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Prototype Design of Fish Feed Pellets Machine based from Rice Husk

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Abstract
Prototype Design of fish feed pellets Machine based from Rice Husk, beginning with the planning, design and development of technology. Output planning is an input, it needs to begin concept development stage, the next level of system design and product details. the product development process is the launch of a product testing and improvement of the previous phase. For the design development by identifying opportunities, evaluate and prioritize projects, allocate resources and plan time, completing the preliminary planning of the project, reflecting the results and the process.Stages of Prototype Design of fish feed pellets Machine based from Rice Husk: To identify and study the initial prototype Rice Husk Pellet Machine Manufacturers, which includes: Result Analysis Test Physical Mixture Pellet and Chemical Analysis Feed, Measurement Capacity Pellet Machine Manufacturers Rice Husk.Outcomes Research:, Analysis Prototype Pellet Machine Manufacturers Rice Husk: Effective and efficient in use because there are entrances and exits separate, more efficient because the screw conveyor will be multi-functional, as well as transporting materials rice hulls, screw conveyor will also serve as a stirrer and heat conductor, pipes and cyclone has a low rate for their blower between so it is possible that the maximum powder processes, thermodynamic parameters Static Pressure: 101325.0 Pa, Temperature: 293.2 K, initial solid temperature: 293.2 K, Turbulence parameters Turbulence intensity and length Intensity: 2.00 % Length: 0.015 m, velocity normal to face: 0.5 m/s, thermodynamic parameters Temperature: 293.2 K, Turbulence intensity and length Intensity: 2.00 % Length: 0.015 m.
Keywords: prototype design of fish feed pellets machine, rice husk

INTRODUCTION
Rice husk is always available throughout the year in large enough quantities and are not used as food. Rice husk has the potential to be a feed material because: (1) production is high, (2) use does not compete with human needs, (3) It is not yet widely used for other purposes more economic value so that only waste or burned directly, (4) Its presence is concentrated in certain places (in the rice milling plant) so as to facilitate its collection, (5) continuity guaranteed availability for its main products such as rice. The main obstacle of rice husk as a feed material nutritifnya value is low, characterized by high crude fiber content, protein and low energy. To process the sewage overflow from Rice Husk into pellets in need Pellet Machine Manufacturers. Rice Husk Pellet Machine Manufacturers using the tool electric motor that aims to assist or facilitate the manufacture of pellets economically (Arifuddin, 2014). As The process of making pellet feed by using a machine that has the advantages of its use as follows: Save electricity energy, results of Pellet Good, Maintenance & Repair Easy, Not Easily Broken Use Easy, Automated, attractive design, easy to carry, price, engine capacity, to be overhauled, as shown in the figure below Figure 1:
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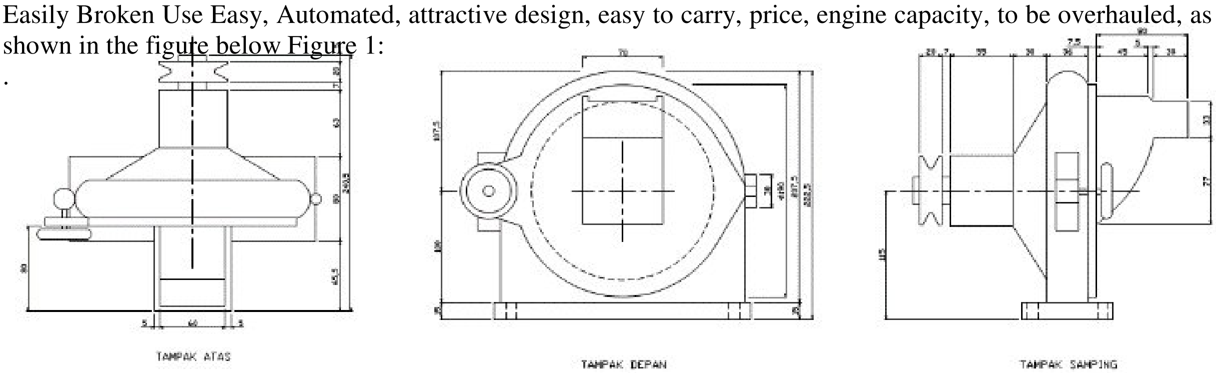

