POLITEKNIK BANTING SELANGOR

DEVELOPMENT OF HORIZONTAL MIXER MACHINE FOR FARMER TO PRODUCE ANIMAL FEED

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DEPARTMENT OF MECHANICAL ENGINEERING

2023

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CERTIFICATION OF PROJECT ORIGINALITY & OWNERSHIP

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SESSION: II 2022/2023

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We hereby declare that this report is the result of our own work, except excerpts that we have outlined its sources and this project will be the ownership of polytechnic

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Terima kasih.

ABSTRACT

Nowadays as the era of life has progressed in many fundamentals industries such as industrial growth in technology. Although technology increases most people take care of nature and use this advantage to make thing easier. In 2020, the world has been shaken by a dangerous epidemic has claimed millions of lives in this world. Corona virus has been spreading for several years and had a bad effect on all countries including Malaysia. Malaysia's economy status has dropped sharply and has a bad effect on all residents who have families. This also affecting the farmers due to the interruption of food supply from abroad. Many modern farmers who prefer to process their fodder using their own manpower which only tire the farmer and take time and do not adopt the mechanization method in their way of life which is easier and more effective. The problem arises about the quality of the livestock in terms of size, the health of the livestock does not meet the requirements of the current market which causes the population and demand to be affected. In order to solve the problem, occur on farmer in enlargement their livestock with design and developing a horizontal mixer machine to produce animal feed by itself. This machine will be helping the farmer to reduces the labour and time taken to mix all kinds of ingredients for livestock. In this development process, Inventor Professional 2023 software is required to obtain accurate measurements according to the accuracy of each tool to facilitate the assembly and fabrication process. This machine mixes a ingredients animal feed by batching process and the time needed is 15 seconds for mixing 3kg material. This machine is very suitable operated by AC motor with 1500 rpm to achieve a homogeneous mixing process. At last of this project, farmers have a multichoice of choosing their method for the growth of their livestock and methods for solutions to facilitate the mixing process efficiently.

ABSTRAK

Pada masa kini sebagai era kehidupan telah berkembang dalam banyak industri asas seperti pertumbuhan industri dalam teknologi. Walaupun teknologi meningkat kebanyakan orang menjaga alam semula jadi dan menggunakan kelebihan ini untuk memudahkan urusan. Pada tahun 2020, dunia telah digemparkan dengan wabak berbahaya yang telah meragut jutaan nyawa di dunia ini. Virus Corona telah merebak selama beberapa tahun dan memberi kesan buruk kepada semua negara termasuk Malaysia. Status ekonomi Malaysia telah menurun secara mendadak dan memberi kesan buruk kepada semua penduduk yang mempunyai keluarga. Ini turut memberi kesan kepada petani berikutan gangguan bekalan makanan dari luar negara. Ramai petani moden yang lebih gemar memproses makanan ternakan mereka menggunakan tenaga kerja sendiri yang hanya memenatkan petani dan mengambil masa serta tidak mengamalkan kaedah mekanisasi dalam cara hidup mereka yang lebih mudah dan berkesan. Masalah timbul tentang kualiti ternakan dari segi saiz, kesihatan ternakan tidak menepati kehendak pasaran semasa yang menyebabkan populasi dan permintaan terjejas. Bagi menyelesaikan masalah tersebut, berlaku pada petani dalam pembesaran ternakan mereka dengan mereka bentuk dan membangunkan mesin pengadun mendatar untuk menghasilkan makanan haiwan dengan sendirinya. Mesin ini akan membantu petani untuk mengurangkan tenaga kerja dan masa yang diambil untuk mencampur semua jenis bahan untuk ternakan. Dalam proses pembangunan ini, perisian Inventor Professional 2023 diperlukan untuk mendapatkan ukuran yang tepat mengikut ketepatan setiap alatan bagi memudahkan proses pemasangan dan fabrikasi. Mesin ini mencampurkan bahan makanan haiwan dengan proses batching dan masa yang diperlukan ialah 15 saat untuk mencampur bahan 3kg. Mesin ini sangat sesuai dikendalikan oleh motor AC dengan 1500 rpm untuk mencapai proses pencampuran yang homogen. Pada akhir projek ini, petani mempunyai pelbagai pilihan untuk memilih kaedah mereka untuk pertumbuhan ternakan mereka dan kaedah penyelesaian untuk memudahkan proses pencampuran dengan cekap.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

SYMBOL	
f	Frequency
m	Mass
P	Pressure
r	Radius
T_{sh}	Shaft Torque
T_a	Gross Torque
P	Power
N	Rotation per minutes

LIST OF ABBREVATION

DCV	Direct Current Motor
RM	Ringgit Malaysia
V	Voltage
RPM	Rotation Per Minute
Covid-19	Coronavirus Disease 2019
AC	Alternating Current
mm	Millimetre

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Nowadays as world can see a new era of life has progressed in many fundamentals industries such as industrial growth in technology, construction and so on. Through this change is no doubt that the world is moving with adaptation to use of technology. When us look at humanity daily tasks in life, technology always expand every time, people are also can use this technology for their benefit in any activities. Although technology increases most people take care of nature and use this advantage to make thing easier. It has a positive effect on animal breeders to develop their farms or repair according to the facilities that are available these days.

In 2020, the world has been shaken by a dangerous epidemic has claimed has claimed millions of lives in this world. Corona virus has been spreading for several years and has had a bad effect on all countries including Malaysia. Malaysia's economy status has dropped sharply and has a bad effect on all residents who have families. Many people have lost their jobs and many are under pressure and resort to suicide. This also affecting the farmers due to the interruption of food supply from abroad. Many losses they have to bear.

With this as situation the group have come up with idea of making horizontal mixer machine for farmer to produce animal feed, which is efficient to be used. Those can be used for farmer who have many livestock such as chicken. The idea created this machine for livestock farmers to save cost and time in preparing food for their livestock.

Through this design mixer machine in terms of materials used and power supply that does not use much electricity.

This machine can help the farmers who have been affected by the virus above. This can also make the price of livestock such as chicken in the market not expensive because the farmers also do not have to incur a lot of costs in managing their livestock. Little by little, this can benefit a lot in this situation.

1.2 PROBLEM STATEMENT

Based on observations and research results, research have defined several problems that local farmers face today. First, unable to process food using mechanical concepts. Many modern farmers who prefer to process their fodder using their own manpower which only tire the farmer and take time and do not adopt the mechanization method in their way of life which is easier and more effective. The use of manpower manually will only harm the farmer due to the manpower that is very limited in daily use. In addition, the use of electricity today that is more convenient for users such as mixing machines requires electricity to generate it.

Next, the problem arises about the quality of the livestock in terms of size, the health of the livestock does not meet the requirements of the current market which causes the population and demand to be affected. In the event of high demand by consumers, farmers must find more effective ways to prevent their livestock population from being affected. This product is very effective for the whole society especially in the field of agriculture in addition to the farmers during the pandemic Covid-19 because it can innovate something new and save all the costs of the farming process.

Last but not least, it can help farmers save on the costs that need to be incurred. It can also give many advantages in terms of economics. For example, it can boost the economy of Malaysia which has declined due to Covid-19. When farmers spend a little, the price of chicken in the market can also accommodate all Malaysians. Currently the price of chicken has reached the price of RM 10 per kilogram in the market.

1.3 OBJECTIVES

The objectives of this project are:

- To designing and creating a horizontal mixing machine for mixing different types of animal feed. This machine produce output and become wet feed or dry feed output to give to livestock.
- It also reduces the labour and time taken to mix all kinds of feed in a few minutes of recorded time.
- This machine can produce healthy livestock and becomes homogenous feed output to give to livestock.

1.4 SCOPES OF THIS STUDY

1. Design using Inventor Professional software to obtain accurate measurements according to accuracy of each tool facilitate the assembly and fabrication process.
2. Using a full power of AC Motor to move the pulley and the shaft.
3. To facilitate livestock digestive system is suitable for wet and dry food.
4. To maintain an adequate supply of nutrients and vitamins for healthy growth.

1.5 LIMITATION OF THIS STUDY

1. Project must be connected to electricity power supply 240 volt.
2. This machine can be operated continuously to process animal feed.
3. The maximum processing material intime10kg.

1.6 SUMMARY

The project summary is a succinct document that gives an overview of the research topic, discusses its intellectual qualities, and explores its wider implications. When designing this project, has to employed the Inventor 2021 programme. Each of these three sections must be present and defined precisely. One of the most crucial elements of the proposal is the project summary. With that said, in the topic of literature review that follows, it will also talk about the article reviews of each and every component that employed in this project.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A literature review is a thorough summary of earlier studies on a subject. The literature review examines scholarly books, journals, and other sources that are pertinent to a particular field of study. This prior research should be listed, described, summed up, impartially evaluated, and clarified in the review. It needs to provide a theoretical framework for the study and assist you (the author) in defining its scope. By acknowledging the contributions of earlier researchers, the literature review reassures the reader that your work has been thoughtfully conceived. When a previous study in the subject is mentioned, it is assumed that the author has read, assessed, and incorporated that study into the current work.

Research pieces that are used to comprehend and delve deeper into a topic are referred to as literature. Instead than just describing the research completed by previous researchers, the literature review examines the research that has been conducted in the subject of study to provide contextual studies. The researcher can also determine the project's limitations and strengths through the analysis of the literature. The literature review is crucial since it can serve as a guide and a point of reference for the researcher while they carry out this study in a number of ways.

The literature review is essential to commence this invention of a design to fit the objective of the project. This research is important so that there is no duplication of existing projects. In addition, it also helps students to gain access to information about

the success of the project and to ensure that it can run properly, it is necessary to obtain information about the project, to meet the objectives that have been submitted. This chapter contains the different types of materials to meet the necessary features used to produce an effective design rather than the previous design. This process is important for the quality of the product to be more effective
and more robust and satisfactory.

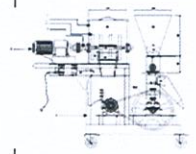
This study to developed a mixer machine to process animal feed for chicken farmers. This machine is easy to operate and does not require monitoring every time when it is turned on., The group will update this machine better and give many benefits to farmers.

2.2 TYPES OF MIXER MACHINE

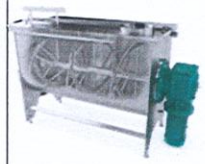
In the study found in the last journal, it was to find some design concepts for mixer machines such as mixing racket, iron steel, shaft blade and ribbon blade (Abo-Habaga, M. M.; A. F. Bahnassi; T. H. ElShabrawy and Abeer W. ElHaddad, 2017) was develop to many functions and suitable with variable material. Base on the Table 2.1 showed a several mixer design with it advantages and disadvantages. That table showing a new design of mixer will develop to solve the problem for farmer to enlargement their livestock.

Table 2.1: Comparison a mixer machine

No.	Machine	Tool bit	Power supply	Input	Output	Advantages	Disadvantages
1.	Manufacturing And Evaluation Of Local Animal Feed Mixing Machine.	Mixing Rackets.	Electric Motor.	Divided into 3.5 kg for maize bran,1.25kg for cotton/ sunflower cake,0.15kg for lime,	1.Replicated mixing durations 10-20 min. 2.The average CV was 5.93% which shows a significant reduction in feed components for the samples tested.	1.The time taken to mix all the ingredients is shorts. 2.Low cost 3.Recommended to control the performance of the manufactured of	1.The mixed ingredients are not well mixed because using maxing rackets. 2.Increasing mixing durations is attributed to the

	 			0.075kg bone meal and 0.018kg for salt.	3.The degree of mixing achieved was 94.06%.	the manufactured mixer for small materials. 4.Achieved maximum pelleting efficiency.	long time required for mixing the same feed formula.
2.	Design of Chicken Feed Mixer Machine Model to Increase Work Productivity. 	Iron Steel.	Gasoline Motor.	Animal feed composed of fifty kilogrammes of grain production, fifty kilogrammes of bran, fifty kilogrammes of concentrate and fifty kilogrammes of nutrients.	1.The stirrer is supposed to be rotated at 3600 rpm. 2.The blending bucket features a capacity of 200kg.	1.It has been discovered that employing a mixer during the process of blending animal feed can cut the workload by 48%. 2. Improve the mixing process.	1.There are no lifting tools attached in the mixer machine. Separate purchasing has to be made. 2.Other mixing equipment on the market still require

						3.It is simple to use. The lower the score of	adaptation based on the needs of the business being served. 3.Based on the company's knowledge, the waste powder the process is not safe enough.
3.	Animal Chicken Poultry Feed Pellet Mill Making Machine, Mixer Machine.	Shaft Blade.	Electric.	The machine was tested with broiler's mash and at different levels of moisture content using 500, 750 and 1000 cm 3 each of water and starch binder	The 120-type single-phase shaft is linked to a small household feed pellet machine, which produces 60 kg per hour. The test that determines the performance of the pelletizer was	The compound feed formula has a variety of raw materials and comprehensive nutrition, which can prevent animals from picking their favourite food from the powder and refusing to ingest	1. More complicated in formulation of multiple unit dosage form. 2. Non-availability of machinery and equipment.

				as preconditioners.	carried out which showed a throughput capacity of 17 kg/h, machine efficiency of 73.33% and a pelletizing efficiency of 90.90% with low mechanical damage of 9.10%.	other ingredients. Because pellet feed can be kept uniform during storage and transportation, feeding loss can be reduced.	
4.	Design And Analysis Of Powder Mixing Ribbon Blender. 	Ribbon Blade.	DC Motor.	After 1000 taps with 110 g of powder, the tapped density had been determined. The fine lactose has a Carr Index (CI) of more than 22%, indicating that it is cohesive. The	1. Low-speed stirring of free-flowing powders (20 rpm blade movement speed). 2. Low-speed stirring of cohesive powders (at an approximate rotation speed of 20 rpm, which corresponds	1. Is crucial to the quality of products in industrial operations and is usually determined by the degree of mixing. 2. Some research investigated the impact of operational conditions, such as fill level, rotational speed,	1. The price is a little expensive. 2. Tool points are difficult to make.

				semolina contains a Carr Index of beneath fifteen percent (%), indicating that the material is free flowing.	to the rolling flow regime). 3. High-speed stirring of cohesive powders (with a greater speed improves powder spreading).	and the total amount the impeller blades, on powder blending in hemispheric horizontal processors featuring bladed impellers that rotate	

2.3 FABRICATE

It was conceived, built, and tested to mix animal feed. For the correct machine design technique, a design computation to handle a 25 kg mass of feed was completed in MS Excel. Before the assembly and manufacture of the pieces, the machine's design was completed using Creo Parametric design software. The machine's effectiveness, the cost of manufacturing that went along with it, and the quality of the end product that was produced after only a short time of mixing made the concept workable and affordable. A feed of 3.5 kilogramme of maize bran, 1.25 kg of cotton/sunflower cake, 0.15 kg of lime, 0.075 kg of bone meal, and 0.018 kg of salt, duplicated three times at two mixing times of 10 and 20 minutes, was used to test the machine. The average CV for the examined samples was 5.93%, indicating a considerable reduction in feed components. A 94.06% level of mixing was achieved according the (Adgidzi, D, A. Mu'azu, S. T. Olorunsogo and E.L. Shiawoya, 2006).

