



JABATAN KEJURUTERAAN MEKANIKAL

(DIPLOMA MECHANICAL ENGINEERING)

REPORT PROJECT 1

RICE WASHER

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PENGHARGAAN

Kami merakamkan penghargaan ikhlas kepada penyelia projek, (nama) dia atas bimbingan dan perbincangan yang diberi sepanjang tempoh projek ini dilaksanakan.

Di samping itu, kami ingin berterima kasih kepada pensyarah yang telah memberi tunjuk ajar dalam menyiapkan projek ini sepanjang tempoh yang diberikan. Pihak Politeknik Sultan Salahuddin Abdul Aziz Shah juga tidak ketinggalan kerana memberikan pelajar untuk memperkembangkan idea-idea yang ada pada setiap pelajar bagi menjadikan sesuatu inovasi yang berguna pada masa akan datang.

Tidak lupa juga pada kawan-kawan yang banyak membantu kami secara langsung ataupun tidak langsung ketika kami menyiapkan idea projek sehinggalah dalam penulisan laporan ini.

Sekian Terima Kasih

ABSTRACT

Washing rice is a routine before cooking rice. Difficulty washing can be seen wanting to wash on a large scale such as food operators, catering, restaurants and others. This project to facilitate their work in terms of time, energy and also the cleanliness of rice. It is also equipped with furniture crutch rubber protector so that it does not move the arrangement of the work process done, it is also light and easy to store. This tool uses manpower with only pressure to rotate the blade where the washing process can be carried out. After taking the exam, the scope can also accommodate a capacity of 5 kilograms of rice. In this way, it can save time and manpower of catering workers across the country. The design and process are also similar to the concept of a versatile mop.

ABSTRAK

Mencuci beras adalah satu rutin sebelum memasak nasi. Kesukaran mencuci yang dapat dilihat apabila ingin mencuci dalam skala yang besar seperti pengusaha makanan, katering, restoran dan lain-lain lagi. Projek ini bertujuan bagi memudahkan kerja-kerja mereka dari segi masa, tenaga dan juga tahap kebersihan beras. Ia juga dilengkapi dengan pelindung getah tongkat perabot padanya agar tidak bergerak ketika proses kerja dilakukan, ia juga ringan dan mudah untuk disimpan. Alat ini menggunakan tenaga manusia dengan hanya menekan untuk memutarlah bilah didalamnya supaya proses cucian dapat dijalankan. Setelah melakukan ujian, skopnya juga dapat menampung kapasiti beras seberat 5 kilogram. Dengan cara ini, ianya dapat menjimatkan masa dan tenaga pekerja katering di seluruh dunia. Reka bentuk dan prosesnya juga serupa dengan konsep mop serba boleh.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Many kitchen utensils have been created to make it easier for consumer to prepare the ingredients before cooking. We saw a few special tool for specific uses like knife had multi-purpose to cut vegetable, meat, fish and other else. However, we found that there were still no special equipment for washing rice. We had some research that most of food operators, caterer, restaurant and else use rice in a large scale and take a quite long time process. Also, some of them still using the old way which is wash using hand and filter basket and sometime wash it not well clean and properly. So we invented and recommend a rice washer to food operators, caterer, restaurant and else to use it which is this invention could help them reduce the time taken of processing, save the worker energy, facilitate the transfer of rice and also it clean as well.

1.2 PROBLEM STATEMENT

Usually, rice has become the main food for Malaysians because we eat rice every day no matter the time, Malaysians also if they do not eat rice in a day will experience something wrong. Until before we eat rice, we must wash and wash it several times until clean before cooking. Sometimes washing is not clean at all. Usually when washing rice and rinsing, water is not completely removed and leaves water that is not clean. The problem is that it is difficult for food entrepreneurs to wash rice on a large scale and ensure that it is completely clean. Some caterers take a long time to process the rice washing, also use more energy up to 2 or 3 people to mix the rice to be clean.

1.3 OBJECTIVE

The objective of this project is to design tools that can help users make work easier. To ensure this tool is user-friendly and produces affordable product prices for users. In addition, the objectives of this project also help food entrepreneurs reduce labor, time and can increase the cost of profit. Next, create a type of appliance that can ensure the cleanliness of the rice during the washing process. The resulting design has a lid that covers the entire rice so that the rice that is washed or to be lifted is not easily spilled and scattered.

1.4 NOVELTY

This innovation project is inspired by "mop spinner 360". We were also inspired to create a process of this product like a rotating washing machine for cleaning.

1.5 SCOPE AND LIMITATION

The purpose of scope study for this project as follows below:

Scope

- i. covers the food industry sector especially to caterers, restaurants and other similar entrepreneurs

Limitation

- i. The limit for our products is to be able to accommodate a load of rice not exceeding 5kg, which is equivalent to a pinch of rice

1.6 CHAPTER SUMMARY

Presents an introduction to the report. In this chapter, introduction, problem statement, objective, novelty, scope and limitation are described clearly.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Here are the types of materials meet characteristics needed of this product. As stated, this product must meet the objective characteristics in order to solve the problems experienced compared to existing product. Here will also be stated the materials selected to produce the project. Each material we choose is best to meet the pre-determined condition. We choose in terms of reasonable cost, good security conditions and design that can meet what we have created.