Figure 1. Rice Husk Pellet Machine Conventional Manufacturers

To get rounded the comparison needed a system reducer power and rounded form. With the kind used in fish feed mill in the form of a conveyor, then the rotation used is 150-200 rpm (Brown, 2006). This round was relatively slow rotation. Round slow degradability produced good material and affect the level of dough Hat and solid. Rounded the dough quickly produce crushed and the batter is not out. And the diameter of standard pulleys on additional driving element in diameter and output pulleys reducer too. We can see the two pulleys reducer and diameter input conveyor drive by the formula:

$$\frac{N1}{N2} = \frac{d1}{d2} \text{ (Brown, 2006)}$$

The parameters are used as reference in motor power is the shaft rotation. The planned rotation axis and diameter pulleys with a view to maximizing the power contained in the motor without damaging components - the engine components that have been installed in such a way, so the motor power can be calculated using the equation:

$$P = F_{tot} \text{ x } Vc$$

Where: P = motor power (W), total Ftot = Force (N), Vc = linear velocity of the shaft (m/s), Ftot = m_{tot} x g, then power a motor that is used is F_{tot}xW = Vc. Motor power that will be used to drive the chaff processing machine into pellets (Shigley, 2008)

THEORY

The Design Product Phase

Prototype Design of fish feed pellets Machine based from Rice Husk are generally divided into several phases. The process begins with a planning phase, associated with the activities of technology development and advanced research. Output planning phase is the project 's mission statement, which is the input needed to initiate the concept development phase. Then go on a systems level design phase and product details. Completion of the product development process is the launch of the product, where the product has been tested and improved on the previous phase. To develop a product plan and project mission statement, Karl T. Ulrich and Steven D. Eppinger (2001) proposed a five -stage process is to identify opportunities, evaluate and prioritize projects, allocate resources and plan time, completing the preliminary planning of the project, reflecting back results and processes.

Concept Development Phase

In the phase of concept development, Prototype Design of fish feed pellets Machine based from Rice Husk targets identified market needs, alternative product concepts generated and evaluated, and one or more concepts selected for further development and experiments. The concept is a description of form, function and appearance of a product and is usually accompanied by a set of specifications, analysis of competitors' products as well as economic considerations projects.

System Level Design Phase

System level design phase Prototype Design of fish feed pellets Machine based from Rice Husk include definition of the product architecture and product descriptions into subsystems and components. Overview final assembly on the production system is usually defined during this phase. The output of this phase usually includes the layout of the form of products, functional specifications of each subsystem products, as well as a preliminary process flow diagram for the final assembly process.

Detail Design Phase

Detail design phase Prototype Design of fish feed pellets Machine based from Rice Husk include full specifications of shapes, materials, and tolerances of all components unique to the product and identification of all standard components purchased from suppliers. Otherwise the process plan and equipment designed for each component created in the production system. The output of this phase is the recording control for the product: the image on the computer file of the shape of each component and equipment production, specifications of purchased components, as well as plans for the manufacture and assembly process of the product.

Testing and Repair Phase

Prototype testing and refinement phase the design of fish feed pellets Machine based from Rice Husk involves the construction and evaluation of the various initial production version of the product. An initial prototype (alpha) are typically made using components with the shape and type of material on actual production, but does not require the manufacturing process with a process similar to that performed on actual production. Prototype (alpha) is tested to determine whether the product will work as planned and whether the products meet the needs of major consumer satisfaction. The next prototype (beta) is usually made with components needed for the production but not assembled using the final assembly process as the actual assembly. Beta prototype internally evaluated and tested by consumers to use it directly. The goal of the beta prototype usually is to answer questions regarding the performance and reliability in order to identify the needs of the changes in techniques for the final product.

Beginning of the Production Phase

At the beginning of the production phase, Prototype Design of fish feed pellets Machine based from Rice Husk of products made using actual production system. The purpose of this initial production is to train manpower in solving problems that may arise in the actual production process. Products produced during the initial production sometimes tailored to the customer's wishes and are carefully evaluated to identify deficiencies that arise.

