POLITEKNIK BANTING

DEVELOPMENT CRUSHER MACHINE OF ANIMAL FEED

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JABATAN KEJURUTERAAN MEKANIKAL

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A REPORT SUBMITTED TO DEPARTMENT OF ENGINEERING MECHANICAL IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR A DIPLOMA ENGINEERING MECHANICAL IN MANUFACTURING

SUPERVISOR:

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DEVELOPMENT CRUSHER MACHINE OF ANIMAL FEED

This report is being submitted, reviewed and endorsed to fulfill the conditions and requirement of report writing as specified

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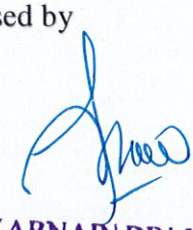

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Kami bekerja keras untuk menyelesaikan projek ini yang dikenali sebagai mesin Penghancur. Walau bagaimanapun, ia tidak mungkin berlaku tanpa bantuan dan sokongan ramai orang. Penyelia kami Roswady bin Abdul Wahab patut dipuji atas tunjuk ajar, penyeliaan yang berterusan, dan memberikan maklumat yang diperlukan untuk projek serta bantuan beliau dalam menyelesaikannya. Kami menghargai sokongan dan dorongan ibu bapa kami dalam membantu projek kami membuahkan hasil dan berjalan lancar. Kami ingin merakamkan rasa terima kasih dan penghargaan kami kepada para profesional dalam bidang ini kerana meluangkan masa dan kesulitan untuk memberi arahan kepada saya tentang cara membina peralatan ini. Selain itu, kami menikmati memuji dan menghormati rakan sepasukan pembangunan projek kami.

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ABSTRACT

Poultry farmers in Malaysia are on the rise, which is 5.9%. The purpose of this project is for the growing number of poultry farmers to be involved in Malaysia. The problem faced nowadays is the market price of chicken feed such as corn where the cost is increasing every year. The forage crushing machine designed is to provide convenience to farmers in raising livestock because it is easy to use and flexible and can be carried anywhere. Where this machine plays an important role in crushing the raw materials of chicken feed for farmers as well as this machine gives another alternative to chicken farmers to process their own food. This grinding machine uses a 240 volt power supply that can crush raw materials such as grains and Moringa leaves as chicken feed. The process of crushing grains and Moringa leaves takes 3 minutes for 100 g of food. Therefore, the cost of processing livestock feed itself is cheaper. Indirectly, this designed grinding machine can reduce the cost of chicken farmers in raising livestock as well as provide better profits to farmers.

ABSTRAK

Pengusaha ternakan ayam di Malaysia semakin meningkat iaitu 5.9%. Tujuan projek ini dijalankan adalah untuk penternak ayam yang semakin meningkat diceburi di Malaysia. Masalah yang dihadapi pada masa kini adalah harga pasaran makanan ayam seperti jagung di mana kosnya semakin meningkat pada setiap tahun. Mesin penghancur bahan makanan ternakan yang direkabentuk adalah untuk memberi kemudahan kepada penternak dalam membesarkan ternakan kerana ianya mudah digunapakai dan fleksibel serta boleh dibawa ke mana-mana. Di mana mesin ini memainkan peranan yang penting bagi menghancurkan bahan mentah makanan ayam untuk penternak serta mesin ini memberi alternatif lain kepada penternak ayam untuk memproses makanan sendiri. Mesin pengisar ini menggunakan bekalan kuasa 240 volt yang boleh menghancurkan bahan mentah seperti bijirin dan daun Moringa sebagai bahan makanan ternakan ayam.Proses penghancuran bijirin dan daun Moringa mengambil masa 3 minit untuk 100 g bahan makanan. Oleh itu, kos memproses makanan ternakan sendiri adalah lebih murah. Secara tidak langsung, mesin pengisar yang direkabentuk ini dapat mengurangkan kos penternak ayam dalam membesarkan ternakan serta memberikan keuntungan yang lebih baik kepada penternak.

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LIST OF ABBREVIATION

U.S.A	United State of America
V	voltage
RPM	rotation per minutes
W	watt
kW	kilowatt
CE	Crushing Efficiency
CC	Crushing Capacity
g	gram

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

The global food system's market forces are constantly changing. Consumers seek reassurance about the methods used to create their animal protein, and regulations are altering how the do business. There particular local context calls for specialized solutions based on in-depth knowledge. As a take the company to the next level of growth, there can assist you in overcoming these difficult obstacles.

Every day, this staff arrives at work with the goal of improving the way we provide nutrition to all main species. There can assist them in differentiating the company and boosting profitability. Our services range from component evaluation to complete feed formulations to productivity solutions.

This rank among the top producers and distributors of animal nutrition goods in the globe. There are able to provide differentiated value thanks to our extensive global expertise in supply chain and risk management.

Cargill began producing feed in Malaysia in 1986. In the present, we run four feed mills in Melaka, Butterworth, Westport, and Kota Kinabalu. Cargill makes use of its extensive knowledge, confidential data, and inventiveness to offer the customers nutritional products that are technically superior and top-notch farm management solutions that will increase their profitability. Additionally, Cargill offers consulting services to feed businesses, livestock integrators, and farmers in the areas of feed

manufacturing, farm management, ingredient sourcing, quality control, and feed formulation.

The strength of Cargill is in its capacity to formulate blends and products for animal nutrition that are specifically tailored to the demands of our wide range of customers. This is accomplished by ongoing technology transfer from the Minneapolis, Minnesota, U.S.A. firm headquarters and lessons gained from other Cargill operations worldwide.

1.1 RESEARCH BACKGROUND

Malaysia's grain maize sector is not very large. However, millions of tons of grain corn are necessary for the growth of the livestock business, particularly for ruminants, broilers and pigs. (Adapted excerpts from Daily Express)

Malaysia imports nearly 100% of its grain corn needs from country of Brazil and Argentina. There have been previous attempts to produce our own corn, with numerous farmers participating in the project to feed the domestic market. Even smallholder producers of rubber cultivated corn to increase their income. Unfortunately, they had no reliable means of selling their produce. As a result, a lot was wasted or sold for prices that were too low to justify their initial investment.

In a free market economy, a product or commodity's price is ultimately decided by its supply and demand. Market responses to news about the weather, governmental reports, and/or policy frequently cause short-term price gyrations and can have an impact. One product that illustrates this situation is corn. Profitability in the cattle industry is heavily influenced by maize prices. As an energy supplement in growth diets, whole or further processed maize is fed to calves who are being completed for slaughter. Additionally, a lot of cow rations contain distiller's grain, hominy feed, corn gluten feed, and other leftovers from corn that has been processed for food and fuel. For cattle owners, managing feed expenses, one of the major production costs, may be facilitated by an understanding of maize market movements. (Article by Noble research institute)

The goal of development is to raise the standard of living for the populace while protecting the environment's resources and creating or expanding employment opportunities locally and regionally. Development involves a feature of being visible and beneficial, albeit not always right away. The reason this project was build is to help small breeder to solve their problem to enlarge livestock.

1.2 PROBLEM STATEMENT

Malaysia becoming self-sufficient in producing chicken feed was one long-term possibility that Prime Minister Ismail Sabri Yaakob stated in his remarks following the May 23, 2022 Cabinet meeting to examine solutions to the country's poultry shortfall. Due to the high cost of wheat and fertilizer as well as the imports' vulnerability to currency swings, this will help to lower the high cost of poultry production.

The Domestic Trade and Consumer Affairs Ministry and the Ministry of Agriculture and Food Industries (Mafi) have been entrusted with presenting proposals on the idea for the production of corn and the use of palm kernel cake as substitutes for poultry feed. The state administration of Kelantan is prepared to grow corn as a long-term substitute in reaction to this. Numerous corn varieties of the cereal crop for animal feed planted in Bachok four years ago have proven to have high yields, according to reports from its state executive councilor for agriculture, agro-based industry, biotechnology, green technology, and environment, Tuan Mohd Saripudin Tuan Ismail. However, the programmed was discontinued at the time due to a lack of market demand. The joint venture, encompassing 238.3ha of land, received a total of RM3 million in funding, and land clearing is anticipated to start in the third quarter of this year.

Although Malaysia has the ability to raise hens and eggs at levels close to self-sufficiency, the country's reliance on imported feed, whose costs have risen recently due to a weakening ringgit, is the primary cause of the country's chronic chicken scarcity. Russia's invasion of Ukraine and erratic weather patterns, according to

Commodities Minister Zuraida Kamaruddin, have caused a global shortage of chicken feed. The supply of chickens in Malaysia is constrained because the animals are eating less and growing more slowly than usual. Due to rising expenses and other considerations, some chicken farmers have stopped producing, while others have boosted prices despite the government's price cap.

1.3 OBJECTIVES OF THIS STUDY

Objectives of this study to develop Crusher machine to produce animal feed (chickenbran) for small and medium scale farmer in Selangor. The purpose of this machine that we develop for small farmers to diversify a source of animal feed and reduce the cost of enlargement of the livestock for those who cannot afford to buy chicken bran which prices have skyrocketed since the Covid-19 disaster. This machine is compact and easy to carry anywhere and can make 2 sizes of chicken feed.

1.4 SCOPES OF THIS STUDY

In this study we should learn such as:

i) Design of Crusher machine by using Inventor Software version 2023.

ii) To develop structure machine by using aluminum profile 20 mm x 20 mm.

iii) Produces of 2 granular size such as small and medium for this machine

iv) Use a power supply 40 watt and 220-240 voltage

v) Adjustable tool bits to crush a raw material.

1.5 RATIONAL OF THIS STUDY

This study is very important to solve the problem always occur to the farmer in Selangor. While this machine will solve the problem and increase the production of farmer in enlargement of livestock.

1.6 SUMMARY

Numerous researchers have developed design items to help farmers access processed chicken bran more easily and affordably. We can use some of their research's insights to innovate certain items for our project.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

Past Study or Literature Review is "a critical analysis of the research conducted on a particular topic or question in the field of science". IA is an analysis in the form of criticism (building up or knocking down) of the research that is being done on a specific topic or a question on a part of science.

Literature Review is not a summary of another study but is a scientific story about certain research problems done by others. After finding an article or writing, you need to see the structure and text in question such as the table of contents, abstract, introduction, sub-topics discussed and the whole writing in question whether or not it matches what you are looking for. The writing should be seen from the perspective of relevance to what we want to study in us writing.

If the article is suitable for your research, that need to read it in more detail to find specific research that will support your Literature Review later. This technique allows them to identify the suitability of the material. At this stage, that need to read as much reading material as possible to obtain as much information and general understanding as possible about the studies in the field of study.

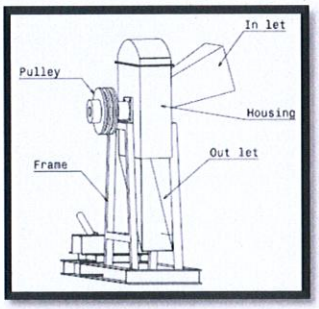
This should be objective when doing research. At this stage, the purpose of reading is to evaluate and criticize other people's selected studies or writings. So, you

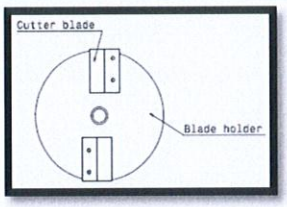
shouldn't just choose studies or writings that agree with what you think is true. You should read all relevant writings transparently even if you do not agree with the writer's opinion or opinion.

2.1 PREVIOUS OF CRUSHER MACHINE

In this study have a preview paper was study to find a several crusher machine such as hammer mills, chopping and blade rotating (Asella Ethiopia, Yonas Mulatu and Muhammad Ashik-E-Rabbani) was develop to many functions and suitable with variable material. Base on the Table 2.1 showing a several crushers which is are advantages and disadvantages. From this table the new design for crusher will develop to solve the problem for farmer to enlargement their livestock.

Table 2.1: Types of Crusher Machine

Concept	Position	Objective	Power supply
 (crushing for livestock feed purpose)	Two top feed hammer mills	To crush crop residue for livestock feed purpose.	ACME diesel engine (169kg/h to 189kg/h rpm from 1200 to 2200
	The rate of rotation of the blade. The performance of the machine is also influenced by the theoretical	To design animal feed chopping machine. To evaluate the performance of the newly constructed	. It is made up of diesel engine, belt, shaft and pulley. (5hp diesel engine With a maximum

 (animal feed chopping machine)	length of the cut, which is controlled by the feed advance. Mechanism	machine	operation speed of 3000.)
 (Chopping, Pulverization, Livestock, Throughput capacity)	The two hoppers were trapezoidal in shape. They were raised 30 °above the horizontal plane to aid the free flow of feed materials .	Their size reduction is imperative in order to Compound them with other feed ingredients to achieve balanced feedstock for livestock.	(1500 rpm and 2100 rpm)
 (low – cost ice crusher for raw fish storage)	This unit's function is to crush the ice block with spikes attached to the rotating cylinder. The beating Force of these spikes depends on	different approaches are employed to shatter ice. The ice is manually crushed with a hefty load in the conventional way. This method is incredibly	(Human power and electric motor) 472rpm

	the power being supplied.	time-consuming and frequently fails.	

2.2 PART OF EACH FIELD

2.2.1 Design (Atiqah)

We can design 3D parts, assemblies, and 2D drawings with the help of the parametric, feature-based technology known as Inventor. Because parameters and connections are built up with control over the design intent, parametric modelling offers greater power and flexibility. The behaviour of your design as determined by the usage of parameters with dimensions and relationships is referred to as design intent.

Because it is an Autodesk tool, Inventor looks and feels similar to AutoCAD. If the currently use AutoCAD, there can quickly create accurate 3D models in Inventor by utilising many of 2D designs. Inventor is necessary for everyone who produces or designs mechanical components. The core abilities required to use Autodesk Inventor will be taught. Start making parts, assemblies, and drawings after becoming familiar with the most frequent features.

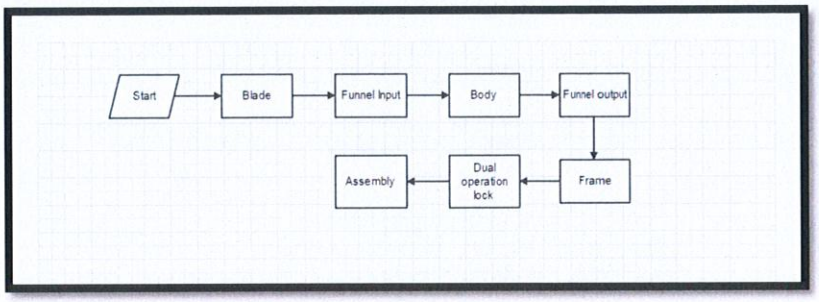


Figure 2.1: Follow concept

African Journal of Agricultural

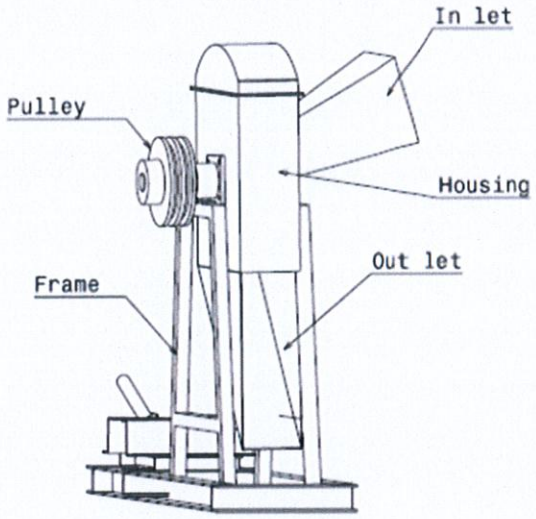


Figure 2.2: Animal Feed Chopping Machine

Journal

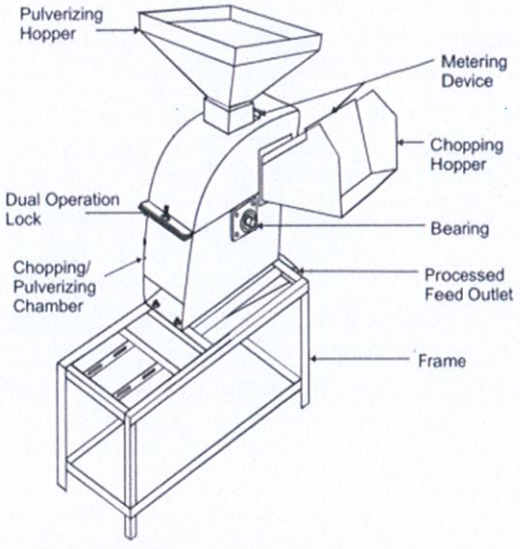


Figure 2.3 Livestock Feed Chopper

2.2.2 Calculation (Danial Haziq)

Calculation and measurement in project. The goal of performance measurement is to assist companies in understanding how past decision-making procedures or practices contributed to their success or failure and how this knowledge might result in future advancements. In our group, I make sure the calculation of each body part is accurate and according to production standards in the market. The importance of calculation in the making of this project is to ensure that there is no waste of material, the feasibility in making the project and to facilitate the use of the machine according to ergonomic standards.