2.2 COMPONENTS AND MATERIALS

2.2.1 360 spinning mop



This is the spinning mop that squeeze water from the mop and do not require hand energy to squeeze it. We choose this item because we want to take the spinning component to be placed on our project.

2.2.2 Anti-slip leg



This item is made from rubber and it's really functional to stop any slippery movement. We use this on our project as the project legs.

2.2.3 PVC netting



PVC netting is potential applications in other production processes can trigger ideas for potential innovation. What one industry may see as a reinforcement netting, another would use it as a separation element. The functionality lies in the eyes of the product developer and we have the ability to deliver the expected performance. We also used this net to prevent the rice from coming out.

2.2.4 16'' fan blade



This fan blade are easy to get and find at any supermarket, hardware and Mr DIY. We use this blade as our main component for our project which is function as component that spin to stir up and clean the rice.

2.2.5 8mm washer



A **washer** is a thin plate (typically disk-shaped, but sometimes square) with a hole (typically in the middle) that is normally used to distribute the load of a threaded fastener, such as a bolt or nut. Other uses are as a spacer, spring (Belleville washer, wave washer), wear pad, preload indicating device, locking device, and to reduce vibration (rubber washer). Washers often have an outer diameter (OD) about twice their inner diameter (ID), but this can vary quite widely.

2.2.6 Gal roofing bolt and nut



Roofing bolts, also known as mushroom head bolts, are a type of steel fastener. They have a wide head with a low profile making them suitable for bolting thin materials together in many applications. They are supplied with square nuts and have a zinc plated finish.

2.2.7 Hex bolt



Hex bolts (six sided heads) are the industry standard for fasteners with forged heads. ASTM A307 grade A bolts, all SAE hex bolts, and several other common specifications require a standard (finished) hex head. For specifications such as A307 grade B, A325 and A490 that require a heavy hex pattern, refer to dimensional tolerances for heavy hex bolts or structural bolts

Hex bolts can be used for many different applications that include fastening [wood](#), [steel](#), and other construction materials for projects such as docks, bridges, highway structures, and buildings. Hex bolts with forged heads are also commonly used as headed anchor bolts.

2.2.8 3'' U bolt



Hex bolts can be used for many different applications that include fastening wood, steel, and other construction materials for projects such as docks, bridges, highway structures, and buildings. Hex bolts with forged heads are also commonly used as headed anchor bolts.

2.2.9 Basket



Basket Series - JT4928

ART NO	JT4928
SIZE	D480 x H180 mm
PACKING	1 ctn x 12 pcs
M3	0.15
EXPORT	L493 x W493 x H610
CTN	mm

This basket are our main item to use because it used to put the rice inside it.

2.3 CHAPTER SUMMARY

Provide a comprehensive literature review on material and component, the functional of each material and their strength, the size and position of each material that be placed.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This project to solve the problem that had been faced by food entrepreneurs in washing the rice. This project are using man power to produce kinetic energy which will move the blade to clean the rice. This project is complete with rubber crutch leg for more stability and not slippery. This also complete with comfortable U bolt holder that easy to lift and carry. The special part of this project that make it simple is this project no need to rinse and change water every time a wash is made. This project design also suitable to the fan blade which is round and this concept similar to washing machine and spinning mop.