Phase Diagram development of Prototype Design of fish feed pellets Machine

These phases can be described generally as follows Figure 2:

Figure 2. Phase Diagram development of Prototype Design of fish feed pellets Machine based from Rice Husk

To produce a feasibility study conclusions precise and accurate, it is necessary to have the data that is valid and reliable. The data used to be collected through measures based on the scientific method. The data collected in this study are primary data and secondary data. According Sekaran and Bougie, 2010: Data can be obtained from primary and secondary sources. Primary data refers to information obtained first hand the variables necessary for the specific purpose. Meanwhile, secondary data refers to information from sources that already exists. The method of collecting data to be used for this research are:

1. Primary Data
   a. Direct observation (Observation)
      Observation activities will be conducted to get a clear picture before drawing a Prototype Design of fish feed pellets Machine based from Rice Husk.
   b. Structured interview
      Structured interview is an interview that dig deeper and add to the information and knowledge about the object of study Prototype Design of fish feed pellets Machine based from Rice Husk so that the data obtained will be more complete, accurate and current.
2. Secondary Data

Secondary data is data obtained from various other sources accountable and trustworthy, for example from the Central Bureau of Statistics, Department of Marine and Fisheries, local, internet websites, papers or studies sudahpernah made earlier. Secondary data collection aims to increase actuality data have been obtained from the primary data so that the study of Prototype Design of fish feed pellets Machine based from Rice Husk.

METHODS

Material: Rice husk, Azolla Pinnata, Cassava flour

Tool: SolidWork®

Phase Diagram development of Prototype Design of fish feed pellets Machine based from Rice Husk, see Figure 3

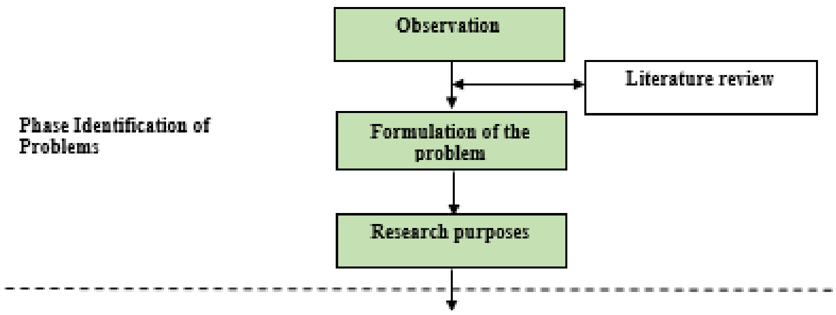

Figure 3. Phase Diagram development of Prototype Design of fish feed pellets Machine based from Rice Husk (cont.)

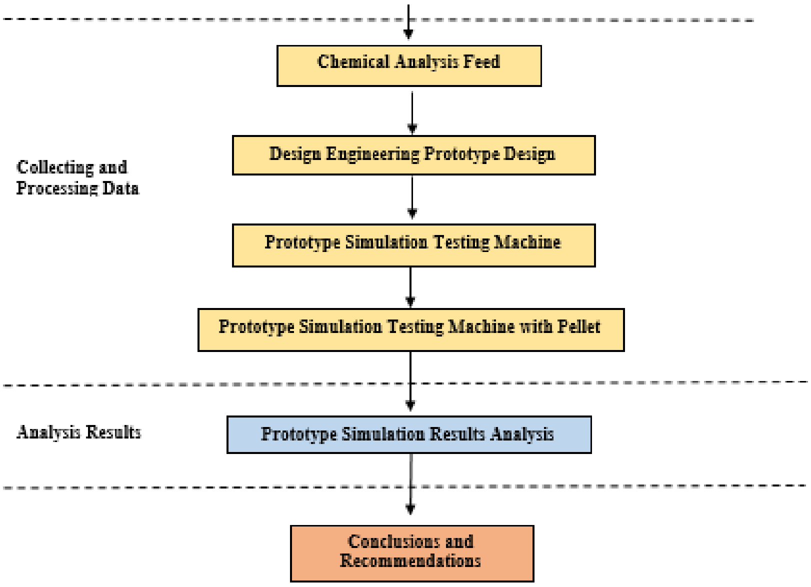

Figure 3. Phase Diagram development of Prototype Design of fish feed pellets Machine based from Rice Husk

Phase Diagram Information:

1. Identify Phase

Viewing machine rice husk processing into flour determine the formulation of the problem to be achieved. Conducting a study of various matters relating to the mechanisms and systems in rice husk processing machine into pellets. In this method intended to obtain feedback on the continuation husk processing machines to be created so that the machine functions can be made more leverage. To identify and study the corresponding initial basic information on designing and simulation Prototype Design of fish feed pellets Machine based from Rice Husk