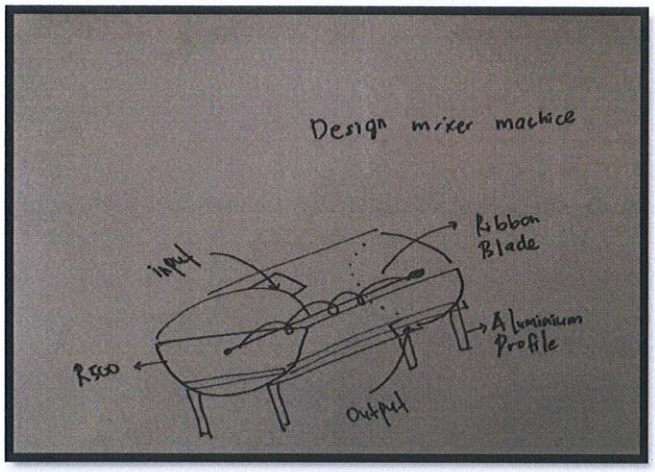


Figure 2.1: Sketching Horizontal Mixer Machine

2.3.1 Drum

A pellet mixer is a machine that evenly blends ingredients for pellet, including corn, protein, and water. A rotating drum is commonly used in pellet mixers to combine the ingredients. Corn, protein and other aggregates are added and then poured in the mixing drum for final mixing and then can be unloaded by tilting the drum.

Specification

Parameter = Drum

Quantity = 1

Material type = Aluminium

Dimension = 1000mm

Height = 1000mm

DC Motor = Converts electrical energy into mechanical energy

Motor Specification

Electric motor=0.5 HP

RPM of motor =200

Shaft = 100mm

Pulley = 200mm

2.3.2 Shaft

Shaft of pellet mixer is mounted concentrically at the centre of the drum with the ribbon blade fixed each other to mixing an animal feed. This shaft also to connected with pulley to transfer a power from electric motor to operate this machine. Shaft is very important to make sure all the parts operate smoothly within process occur.

2.3.3 Pulley

A pulley is wheel on axle or shaft that is design to support moment and change of direction of belt. A pulley is a simple machine that is used to lift heavy objects. Bearing: Support the shaft that rotates inside the machinery. Bearing holder: Protect them from contaminants while keeping in lubricant, and can also house monitoring equipment. Belt can be use with pulley to transfers the rotary motion from the central motor to the drive pulley.

2.3.4 Working

With the aid of a portable pellet mixer, chicken feed ingredients such crushed corn, corn by products, rice polish, de-oiled rice bran, molasses, and toxin binder can be uniformly mixed with water to create pellets. Pellet mixers come in a variety of sizes, from the very big commercial mixing machine to the smaller, portable pellet mixer that is occasionally referred to as a little mixer. The main components of a pellet mixer are a motor, a rotating drum, and the materials needed to cause the ingredients to spin around, mix evenly, and form pellets. For the ready-mix pellet agriculture industries of today's market, consistency homogeneity and quick mixing times are increasingly important. New technology for the agriculture industry is the result of this machines were created with the present labour shortage in mind. Your ability to fulfil deadlines and goals is being hampered by escalating labour expenses and a lack of availability. Let's define pellet mixing first. The six ingredients are combined in a stationary or mobile mixer to create the pellet. As the water is absorbed by the ingredients, the aggregate is bound together and the pellet is produced.

2.4 POWER SUPPLY

In operate the all mechanical components needed a power supply such as AC or DC electric motor, Solar cell and other sources to ensure it will be a functionable and produce a good output.

2.4.1 DC Motor

A direct current (DC) power supply is a power a source which supplies the voltage necessary for direct current (DC) to power a device. Because DC power supplies are frequently employed as on an engineer's or technician's bench for various kinds of power-related tests, they are also referred to as "bench strength supplies." A direct current (DC) source of can also accept as an input a direct current voltage (DC voltage) with a standard range of 5V, 12V, 24V, or 48V. The output voltage can also be generated, ranging from less than one volt to more than 1000 volts DC. In most cases, the DC power management subsystem is linked with the electronic system of portable equipment. The solar panel may harvest small amounts energy from solar power, thermal energy, wind energy, or kinetic energy.

Figure 2.2: DC Motor

Table 2.2: Advantages and Disadvantages of DC Motor

No.	Advantages	Disadvantages
1.	Higher starting torque	High initial cost.
2.	Quick starting and stopping	Its operation for cost and maintenance cost is very high due to the presence of commutator and brush gear.
3.	Variable speeds with voltage input and they are easier and cheaper to control than AC	Risk in commutation failure because due to the sparking occurs at brush it cannot operate in explosive and hazard conditions.

2.4.2 AC Motor

A motor that transforms alternating current into mechanical power is known as an Alternating Current (AC) motor. Important components of AC motors are the stator and rotor. The stator is the motor's stationary component, and the rotor is its revolving component. Either a single phase or three phase AC motor is possible. The first AC induction motor was created by Nikola Tesla in 1887.

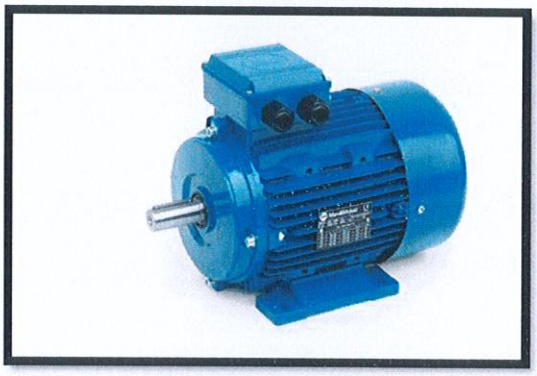


Figure 2.3: AC Motor

Table 2.3: Advantages and Disadvantages of AC Motor

No.	Advantages	Disadvantages
1.	DC generation is more expensive than AC generating.	Certain applications, such as battery charging, electroplating, electric traction, etc., cannot employ alternating voltages.
2.	Compared to DC transmission, the transmission losses are less when AC is supplied at higher voltages.	Working with AC is riskier than DC at high voltages.
3.	Rectifiers make it simple to transform AC into DC.	One cannot utilise the ac in procedures like electrorefining, electroplating, etc. Only dc is employed in these procedures.

2.4.3 Solar Power

Sun energy is the term for solar radiation that can create heat, trigger chemical reactions, or create electricity. The total solar energy incident on Earth is far greater than the global energy needs at the moment and in the future. This highly distributed source has the ability to meet all future energy demands if properly exploited. Due to its limitless supply and lack of pollution, solar energy is predicted to become a more appealing renewable energy source in the twenty-first century than the finite fossil fuels coal, petroleum, and natural gas.

Figure 2.4: Solar

Table 2.4: Advantages and Disadvantages of Solar

No.	Advantages	Disadvantages
1.	Solar Is a Renewable Energy Source.	Solar Energy is Weather Dependent.
2.	Solar Life Cycle Generates Minimal Greenhouse Gas Emissions.	Solar Power Plants Are Not the Most Environmentally Friendly Option.
3.	Solar Technologies Are Getting More Efficient.	Solar Energy is Still Expensive for Households.

2.4.4 Wind Power

Utilising wind energy to create useful work is known as wind power. In the past, sails, windmills, and wind pumps utilised wind power; but, today, electricity is the main usage of wind power. The main topic of this article is the use of wind energy to produce electricity. Wind turbines, which are typically clustered into wind farms and connected to the electrical grid, are used to generate practically all of the wind power used today. In comparison to burning fossil fuels, wind power is seen as a sustainable, renewable energy source because it has less of an adverse effect on the environment. Since wind power is unpredictable, a steady supply of electricity must be produced using energy storage or other dispatch able energy sources. Compared to most other power plants, land-based (onshore) wind farms have a more noticeable visual impact on the environment produced. Offshore wind farms are often more expensive but have a lower aesthetic impact and better capacity factors. Currently, around 10% of new installations are for offshore wind power.

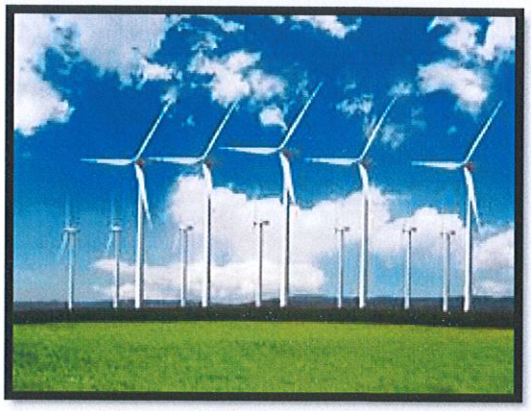


Figure 2.5: Wind Power

Table 2.5: Advantages and Disadvantages of Wind Power

No.	Advantages	Disadvantages
1.	Wind farms can be built on existing farms and ranches and they help to preserve space.	Unpredictable availability of wind.
2.	Clean and Renewable Energy Source.	Large wind farms are needed to produce a significant supply of electricity.
3.	Cost-effective Energy Production.	Unpredictable availability of wind.

2.5 HOW DC MOTOR WORK

A DC motor works on the theory that when a current-carrying conductor is placed in a magnetic field, mechanical force is produced. The direction of the force is determined by left hand rule. Due to the similarity in their architectural designs, DC motors and DC generators can be utilised interchangeably.

For usage in large electrical applications like steel mills and electric trains, where a DC motor's speed and torque characteristics are superior to those of an AC motor, alternating current (AC) is converted into direct current (DC). In industrial applications, DC motors are just as prevalent as three-phase induction motors.

2.5.1 Stator

The motor's stationary primary body, or stator, serves as support and security for the rotating component. The rotor or armature is propelled by the stator's revolving magnetic field. The field windings are housed in the static portion of the motor, which also receives power through its terminals.

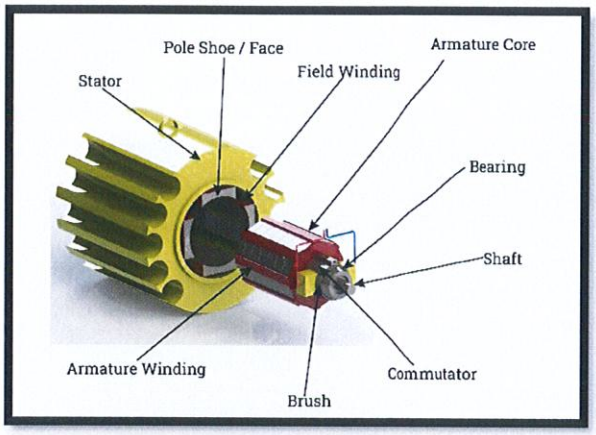


Figure 2.6: Stator

2.5.2 Shaft

The shaft, which is located in the middle of the motor and is made of a hardened metal, typically steel, to bear the weights of the application, is rotated by the windings and commutator. The plate that is secured to the shaft by plastic moulding has the commutator bars attached to it. The shaft supported by the stator receives the torque generated by the winding. The shaft connects the motor to the application and extends through the stator.

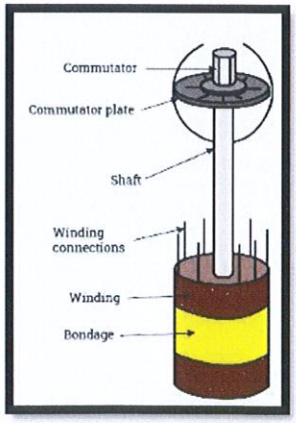


Figure 2.7: shaft

2.5.3 Terminals

Positive and negative terminals are present on a DC motor. The motor turns clockwise when the positive wire is connected to the positive terminal and the negative wire is attached to the negative terminal. The motor spins in the opposite direction while they are in reverse. The brushes and brush arms inside the back cover are attached to the terminals, which deliver electricity to the motor.

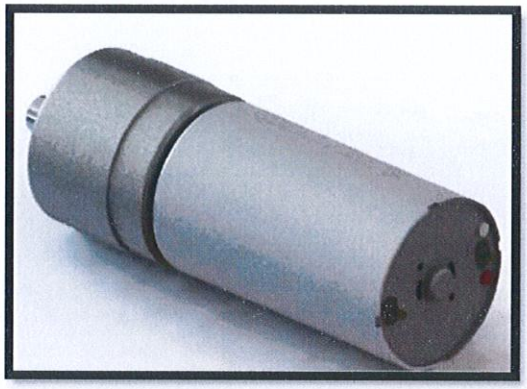


Figure 2.8: Terminals

2.5.4 Magnet

As permanent magnets, the magnets used in DC motors have an active magnetic field all the time. Magnets' opposing ends attract and their like ends repel one another. A magnet's magnetic field extends from its south pole to its north pole. The endpoints of a magnet's magnetic field are where it is strongest. Due to the fact that two magnets together produce a highly powerful field, a DC motor's rotor is surrounded by two magnets so that the rotor is passed through by the powerful magnetic field.