3.2 FLOW CHART OF THE PROJECT

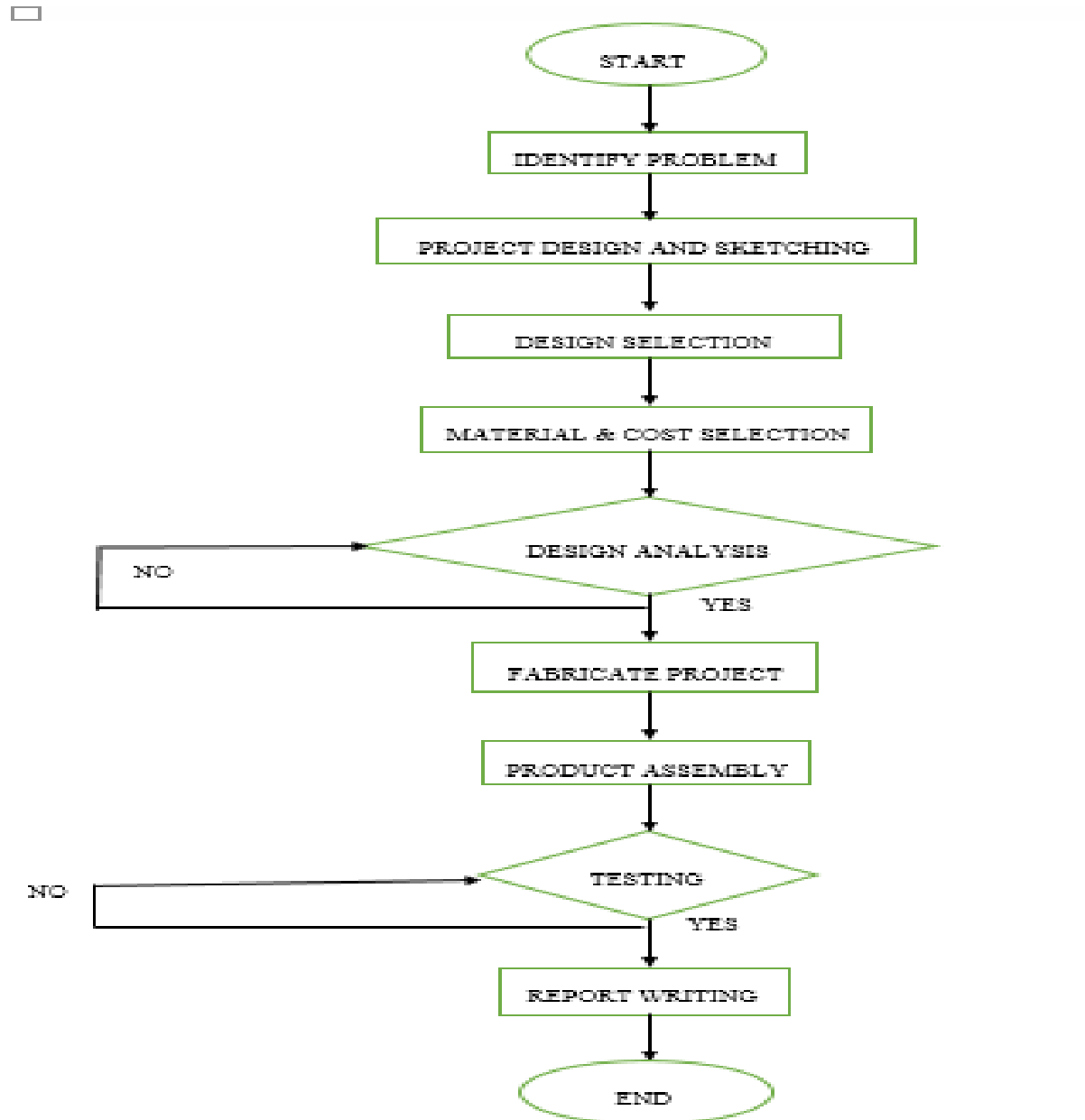


Figure 3.0: Project Flow Chart

3.3 DESIGN

The structure was designed so it can hold specific weight. It also can avoid from spilled. We also design this project suitable to its working principle.