2. Design Prototype Phase

After undergoing various experimental studies, carried out structural calculations and design drawings for the process of rice husk processing machine.

a. Making Simulation phase component design. Design drawings and calculations were ripe followed by the manufacture of the components of the mechanism of rice husk processing machine.
b. Assembly Simulation component design stage. Once all the components are so made the engine components will be assembled in accordance with the place and function of each - each.
c. Simulation Testing tools phase. All components are installed in this place. Husk processing machines will be tested using rice husk material. The test covers.
    - The process of destruction into flour rice husks
    - The formation process of rice husk powder into pellets

3. Product development Prototype

RESULTS AND ANALYSIS

Prototype Design of fish feed pellets Machine based from Rice Husk, there are two design concepts are used as an alternative and a reference in designing prototype of this machine, namely; Prototype Design of fish feed pellets Machine based from Rice Husk Without Pipes and Cyclone and Prototype Design of fish feed pellets Machine based from Rice Husk with Pipe and Cyclone, see Figure 4.

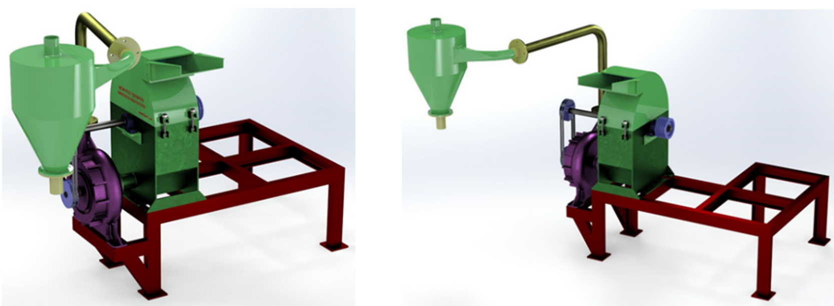

Figure 4. Prototype Design of fish feed pellets Machine based from Rice Husk

Component Frame Analysis Prototype Design of Fish Feed Pellets Machine Based From Rice Husk

Component Frame Analysis Prototype Design see Figure 5.

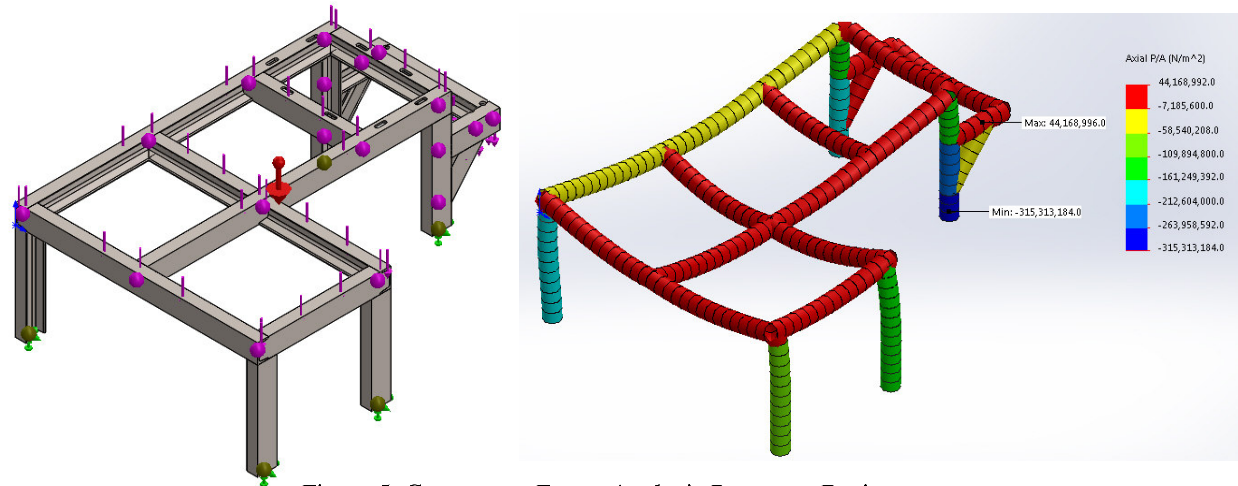

Figure 5. Component Frame Analysis Prototype Design

Reaction force prototype design frame see Table 1, Reaction moment force prototype design frame see Table 2, Simulation design frame - static stress-stress see Table 3