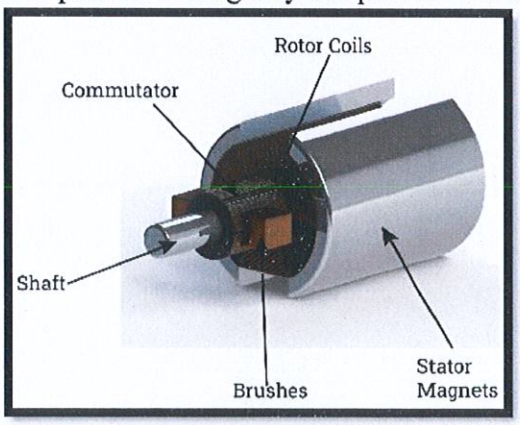


Figure:2.9: Magnet

2.5.5 Rotor

The rotor or armature is composed of several discs that are separated from one another by laminated sheets. The abundance of discs prevents a strong eddy current from forming. (Eddy currents have caused the plates to be insulated) Eddy currents are still there, albeit being significantly reduced, and do not hinder the motor's performance; rather, they are an essential part of it. For better motor efficiency, the rotor's discs are made as small as feasible. The rotor is the dynamic element of the motor that drives the mechanical rotations.

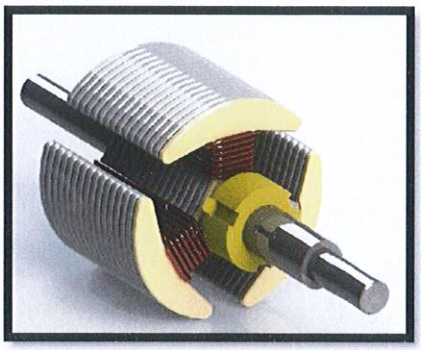


Figure 2.10: Rotor

2.5.6 Coil Winding

The coil windings surrounding the rotor. Coiling the wire generates a strong magnetic field. A weak magnetic field builds up when electricity passes through whatever kind of wire. Because of the wire's coiling, each alternated segment has the same weak magnetic field. When numerous wire coils are joined together, an extremely strong magnetic field is generated. When more coils are added to the rotor, it shifts more smoothly. In light of the fact that just two coils typically jam and lead the motor to cease functioning, all DC motors are required to have at least three separate coils in order to maintain consistent spinning. Each coil is 120 degrees away from the one preceding it.

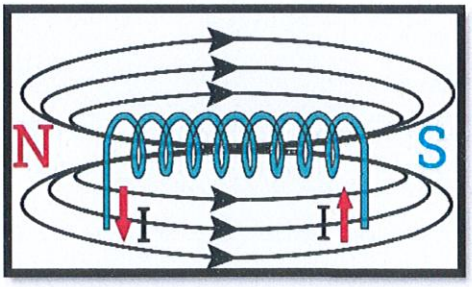


Figure 2.11: Coil Winding

2.5.7 Brusher

The coils of a DC motor are powered by metal components called brushes that function similarly to springs. They have a carbon-based conductive substance on one side. They have a pin on the opposite side that is used to apply power to the motor. The brushes are maintained in place by the brush arms and pushed against the commutator by their spring action. They are also directly attached to the terminals or electrical supply.

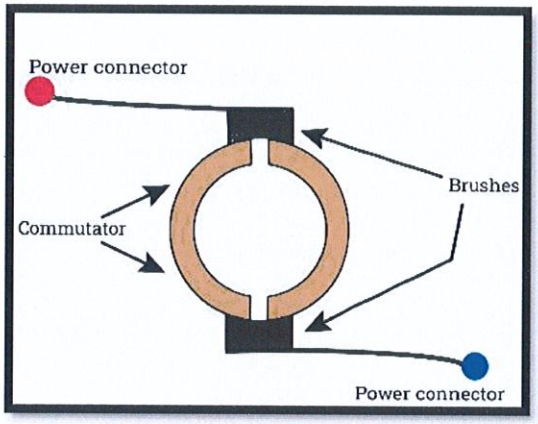


Figure 2.12: Brusher

2.5.8 Commutator

Small copper plates that are installed on the shaft and spin along with the shaft make up the commutator. The power supply poles to the coils change as a result of the rotor's rotation. Two commutator plates, which are electrically insulated from one another but connected by the coils, are connected to each coil. An electromagnetic field is produced when positive and negative terminals are linked to two commutator plates.

Figure 2.13: Commutator

2.6 HOW AC MOTOR WORK

The concept of "AC controller" corresponds to a variety of engine varieties which include single phase, three phase, braking, synchronous, asynchronous, customised, two speed, as well as three speeding single phase. The difference between every kind is related to what kind of work that is performed; though certain types of AC motors are simple to apply for little jobs, other versions have been created for larger, more complex jobs. The phase of the electricity supply changes significantly both personal and business applications.

2.6.1 Stator

The stator generates a rotating magnetic field. It has an internal metal axle, a wire loop, coils, a squirrel cage, and connectors. Despite knowing that it cannot be found in all AC motors, a squirrel cage is the most common design. In AC motors, the renewable energy can be transmitted directly from the stator's the outside coils. The stator's fundamental is surrounded by several rows of plates that radiate outward by copper magnetic wire. It has three phase windings, a core, and a three-phase AC motor housing. The windings, which might have been six or twelve, are 120 degrees apart. The windings have been set up on top of a laminated iron core. The illustration below demonstrates how the core is constructed.

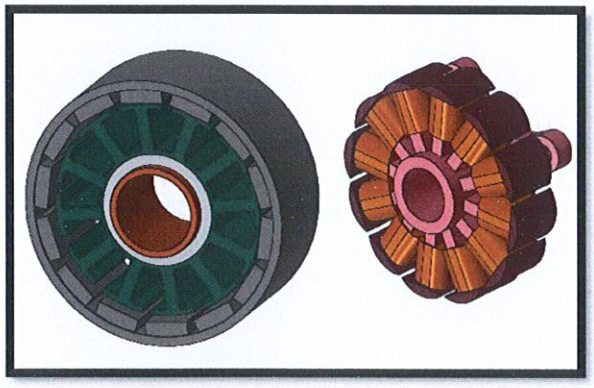


Figure 2.14: Stator

2.6.2 Rotor

A DC motor's rotor is connected to the external power source, but an AC motor's rotor is not. The stator provides it with power. The rotor in a three-phase induction motor can be wound or in a squirrel cage configuration. The rotor in the squirrel cage variation is made out of rotor bars with end rings on both ends. The squirrel cage rotor is available in split phase, capacitor start, capacitor start and run, permanent split phase capacitor run, shaded pole, and variations that fall under categories A, B, C, D, and E. The squirrel cage is often constructed of copper or aluminium.

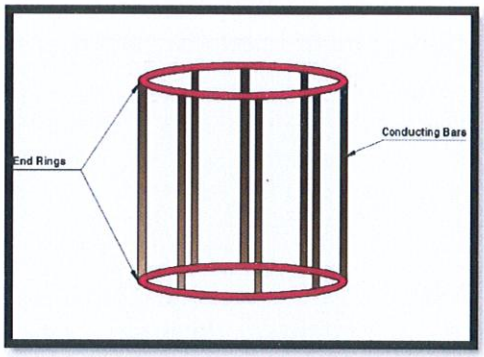


Figure 2.15: Rotor

2.6.3 Cage Motor

A squirrel cage motor works by having the rotor's bars interact with the stator's electromagnetic field (EMF). The EMF changes together with the current as the rotor rotates, providing rotational motion. The rotor's constant effort to catch up with the AC current as it rotates, which is how the rotation is produced, is a vital component in the motion. The rotor would freeze and cease to rotate if the frequencies were the same.

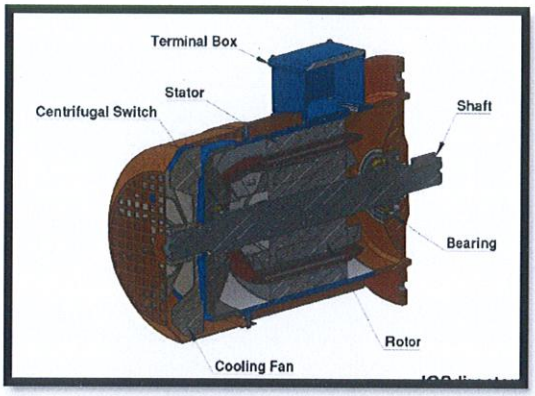


Figure 2.16: Cage Motor

2.6.4 Slip Ring Wound Rotor

An exclusive kind of AC motor is one with coiled or slides rings. It is always three phase and has the same components as all AC motors. The rotor's cylindrical laminated core is wound with wire in the same manner as the windings on the stator. On the output shaft, slip rings are used to connect the wires' terminal ends. The brushes and a variable speed resistor are connected by the slip rings. The primary advantage of a wound rotor is the slip rings' ability to adjust the motor's speed and torque.

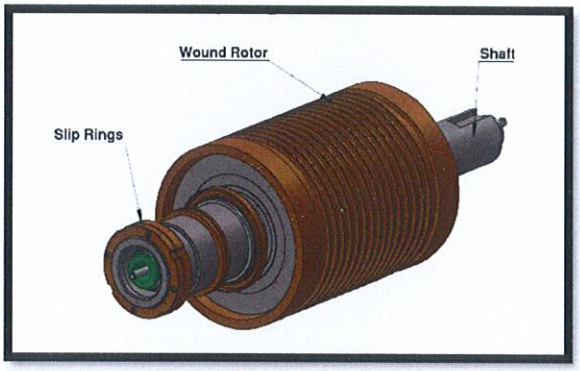


Figure 2.17: Slip Ring Wound Rotor

2.6.5 Wound Rotor

When the output speed and stator speed are different, wound motors are asynchronous. The motor will experience slippage between the spinning field and the rotor when producing current in the latter. The rotor weakens the stator when the motor is driven, allowing the rotation to be controlled and the option to select the torque and running characteristics.

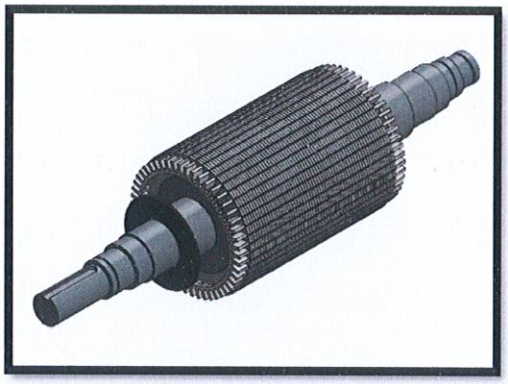


Figure 2.18: Wound Rotor

2.7 HOW SOLAR POWER WORK

Solar panels are frequently referred to as PV panels because they use the photovoltaic (PV) effect to convert sunlight into electricity. When photons from the sun's rays strike the semi conductive substance (usually silicon) in the solar module's cell, the photovoltaic effect takes place. Electrons are activated by photons and come loose from the semi conductive substance as a result. Direct current (DC) is created as the free electrons pass through the solar cells, down wires along the panel's edge, and into a junction box. From the solar panel, this current flows to an inverter, where it is converted into alternate current (AC), which may be utilised to power homes and other structures.

2.7.1 Solar cell

Solar cells, often known as solar energy systems, are systems that converted solar energy into electricity directly. In such cells, an insignificant electric field builds up whenever illumination impacts the connection among a metallic substance plus a material known as a semiconductor (such as silicon) or the intersection between two distinct transistors. Look at the photovoltaic effect. A single solar cell usually generates only two watts of power. However, by connecting multiple individuals cells together, as in renewable-panel arrays, hundreds of thousands more kilogrammes of electrical power can be manufactured in a renewable electric plant or a large the household array. Considering the intensity of solar radiation is already low, most modern photovoltaic cells have an energy efficiency only 15 to 20%, and in order generate additional electricity.

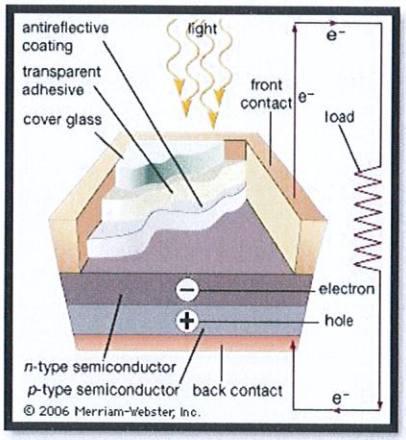


Figure 2.19: Solar cell

2.8 HOW WIND POWER WORK

Wind turbine rotor blades, which work similarly to an aviation wing or a helicopter rotor blade, convert wind energy into electricity using aerodynamic force. As wind blows over the blade, the air pressure on one side drops. The difference in air pressure on the two sides of the blade produces both lift and drag. Because the force of lift is higher than the force of drag, the rotor rotates. If the generator is a direct drive turbine, the rotor is directly attached to it; otherwise, a gearbox is utilised to speed up

the rotation and allow for a physically smaller generator. The conversion of aerodynamic force into generator rotation produces electricity.

2.8.1 Wind Turbine

Consider a wind turbine's operation as the polar opposite of a fan. While a wind turbine produces power using the wind, a fan creates wind using electricity. The horizontal-axis and vertical-axis wind turbines are the two different varieties. Wind turbines with a horizontal axis typically have two or three blades. The blades of the horizontal-axis wind turbines are positioned to face the wind. The placement and appearance of vertical axis turbines are comparable to an eggbeater. Large farms and bodies of water are suitable locations for wind turbines. A wind farm is often where several wind turbines are erected simultaneously in the same location. Wind farms are economical and supply large amounts of electricity to the grids.