- Formula from journal of crushing for livestock feed purpose

$$\mathrm{CE} = \frac{Mass\ of\ materials\ after\ crushing\ (kg)}{mass\ of\ materials\ before\ crushing(kg)} x100\%$$

Figure 2.4: Calculation Crushing Efficiency

$$\mathrm{CC} = \frac{Total\ mass\ of\ materials\ crushing(kg)}{total\ time\ taken\ (hr)}$$

Figure 2.5: Calculation Crushing Capacity

2.2.3 Electrical (Farezudin)

Electricity is supplying or sending an electrical signal to a power supply. For this project was given the task of making a power supply to be able to move the animal feed crusher. For this project which is an animal feed crusher our group decided to use a Direct current (DC) 24v power supply to drive the machine. Most electric motors work by creating force in the form of torque applied to the motor shaft through the interaction between the motor's magnetic field and the electric current in the wire winding. To ensure that the electric circuit of the motor is successful or not can try or

test the circuit on the website named circuit diagram

Types of power supply

I. DC Motor

DC motor is an electric motor that runs on direct current (DC) electricity. DC motor have two types that is brush and brushless DC motor.

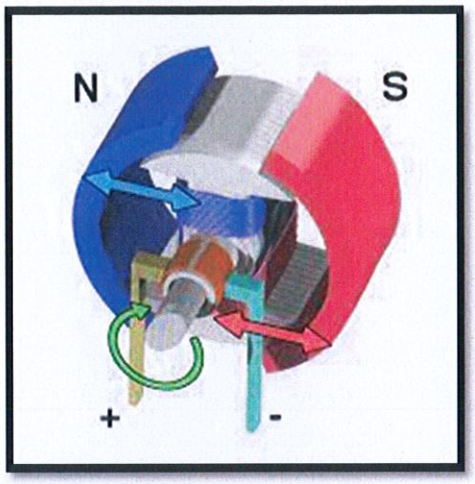


Figure 2.6: DC Motor

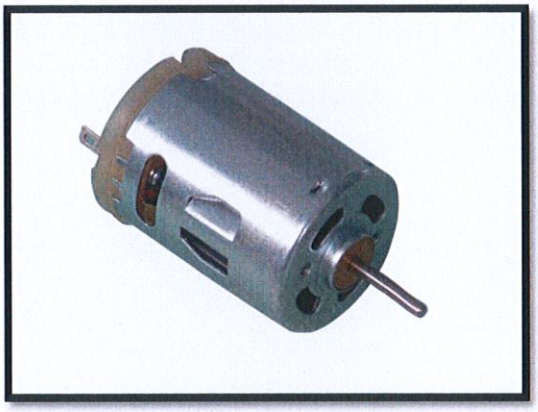


Figure 2.7: Brush Motor

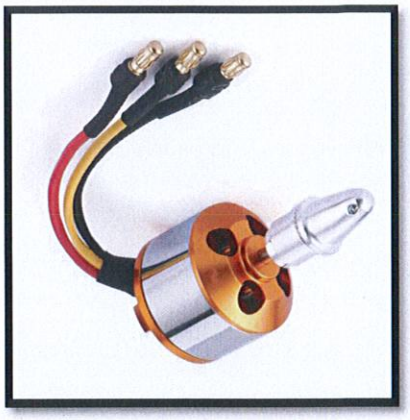


Figure 2.8: Brushless Motor

Table 2.2: Advantages and disadvantages for DC motor

NO.	Advantages	Disadvantages
1.	Provide excellent speed control	High maintenance
2.	Easy to understand design	Not suitable in very clean environment
3.	Simple and cheap drive design	

II. AC Motor

AC motor is an electric motor driven by an alternating current. Commonly consists of two basic parts, an outside stationary stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft that is given a torque by the rotating field. For this AC motor, there are two types depending on the type of rotor used:

- The Sychronous Motor
- The Induction Motor

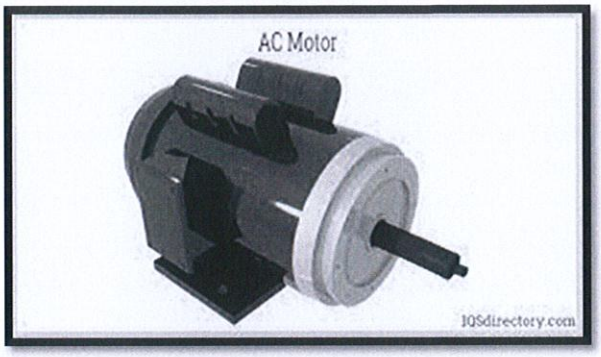


Figure 2.9: AC Motor

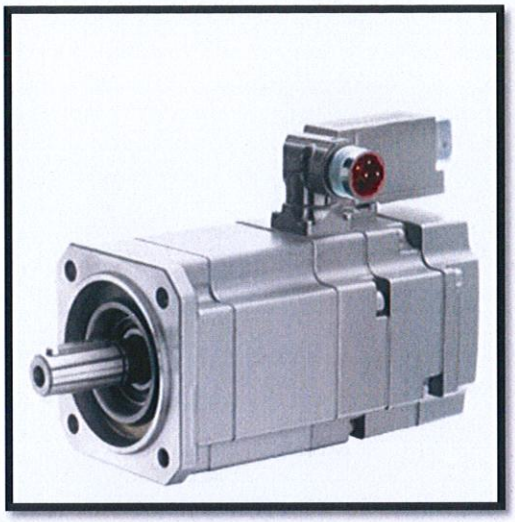


Figure 2.10: Sychronous Motor

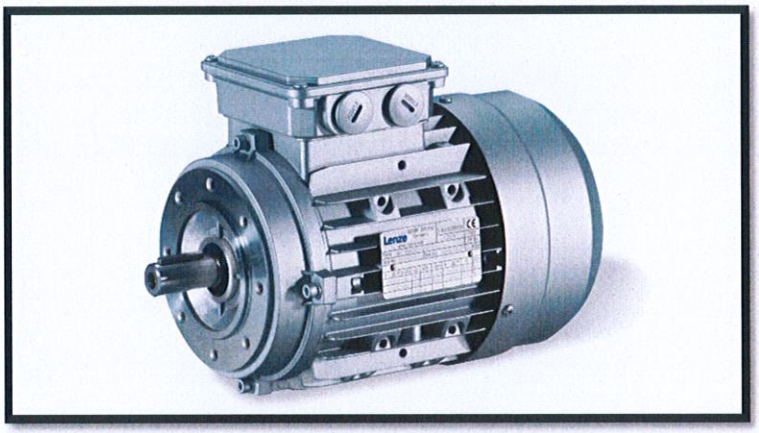


Figure 2.11: Induction Motor

Table 2.3: Advantages and disadvantages for AC motor

NO.	Advantages	Disadvantages
1.	Low cost	Inability to operate at low speeds
2.	Speed variation	Poor positioning control
3.	High power factor	AC will produce eddy currents due to the production of a back emf

2.2.4 Fabricate (Zahrin)

Fabricate is creating or producing something especially in industry. Fabricate is creating or producing something especially in industry. For this project I will make an animal food crushing machine using stainless steel, aluminum and aluminum profile. By following the measurements and drawings that other members have made I will create the machine fabricate is to make anything, particularly for the industrial sector. For this project, I'll use stainless steel, aluminum, and aluminum profile to create a crushing machine for animal feed. I'll build the machine by using the measurements and sketches that other team members have created.

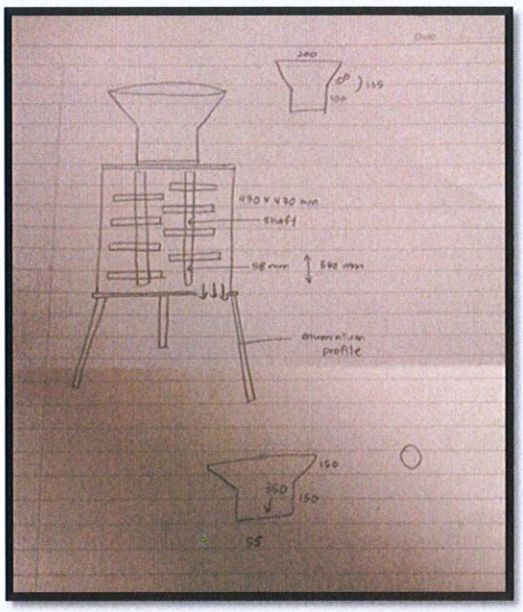


Figure 2.12: Design Concept 1

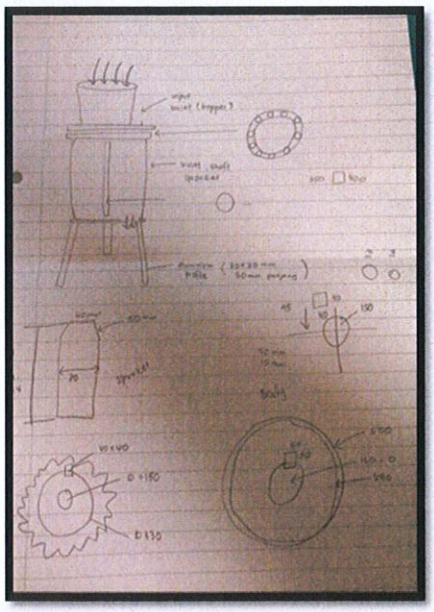


Figure 2.13: Design Concept 2

2.3 SUMMARY

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.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

Methodology is the study of research methodologies. However, the phrase can also be used to characterize the methods themselves or the philosophical examination of the underlying assumptions. A technique is a methodical approach to achieving a specific goal. In the context of research, this goal is frequently to produce new knowledge or to support claims made by pre-existing knowledge. This typically involves several steps, such as choosing a sample, collecting data from this sample, and analyzing this data. The study of techniques includes a comprehensive description and assessment of various processes. It also includes evaluative elements, such as analyzing alternative techniques to identify their advantages and disadvantages in respect to specific research goals and situations.

The study methodology used covers and explains the techniques used for data collection and analysis. An essential portion of any thesis, dissertation, or research paper is the methodology chapter, which describes what happened and how it done so that readers may judge the reliability and validity of work.

3.1 FLOW CHART OF PROJECT

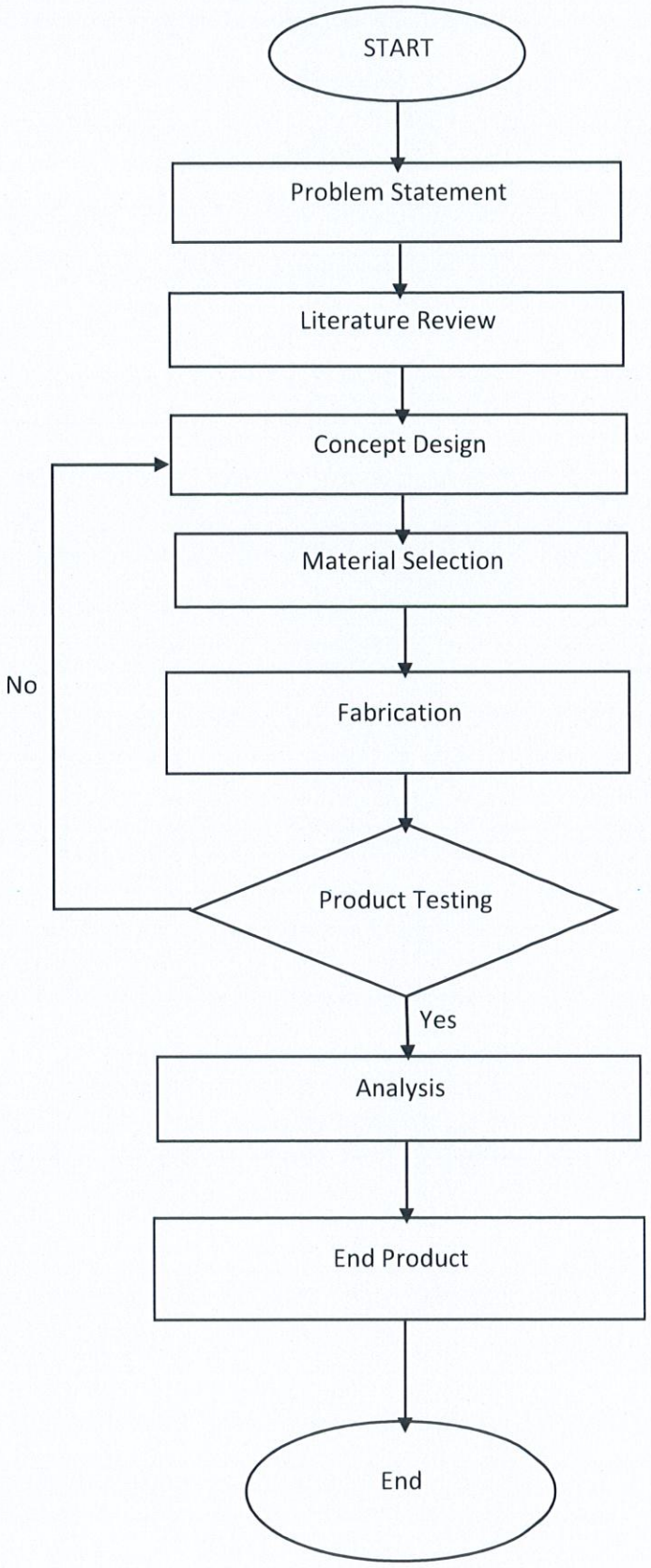
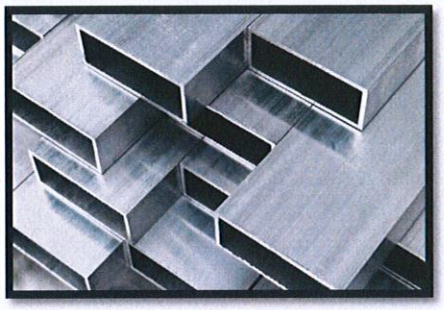


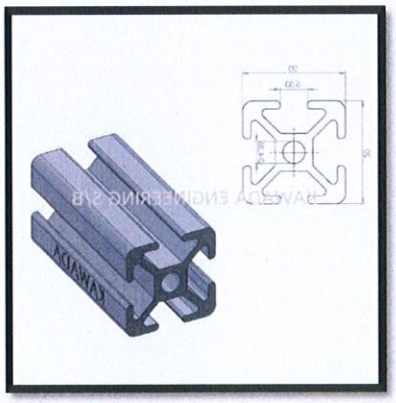
Figure 3.1: Flow chart of project

3.2 MATERIAL

In development of crusher machine for this project have a many material was studied and shown in Table 3.1.

Table 3.1: List of material for Crusher Machine

No.	Material	Describes
1	Aluminum 	Aluminum is a chemical element in the periodic table that has the symbol Al and atomic number 13. It is a member of a group of chemical elements called weak metals and has silvery and ductile properties. Aluminium is a silvery-white, lightweight metal. It is soft and malleable. Uses. Aluminium is used in a huge variety of products including cans, foils, kitchen utensils, window frames, beer kegs and aeroplane parts. This is because of its particular properties.
2	Stainless steel 	The name stainless steel comes from the fact that it does not rust, tarnish, or corrode as quickly as conventional steel. Stainless steel, also known as stainless iron, is defined as an iron-carbon combination with a minimum level of 10.5% chromium. When the type of compound or grade is not mentioned, this material is also referred to as corrosion-resistant iron,

		particularly in the aviation sector. As a result, there are many different stainless steel surfaces available and supplied, depending on the environment to which the material is exposed throughout its lifetime. Everyday spoons and forks as well as iron watch bands are frequently made out of stainless steel.
3	DC 	DC motor 24voltage For electric motor you need one C battery, a small but strong magnet, about three feet of magnet wire (buy it at Radio Shack, online, or any hardware store), two safety pins, a rubber band, sticky putty, and a small piece of sandpaper. Magnet wire has a plastic coating.
4	Aluminum profile 	Aluminum profiles are products born from aluminum alloys that are transformed into shaped objects through the extrusion process. Aluminum's unique combination of physical characteristics mostly depends on this process. Aluminum extrusions are used in several fields because this metal is: Strong and stable.