Table 1 : Reaction force prototype design *frame*

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-0.000488281	1.03671e+006	-0.000488281	1.03671e+006

Table 2: Reaction moment force prototype design *frame*

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	10118.8	-319.568	-2994.65	10557.5

Table 3: Simulation design *frame* - static stress-stress

Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0 mm Node: 17434	20.2032 mm Node: 17549

Axle Reaction Force Analysis

Axle Reaction Force Analysis, see Figure 6

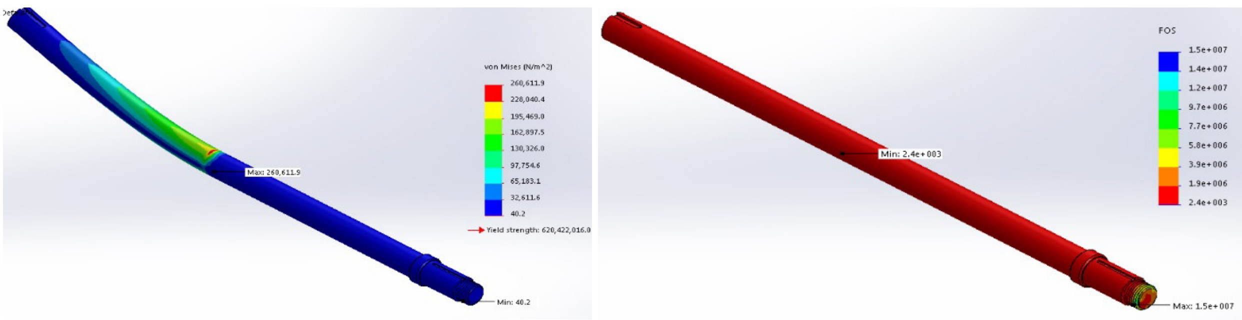

Figure 6. Axle Reaction Force Analysis Axle and Reaction Moment Force Analysis

Axle Reaction Force Analysis Axle see Table 4 and Reaction Moment Force Analysis see Table 5

Table 4: Axle Reaction Force Analysis

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-0.0150707	-6.26986	0.0047828	6.26988

Table 5: Axle Reaction Moment Force Analysis

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

Results And Analysis Of Fluid Engineering Prototype

Determining configuration

The basic steps in the manufacturing flow simulation analysis are as follows:

a. Determine the configuration of which will be used for analysis, either use an existing configuration or new configuration.
b. Specify the type of analysis to be used for both internal and external. Here also can determine the physical features.
c. Specifies the default fluid used in this analysis and also the type of flow as laminar, turbulent, or both.
d. Defining the boundary condition for the flow that occurs in the walls of the model geometry.
e. If the project were made does not include heat transfer, we recommend using the "Adiabatic wall". This type assumes that the walls are insulated completely.
f. If we do not know the degree of fineness of the wall, we should use the default value of "0" (assuming a smooth wall) Defining density (density) mesh to improve the accuracy of the results obtained.

Computational Domain

Computational domain or wireframe box surrounding the model, defined as a fixed volume with the coordinate system. Although the fluid in and out of the computational domain computational itself remains fixed. Flow Simulation to analyze the model and automatically create a computational domain which covers all models, as shown below Figure 7:

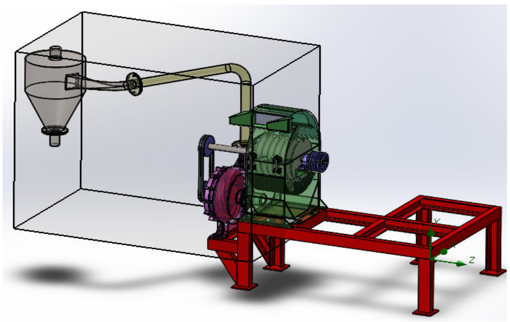

Figure 7. Computational Domain

Cut Process Pressure Plot

Can see the value of maximum pressure and minimum 101098.2 103634.2 Pa Pa look at the color bars are marked in red to blue for the maximum and minimum. See Figure 8.