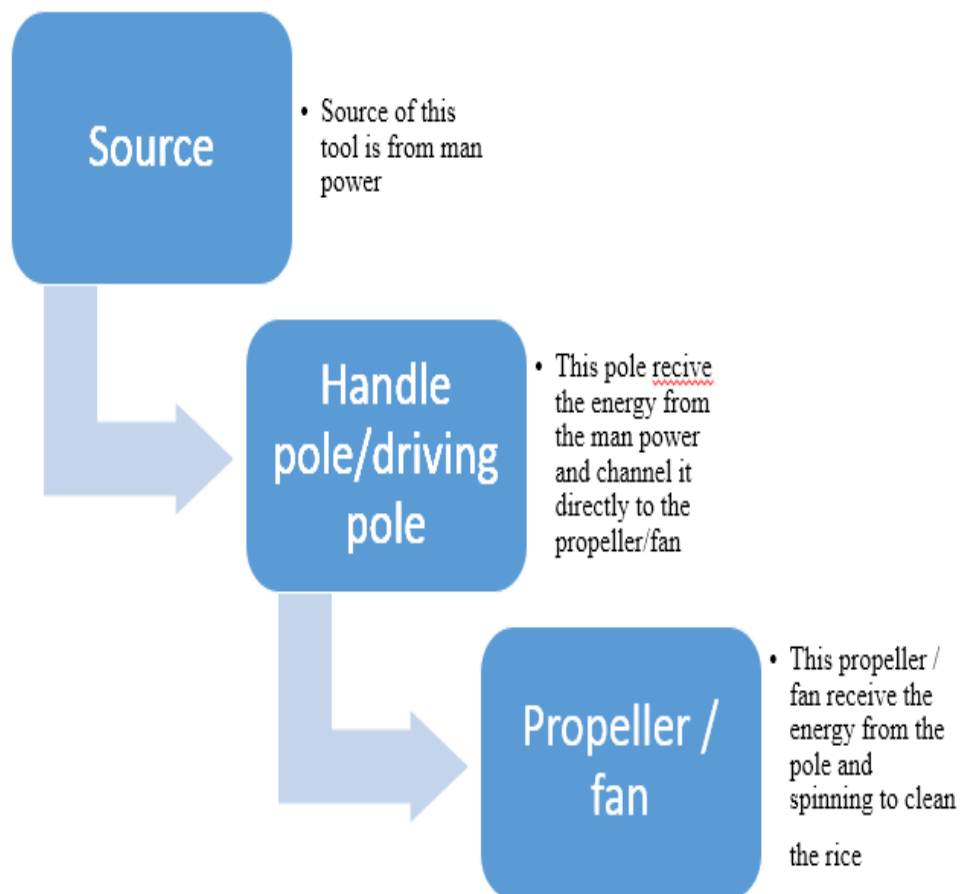


Figure 3.1: Design Process

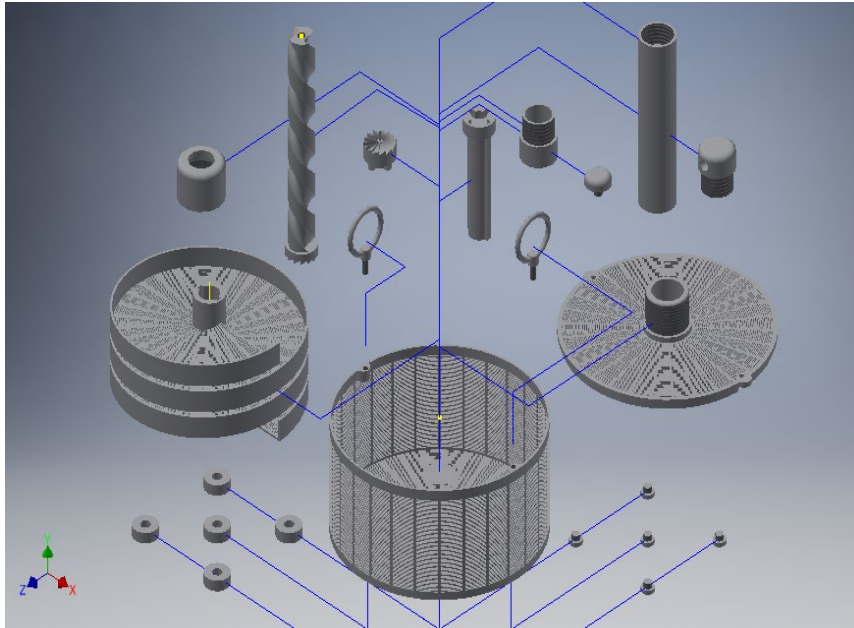


Figure 3.2: Explode Design

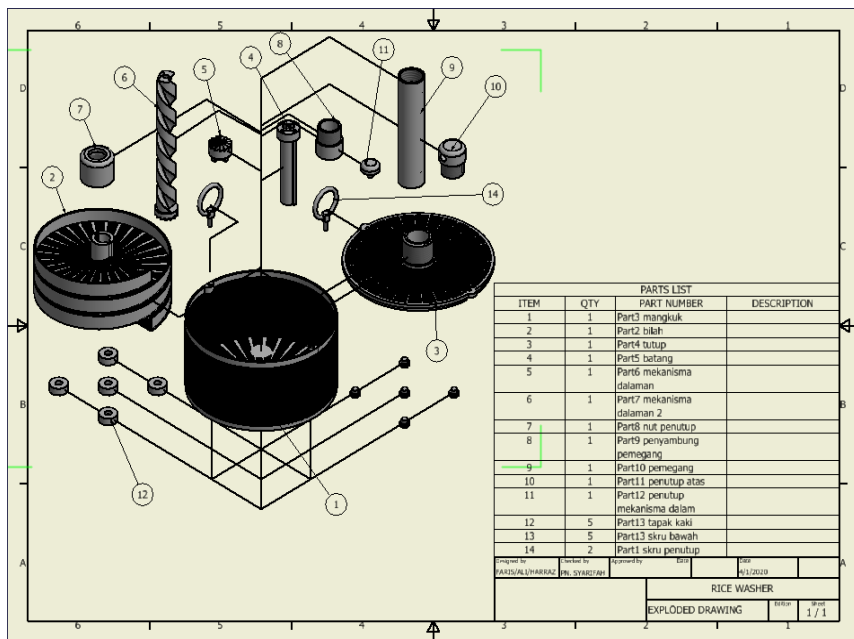


Figure 3.3: Drawing Design

3.4 DESIGN ANALYSIS

The design analysis was conducted on the strength of the product to ensure it really strong enough to support the weight and also can function it well. We also have done some research which is observation and questions to random people especially to students and food entrepreneur.

There are list of question observation:

1. Gender

Male () Female ()

2. Age

16 – 18 () 19-21 () 22-24 () 25 above ()

3. Do you had wash rice before?

Yes () No ()

4. Do you think the rice that you wash not clean as well?

Yes () No ()

5. Do you think this rice washer would easier your work?

Yes () No ()

6. Are you sure your hand are clean as well?

Yes () No ()

7. Do you think this rice washer would save your time in washing it?

Yes () No ()

8. Do you agree using rice washer would be more hygiene from the bacteria?

Yes () No ()

9. Is this product difficult to carry?

Yes () No ()

10. What is your opinion about this product?

3.5 FABRICATION

3.5.1 MEASURING

Measuring is important to start a project. We measure the height and the area of the basket so that we could make a calculation to fit the fan blade and the net in it. Also the measurement we take to make custom component that connect the pole, blade and the basket. The height of blade anyway been measured and calculated so that it can spinning and cleaning as well.