3.3 PRODUCTION

Making something out of parts or raw materials is the act of producing something. To put it another way, manufacturing uses inputs to produce a finished good or product that is valuable to a client or final consumer. The process of creating anything that is meant for consumption (output) involves combining several immaterial inputs (plans, knowledge). It is the action of creating an output, a good, or a service that is valuable and improves the utility of individuals.

A productive action or endeavor to produce commodities and services that can satiate human needs and wants is referred to as production. Economic prosperity is produced during the production process, which includes all economic endeavors with a direct or indirect

3.4 MACHINE CONCEPT

Machine concept is a machine or system, such a computer that completes or facilitates the completion of a human task. This machine is a chicken corn bran crushing machine. It is to make it easier for small scale chicken farmers to get different sizes of corn bran as the market price of bran is getting higher. The machine can make 2 different sizes of bran. That machines are also made according to standard height or ergonomics. This corn bran grinding machine also uses legs that can modify the height according to the needs of the farmer. This machine can crush 100gram of corn bran in 3 minutes. This is the chosen design concept.

3.4.1 Body

There are several design concept of body machines. And this is the chosen design concept for the project. The design can be referring to figure 3.2 to figure 3.4.

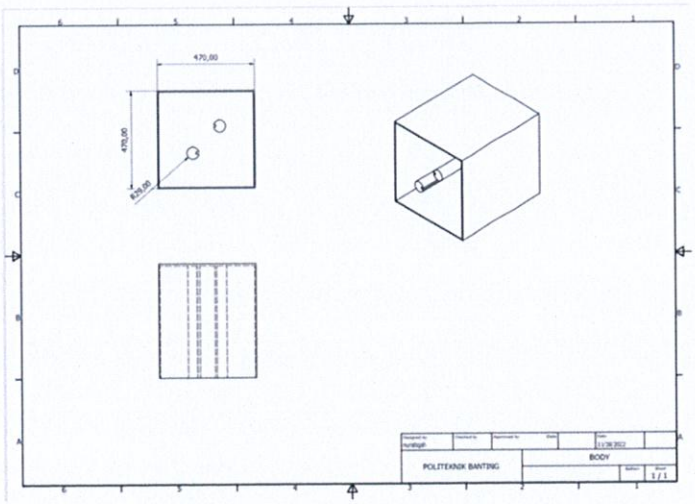


Figure 3.2: Square blade body

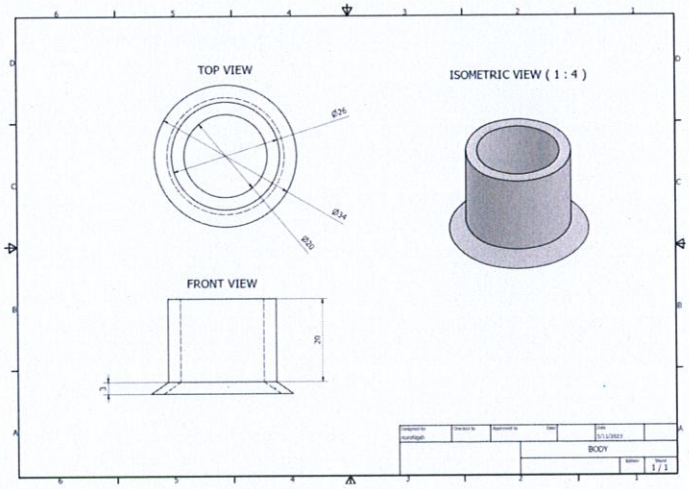


Figure 3.3: Hollow body

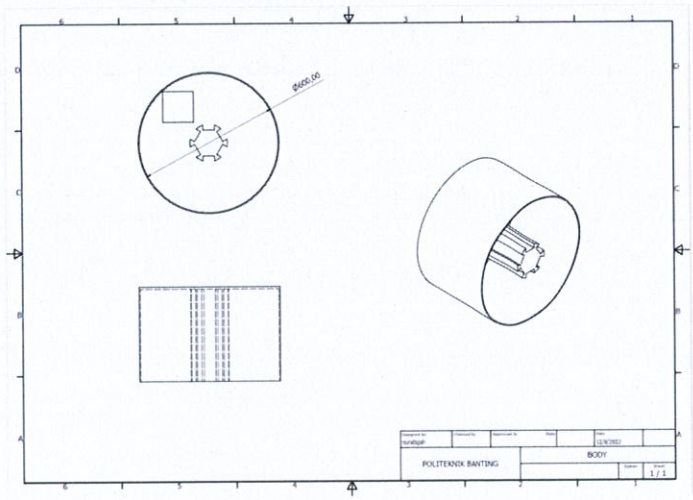


Figure 3.4: Body sprocket

3.4.2 Blades

To crush material into small or fine pieces of material should be refer to the figure 3.5, figure 3.6 and figure 3.7 a type of blades.

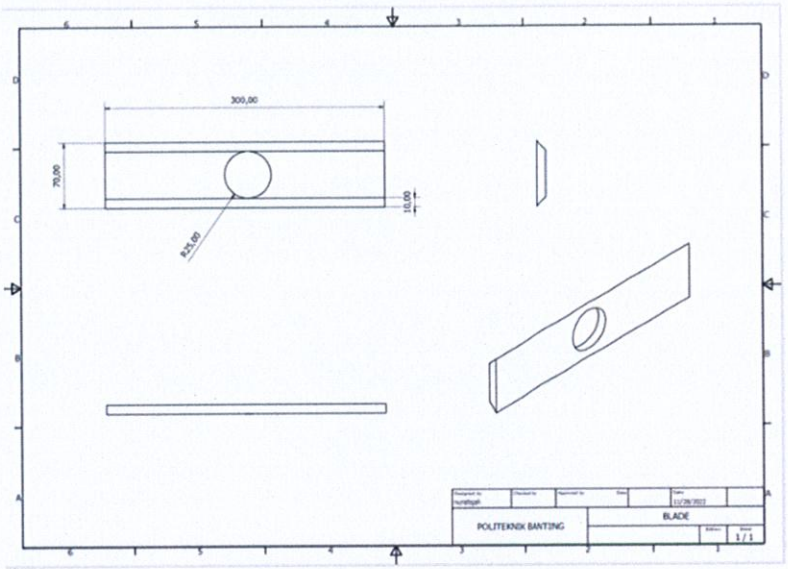


Figure 3.5: Blade knife

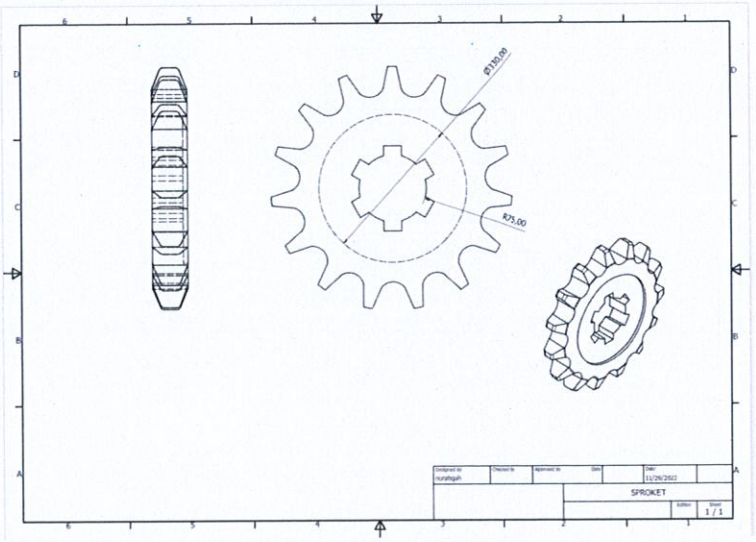


Figure 3.6: Blade knife sprocket

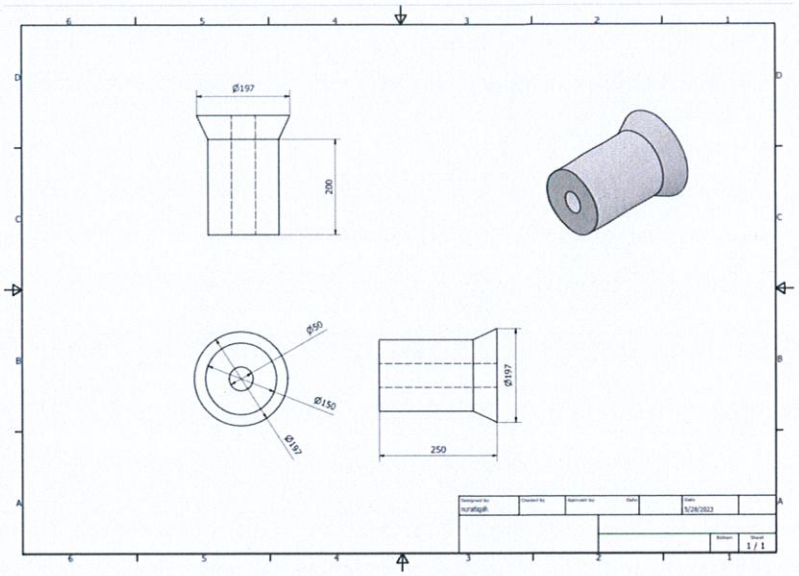


Figure 3.7: Cylindrical Mincer

3.4.3 Hopper / Input

A container for a loose bulk material such as grain, rock, or rubbish, typically one that tapers downward and is able to discharge its contents at the bottom or enter the material to be crushed refer to the figure 3.8 and 3.9.

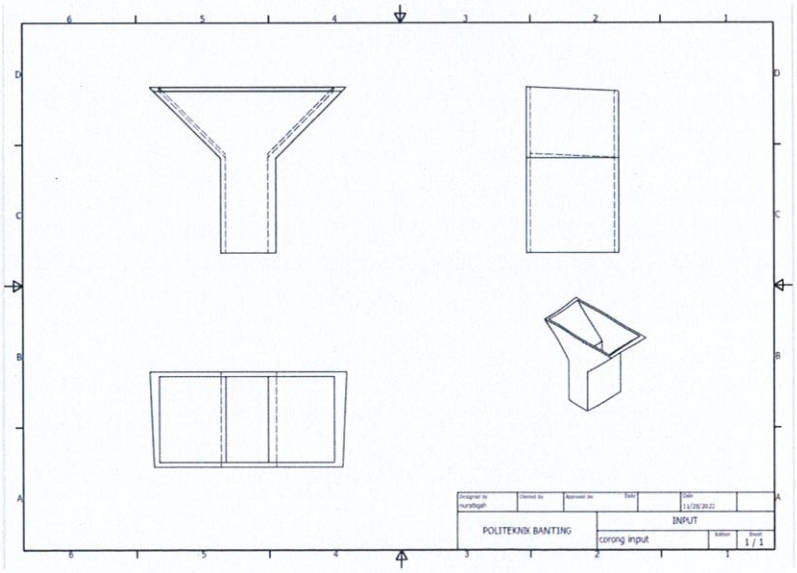


Figure 3.8: Hopper body blades

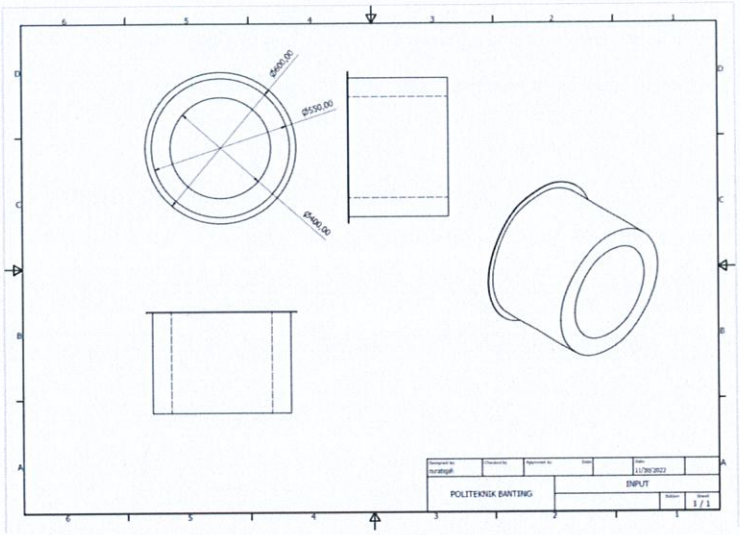


Figure 3.9: Input body sprocket

3.4.4 Aluminium profile

Aluminium profile uses this machine because it is to balance the body and can adjust for high and low 20x20 mm refer to the figure 3.10.

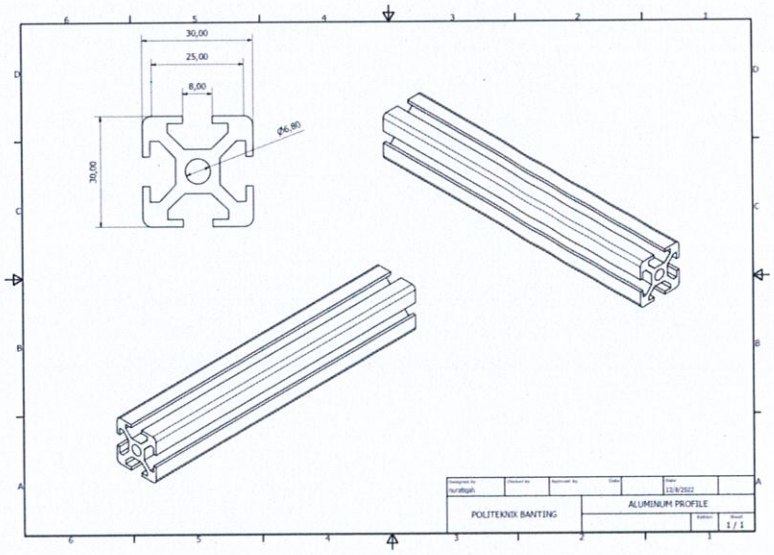


Figure 3.10: Aluminium profile

3.4.5 AC Motor

The AC motor delivers controlled acceleration, controlled beginning current, adjustable operation speed, and adjustable torque in addition to reducing power line

disruptions and lowering power requirement during start up. The design of motor for this project such as figure 3.11 and figure 3.12.

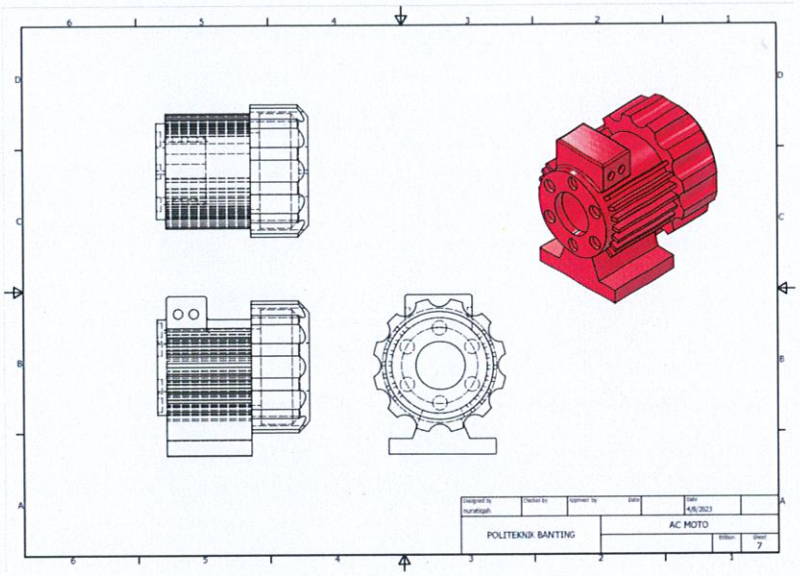


Figure 3.11: AC Motor

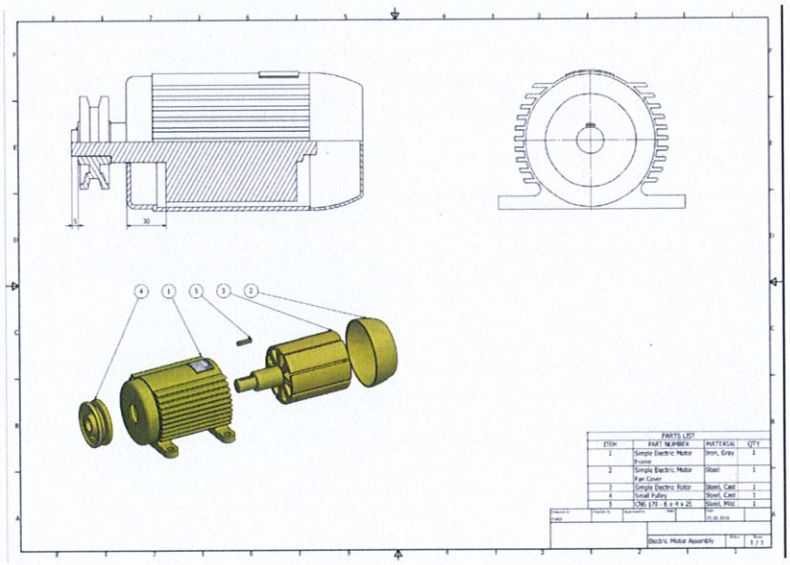


Figure 3.12: Electrical Motor

3.4.6 Ball Bearing

Bearing is one of the components that play a very important role in the machine and mechanic industry. It can also determine an object or place accurately. Refer to the figure 3.13.