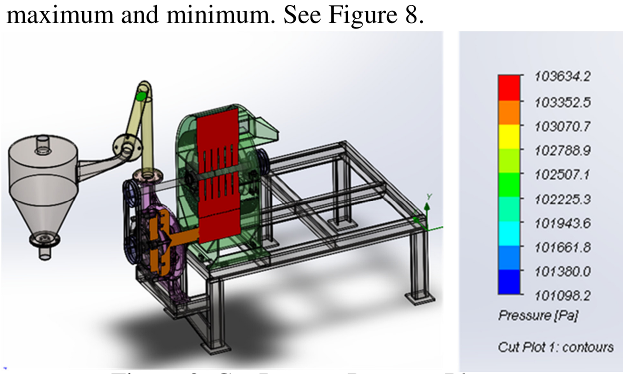

Figure 8. Cut Process Pressure Plot

Plot Surface Process Pressure

Surface Plot displays results of analysis on the surface of the model. Probe is used to see the value that occurs diarea we choose. We can see the value of 103634.2 Pa maximum pressure that occur on the surface of the hammer mill and minimal body 101098.2 Pa which on the surface look at the color bar outlet marked with red color to blue color for the maximum and minimum, see Figure 9.

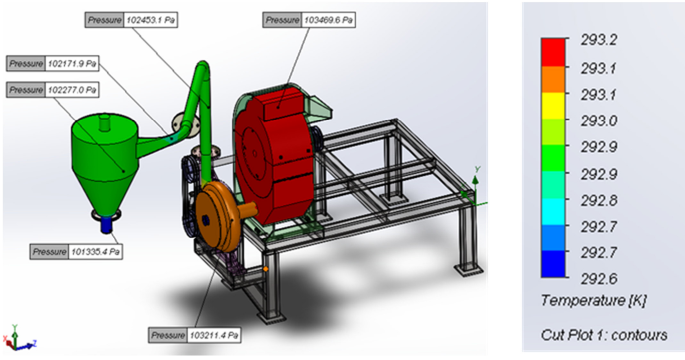

Figure 9. Plot Surface Process Pressure

Pressure Plot Flowtrajectors Process

With Flow trajectories we can see the flow of current and the trajectory of the particles with mass and temperature that is inserted into the fluid. We can see the value of 103634.2 Pa maximum pressure that occurs in the body, pressure is happening on the inside of the silo hammer mill with Pa and values 102225.3 101098.2 Pa minimal value that is on the inside of the outlet channel. Look at the color bars are marked in red to blue for the maximum and minimum, see Figure 10.

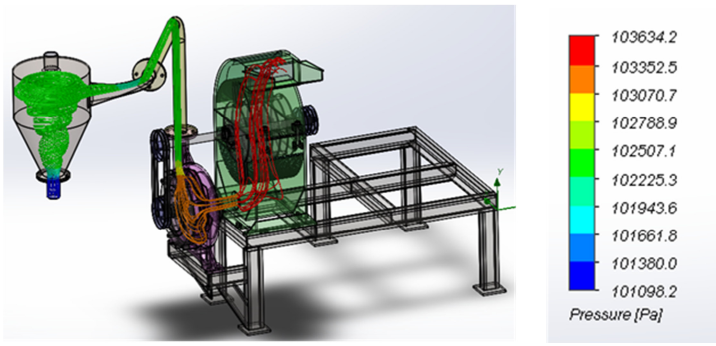

Figure 10. Pressure Plot Flowtrajectors process.

Cut Process Temperature Plot

Temperature can see the value of the maximum and minimum 292.6 293.2 K which look at the color bars are marked in red to blue for the maximum and minimum see Figure 11.

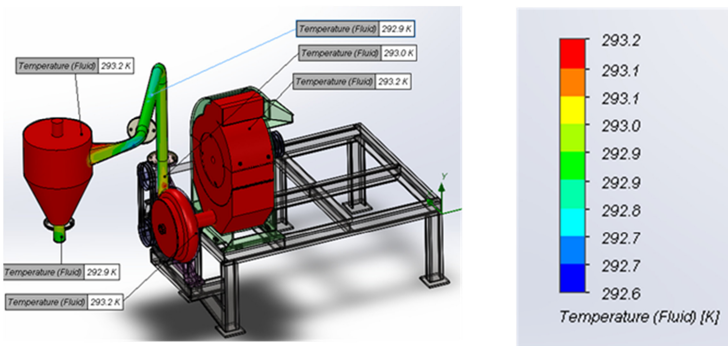

Figure 11. Cut Process Temperature Plot

Process Temperature Plot FlowTrajectors

Can see the value of the maximum temperature of 293.2 K that occur on the inside of the body, blower and silo temperature was happening on the inside of the connecting pipe with a minimum value of 292.9 K and 292.6 K with the value that the inside of the blower with the vertical direction. Look at the color bars are marked in red to blue for the maximum and minimum, see Figure 12.