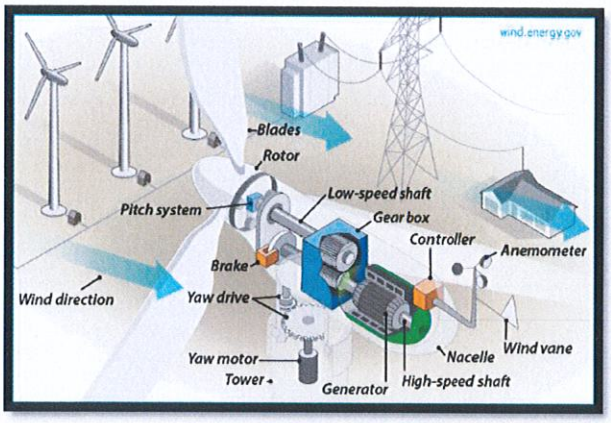


Figure 2.20: Wind Turbine

2.9 CALCULATION

A modernised ring frame may operate at an ultimate spindle spindle speed of 25 000 rpm. This high structural restriction to spindle speed was established by machinery producers about 15 years ago, and several companies have provided such machines in different parts of the world. The limiting cause for this stagnation in the highest achievable speed could be that the ring traveller friction becomes excessive at higher speeds, or the ring frame tenter finds it extremely difficult to manage a satisfactory piecing. Several other factors which, a mill technologist would not be expected to know or to understand, may also be responsible for this upper limit not increasing continuously over the years.

When the pulley is not massless, part of the driving force is diverted into accelerating the pulley's rotation. The pulley can be considered a solid disc, with I = ½ mpR2, where R is the radius of the pulley.

Easily operation, machine was designed to carry 100 kg of ingredients at once. The bulk densities and angles of repose were measured in laboratory. Maximum bulk density was used to calculate. Design and Fabrication of an Animal Feed Mixing Machine. Design of mixing chamber (cylindrical surface): Mixing chamber is a place where the mixing process is carried out by the rotating shaft joined with propeller. Assuming the height of mixing chamber to be 100 cm, and shaft of 100 mm is inserted inside of this cylinder.

2.9.1 Selection of pulley diameter

The need to reduce the DC motor speed to the required paddle type horizontal feed mixer shaft is based on the selected diameters.

D1 X N1= D2 X N2

Where: D1 = Diameter of driving pulley in (mm), D2 = Diameter of driven pulley in (mm), N1 = Speed of driving pulley in (rpm), N2 = Speed of driven pulley in (rpm).

2.9.2 Calculation of Belt Contact Angle

$\varphi = \text{Sin}^{-1} [R - r/C]$

$\alpha 1 = 180 - 2\text{Sin}^{-1} [R - r/C]$

$\alpha 2 = 180 + 2\text{Sin}^{-1} [R - r/C]$

Where: R = radius of driven pulley, mm; = belt angle of attachment, degrees; 1 = inclination of cover around the controlling a pulling device, degree; 2 = inclination at cover for the motorised pulley, degree; C = is the exact centre distance between the two centre pulleys.

2.9.3 Calculation the length of the belt.

$L = 2C + \pi/2 (D2 + D1) + (D2 - D1)^2/4C$

Where: L = belt length, m; C = centre distance between pulleys, m; D2 = pitch diameter of driven pulley, m; D1 = Pitch diameter of driver pulley, m.

2.9.4 Belt Speed:

$V = N1\ D1\ /60$

Where; V = belt speed

D1 = diameter of driver pulley

N1 = speed of driver in rpm

2.9.5 Capacity of The Machine Conveyor:

For the actual mixing, the horizontal blade conveyor in a closed cylindrical barrel system was adopted for the machine design.

$Q = 60n\Phi (D - d) \pi/4$

Where; Q = conveyor capacity, t/h;

n = number of screw rotations, 580rpm;

D = conveyor pitch diameter, 105mm;

d = shaft diameter, 100mm

Φ = factor of safety for inclined conveyor, 0.33

2.9.6 Formula of Shaft Torque:

$T_{sh} = P/2\pi N$

$T_{sh} = P/2\pi N \div 60$

$T_{sh} = (60/2\pi)\ (P/N)$

$T_{sh} = 9.55$ (Output power (P)/N

(N – m in rpm)

$P = 2\pi N T_{sh}$

Where, P = Power (watt)

N = Speed in rpm

T_{sh} = Shaft Torque Nm

2.9.7 Definition of Torque.

Shaft power (T_{sh}) is the real power available at the rotating motor shaft for driving mechanical components. The same electromagnetic or gross torque (T_a) exerted by the AC motor cannot be available at the shaft; nonetheless, it is somewhat smaller than the electromagnetic torque. This is because some of it was lost when overcoming iron and mechanical losses. The shaft torque is the potential net torque for driving mechanical equipment. In this post, project will look at the shaft's torque of a direct current (AC) motor.

2.9.8 Cost Estimation

The table 2.6 below shows the list of costs that use in the production of the 'Development of Horizontal Mixer Machine for Farmer To Produce Animal Feed 'starting from the purchase process to the product finishing.

Table 2.6: Cost Estimation

No.	Item	Quantity	Cost per item	Total (RM)
1.	DC Motor	1	RM18.90	RM18.90
2.	Container	1	RM100	RM100
3.	Bearing	2	RM16	RM32
4.	Bearing Holder	2	RM50	RM100
5.	Belt	1	RM10	RM10
6.	Pulley	1	RM13	RM13
7.	Machine Stand	2	RM50	RM50
8.	Aluminium Profile	1	RM35	RM35
9.	Shaft	1	RM18.99	RM18.99
10.	Defferential Gear	1	RM23	RM23

Total (RM) = RM 400.89

Table 2.7: Details of the components for horizontal mixer machine

No.	Technical Characteristics	Determine and selected values
1.	Diameter of mixing chamber	30cm
2.	Diameter (D) of pulley for mixing	19mm
3.	Number of belts	1
4.	Diameter of mixer shaft	16mm

2.9.9 Study aims and goals

The majority of present continuous mixing research looks at how the convective system and rotation rate influence mixing behaviours and residence time the studies' goal and objective are to enhance the process of preparing mixed feed in a horizontal ribbon mixer in order to increase the quality of the completed product and minimise the process's power consumption.

2.10 DRAWING

A design is a plan or specification for the creation of a system, object, activity, or process, as well as the output of that plan or specification in the form of a prototype, finished good, or method. The action of creating a design is expressed by the verb design. In some circumstances, it may also be possible to classify the direct building of an object without a clear preceding plan as a design activity (such as in some types of engineering, coding, and graphic design). The design typically has to adhere to a set of objectives and restrictions, as well as possible aesthetic, functional, economic, and socio-political factors, and is anticipated to interact with a specific context. Architectural and technical drawings, AutoCAD software designs, circuit diagrams, sewing patterns, and less tangible artefacts like business process models are typical examples of designs.

Mechanical work in physics is the quantity of force-transferred energy. It is a scalar quantity with joules as its SI unit, just as energy. Since only microscopic forces generated by atomic collisions can be measured macroscopically, heat conduction is not regarded as a source of work. Work forms that don't seem to be mechanical are actually particular examples of this idea. For instance, in the case of "electrical work," charged particles moving through a medium are affected by an electric field. Work forms that don't seem to be mechanical are actually particular examples of this idea.

2.10.1 Explanation Part of Mixer Machine

The mixer shafts used in other machining sectors served as the inspiration for the ribbon blade design. A spiral blade is a type of blade commonly used in mixers, food processors, and other industrial equipment. As the name suggests, a spiral blade has a twisted, helical shape, which helps to mix and blend materials more efficiently than other types of blades.

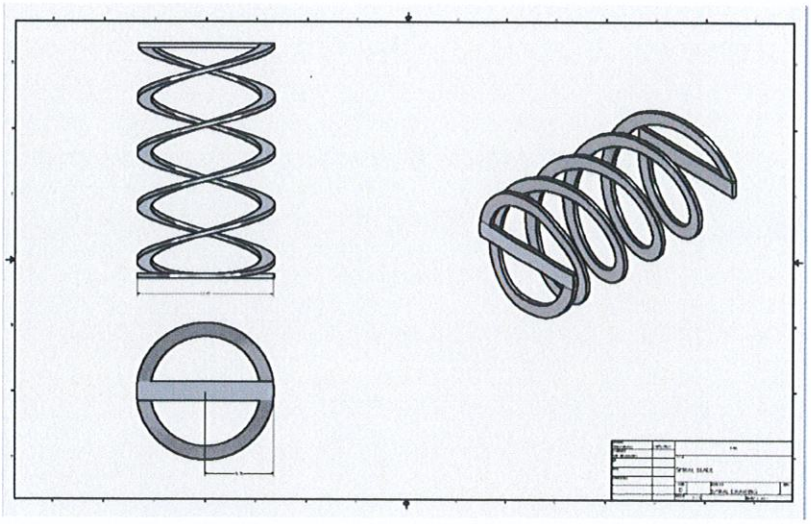


Figure 2.21: Spiral Blade

The bottom tank can accommodate the mixed material (input). It is designed semi-round because it is an ergonomic shape and facilitates the mixing process and also has a radius of 61mm to load the blade and bearing components into the tank.

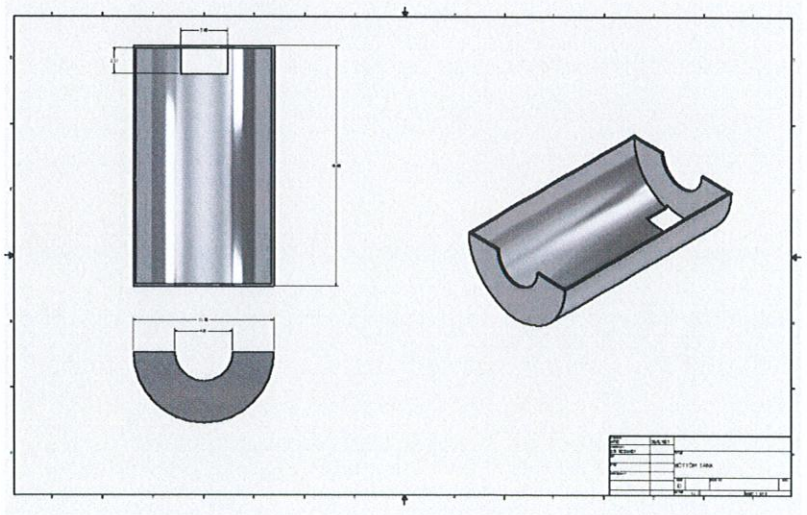


Figure 2.22: Bottom Tank

The design of this tank top acts as a cover or as a safety factor during the mixing process. The shape is semi-round and exactly the same size as the bottom tank, the only difference is that it is equipped with a handle for easy opening and closing.

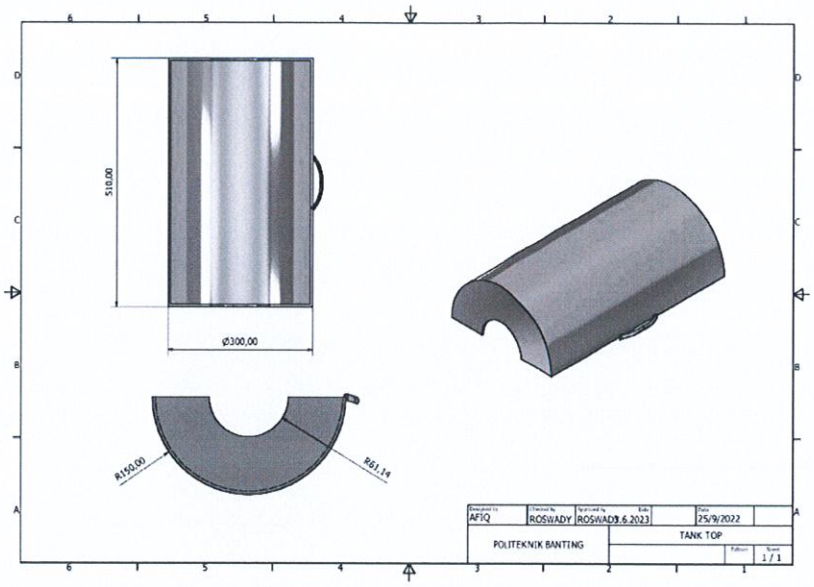


Figure 2.23: Tank Top

The basic components of an AC motor include a rotor, stator, and windings. The stator is the stationary part of the motor, while the rotor is the rotating part. The windings, which are made of coils of wire, are located on both the stator and the rotor. When an AC voltage is applied to the motor, a magnetic field is generated in the windings. This magnetic field causes the rotor to turn in response. The rotation of the rotor is what generates the mechanical energy that drives the motor.

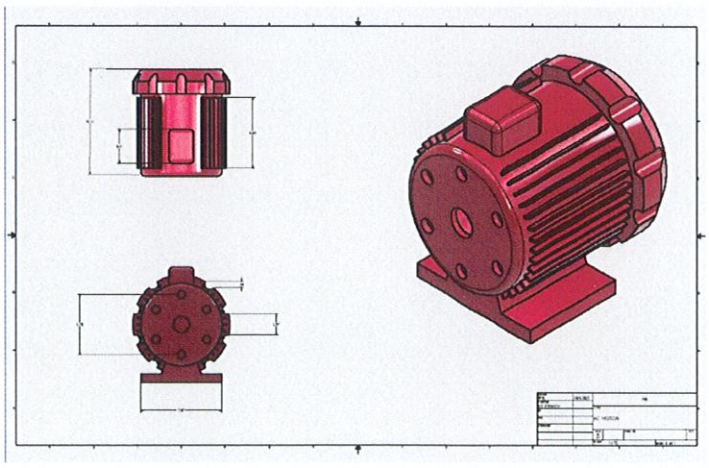


Figure 2.24: Ac Motor

A pulley is a simple machine that consists of a wheel with a groove in its edge and a rope or cable that runs along the groove. The purpose of a pulley is to make it easier to lift or move heavy objects by reducing the force required to do so. When a force is applied to the rope or cable that is wrapped around the pulley, it creates a mechanical advantage that results in a greater force being exerted on the object being lifted or moved.

