ease of use?

30 jawapan

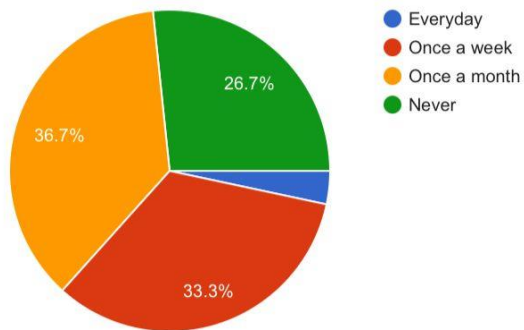
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3. How often do you use the automatic flour sifter?



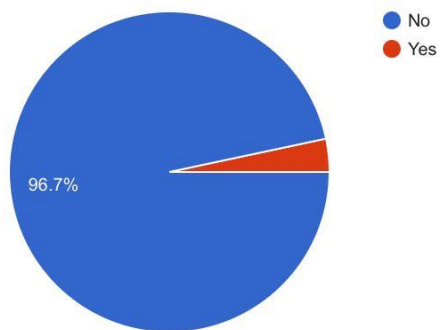
30 jawapan



4. Have you experienced any technical issues with the automatic flour sifter? If yes, please provide details.



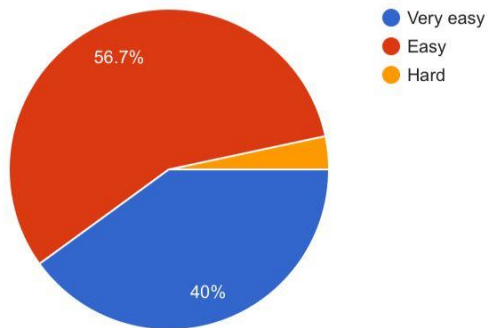
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5. How easy was it to clean and maintain the automatic flour sifter?



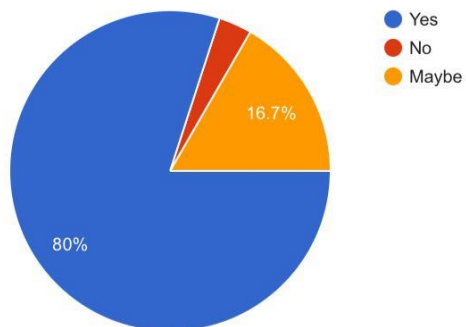
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6. Did the automatic flour sifter produce consistent and fine flour texture?



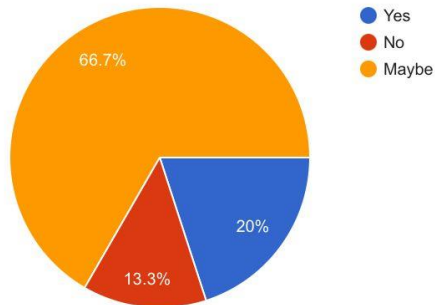
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7. Did the automatic flour sifter meet your expectations in terms of noise level during operation?