3.5.2 CUTTING

Cutting process we make to PVC pipe to make some component to fit the fan blade with the pole and the basket and also fit to the suitable height followed as we calculate. We also cutting a net that already measured followed the area, height and length of the basket. Hole cutting is also made on the basket cover so that the poles can be inserted through it.

3.5.3 MAKING COMPONENT

Custom made component been made to fit and connect the pole shaft, blade fan and the body (basket). We made this custom component because there are no way to fit in it. Other than that, this custom component also used to make the blade higher from the base.

3.5.4 ASSEMBLY

This is the final step of fabrication process which is assembly all the parts and components that had been measured and confirmed their position and measurement. This assembly process have been made from below to top because it is easier to assemble. We also used some screw and nut to assemble this project and also some hot glue gun and cable tight to paste the net to the projects body.

3.6 TESTING

This is the final step before consider it done and complete the project. This testing been done intended to determine the weaknesses and which part to be improve. So far throughout the test run, we found this project been running smoothly but also we found out the limitation of this project cannot exceed the limit of 5kg.

Project testing can be divided into 4 parts or categories:

- i. Limitation Testing
- ii. Rotation of the blade Testing
- iii. Hygiene Level Testing
- iv. Work force or energy used Testing

3.7 CHAPTER SUMMARY

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

The project of rice washer was design to innovate the way to washing rice. This project aiming renewable energy product employed human energy that produce kinetic energy, considering screwed part inside it is produce kinetic energy without any electrical power source. The innovativeness focus of this project reduce high capital withdrawal costs from some entrepreneurs. Project Design was successfully proposed and fabricated not fully according to design material and fabrication method.

4.2 DESIGN ANALYSIS

The results of analysis for this project by using observation questions among random people and random food entrepreneur. This result is important to produce innovations that can solve the problem statements. These are some result of our analysis.