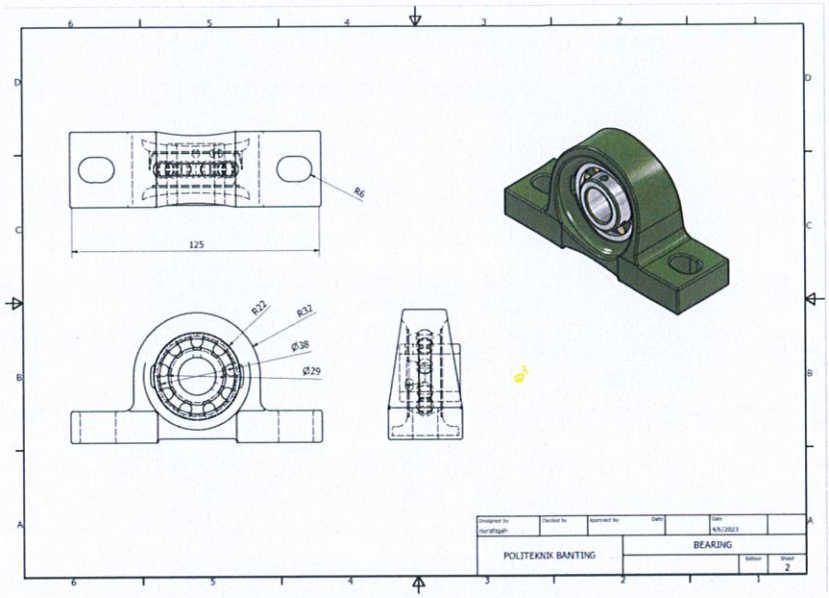


Figure 3.13: Ball Bearing

3.4.7 Bevel gear

Bevel gears intersect at 90° angles but they can also be designed to work at other angles. The flange shaft connects the pinion gear with the clutch shaft, so that the pinion gear can receive rotation and pass it on to the bevel gear. Refer to the figure 3.14.

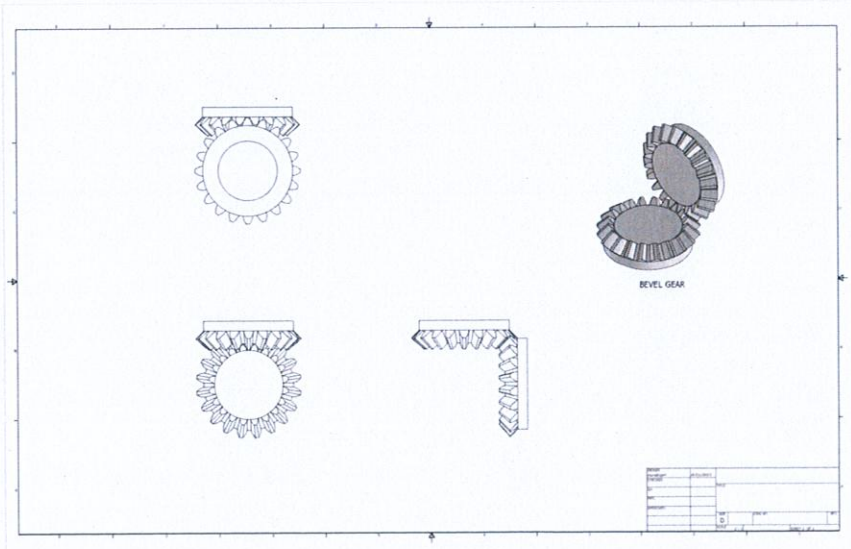


Figure 3.14: Bevel Gear

3.4.8 Funnel and container

This is for the output of the material so it doesn't hit the gear or rather it doesn't get messy. Refer to the figure 3.15 and 3.16.

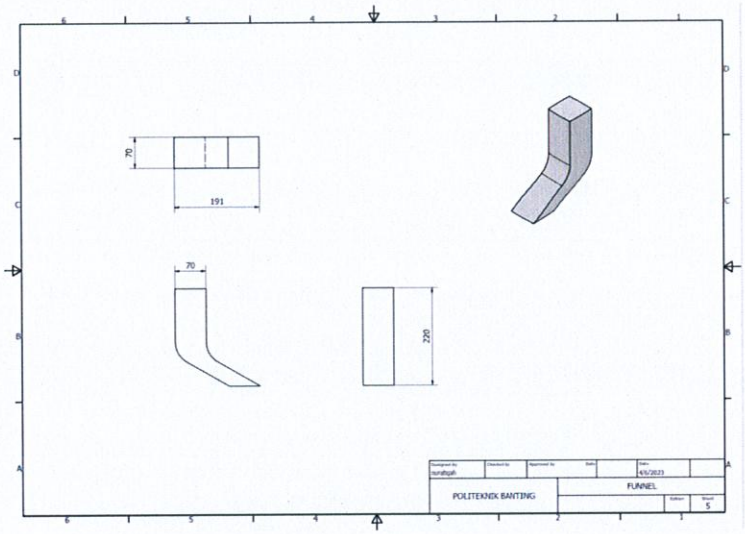


Figure 3.15: Funnel

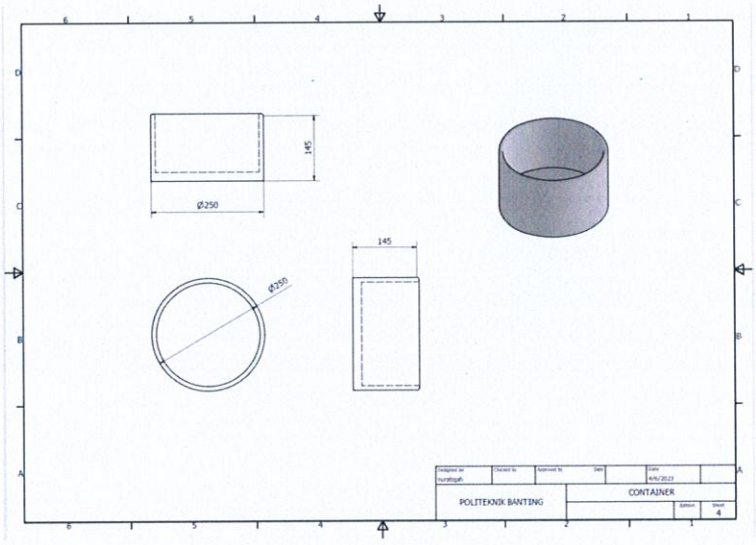


Figure 3.16: Container

3.4.9 Plate or structure

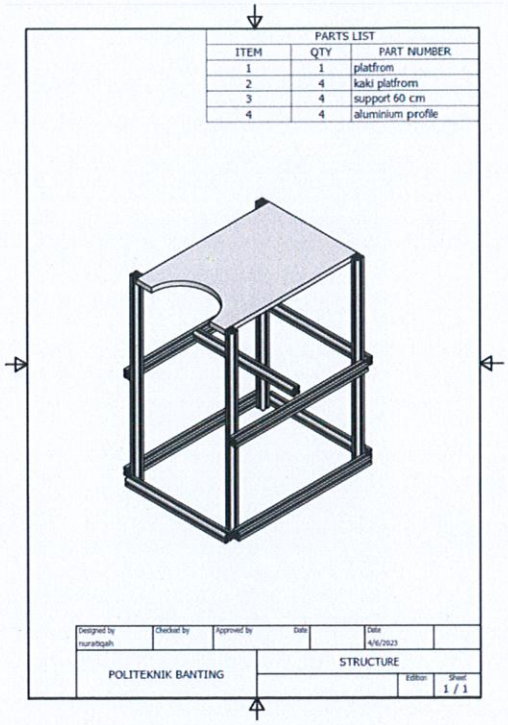


Figure 3.17: Structure

3.4.10 Assembly part first design

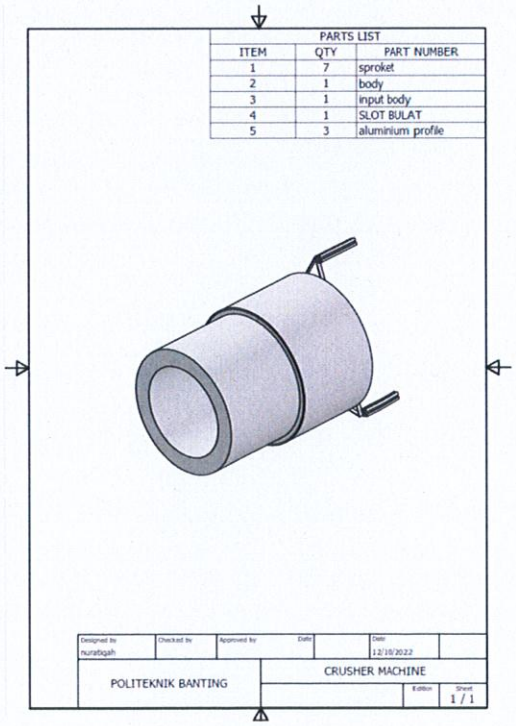


Figure 3.18: Assembly 1

3.4.11 Assembly second design

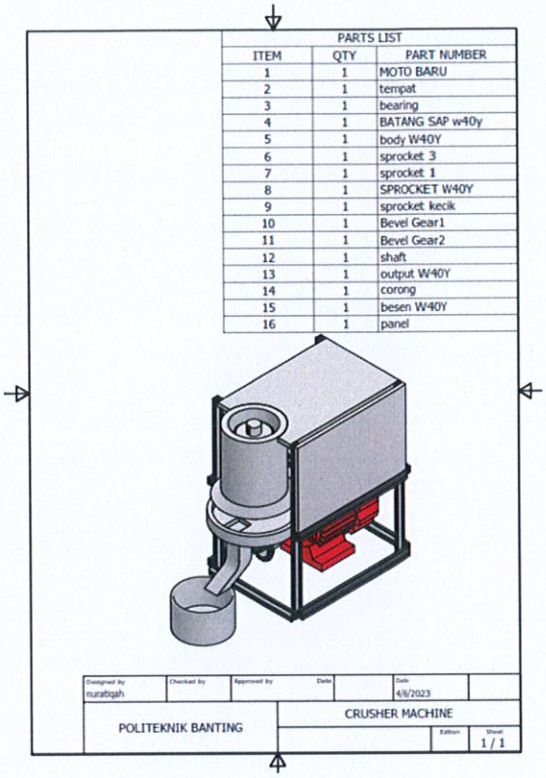


Figure 3.19: Assembly 2

3.5 DATA ANALYSIS METHOD

A Gantt chart is a chart created to represent the production control process in an industry. This chart uses a bar graph. Gantt chart is our planning progress project.

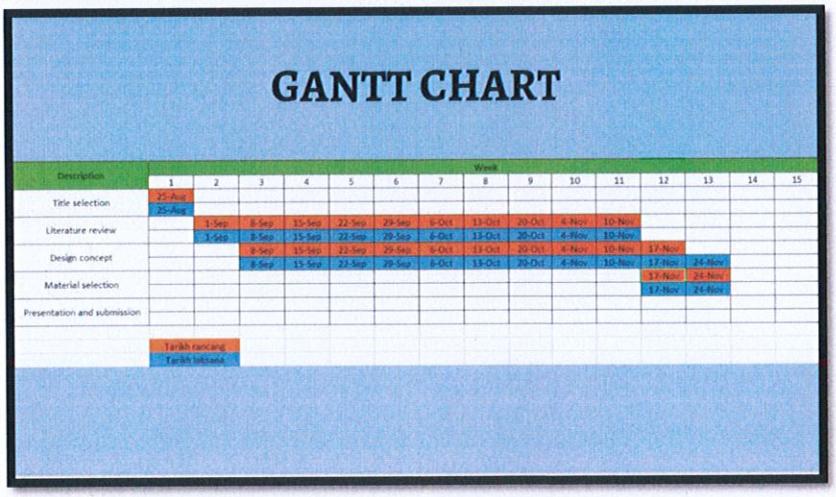


Figure 3.20: Gantt chart

3.6 SUMMARY

Data are an effective way to sort through massive amounts of information to find patterns, trends, and insights. It gives us a factual foundation on which to base our discussions, allowing us to go beyond merely expressing our opinions and sharing anecdotes. Data may help us better comprehend the environment around us, spot issues, and search for creative solutions. It gives us the ability to pose important queries, refute presumptions, and participate in serious intellectual discussions.

CHAPTER 4

RESULT AND DISCUSSION

4.0 INTRODUCTION OF CHAPTER

This chapter focuses on result data and discussion. The data was obtained from the process of collecting data from the percentage of crushed feed and the time taken for the machine to crush it.

Data are an effective way to sort through massive amounts of information to find patterns, trends, and insights. It gives us a factual foundation on which to base our discussions, allowing us to go beyond merely expressing our opinions and sharing anecdotes. Data may help us better comprehend the environment around us, spot issues, and search for creative solutions. It gives us the ability to pose important queries, refute presumptions, and participate in serious intellectual discussions.

Furthermore, data-driven debates provide a platform for people to interact and share ideas from different points of view. By depending on factual information, we can close comprehension gaps and promote fruitful discussion. Data serves as an objective arbiter, leading us to draw conclusions supported by evidence and easing the use of evidence in making decisions.