 Salin

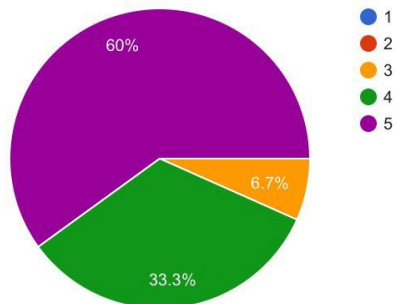
30 jawapan



8. How would you rate the durability and quality of the automatic flour sifter? Rate 1 to 5

 Salin

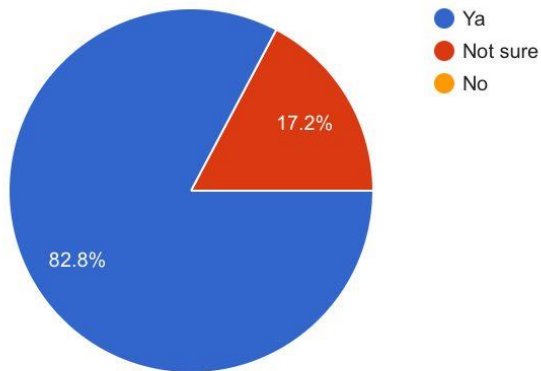
30 jawapan



9. Did automatic flour sifter looks futuristic in nowadays?



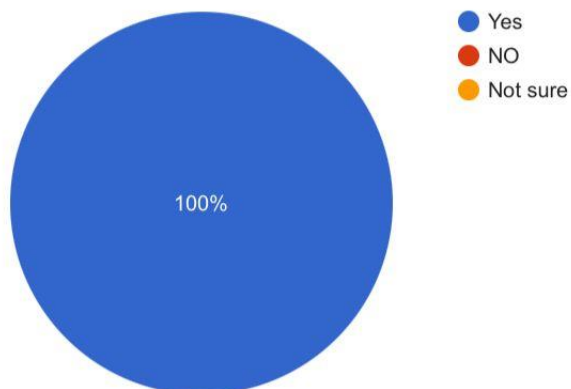
29 jawapan



10. Would you recommend the automatic flour sifter to others?



30 jawapan



Every response we received was positive and helpful in carrying out our project, the automatic flour sifter.

4.3 IMPACT OF APPLICATION OF THE PROJECT

The automatic flour sifter project can have several impacts, both in terms of efficiency and convenience in the food processing industry. Here are some potential impacts of applying an automatic flour sifter:

1. **Increased Efficiency:** Manual flour sifting can be time-consuming and labour-intensive, especially in large-scale food production settings. By automating the process with an automatic flour sifter, the efficiency of flour sifting can be significantly increased. This can lead to higher productivity and reduced labour costs.
2. **Consistent Quality:** Flour sifting is crucial for achieving consistent quality in baked goods and other food products. Uneven or inadequate sifting can result in lumps, uneven texture, and inconsistent baking results. An automatic flour sifter can ensure uniform sifting, resulting in consistent quality across batches.
3. **Improved Food Safety:** Contaminants, such as debris or foreign objects, can inadvertently end up in bags or containers of flour. The automatic flour sifter can help detect and remove such contaminants, enhancing food safety and reducing the risk of customer complaints or health hazards.

4. Cost Savings: In manual flour sifting, some flour may be wasted or lost during the process. An automatic flour sifter can minimize flour wastage by efficiently sifting and separating impurities, ensuring maximum utilization of the flour and reducing overall costs for food producers.

5. Ergonomic Benefits: Manual flour sifting can strain the arms and hands of workers, particularly when dealing with large quantities of flour. Automation through an automatic flour sifter can alleviate these physical strains, contributing to improved worker safety and well-being.

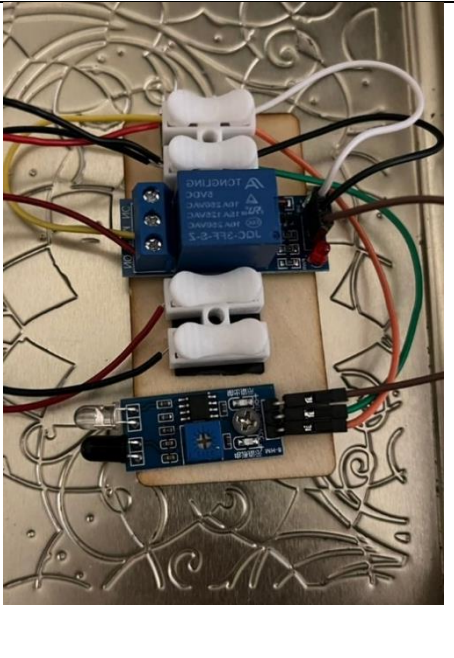
6. Time Savings: Time is a critical factor in food production, and any process that can save time can have significant impacts on overall productivity. The automatic flour sifter can quickly sift large quantities of flour, allowing food manufacturers to streamline their operations and meet tight production schedules.

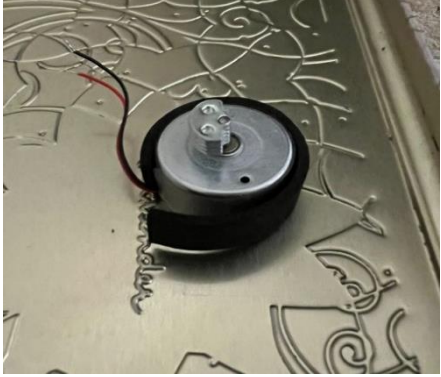
7. Scalability: As demand for food products increases, manufacturers often need to scale up their production capacity. An automatic flour sifter can easily adapt to higher production volumes, making it an ideal solution for scaling up food processing operations without compromising efficiency or quality.

8. Enhanced Productivity: By automating the flour sifting process, workers can focus on other tasks, such as ingredient preparation, quality control, or packaging. This can lead to increased overall productivity within the food processing facility.