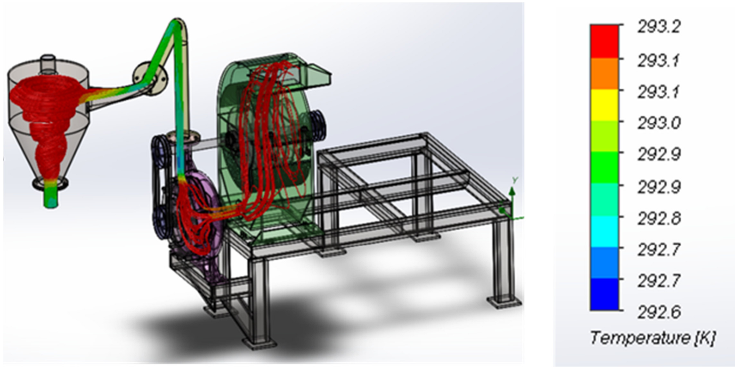

Figure 12. Process Temperature Plot FlowTrajectors

Cut Process Velocity Plot
Can see the value of a maximum speed of 0 m / s and a minimum of 0 m / s which look at the color bars are marked in red to blue for the maximum and minimum, see Figure 13.

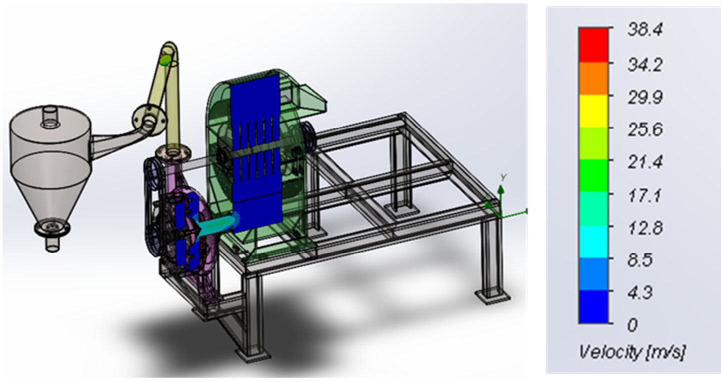

Figure 13. Cut Process Velocity Plot

Plot Surface Velocity process
Velocity can see the value of a maximum of 0:16 m / s in the surface of the hammer mill and minimal blower 0:02 m / s are on the surface of the body look at the color bars are marked in red to blue for the maximum and minimum, see Figure 14.

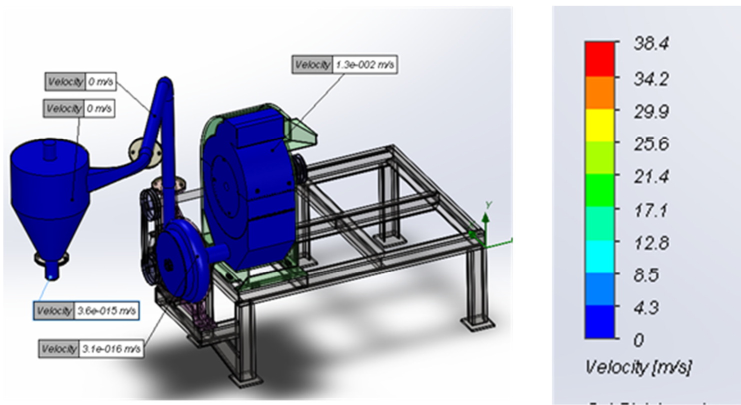

Figure 14. Plot Surface Velocity process

Plot FlowTrajectors process Velocity
Can see the value of velocity up to 28.4 m / s happening on the inside of the blower vertical direction, velocity is happening inside the pipe silo and the outlet pipe to the value 17:10 m / s and a minimum value of 0 m / s are on

the inside of the body, blower and silo at the color bars are marked in red to blue for the maximum and minimum, see Figure 15.