4.1 PRESENTATION OF FINDINGS

The aluminum profile use 20x20mm for the 8-meter structure with price RM 400. After that, this hollow cylinder iron to make a body measuring 22cm and a blade measuring 14cm and cut the bottom of the body and blade by 3cm and tilt it by 45 degrees and weld the cut part using MIG welding. After that, make a coupling for the motor to connect with the shaft. By using a machine lathe. By using mild steel make a coupling shape measuring 8cm. After that, this connects the coupling with the shaft using welding and connect the shaft with a 90° bevel gear size 20 teeth and 25 teeth with price RM 169. This machine using 3 ball bearings of sizes 1.5cm on the upper shaft and use mild steel for the bearing holder. Another part of machine uses a 20-watt fan motor to drive. This our part of machine. Refer to figure 4.1 until figure 4.11

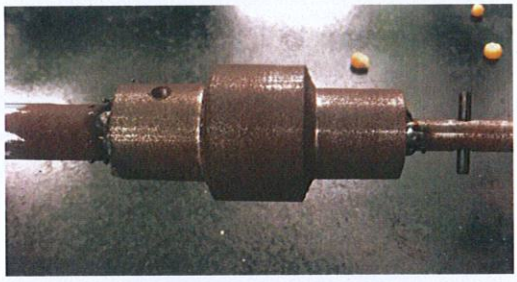


Figure 4.1: Coupling

Figure 4.2: Bevel Gear

Figure 4.3: Hopper

Figure 4.4: Output

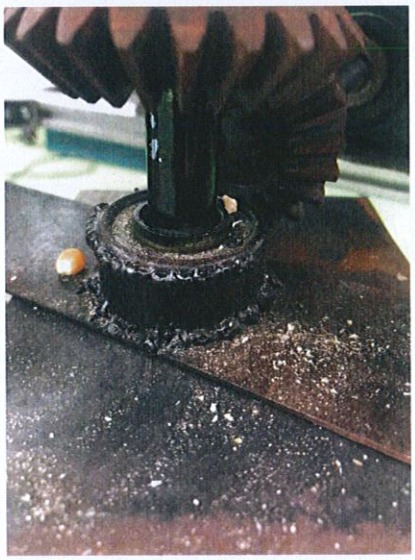


Figure 4.5: Bearing

Figure 4.6: Body Machine

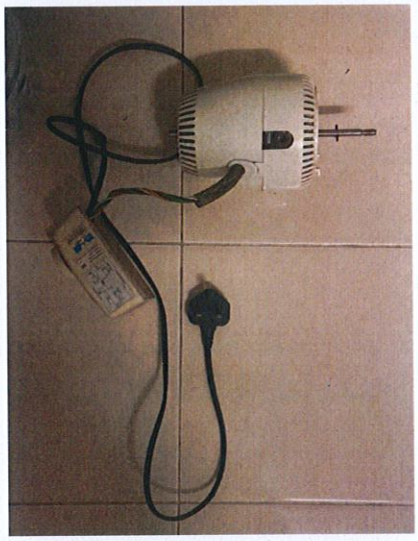


Figure 4.7: Fan Motor

Figure 4.8: Cylindrical Mincer

Figure 4.9: Structure

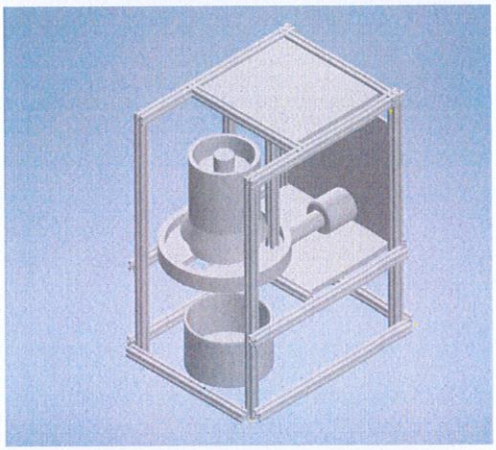


Figure 4.10: Drawing Crusher

Figure 4.11: The Complete of Machine Crusher

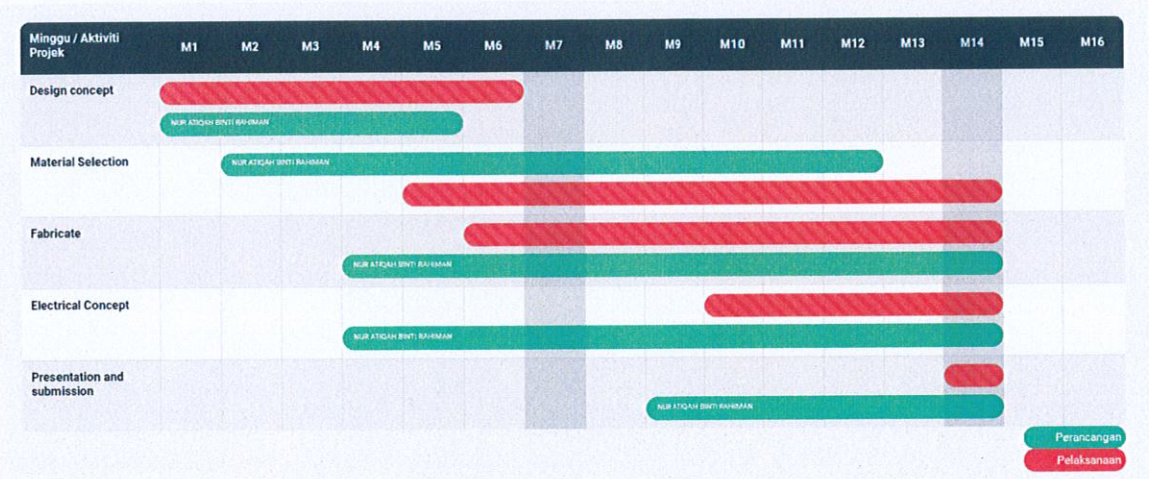


Figure 4.12: Gantt Chart

4.2 DATA ANALYSIS

In this study, the raw material for livestock was selected are corn seed and moringa leaves because this material a major using in animal feed to enhancement he livestock. The data processing for this machine can be show as below:

Material corn bran and moringa leaves

1. First data collected from original position. For 100g of corn bran, the result is around 5% of crushed corn bran. The space between the cylindrical mincer and the body from the original position is 1cm. The crushing process took about 3 minutes and 14 seconds to crushed all 100g of corn bran.

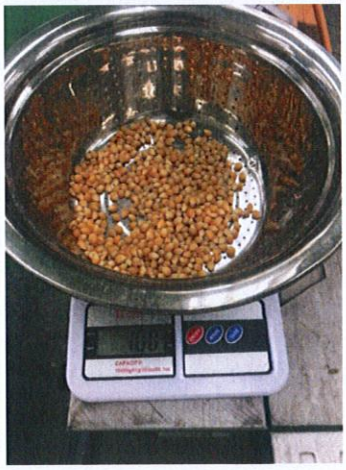


Figure 4.13: 100gram corn bran

Figure 4.14: First Crusher Result

Figure 4.15: Process Time

2. Data collection number two is, a piece of metal sheet with 0.4 cm thickness is insert between the bearing house and making the height of the cylindrical mincer changed to 0.6cm in tolerance. The same amount of corn bran was used which is 100g. The percentage of corn brans that crushed is 15% and it took 1 minute and 32 seconds only because the cylindrical mincer and the machine body is stuck.

Figure 4.16: 15% Dissolved

Figure 4.17: Process Second Time

3. After studied the data about corn bran, moringa leaf is the second ingredient in choice to study and find data in the effectiveness of the machine since it is also included in nutritious feed for poultry. For the first data collection from Moringa leaves, 50g of leaves are used and study is performed on original position from the machine. The results were only 11% of moringa leaves were dissolved from the twigs after being put in the machine. The process for the machine to dissolve moringa leaves at the first tolerance is 1 minute and 32 seconds. The moringa leaves used for the first data is freshly pick.

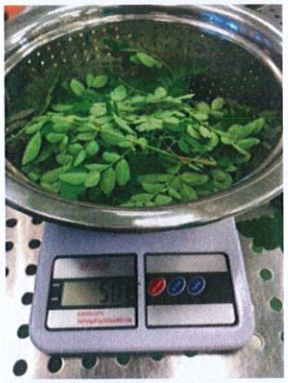


Figure 4.18:Mass Before Crush

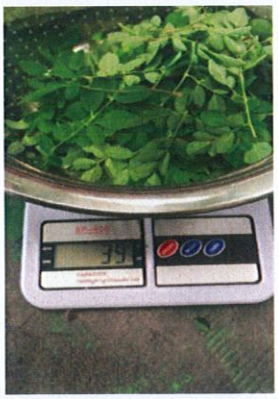


Figure 4.19: Mass After Crush

Figure 4.20: Time First

Figure 4.21: 11% Crush

4. The second data obtained is with the same weight of moringa leaves which is 50g but a different tolerance which is with the addition of a piece of iron with a thickness of 0.6cm. The result is that moringa leaves can be dissolved in 50% with this method in 1 minute and 49 seconds.

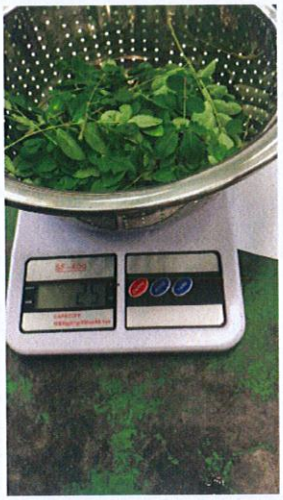


Figure 4.22: Mass After Crush

Figure 4.23: 50% Crush

Figure 4.24: Time

5. The second data collection is by letting the moringa leaves stay at room temperature for 1 hour. Moringa leaves with the same weight of 50g and the original tolerance. The result is that moringa leaves can be crushed and dissolved by 18%.

Figure 4.25: Time Crush

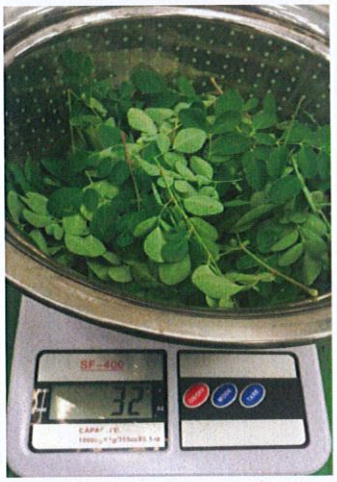


Figure 4.26: Mass After Crush

Figure 4.27: After Crusher

6. The last data took was moringa leaves that had been left at room temperature for 1 hour. The same quantity is use which is 50g but a different tolerance which is reduced up to 0.6cm. As a result, the moringa leaves were crushed and dissolved from the stem by 90%.

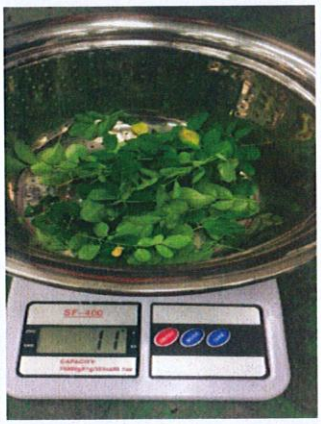


Figure 4.28: Mass After Crush

Figure 4.29: Time

Figure 4.30: 90% dissolved

4.3 DISCUSSION ON RESEARCH FINDINGS

Regarding the data analysis and experiments was tested for this machine showing this machine is suitable using for farmer to process animal feed by itself. The data processing material such as corn bran and moringa leave. And this machine is very suitable using for moringa leave because the more material can be crush to small size particle. The machine can crush and dissolve moringa leave but there will be a few leave will be stuck inside the machine body and it will make the machine stop spinning. After a few minutes crushing and dissolving process, the machine will loss the power since it operated using small motor (fan motor). The motor will overheat and slowing down the speed for crushing and dissolving process until the machine stop.

4.5 SUMMARY OF CHAPTER

All this is related to the project that have completed well. This data is very satisfactory and managed to get the objective completely. In understanding of the data can improve the machine even better. If this data contains potential confounding variables are confident that can control.

CHAPTER 5

CONCLUSION & RECOMMENDATIONS

5.0 INTRODUCTION ON CHAPTER

This chapter describes a project that was successfully finished in roughly twelve months, or two semesters. In addition, there were several issues encountered during the installation and testing of the product. As a result, there are some recommendations for future improvements to our product that will benefit the users. The choice made in this chapter is based on the conclusion reached after conducting this study and having a debate in the chapter that came before it. In addition, the associated topics that connect to the goal and the recommendations from the research are covered in this chapter as well. The study's conclusion has been reached at this point

5.1 ACHIEVEMENT OF RESEARCH OF OBJECTIVES

This machine can dissolve and crush materials such as moringa leaves. After conducting studies and data collection, there can give the final word that the crusher use for the manufacture of the machine is not suitable for crushing materials such as chicken bran. But moringa leaves are better for dissolving and crushing using our original crusher. As the data have recorded, almost 100% of the production of the data

obtained is the process of dissolving and crushing the type of moringa leaf material and this proves that the machine is suitable for use.

5.2 CONTRIBUTION / IMPACT OF THE STUDY

With the research that have done, there are confident that can help small farmers. Apart from that, the change in the selling price of chicken will also decrease if our project can be recognized by many more large breeders throughout the country. After all, the objective of this machine development is to help small farmers reduce the cost of purchasing chicken bran (corn bran) which is increasingly soaring in market prices.

5.3 LIMITATION / CONSTRAINT OF THE STUDY

The research study aims to help small farmers in reducing the cost of expenses. However, several limitations were encountered during the study, which affected the scope and generalizability of the findings. This Crusher Machine is not suitable to use for crushing of corn seed for chicken bran because the data showing around 15% maximum was crushed compare with Moringa leaves around 90% was crushed. This is because of mistake in producing the machine body and blade without proper equipment. Next, the objective target is to get 2 different types of bran destruction size. This is due to inaccuracy in the measurement before doing the installation of the project. Also, the motor can use is quite small and cannot produce a strong energy transfer and cannot last for a long time. This is because don't have the money to buy a high-powered motor. Despite these limitations, the study provides valuable insights into the potential relationship between technology and student achievement. Future research should aim to address these limitations to further contribute to the understanding of the topic and enhance the validity and generalizability of the findings.

5.4 FUTURE IMPROVEMENT & SUGGESTION

In future study, there are a few improvements needed to be done such as:

I. This project uses a 20-watt fan motor but would suggest using a higher power motor for example a 1.118 kW ac motor or using an automatic Arduino can control speed and open and close.

II. Measure more correctly don't fight.

III. Change the tool points that are easy to crush the bran.

IV. The output is not cluttered or covered with containers or funnels

V. Priority safety so that fingers are not injured.

VI. Cover the bottom of the machine with a plate.

VII. Easy input when entering material.

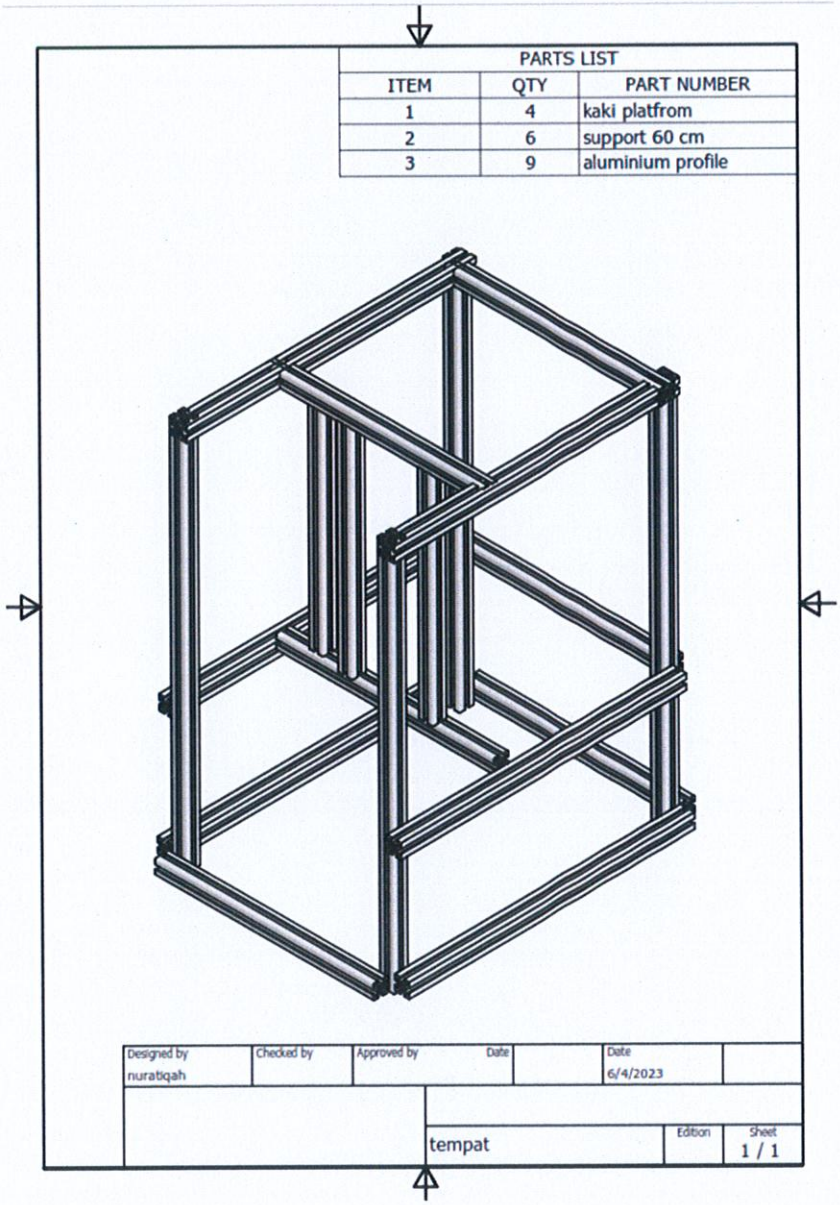
VIII. Use a light plate so that the machine is easy to carry.