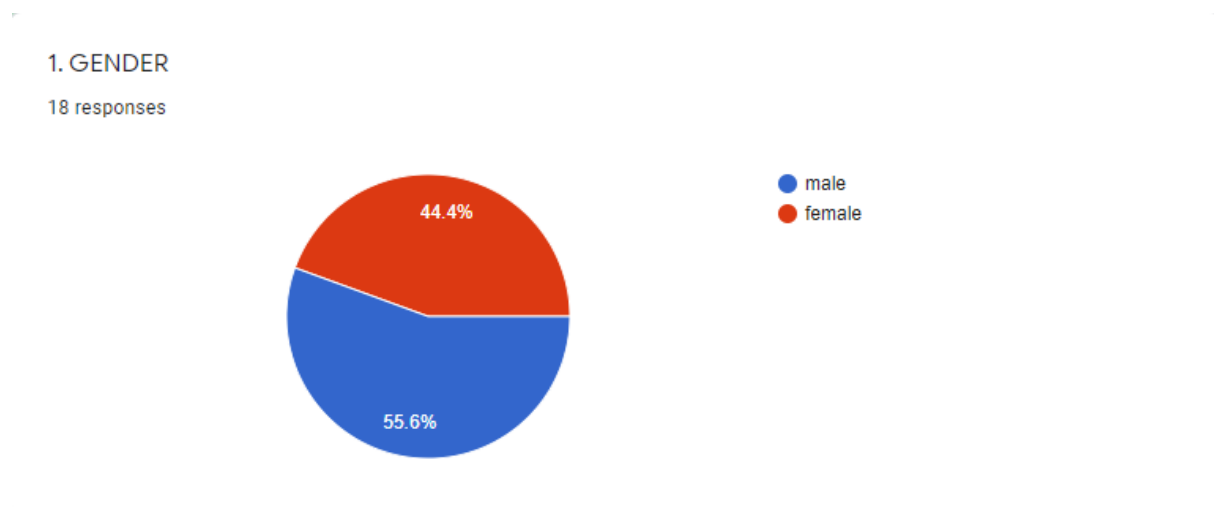


Figure 4.1: results for question 1

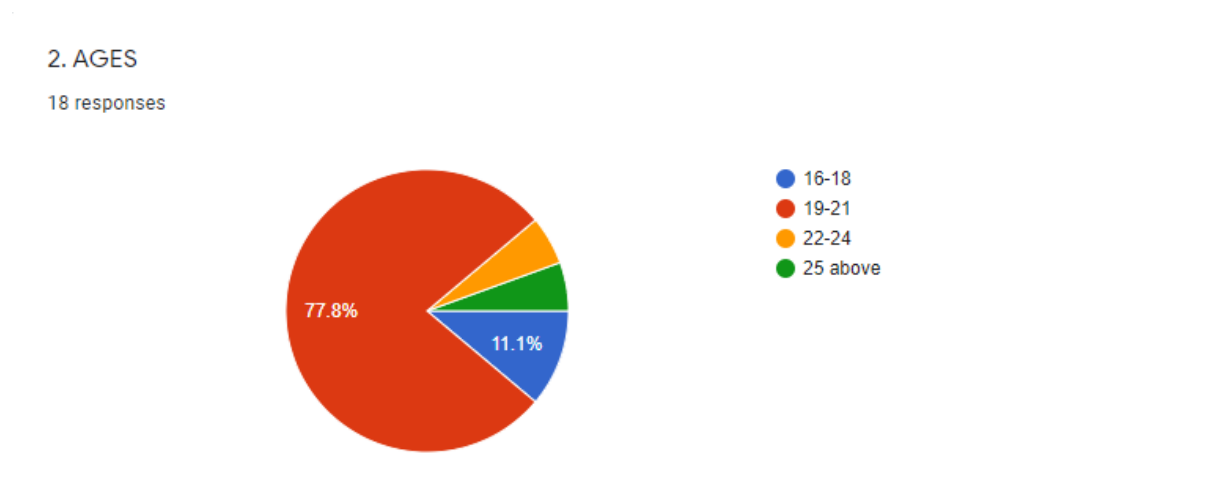


Figure 4.2: results for question 2

3. Do you had wash rice before?

18 responses

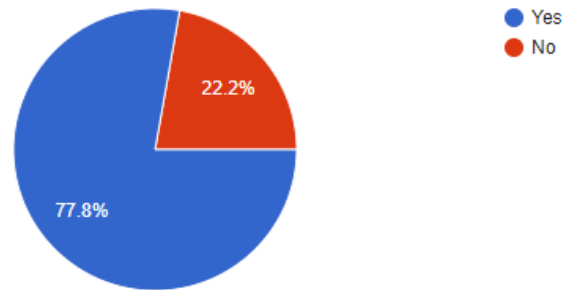


Figure 4.3: results for question 3

4. Do you think the rice that you wash not clean as well?

18 responses

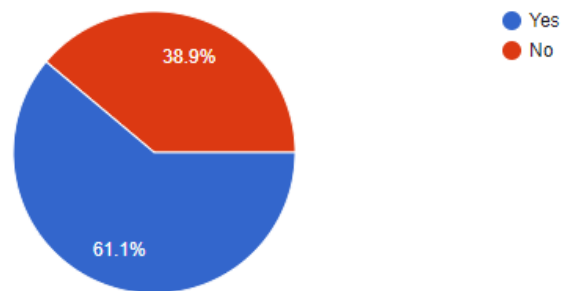


Figure 4.4: results for question 4

5. Do you think this rice washer would easier your work?

18 responses

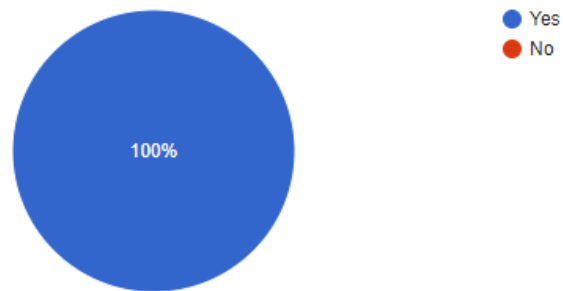


Figure 4.5: results for question 5

6. Are you sure that your hand are clean as well?

18 responses

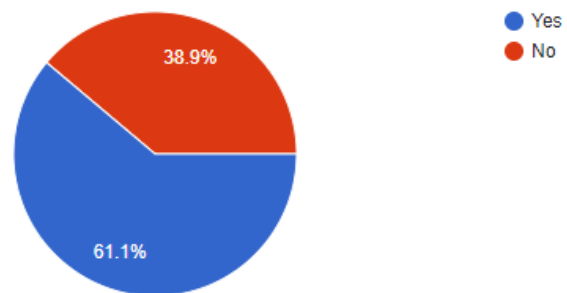


Figure 4.6: results for question 6

7. Do you think this rice washer would save your time in washing it?

18 responses

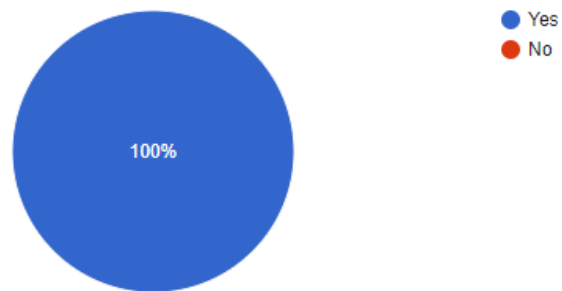


Figure 4.7: results for question 7

8. Do you agree using rice washer would more hygiene from the bacteria?

18 responses

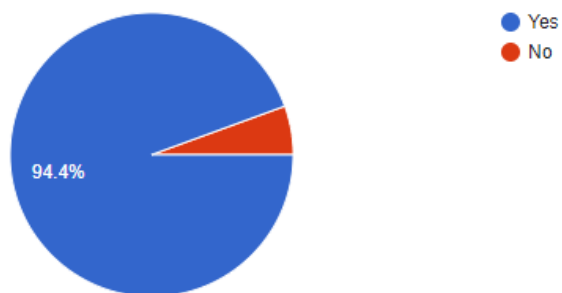