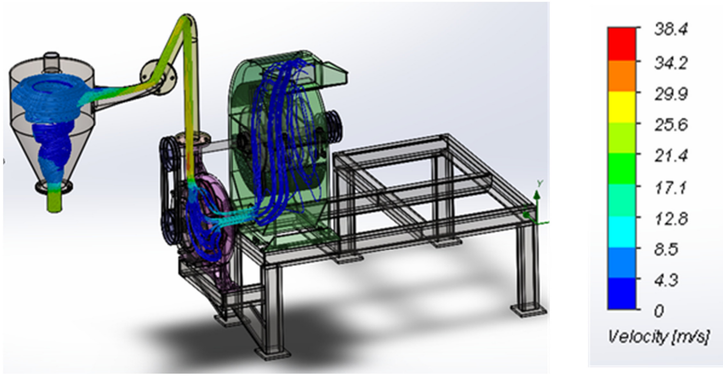

Figure 15. Plot FlowTrajectors process Velocity

Process Density Surface Plot

Density can see the value of a maximum of 1:23 kg / m3 in the surface of the hammer mill and minimal body 1:20 kg / m3 at the outlet surface look at the color bars are marked in red to blue for the maximum and minimum, see Figure 16

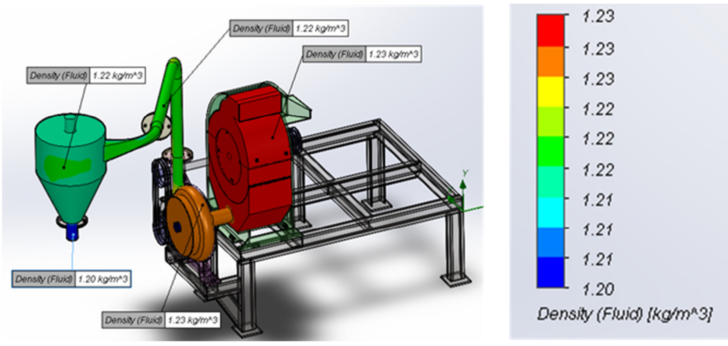

Figure 16. Process Density Surface Plot

Plot FlowTrajectors process Density

We can see the value of the density maximum of 1:23 kg / m3 occurring on the inside of the body hammer mill density is happening on the inside of the silo with a value of 1:22 kg / m3 and a minimum value 1:20 kg / m3 which is on the inside of the outlet pipe at the color bar which is marked in red to blue for the maximum and minimum, see Figure 17.

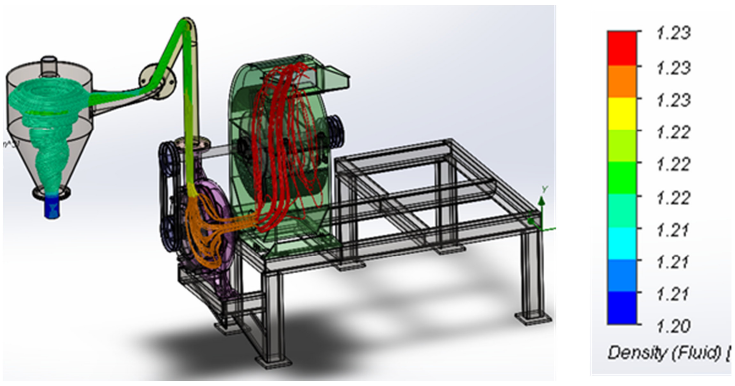

Figure 17. Plot FlowTrajectors process Density

CONCLUSION

a. Effective and efficient in use because there are entrances and exits separate.
b. More efifien because the screw conveyor will be multi-functional, as well as transporting materials rice

hulls, screw conveyor will also serve as a stirrer and heat conductor.

c. Pipes and cyclone has a low rate for their blower between so it is possible that the maximum powder processes.
d. Thermodynamic parameters Static Pressure: 101325.0 Pa, Temperature: 293.2 K
e. Initial solid temperature: 293.2 K, Turbulence parameters Turbulence intensity and length Intensity: 2.00 % Length: 0.015 m
f. Velocity normal to face: 0.5 m/s, Thermodynamic parameters Temperature: 293.2 K, Turbulence intensity and length Intensity: 2.00 % Length: 0.015 m

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