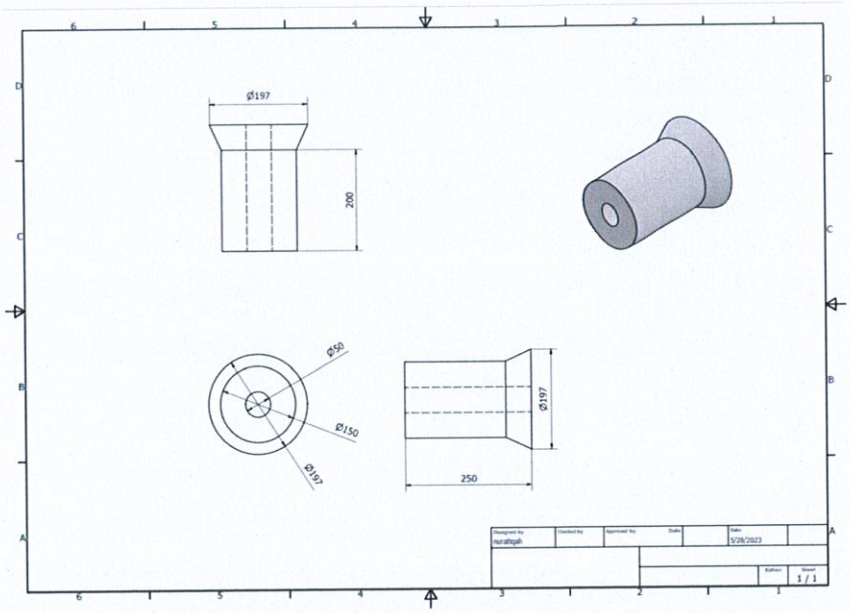
5.5 SUMMARY OF CHAPTER

In general, as observed in the evaluation results, the machine can reach the highest capacity based on the operating speed. When the machine operates at a higher speed, the capacity increases as high as possible performance. Machine speed also affects length at the cutting feed rate, and the faster the machine's operating speed the higher its efficiency and lower material consumption. Recommendations are made to increase the capacity and efficiency of the machine. Based on the results of the evaluation, some recommendations can be made with respect to the power source. The recommend using a high-powered motor to get high torque. This machine got very satisfactory data using moringa leaf material from corn.

APPENDIX

Technical Drawing

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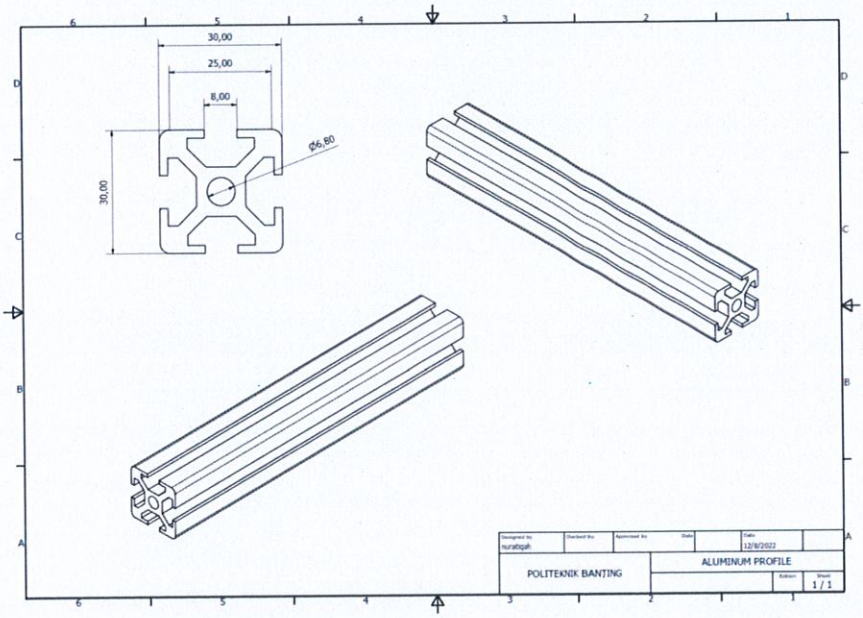
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POLITEKNIK BANTING
ALUMINUM PROFILE
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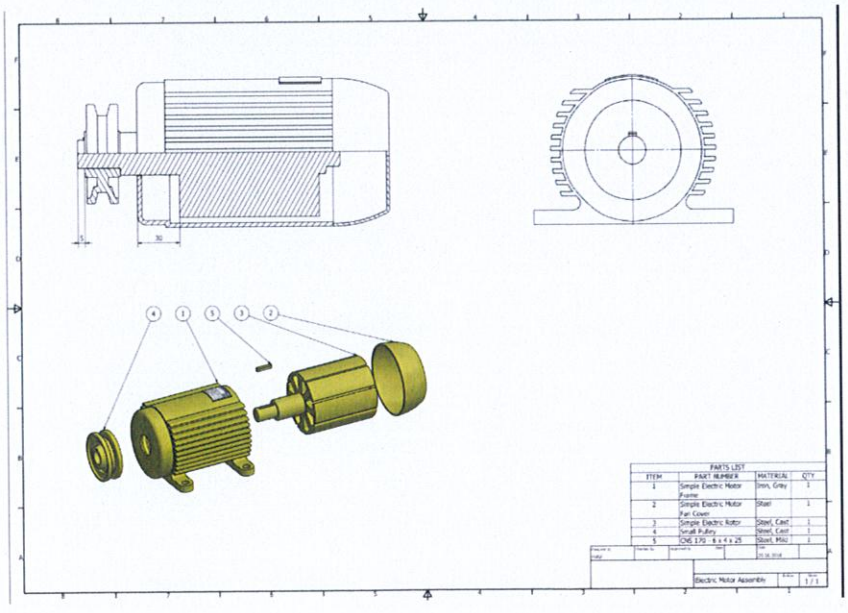
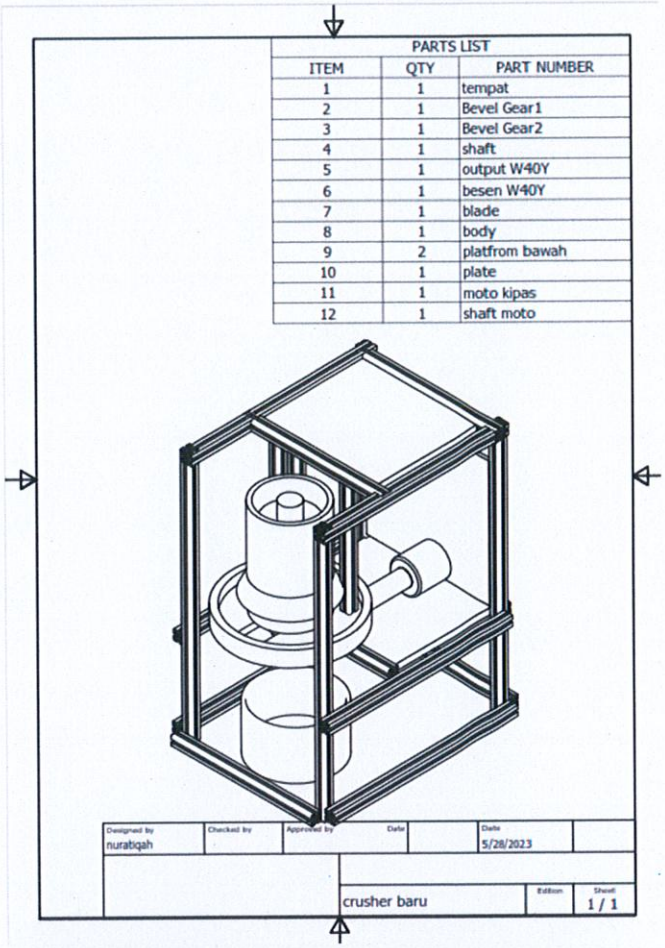

PARTS LIST
ITEM
PART NUMBER
MATERIAL
QTY
Simple Electric Motor
Iron, Gray
Frame
Simple Electric Motor
Steel
Part Cover
Simple Electric Rotor
Steel, Cast
Small Pulley
Steel, Cast
CNS 170 6 x 4 x 25
Steel, Mild
Electric Motor Assembly
1 / 1

Result drawing



PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	tempat
2	1	Bevel Gear1
3	1	Bevel Gear2
4	1	shaft
5	1	output W40Y
6	1	besen W40Y
7	1	blade
8	1	body
9	2	platfrom bawah
10	1	plate
11	1	moto kipas
12	1	shaft moto

References

1. Alemneh T, Getabalew M (2019). Beef Cattle Production Systems, Challenges and Opportunities in Ethiopia. Juniper Online Journal of Public Health 5(1):2019. https://doi.org/10.19080/JOJPH.2019.05.555651

.

2. Shrinivasa DJ, Mathur SM, Khadatkar A (2021). Design and evaluation of portable compound cattle feed pelleting machine for farm-level

3. Feed production. Journal of Scientific and Industrial Research 80:105-

4. 114. Central Statistical Authority (CSA) (2020). Central Statistical Authority of Ethiopia: Report on Livestock and Livestock Characteristics (Private Peasant Holdings). II (March).

5. Lazaro EA, Turuka FM, Mdoe NSY (1999). Introduction of forage choppers in livestock producion systems in Tanzania. In Proceedings of FoA Conference 4:90-95.FAO (2019). The future of livestock in Ethiopia. Opportunities and challenges in the face of uncertainty. Rome. 48 p. Licence: CC BY- NC-SA 3.0 IGO.

6. Jibrin MU, Amonye MC, Akonyi NS, Oyeleran OA (2013). Design and Development of a Crop Residue Crushing Machine. International Journal of Engineering Inventions 2(8):28-34. http://www.ijeijournal.com/papers/v2i8/D02082834.pdf.

7. Kebede G, Ababa A, Feyissa F, Assefa G (2017). Review on Major Feed Resources in Ethiopia: Conditions, Challenges and Opportunities. Academic Research Journal of Agricultural Science and Research 5(3):176-185. https://doi.org/10.14662/ARJASR2017.013

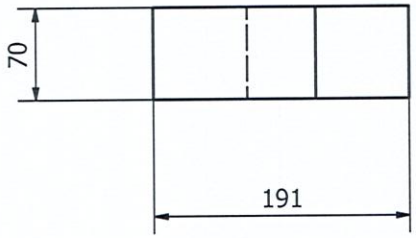
8. Muhammad K, Walusimbi K H, Jimmy K, Swidiq M (2018). Design and performance evaluation of a NARO forage chopper prototype for

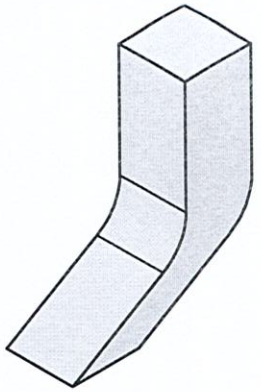
9. Smallholder dairying systems. Design and Performance 5(11): 547–551.

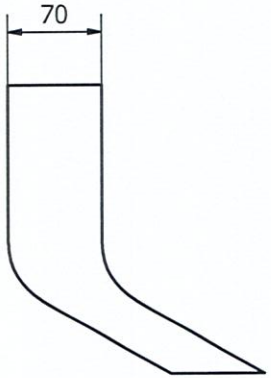
10. Srivastava AK, Goering CE, Rohrbach RP, Buck master DR (2013). Engineering Principles of Agricultural Machines, Second Edition. https://doi.org/10.13031/epam.2013

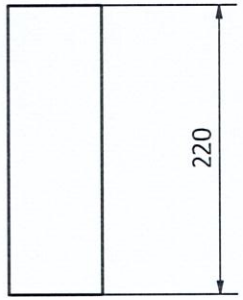
11. Tekeste S (2020). A Design Study of a Motor-Diven Chopper for Chopping Crop Residue and Hay. November 2012. IUP Journal of Mechanical Engineering 5(3):68.

ATTACHMENT
1 – 13









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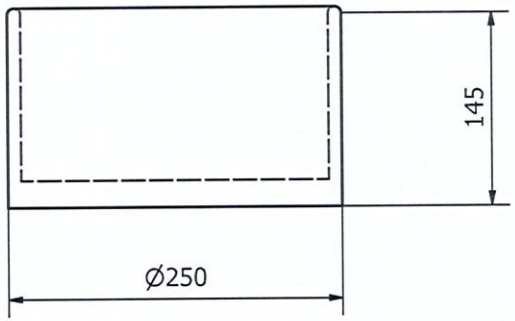

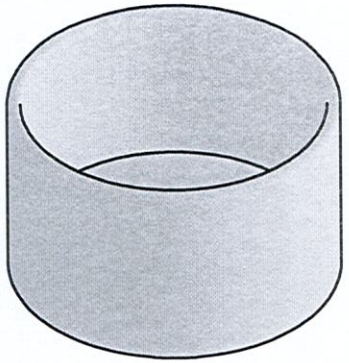

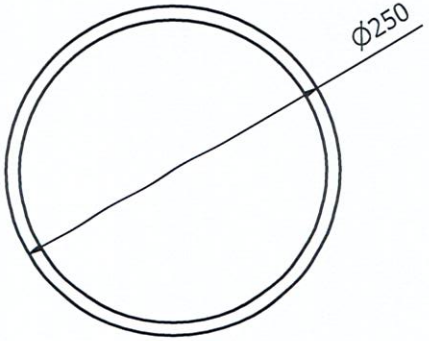

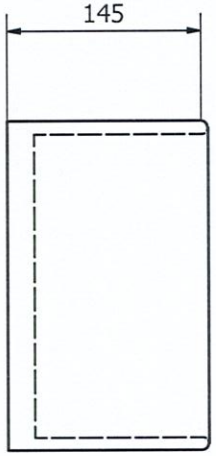

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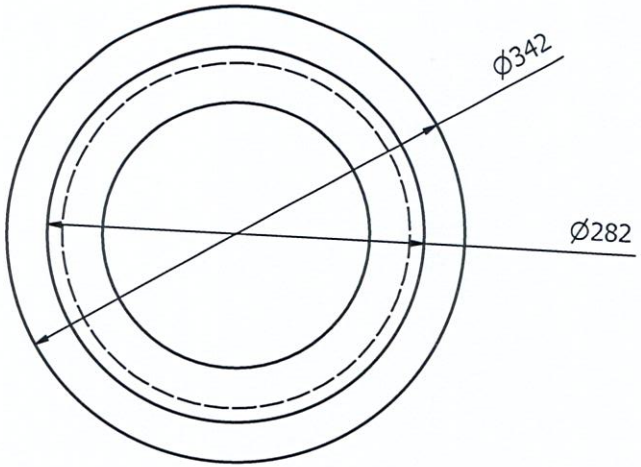

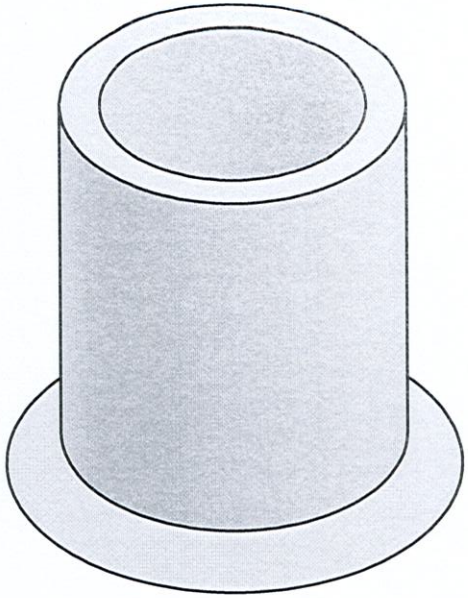

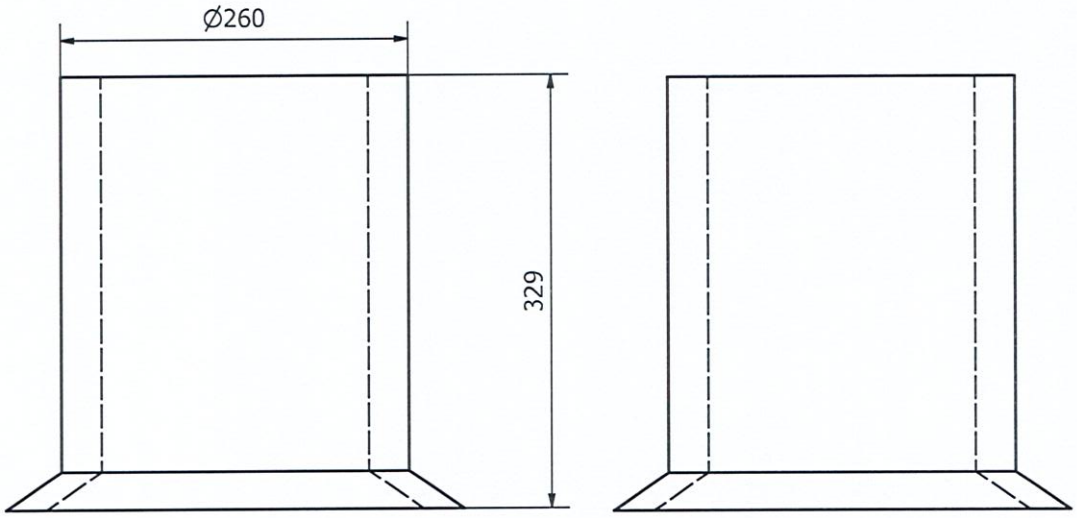

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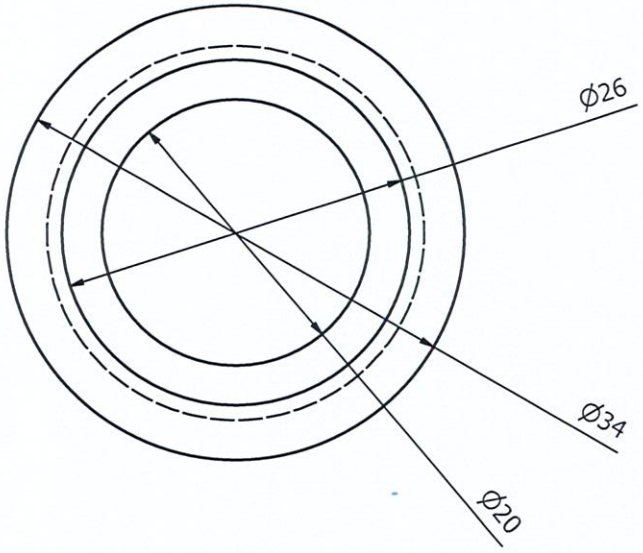
TOP VIEW