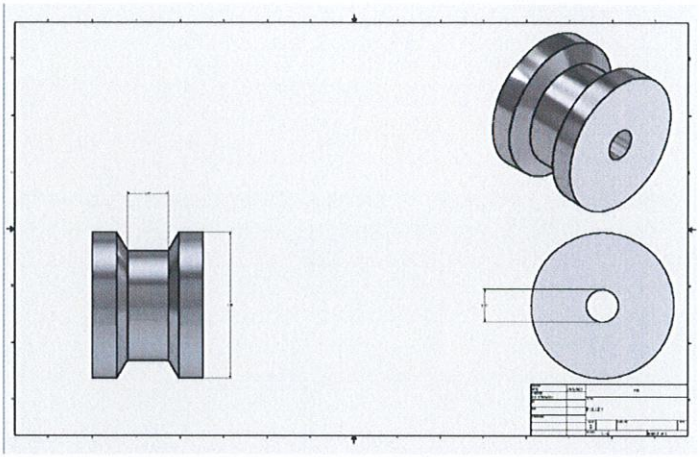


Figure 2.25: Pulley

A bearing is a mechanical component that is designed to reduce friction between two moving parts of a machine. Bearings are used in a variety of different applications, including in vehicles, industrial machinery. The basic principle behind a bearing is that it provides a smooth, low-friction surface for a rotating or sliding component to move against. This helps to reduce wear and tear on the parts and prolong their lifespan. Bearings generally consist of a raceway, which is a groove or track that the moving component sits in, and rolling elements, such as balls or rollers, that allow the component to move with minimal friction.

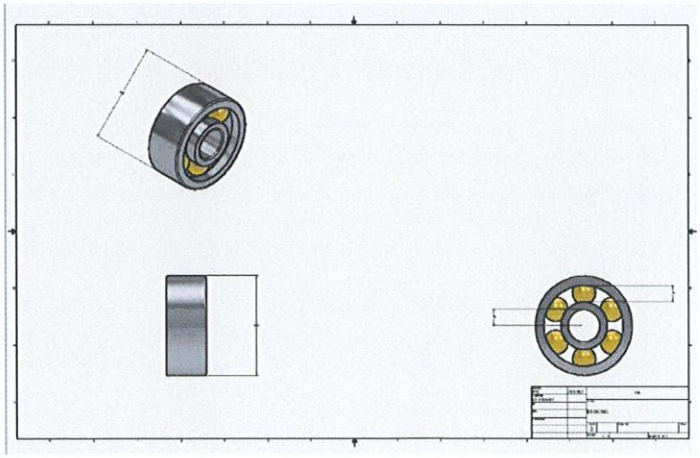


Figure 2.26: Bearing

Aluminium profiles have been produced from aluminium alloys and are formed into shaped items by the extrusion process. The use of this method is largely responsible for the aluminium's distinctive blend of the biological properties. Aluminium extrusions are utilised in a variety of industries since it is both robust and durable.

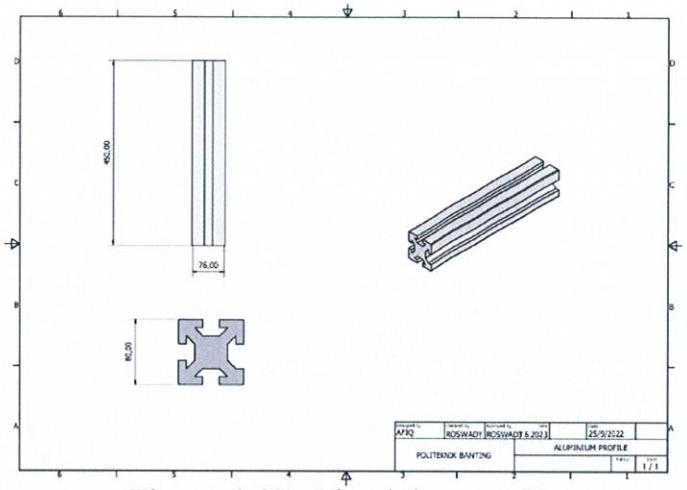


Figure 2.27: Aluminium Profile

To support the power of the pulley, bearing and tank. This mini shaft is designed with a diameter according to the rules of pulley, bearing and then plate. In addition, it is made of mild steel so that it can test the durability in terms of rust resistance and the force applied to the shaft.

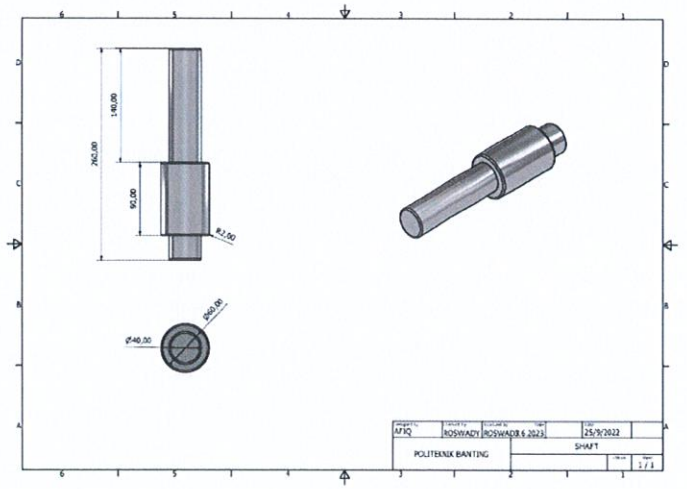


Figure 2.28: Shaft

At the end of the process in the inventory, put together all the components and become this mixer machine.

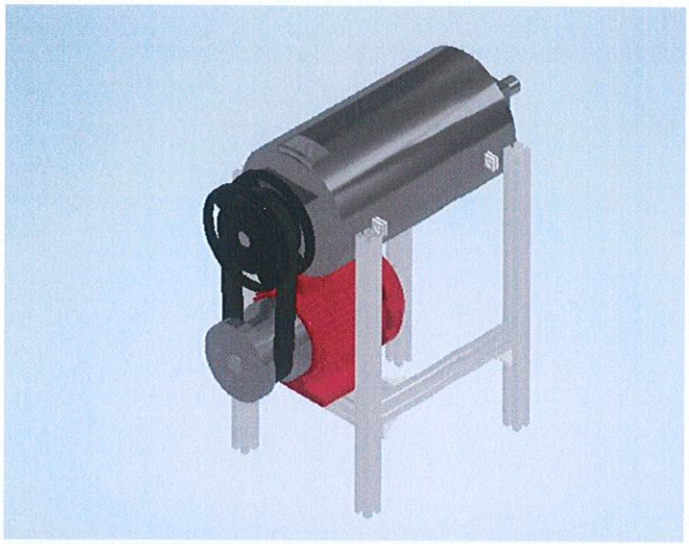


Figure 2.29: Assembly Drawing Horizontal Mixer Machine

2.11 SUMMARY

As a summary of this topic, have a parts and function was identify to design of this machine. All parts must be installed and selected with a suitable a function and for heavy duty task. The parts were study are motor, bearing, pulley, shaft and etc.

CHAPTER 3

MEHODOLOGY

3.1 INTRODUCTION

In this chapter, project procedures and understand the scope. In the project. this project will extensively explore the flow of this project by defining the position of each person in the group and explain the flow of how this project will operate in simple words with a flow chart. The project will also show in the table the estimated cost that will spend during this project, as well as the preparations has made to complete the project and the project report with Gantt chart evaluation. Furthermore, this project needs to be researched by comparing the existing situation and stating facts, statistics, and questionnaire findings as a result of this project investigation. Finally, this project has achieved a design result in a mixing machine.

The section on research technique is offered first, followed by a section that compares and differentiates the two. The various sorts of research methodology are then outlined, as are the two primary types of research methodologies, namely qualitative research methodology and quantitative research methodology. The methodology of qualitative research is described. The research technique used for this study is explored, as well as the reasons why the specific research approach was chosen with adequate justification. The research method, or the actual data collection and analysis procedure, is next detailed, along with a rationale for why the particular study plan was chosen.

The case study research method is used with the grounded theory research strategy for document analysis of archive material obtained over the Internet. Descriptive approaches were implemented to investigate the advantages as well as obstacles of online computing with portable devices for nations who are developing.

3.2 GANTT CHART

This shows a Gantt chart in this project production process starting from the first week until the 10th week. A graph in which a succession of horizontal lines depicts the quantity of work or output performed in particular time periods in proportion to the amount anticipated for those times.

Table 3.1 Gantt Chart Project 1

	Planning
	Actual

Description	**Week**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Research Studies															
- **Title project**															
- **Problem statement**															
- **Objective**															
Development and Test															
- **Prepare the project equipment**															
- **Check the performance of the**															
Project Completion															
- **Achieve the planned objectives**															
- **Make improvements**															
- **Inventor drawing**															
Report Completion															
- **Finish Chapter 1, 2, 3**															
Supervisor checked report															
Presentation And Submission															
- **Final project presentation**															
- **Submission of Final**															

Table 3.2 Gantt Chart Project 2

	Planning
	Actual

Description	**Week**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Fabrication of the development of horizontal mixer machine for farmer to produce animal feed.															
Survey about the components needed for the development of horizontal mixer machine for farmer to produce animal feed.															
Purchase all the components and items needed for the Final Year Project 2.															
Complete cutting process in the project.															
Complete the structure of the project.															
Complete drilling work process in the project.															
Testing the wiring process.															
Testing project.															
Project modification.															

Fix The problems and participate in the Aero Mach competition.															
Include billings and sketching of the development of horizontal mixer machine for farmer to produce animal feed.															
Include chapter 4 and chapter 5 into final year project report.															
Final year presentation to the panel and submission of the final year project report to supervisor.															

Based on the Gantt chart shown above, the yellow box is the time expected to do. While the orange one, shows the actual time to did the task. If it can be observed every task that we plan to do in a certain period has lasted for a week. This is because at the beginning of the semester must faced some obstacles in doing face -to -face classes, as well as items purchased arriving later than expected. This resulted in a one-week delay from the period were supposed to complete the task planned to complete within 15 weeks.

3.3 METHODOLOGY PROCESS

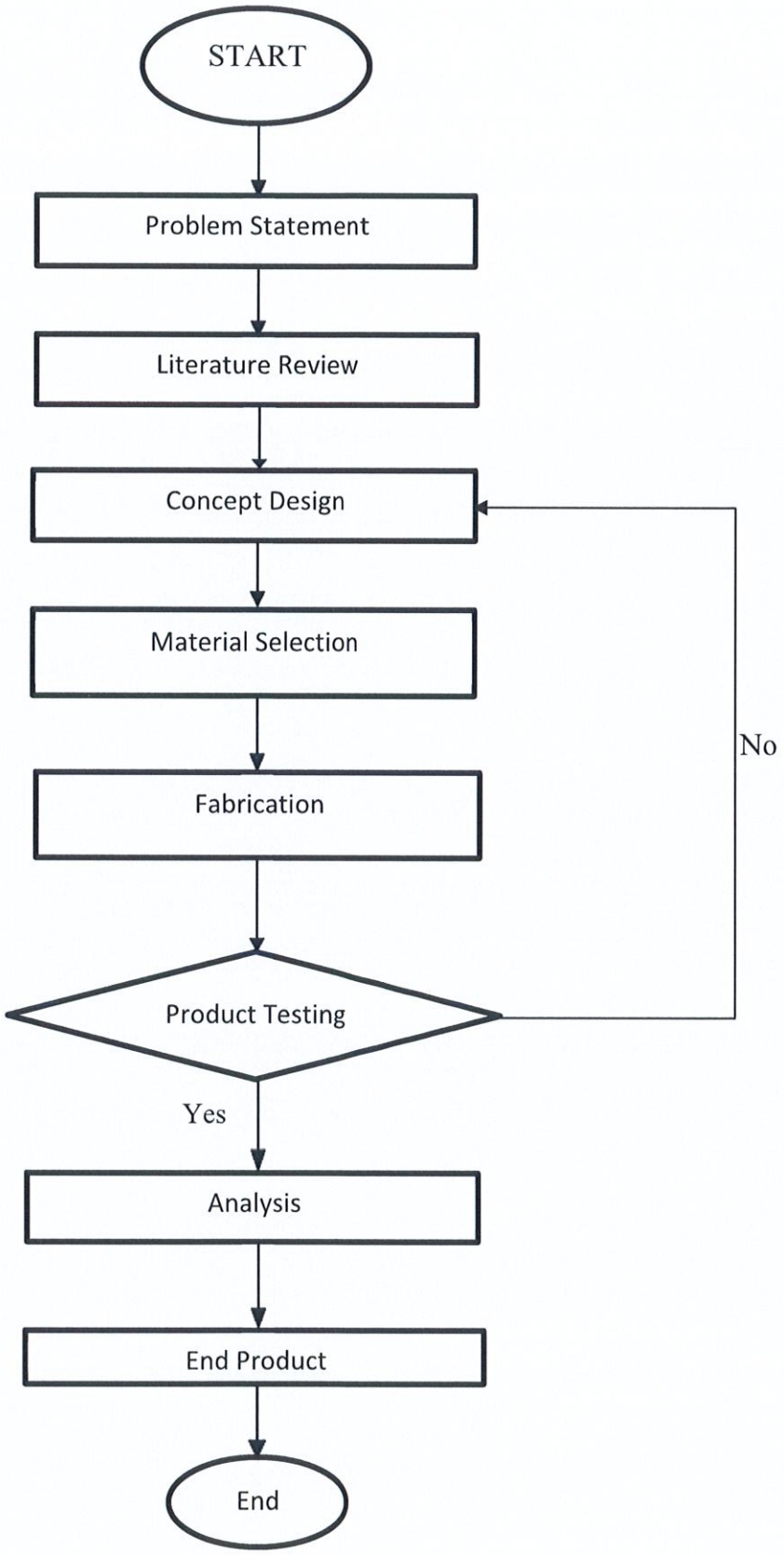


Figure 3.1: Flow Chart of project

3.3.1 Methodology Process of Mixer Machine

The Discussion of project was discussed with supervisor about a suitable title for this project 1. Supervisor suggested the title as written at the beginning of this report page. This project has obtained to give the best ideas in doing the design process for project. The brief is made by supervisor on this topic are well run. Supervisor also came up with some other ideas that is simple and easy for this project to fabricate from the beginning until the end.