Overall, the application of an automatic flour sifter project can bring numerous benefits to the food processing industry, including increased efficiency, consistent quality, improved food safety, cost savings, ergonomic benefits, time savings, scalability, and enhanced productivity.

4.4 PRODUCT FEATURES SPECIFICATION

	- Battery triple A - 4 Battery used - Battery holder
	- IR Sensor module

	- Vibrator motor - 2V-5V DC
	- Spring - 5 CM
	- Table - Wide 52 CM - Height 37 CM

	- Strainer flour - 24.5 CM - Material Stainless steel
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4.5 DISCUSSION

Final year projects in mechanical engineering offer students an opportunity to apply the knowledge and skills they have acquired throughout their academic journey to real-world engineering problems. These projects can be diverse and cover various subfields within mechanical engineering. We completed all of the tasks in this project report by planning, and we also discussed this report extensively with our supervisor. We struggled a lot and faced many challenges to complete this report between week 1 and week 14. We ran out of project ideas in the first few weeks. So, I did a lot of research on Google and went through all of the previous project 1 assessments and model build ups. In addition, we enquired extensively with the supervisor about the best project to undertake. after we asked the supervisor, the supervisor told us to show each group's ideas and after we show the result, we also requested that the supervisor select an appropriate project from our idea group. Then the supervisor chose the automatic flour sifter because it was easy to build this project and then our group agreed with supervisor for making this project.

Next, after we get the idea, we search on the internet and ask with baker about how good automatic flour sifter to use for bakery, and we also target for small bakery because our project is not too big and cannot accommodate a lot of flour to be refined. Next, we also want to know more about this project, so we make data collection use by question in google form and we get good and positive respond from people for our project automatic flour sifter.

Based on the result, Everything went smoothly with all of the wood cutting and spring combinations. The issue is that there are many lessons and challenges to getting the sensor to work when we wire up the sensor and the dcv vibrator. Fortunately, we were able to get the sensor to work and move the DCV vibrator. We also tested the flour to be filtered using an automatic flour sifter, and everything went smoothly.

CHAPTER 5

CONCLUSION

5.1 CONCLUSION

Finally, the automatic flour sifter is a game changer that greatly simplifies flour sifting. Because of its innovative design and advanced technology, it has several advantages over traditional manual sifters.

First and foremost, an automatic flour sifter saves time and effort. It eliminates the need to shake or tap the sifter manually to sift the flour, which can be a time-consuming and exhausting task. The automated mechanism efficiently sifts the flour, ensuring a consistent and uniform texture free of lumps.

Second, using a flour sifter automatically improves precision and accuracy. It has adjustable settings for fine-tuning the fineness of the sifted flour. This feature is especially useful for baking, as different recipes require different textures of flour.

Finally, the automatic flour sifter is a durable item. It's made of high-quality materials that will last a long time. The automated mechanism is designed to withstand repeated use while still functioning.

In conclusion, the automatic flour sifter is a game changer in the kitchen, offering time savings, precise sifting capabilities, improved hygiene, user-friendly operation, and durability. It has transformed the way flour is sifted since its introduction to the market, making it an indispensable tool for bakers and cooking enthusiasts alike.

5.2 SUGGESTION

To improve the automatic flour sifter product, consider implementing the following suggestions:

1. **Noise Reduction:** Reduce the amount of noise produced during operation. Implement noise-reducing materials or mechanisms to ensure a more peaceful cooking environment, especially for those who value a peaceful cooking environment.
2. **Ergonomic Design:** Improve the product's ergonomic design by taking into account factors such as comfortable grip handles, lightweight materials, and intuitive controls. This increases user comfort and convenience.
3. **Connectivity and Smart Features:** Include smart features like Wi-Fi or Bluetooth connectivity to allow the flour sifter to be controlled and monitored remotely via a mobile app. This improves the product's convenience and versatility.
4. **Increased Durability:** Strengthen the product's construction and durability to ensure it can withstand heavy and prolonged use. This includes the use of long-lasting materials and the reinforcement of critical components.
5. **Self-Cleaning Functionality:** Include a self-cleaning feature to make cleaning easier after use. This could include a mechanism to remove excess flour or a detachable, easily washable component.

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3. <https://youtube.com/shorts/e1FMvcQAsE8?feature=share>
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5. <https://ir.uitm.edu.my/id/eprint/71097/1/71097.pdf>

APPENDICES

1 Questionnaire Form

2 List Of Respondent

Class Homepage

This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

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