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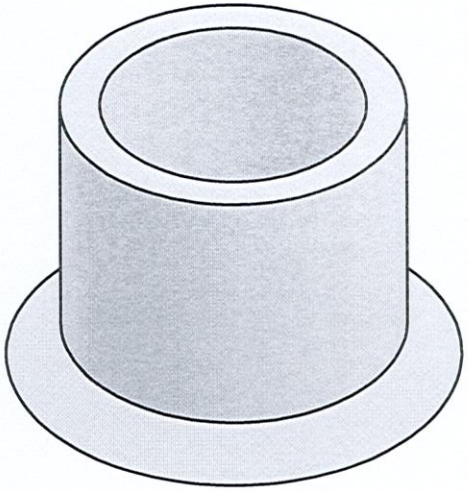

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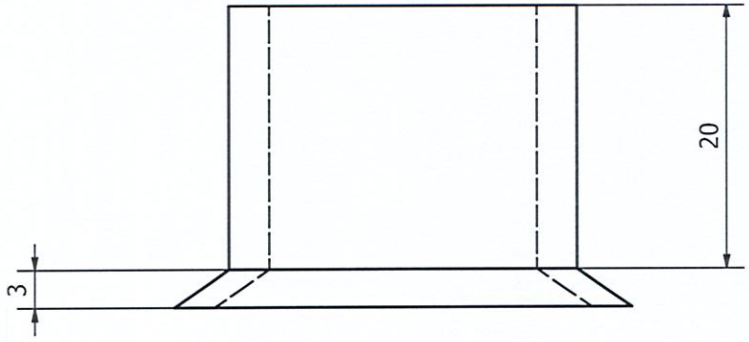

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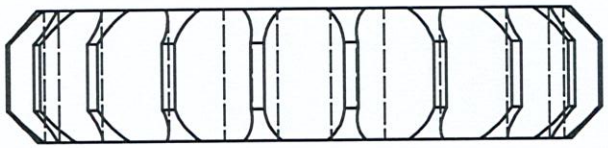

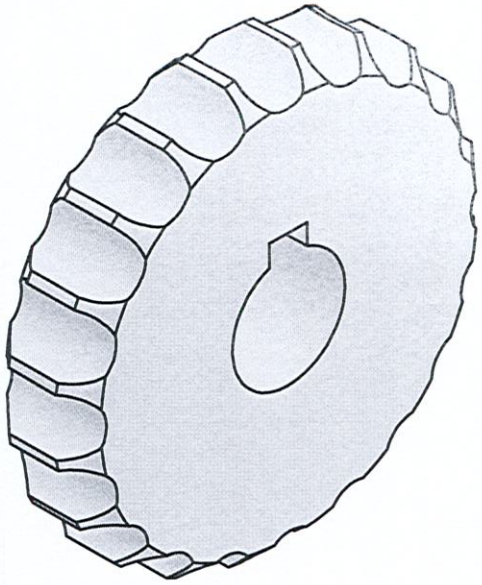

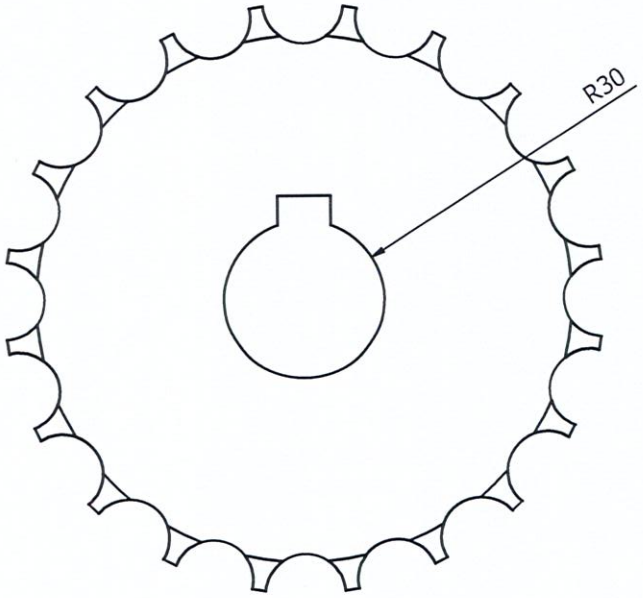

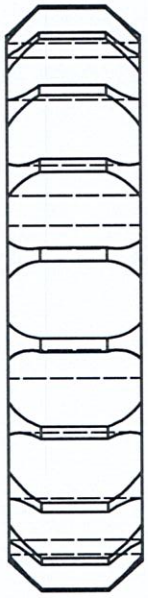

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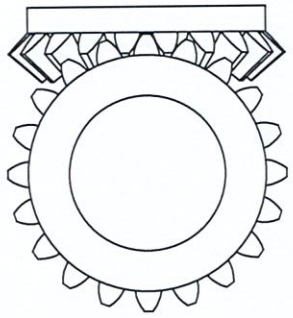

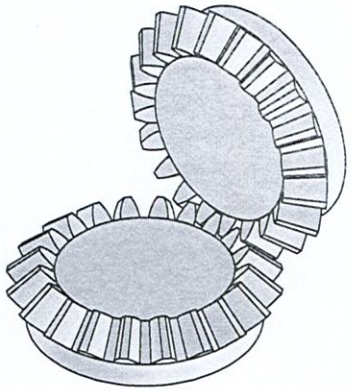

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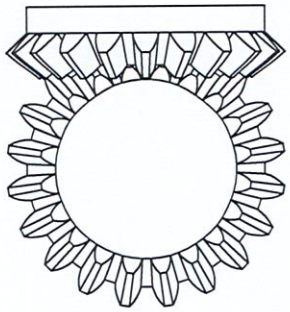

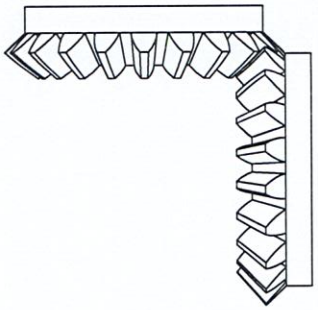

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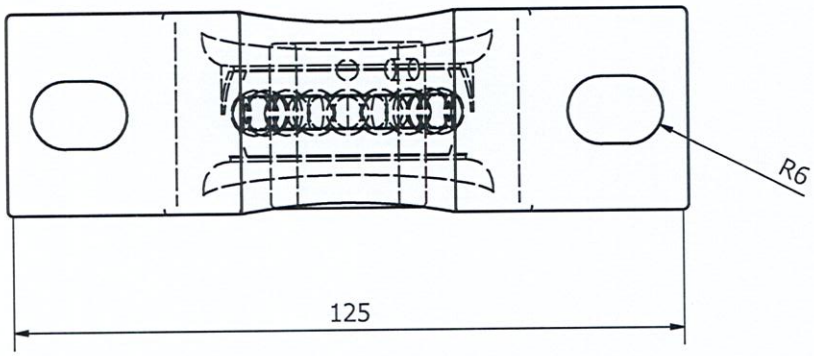

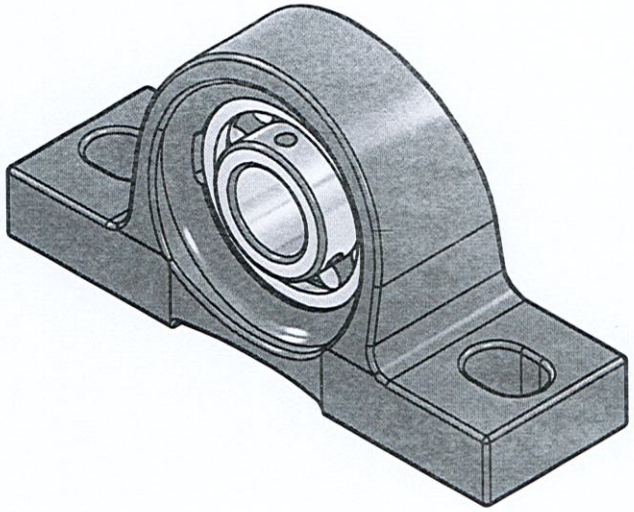

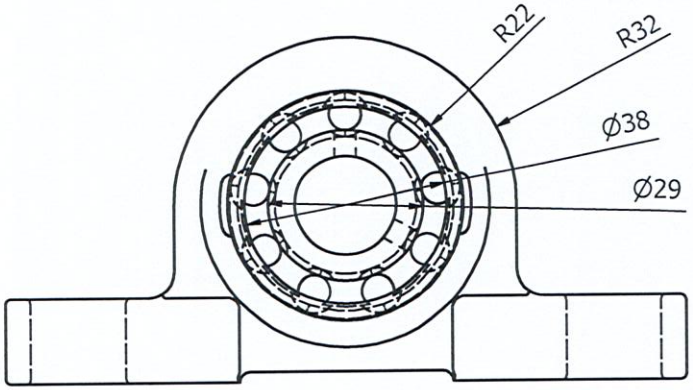

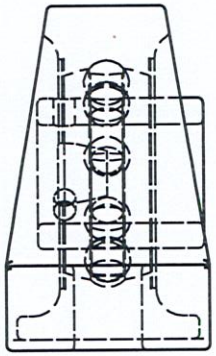

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POLITEKNIK BANTING	BEARING		
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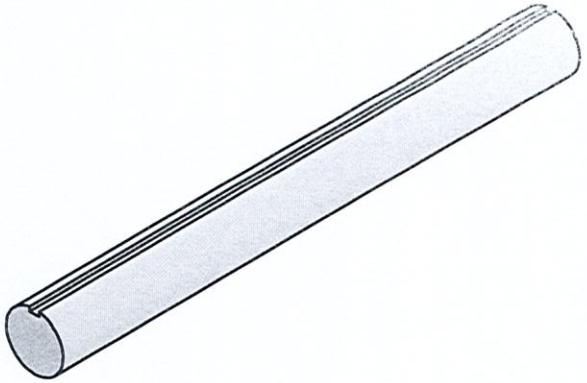
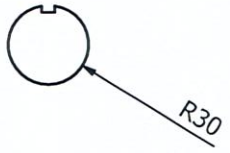
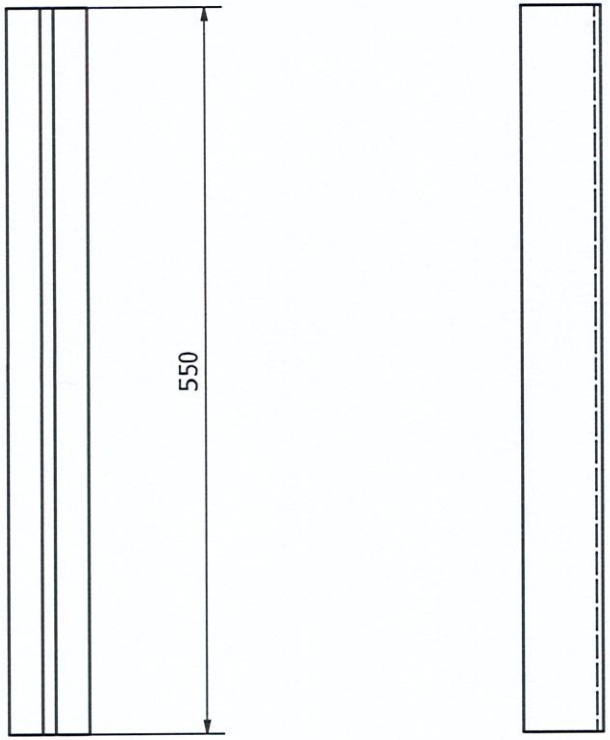
ISOMETRIC VIEW







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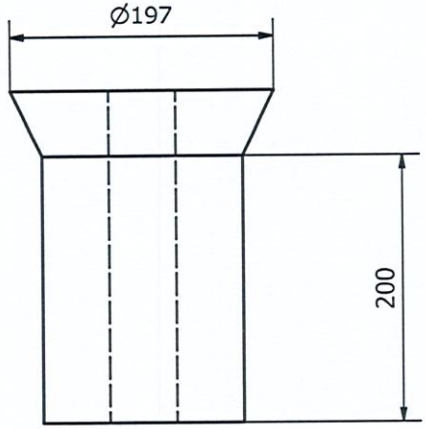

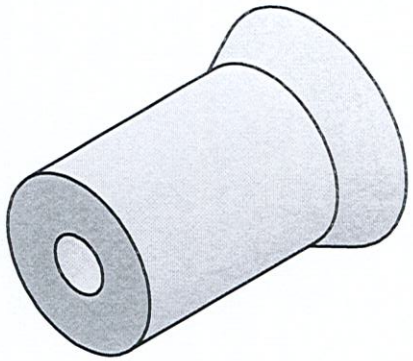

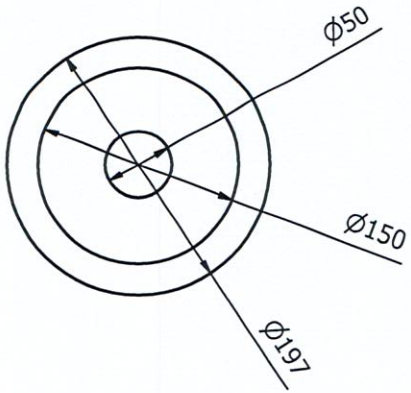

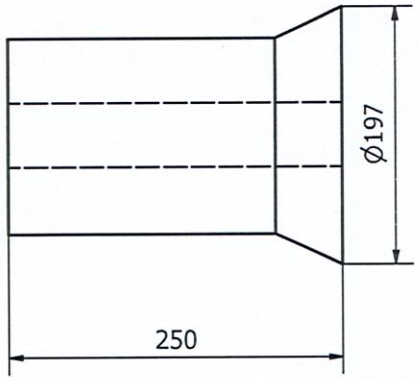

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	Edition	Sheet
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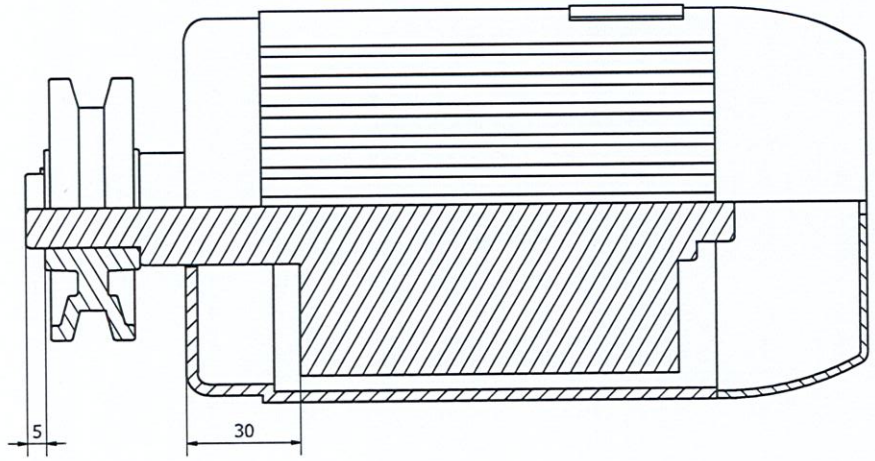