Figure 4.8: results for question 8

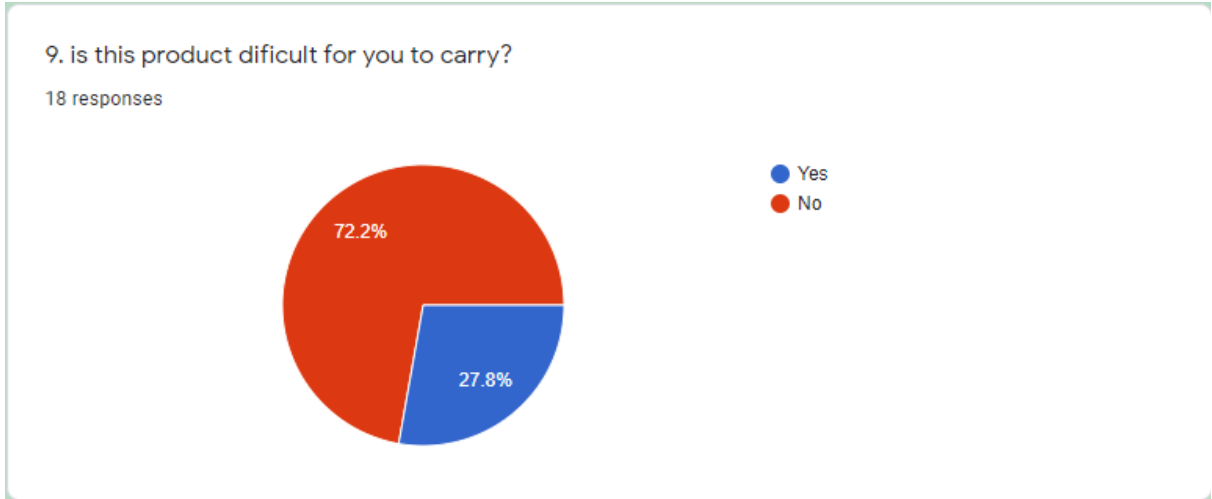


Figure 4.9: results for question 9

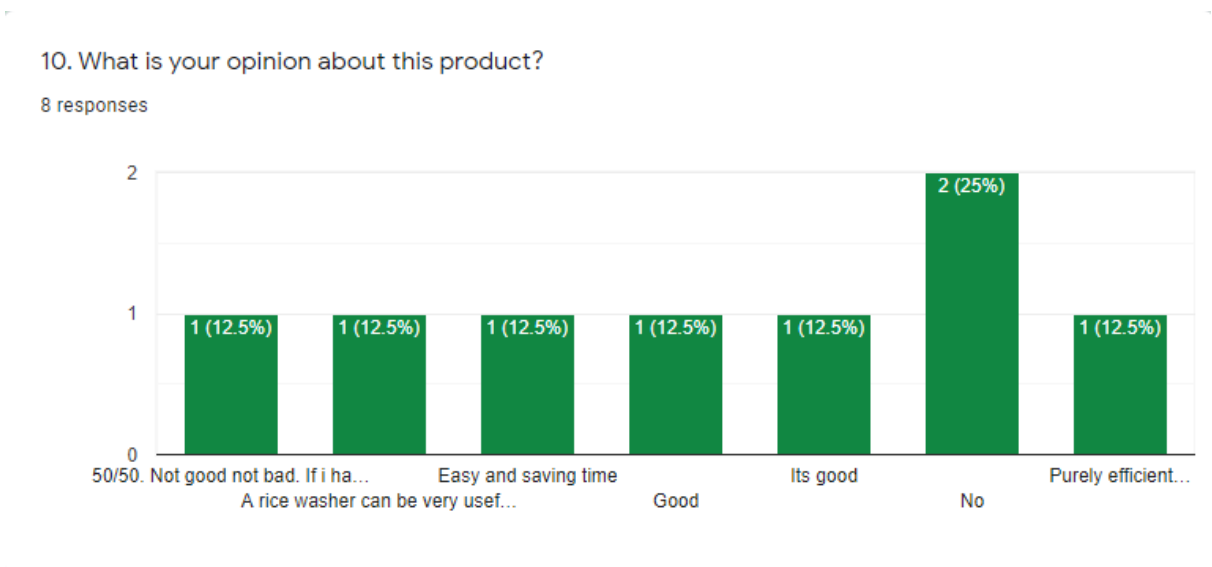


Figure 4.10: results for question 10

4.2.1 DESIGN ANALYSIS SUMMARY

From this observation questioners, this product will help people to solve their problem such as mostly cause of care in hygiene. This project will equip with a good versatile that will help them to facilitate their work. This project will be more useful in terms of saving time and energy. This project is guarantee effective cleaning quality and easy to carry no matter where we are such as to a distant place

4.3 DESIGN AND FABRICATE ASSEMBLY

4.3.1 FABRICATION



Figure 4.11: assemble rice washer

Steps:

1. The blade fan is connected with the screw inside the project.
2. Connect the custom made component on the blade fan.
3. Insert the pole into the hole that has been drilled on the cover.
4. Placed the cover on the basket and placed the U bolt holder.