Next, this project must obtain a study from journal related to this mixer machine as a reference. This project also obtained ideas in the group to realize the best machine design for farmers to use. Based on briefs, this project required to studied four (4) journals and do research then choose the best design. From the journal have studied in terms of tool points, machine body materials, etc. This project also required a design of the mixer machine. The supervisor further improved the machine from drawings in terms of power, the materials used and the blade for the machine mixed with that material perfectly.

Third, after sketching the machine, started to list out the materials that are going to use in the project. The study refers to some of online shopping websites to find the price of each project. As a student and having lack of fund and need make sure that the product that are purchased is cheap and have a good quality. Some also get some advice from supervisor about the product material that has to purchase.

After that, the materials of this project need to be check before make purchasing. It needs to make sure that the materials used are of high quality and that the quantity of the material is as planned in the project. In terms of quantity, it needs to check the quantity such as T-slots, screws, nut hand tools are according to the conditions and sufficient or not. In terms of quality, this project uses aluminium material as part of the tank body of the project. As everyone knows, mixing machines must have strong resistance and very efficient in manufacturing, so the tank body parts must have suitable materials so that able to withstand strong rotational force when the shaft rotates per minute and does not leave any dented on the surface of the body. So, aluminium is the

checking material that used in this production because of its affordable price, high durability and no rust.

Then, after made the material selection for production. Discussion made improvements and modifications. After finishing the discussion, us decided to add a power supply for the rotation force so that it is more easily adjustable and accurate with the desired rotation. One of the reasons must repaired the rotation force is for the shaft to rotate with a speed that is not too fast and slow. The shaft rotation power should be at a medium power rotation so that the corn can be mixed together. Then also improve the power supply to the motor on the high-powered motor so that it can last longer.

More than that, it's time to test the project. It can finally test the project has produced whether it runs or not. If the project passes the requirements and according to the objective, project will test run if the shaft rotates according to rotation per minute (RPM) and not also forget the structural durability of other parts found in this project. Since this project uses a AC Motor, it is owned priority to ensure that the source of power supply is sufficient and according to the accuracy of the pulley and shaft rotate perfectly and in good condition. If this project is found no dented and any problems in terms of power supply, structural durability and shaft rotation then this project is considered successful and completed in testing. However, if this project is found to be dented, lack of power supply and the shaft does not rotate perfectly then it is considered a failure and not finished. Then, project need to repeat the material checking process to solve any problems their chest.

Finally, if the trial process is successfully carried out. This process refers to the mixed material (output) after the mixing process is complete. This analysis is made after the mixed material is consumed by farm animals such as chickens and ducks, which is a visit to farm. For general information, the project produce wet food and dry food to give to farm animals. If this material is easily digested by chickens and ducks, then the objective and scope of this project is perfectly achieved.

3.4 PROJECT DESIGN OF DESIGN MIXER MACHINE

Based on the design concept found in the previous studied journal, the design concept can be renewed and innovated from the old method to a new method.

Table 3.3: Shows the old design of mixer machine

Old	New
	
Vertical mixer machine	Horizontal mixer machine

3.5 PROJECT PART DRAWING

Talking about component part of this project, to complete the project it must provide with engineering drawings aka mechanical drawings are a rich and specific outline with tolerance that shows all the information and requirements needed to fabricate the project. It is more than simply a drawing, it is a graphical language that communicates ideas and information. For (**figure 3.1**) this project use AC motor power supply as it rotates the shaft, pulley and bearing to transferred the rotation power to the spiral blade. The aluminium profile (**figure 3.3**) part is where the structures holds each component part in the project. The design in (**figure 3.5**) of this tank top acts as a cover or as a safety factor during the mixing process. The shape is semi-round and exactly the same size as the bottom tank, the only difference is that it is equipped with a handle for easy opening and closing.