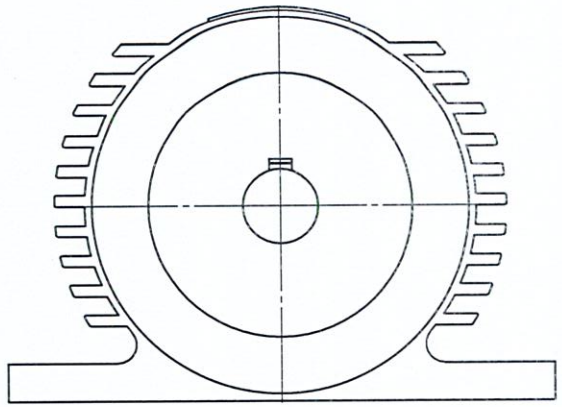

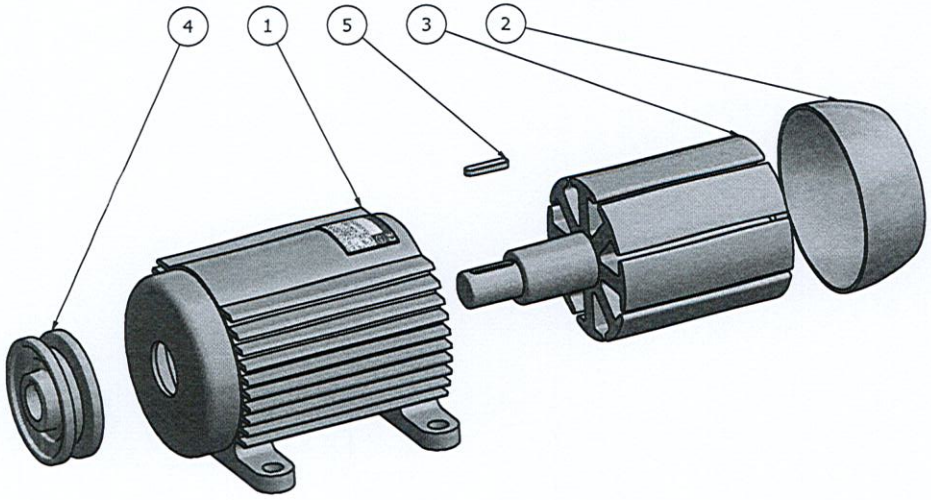

PARTS LIST			
ITEM	PART NUMBER	MATERIAL	QTY
1	Simple Electric Motor Frame	Iron, Gray	1
2	Simple Electric Motor Fan Cover	Steel	1
3	Simple Electric Rotor	Steel, Cast	1
4	Small Pulley	Steel, Cast	1
5	CNS 170 - 6 x 4 x 25	Steel, Mild	1

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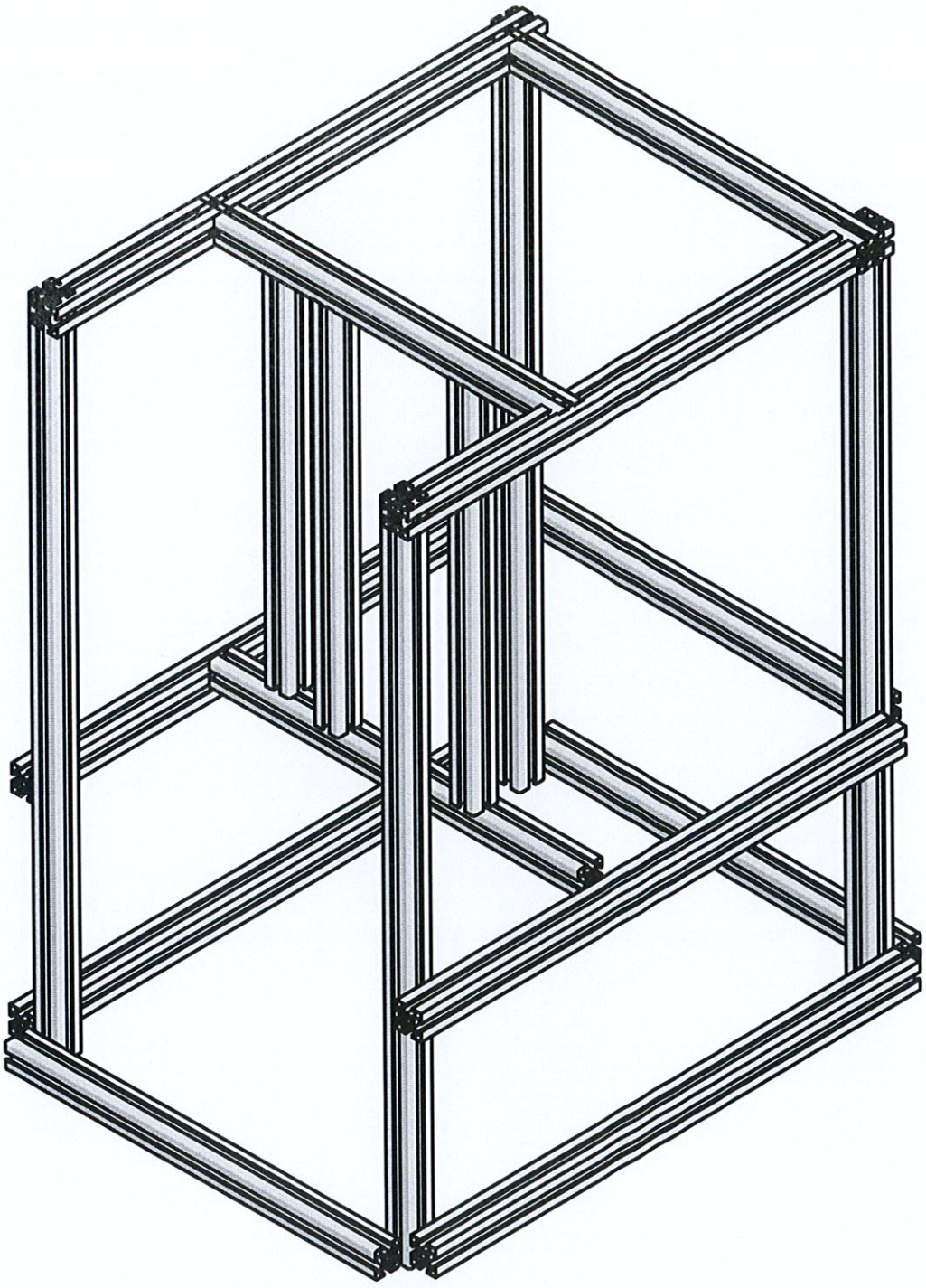
matpl				20.06.2018	

Electric Motor Assembly	Edition	Sheet 1 / 1	

PARTS LIST		
ITEM	QTY	PART NUMBER
1	4	kaki platfrom
2	6	support 60 cm
3	9	aluminium profile



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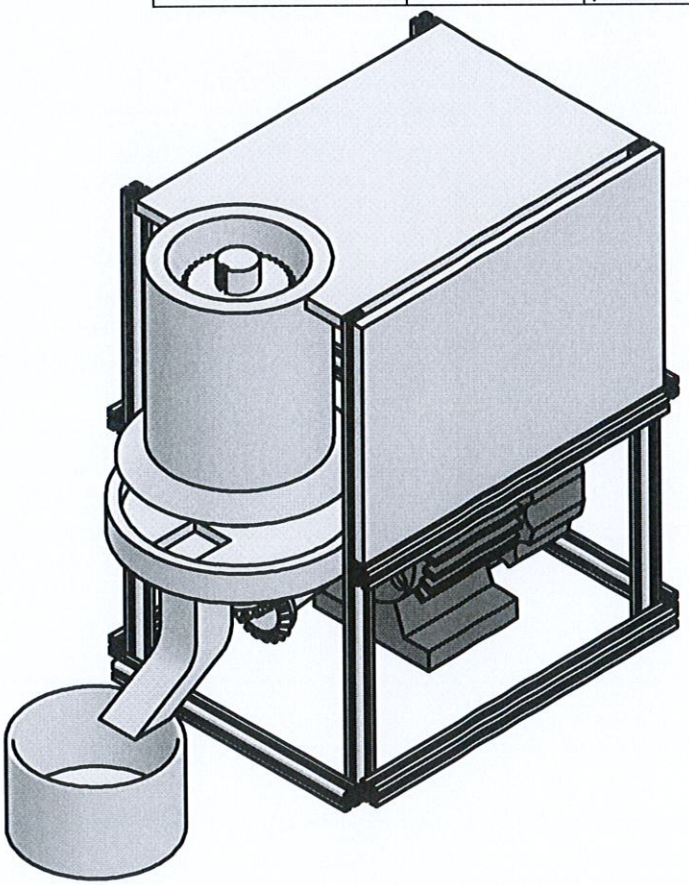
nuratiqah					6/4/2023	

tempat		Edition	Sheet 1 / 1

PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	MOTO BARU
2	1	tempat
3	1	bearing
4	1	BATANG SAP w40y
5	1	body W40Y
6	1	sprocket 3
7	1	sprocket 1
8	1	SPROCKET W40Y
9	1	sprocket kecik
10	1	Bevel Gear1
11	1	Bevel Gear2
12	1	shaft
13	1	output W40Y
14	1	corong
15	1	besen W40Y
16	1	panel



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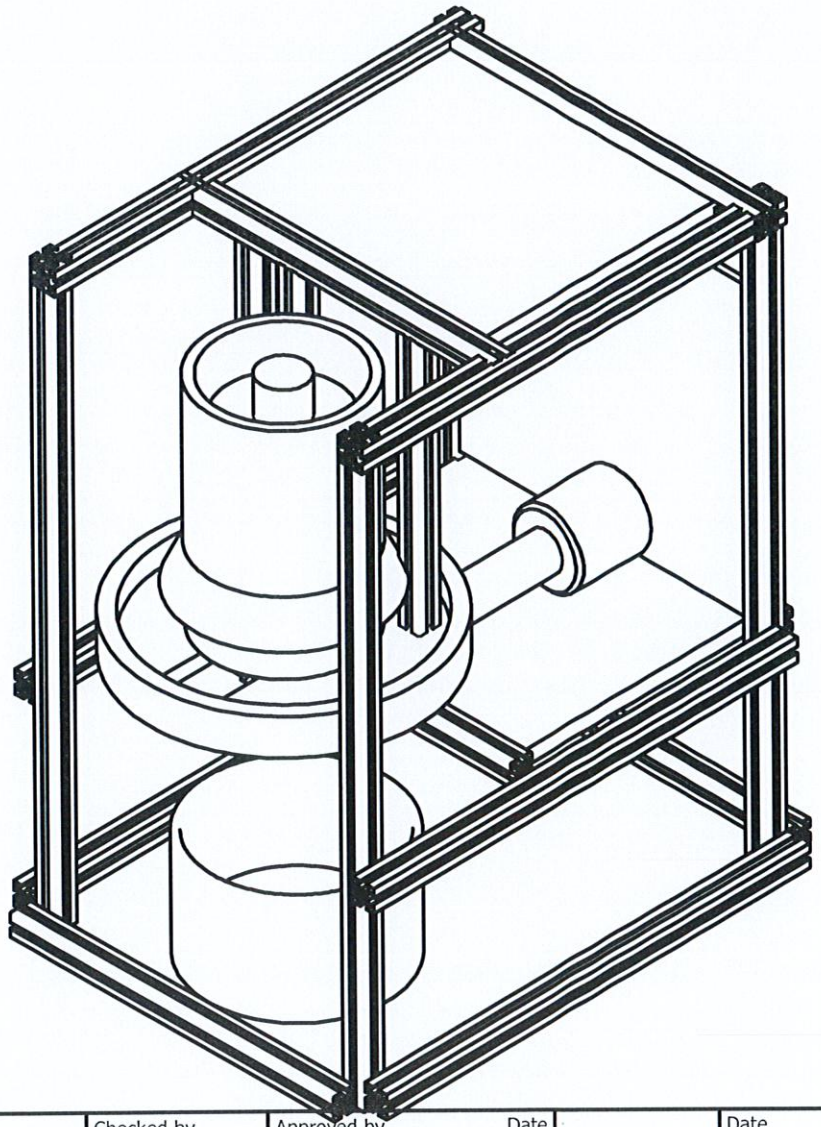
POLITEKNIK BANTING	CRUSHER MACHINE		
		Edition	Sheet 1 / 1

PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	tempat
2	1	Bevel Gear1
3	1	Bevel Gear2
4	1	shaft
5	1	output W40Y
6	1	besen W40Y
7	1	blade
8	1	body
9	2	platfrom bawah
10	1	plate
11	1	moto kipas
12	1	shaft moto



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crusher baru	Edition	Sheet 1 / 1	

GANTT CHART

CARTA GANTT : PERANCANGAN DAN PELAKSANAAN PROJEK PELAJAR

SESI : 2 : 2022/2023
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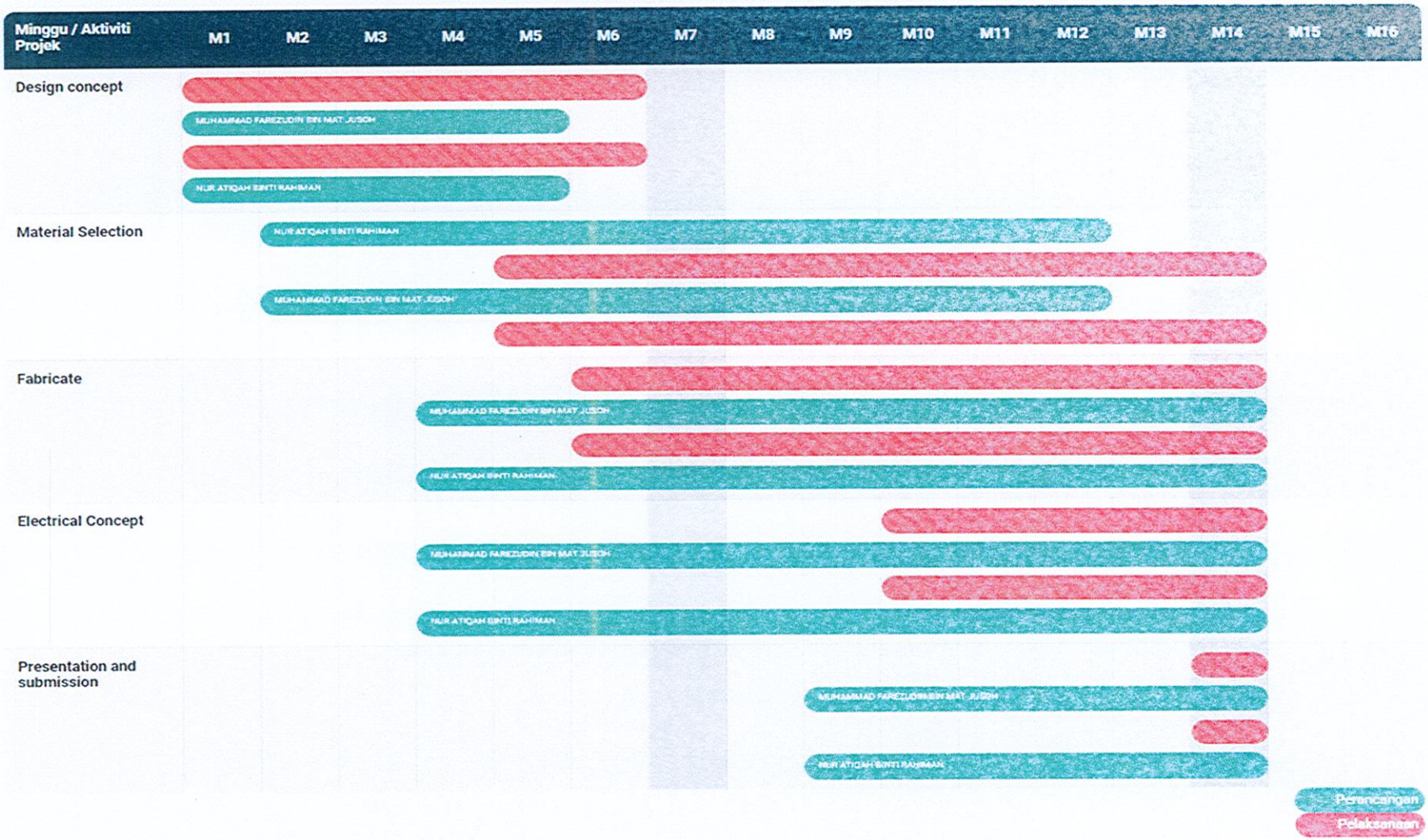

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by nur atiqah

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