4.4 RESULT

4.4.1 BLADE SPINNING

To ensure all of the component is fitted perfectly and make sure the blade is functionally and does not have any problem such as some component is uprooted, the blade is jammed and any kind of problem. To make sure the blade rotates well during the washing process and also the rice can be washed clean.

4.5 COST ESTIMATION

Material	Price	Quantity	Total
3" U bolt	RM2.4 each	2	RM4.8
Hex bolt	RM11.30/kilo	6	RM1.10
8mm washer	RM2.80/bag	1	RM2.8
Basket	RM11.90	1	RM11.90
Gal roofing bolt & nut	RM1.15/bag	1	RM1.15
Anti-Slip legs	RM13.70/12 pieces	1 set	RM13.70
Hot Glue stick	RM3/bag	1	RM3
PVC netting	RM8/30'x50'	1 roll	RM8
16" Fan blade	RM11/each	1	RM11
360 spinning mop	RM30	1	RM30
Nylon cable tie	RM2/bag	1	RM2
Total	RM89.45		

4.6 CHAPTER SUMMARY

Chapter 4, presents the overall results of the questionnaire and discussion of this project. All decisions discuss the level of cleanliness by using the project and can save time and manpower. It also discusses a product that is lightweight in nature making it easy to carry anywhere. Finally, design also discussed in terms of the size of each material that has been purchased and the effectiveness of a project.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

Planning is an important thing before starting or wanting to do something. Finally we completed the project according to the schedule that has been made and set of semester 4 and 5. However, the problem still exists and needs to be faced but manage to follow the schedule. Meeting with project are held weekly to discuss important, latest and some things that need to be improved.

All the planning scheduled for semesters 5 and 6 went smoothly even if it slipped a bit due to doing a little research and looking for materials.

5.2 PROBLEM BUILDING PROJECT

5.2.1 PROBLEM & CHALLENGE

At this time of the covid-19 outbreak, we could not find a shop or workshop for us to forge, so this below a few problem that we face to finish our project.

- The component or part that are supposed use aluminum alloy or plate but we have a short term to complete our project.
- The main body or container of our project that are supposed use aluminum plate or make some weld or forge to shape it.
- The blades replaced with other materials cannot fit in the container.

5.2.2 SOLVING

- The component or parts such as blades material are replaced with plastic fan blade because they are lightweight, easy to replace and inexpensive.
- The main body or container material are replaced with basket because they are already shaped.
- The blades replaced with other materials had to be trimmed or slightly scraped to fit in the container.

5.3 CONCLUSION

The conclusion from this innovation project is that our project is very convenient for consumers, especially to employees in restaurants and can save time by using **RICE WASHER** which can load rice on a large scale. The rate of rice washing is also guaranteed to be clean and there is no need to use our limbs.

REFERENCE

- [1] KS Lee, KY Kim, A Samad - Journal of mechanical science and technology 22 (10), 1864-1869, 2008 – Springer
- [2] Andrea Raab, Christina Baskaran, Joerg Feldmann, Andrew A Meharg, Journal of Environmental Monitoring 11 (1), 41-44, 2009
- [3] R Stehle, M Krüger, G Pfitzer, Biophysical journal 83 (4), 2152-2161, 2002
- [4] David A Winter, Journal of Applied Physiology 46 (1), 79-83, 1979
- [5] Roland Winston, Energy transmission, US Patent 4,240,692, 1980
- [6] Hunt Allcott, Michael Greenstone, “Is there an energy efficiency gap?” Journal of Economic Perspectives 26 (1), 3-28, 2012
- [7] Murray G Patterson, What is energy efficiency? Concepts, indicators and methodological issues, Energy policy 24 (5), 377-390, 1996
- [8] Kelli Foster, “Yes, should rinsing your rice”. Plan & Prep Publisher, <https://www.thekitchn.com/yes-you-should-be-rinsing-your-rice-22808>, Feb 10 2016

GANTT CHART 2

MONTH	AUGUST				SEPTEMBER				OCTOBER				NOVEMBER			
	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14	WEEK 15	WEEK 16
BUYING AND COLLECTING PARTS																
ASSEMBLE THE PARTS AND TEST																
PRODUCE PRODUCTS																
FINAL PRESENTATION																
REPORT																

CHAPTER SUMMARY