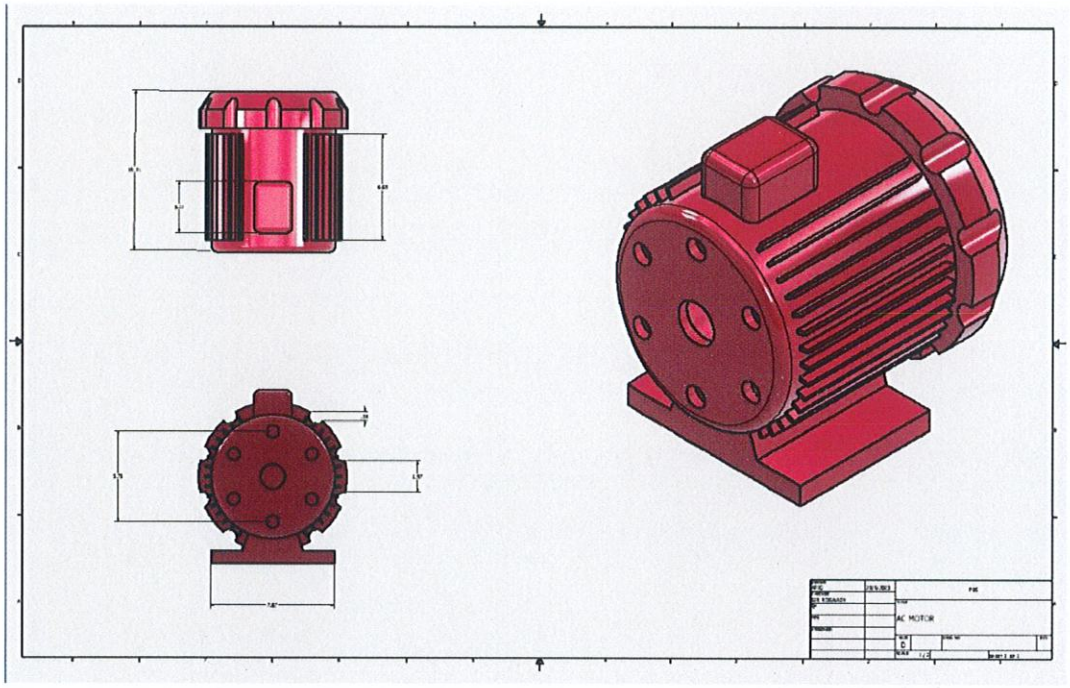


Figure 3.2: AC Motor

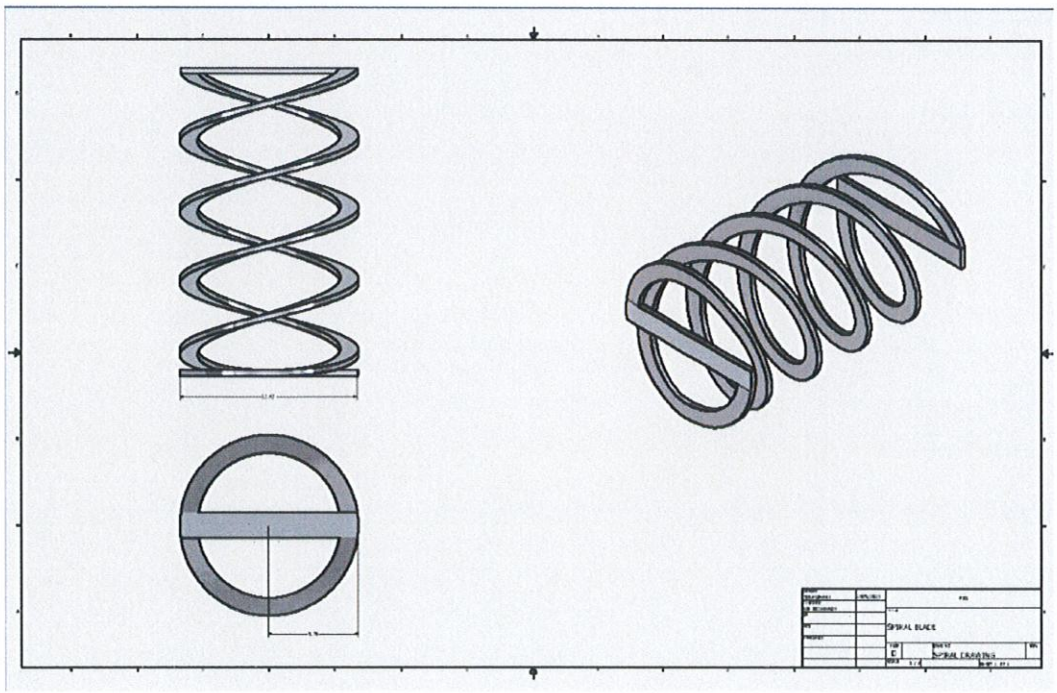


Figure 3.3: Spiral blade

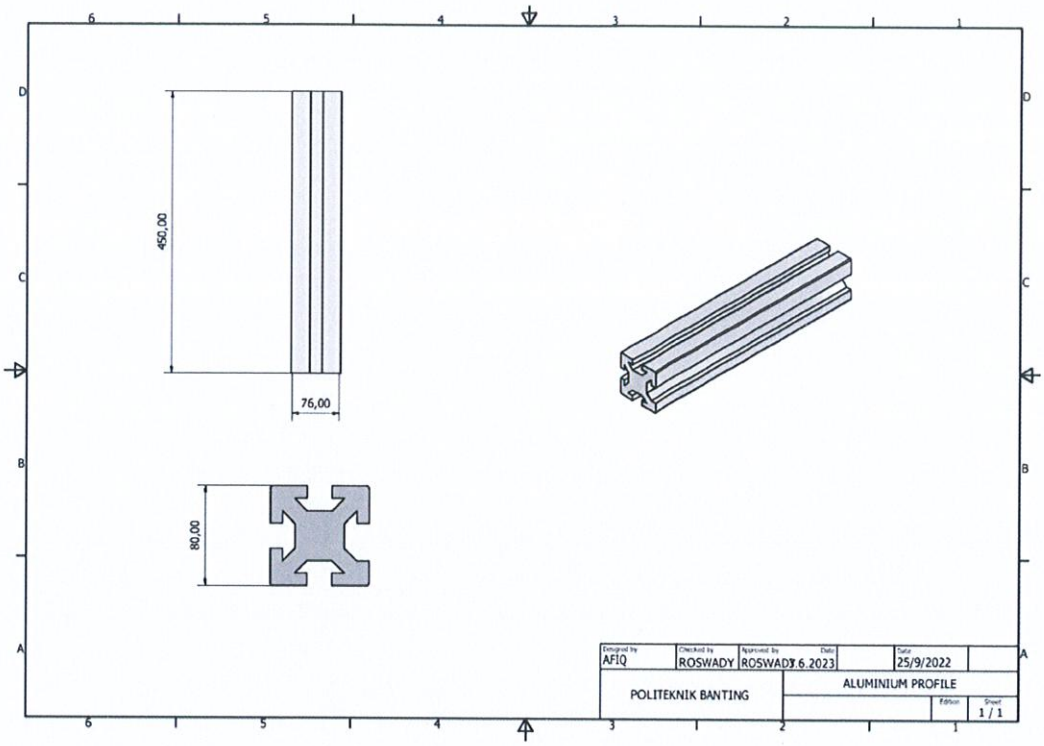


Figure 3.4: Aluminium Profile

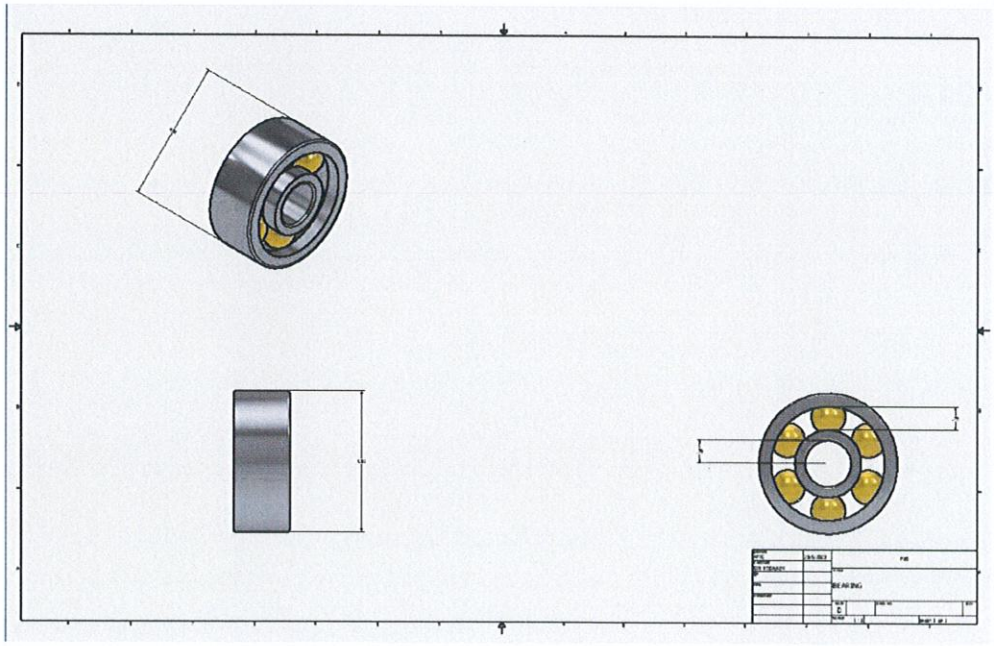


Figure 3.5: Bearing

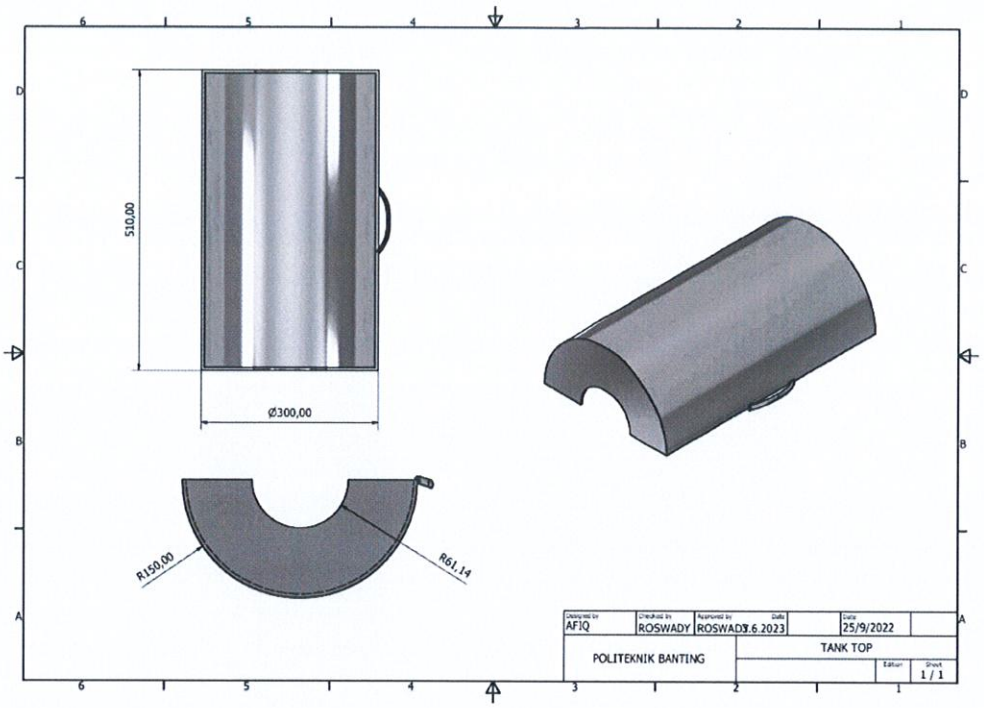


Figure 3.6: Tank top

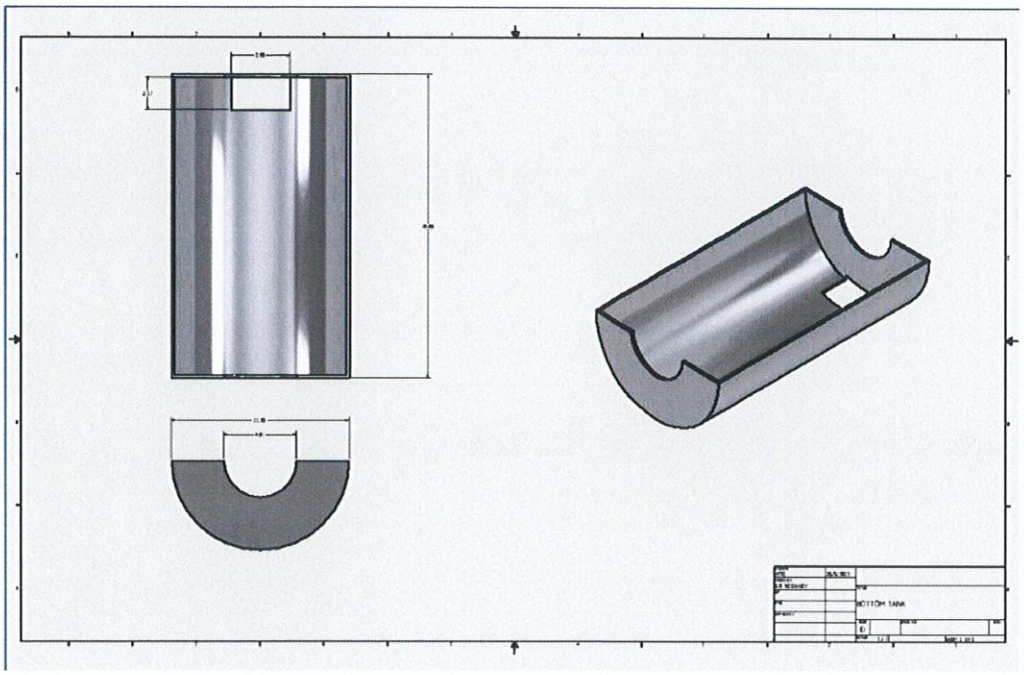


Figure 3.7: Tank Bottom

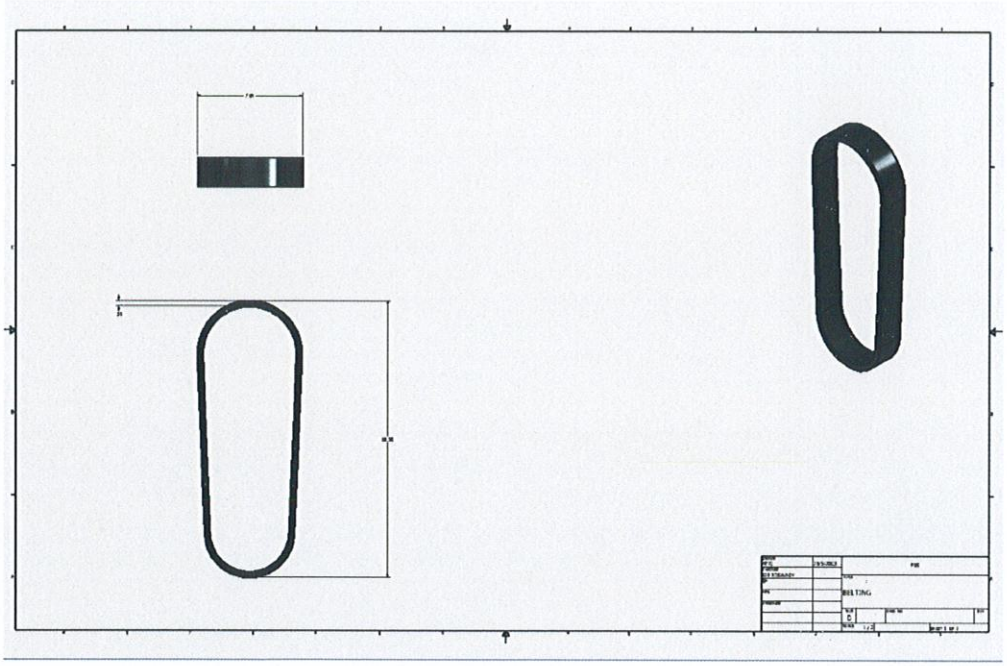


Figure 3.8: Belting

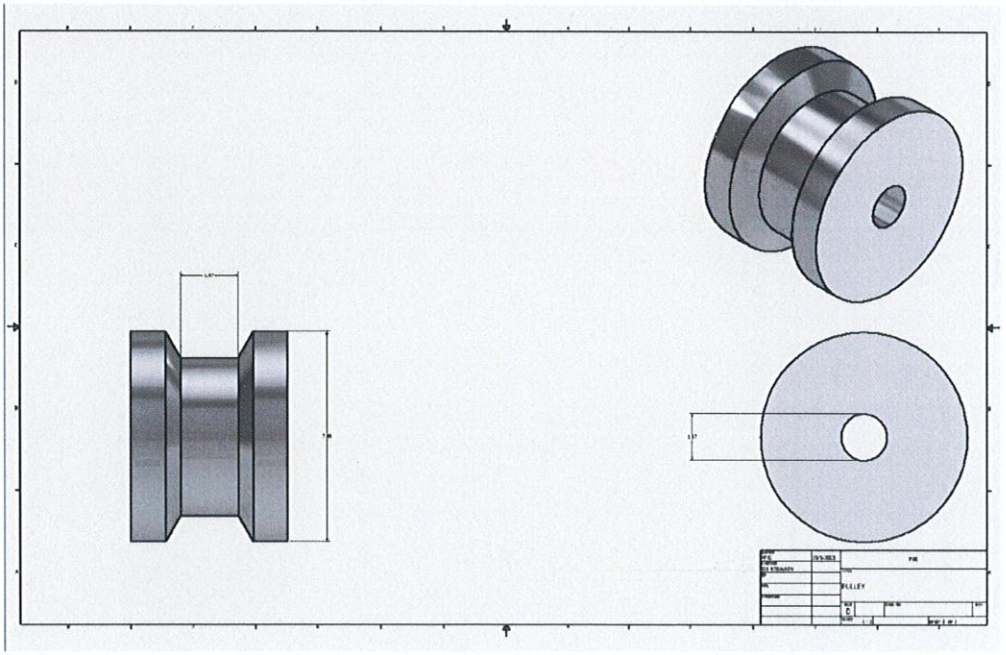


Figure 3.9: Pulley

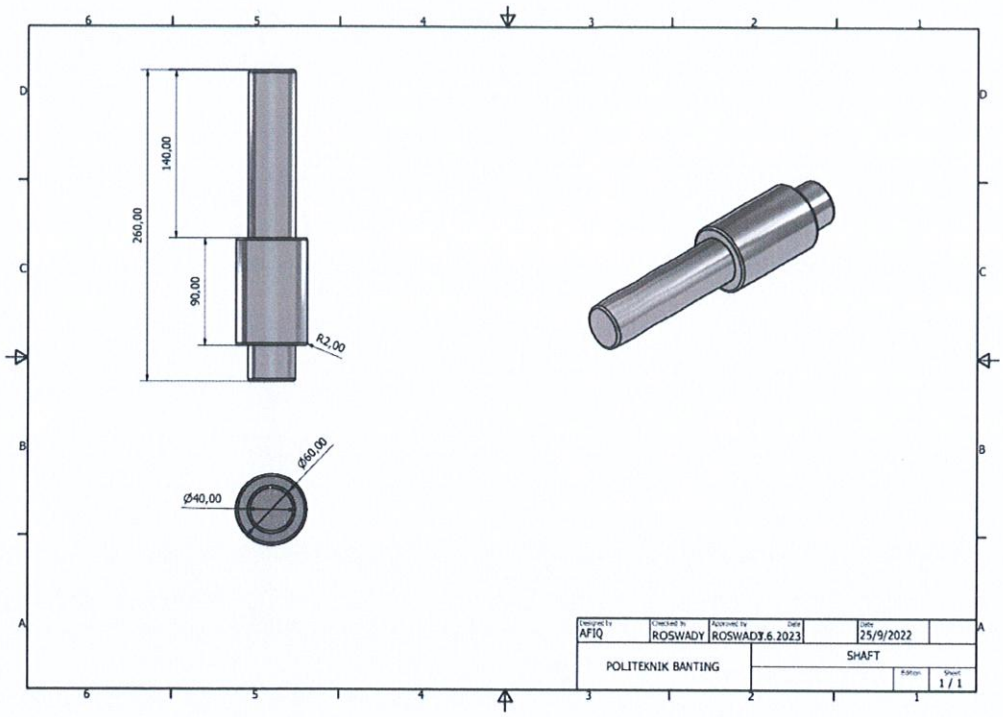


Figure 3.10: Shaft

Figure 3.11: Assemble of Horizontal Mixer Machine

3.6 SUMMARY

Based on this methodology, design has organized and do projects on a regular basis as there is a Gantt chart to ensure that the assigned tasks are completed within the stipulated period. Also, find out more details about the project through flow charts as well as drawings from CAD to show the product results. Finally, the list of costs has been used does not exceed limit budget of RM600 and below.

CHAPTER 4

RESULT AND ANALYSIS DATA

4.1 INTRODUCTION

This chapter discusses the study's findings based on the project's testing that was completed. It cannot be implemented through the final project has been finished properly. This chapter will additionally go into the study's results and conclusions from the project. Every project that has been made confirmed to work thoroughly and successfully. The goal of the project for developing a horizontal the mixer machine for agriculture to produce animal feed is to produce output that is consistent sufficient for consumption by livestock. Several important research studies have been conducted and will be discussed within the context on the project's end date. The data achieved are presented not only in the form of research charts, but also in the form of the This chapter discusses the study's findings based on the project's testing that was completed. It cannot be implemented through the final project has been finished properly. This chapter will additionally go into the study's results and conclusions from the project. Every project that has been made confirmed to work thoroughly and successfully. The goal of the project for developing a horizontal the mixer machine for agriculture to produce animal feed is to produce output that is consistent sufficient for consumption by livestock. Several important research studies have been conducted and will be discussed within the context on the project's end date. The data achieved are presented not only in the form of research charts, but also in the form of the concept's advantages

as well as disadvantages. As a result of this, both the advantages and the disadvantages of the finished job can potentially be seen. The entire project that has been accomplished successfully accomplished an objective where this horizontal mixer machine for farmer to produce animal feed project can aid and the results displayed are quite positive where the goal was completely achieved.

In order to evaluate the performance of the horizontal mixer machine for farmer to produce animal feed project, several comprehensive studies were conducted. One of the major studies focused on analysing the efficiency and effectiveness of the machine in achieving homogenous feed output for livestock. The research team conducted numerous tests using different feed ingredients and varying mixing times to determine the optimal settings for the machine. The results were measured based on the uniformity and consistency of the feed produced. The study found that the horizontal mixer machine consistently delivered homogenous feed, ensuring that all animals received a balanced diet. This is a significant advantage as it promotes the overall health and well-being of the livestock, leading to improved growth rates and productivity

Furthermore, the project also aimed to identify any potential drawbacks or limitations of the horizontal mixer machine. Extensive research was conducted to assess the machine's performance under various conditions and identify areas for improvement. One of the main disadvantages identified was the limitation in handling certain types of feed ingredients, particularly those with high moisture content or large particle sizes. The machine's design and capacity were optimized for typical feed ingredients used in animal farming, but it may encounter challenges when processing unconventional materials. Nevertheless, this limitation can be mitigated by providing clear guidelines to farmers regarding the suitable feed ingredients and preparation methods for optimal machine performance.

Overall, the project successfully achieved its objective of developing a horizontal mixer machine for farmers to produce animal feed. The positive results obtained through rigorous testing and evaluation demonstrate the effectiveness and

efficiency of the machine in delivering homogenous feed output. While some limitations were identified, they can be addressed through proper guidance and recommendations. This project represents a valuable contribution to the agricultural industry, providing farmers with a reliable tool to enhance their livestock's nutrition and ultimately improve their overall farming operations.

4.2 RESEARCH FINDINGS

The development of horizontal mixing machines for farmers producing animal feed has been found to have several benefits once the production and testing phase of the project is complete. Mixer machine has an ergonomic advantage because it is practical and can reduce the risks associated with insufficient rest breaks. Also, the AC motor have chosen for this project is 240V (4.8 A), which is a suitable recommendation for this project's electrical rating and energy usage. Advantages and disadvantages are related to each other. Therefore, the aluminium profile structure chosen for this project material may be seen as a symbol of his disability. Although the aluminium profile is strong enough, it cannot be crushed. The next error is mixing machine blade placement. Blades that made for this project from standard blade. The blade is less suitable because it mixes the corn less effectively. This blade is quite small so the corn may not be well mixed but at the same time can see the effect.

4.3 ANALYSIS

The practise of systematically applying statistical and/or logical approaches to describe and demonstrate, condense and recapitulate, and assess data is known as data analysis. While statistical processes may be used in qualitative data analysis, analysis is frequently a continual iterative process in which data is continuously collected and examined virtually concurrently.

Table 4.1: Data of the mixing process of 15 seconds

No.	Weight of yellow corn(g)	Weight of bran(g)	Weight of red corn(g)	Weight of green corn(g)	Total	Mean	Standard deviation	Coefficient
1.	300	600			900	450	212.13	47.14
2.	400		500		900	450	70.71	15.71
3.	500		600	600	1700	566.7	57.73	10.18
4.		300	400	500	1200	400	100	25

Based on the analysis of the mathematical models. As illustrated in Table 1), if the amount of base mix (x1) decreases from 650 to 300 g, and mixing time (x3) decreases from 15 to 6 seconds, with a quantity of reference component of the mix1 = 650g, and mixing time = 15 seconds the maximum uniformity coefficient = 10.878566 of the finished products is achieved. The reference component in the mix 2 = 875 g, and mixing time = 15 seconds, the maximum uniformity coefficient = 4.0406102. With a quantity of reference component of the mix x3 = 1550 g, and mixing time = 15 seconds the maximum uniformity coefficient = 5.5872607 of the finished products is achieved. Mix x4 = 1875 g, and mixing time = 15 seconds the maximum uniformity coefficient = 4 of the finished products is achieved

Figure 4.1: Material for mixing process and result of animal feed for number 1

Figure 4.2: Material for mixing process and result of animal feed for number 2

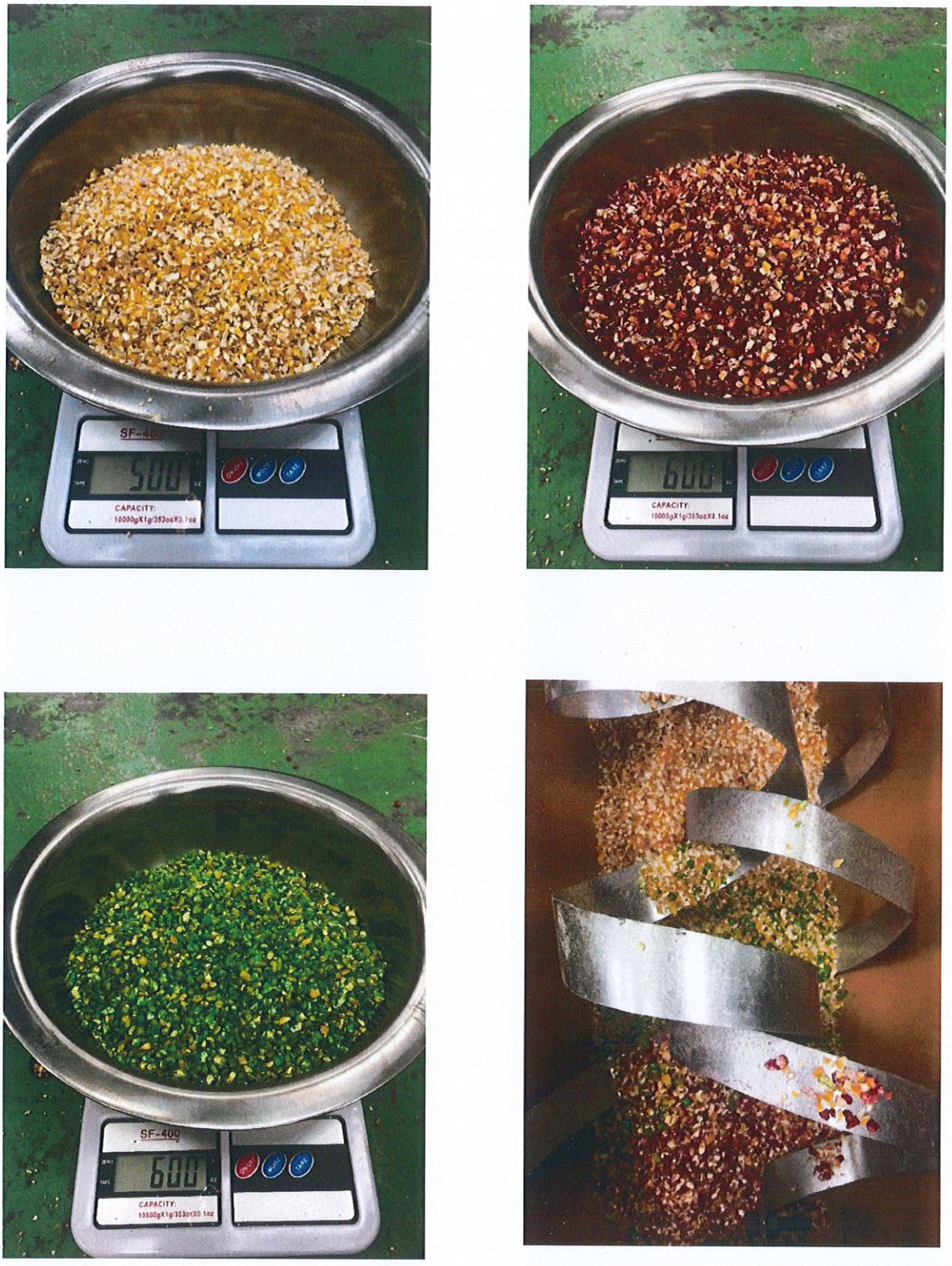


Figure 4.3: Material for mixing process and result of animal feed for number 3

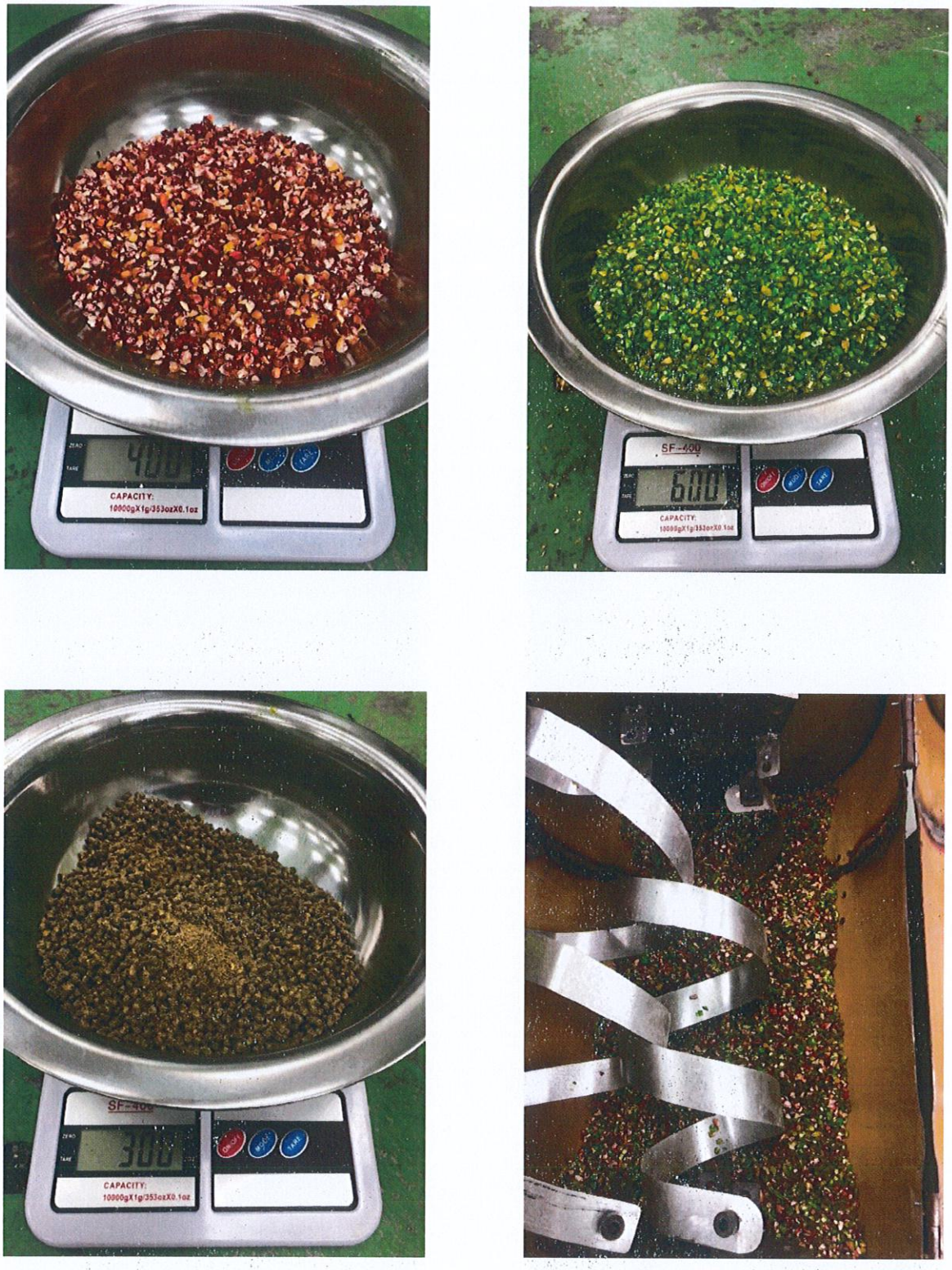


Figure 4.4: Material for mixing process and result of animal feed for number 4

4.4 DISCUSSION OF THE PROJECT

The Development of a Horizontal Mixer for Farmers Producing Animal Feed is an existing project but developed it with a new invention that creates a shaft at the end of right side and left side instead of creating a long shaft from end to end get energy from the AC motor that have been placed because conversations that lead from Project 1 to Project 2. In addition, it will be able to reduce the need for labour and cost, compared to another manual mixer machine. Ideas have had been updated to reflect modern technology. Additionally, this initiative places a high priority on user safety. The mixer machine's body made of iron bucket. This is done to make the project durable. In addition, there are one high-torque AC motors, two bearing with diameter of 16mm, two bearing holder which made of iron material, two aluminium shafts. Components to be used and included in the project has been as short as possible for the project. The project at hand issues that are not resolved by the time the results are fully collected. This prevents the initiative from operating as well as it can have. The AC motor must be changed, and it must be replaced with an AC motor which has a greater voltage that can support the project and easy to use.

4.4.1 Objectives That Achieved

The two goals that the previous animal feed mixer machine lacked have been met by us. Firstly, unlike the previous mixer machine, project have developed an automatic animal feed mixer machine. The users' manpower will be saved by utilizing the automatic mixer machine. Users may save time by not mixing the animal feed manually by hand. The mixer machine will subsequently be powered using the energy that is stored from direct current. The goal of ergonomics is to maximize productivity, reduce fatigue and discomfort, and prevent injuries and musculoskeletal disorders caused by repetitive movements or long periods of sitting or standing. build the machine with the height which is suitable to whom couldn't bend down or reach up. This field is concerned with creating products and systems that fit the physical and cognitive abilities and limitations of human beings, and that consider factors such as posture, movement, vision, and cognition.

5.2 CONCLUSION

In conclusion, the project still has room for improvement. It is because the project has the most basic things to make farmers' work easier, but there are still many things that can be enhanced in this project to make its functions more advanced and useful. There are several functions to bring the project forward, more money must be invested in its development. To avoid excess expenses, thorough preparation and a clear vision in planning are essential. Automatic mixer machines require a power source other than human energy, which has provided designers with a dilemma. The goal of this project is to create an automatic horizontal mixer equipment that can be used to mix animal feed homogeneously and automatically. The horizontal animal feed mixer machine with AC motor supply is a reliable and efficient tool for animal feed production. The AC motor supply ensures consistent power supply, making it suitable for large-scale production. The horizontal design provides ample mixing space, ensuring homogeneous mixing of ingredients. Additionally, the machine is easy to operate and maintain, making it ideal for both small and large-scale animal feed businesses. Overall, this machine is a valuable investment for any farmer or feed mill owner looking to increase productivity and produce high-quality animal feeds.

5.3 RECOMMENDATION

This project's availability on the market, in opinion, will allow for the easy and speedy fulfilment of the market's need for mixing animal feed. As a result, have a several initiatives will be developed further by researcher to enhancement the operation of this horizontal mixer machine. The machine's operating hours should also be increased by using a motor power that matches your power supply. A 2-3 HP motor is suitable for a mini mixer machine. Choose a machine with adjustable paddle speed: An adjustable paddle speed allows for greater control over the mixing process and ensures that all ingredients are thoroughly mixed. Last but not least, a machine with safety features such as an emergency stop button and overload protection to minimize the risk of accidents is perfect.

5.4 SUMMARY

This chapter has explained the safety issues that arose throughout the production of this project. Workplace safety and security are critical, and one of the most important components of the job is student health in the workshop. Every student should grasp the significance of workplace safety. The purpose of workplace safety enforcement must be to prevent accidents and injuries in the workshop, as well as the spread of diseases caused by an unhealthy working environment. Things like these can securely launch the work in the workshop. Each project developed has its own significance and distinct goal, such as the horizontal mixer machine for farmers to produce animal feed project. There were flaws even at the beginning. However, this project was successful in achieving the goal. Based on the conclusions reached, can conclude that this project is favourably appreciated by the people of various ages, particularly those who like raising animals or working as animal breeders. This is because we have supplied their needs and even relieved some of their load. As a result, student expect that this initiative can be expanded so that it can be accepted by all poultry producers and elderly people and widely commercialised. With this, let us contribute to the development of the Malaysian economy by producing more innovation.

MIXER MACHINE

by Afiq Izzudin

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MIXER MACHINE

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