

# Coffee Peeling Machine Design

**Rina Indrayani\*, Dewi Mulyasari Sumarta, and Agus Rahmat Hermawanto**

Sekolah Tinggi Teknologi Bandung

\*rina@sttbandung.ac.id

**Abstract.** Coffee is a commodity crop that has an important role in economic activities in Indonesia. Coffee is also one of Indonesia's export commodities are quite important as a producer of foreign exchange in addition to oil and gas. In addition to the export opportunities increasingly open, the coffee market in the country is still enough of a major of this research is to produce a coffee peeling machine design and to know how to work the coffee peeling machine. Coffee peeling machines is expected to help farmers in the harvest with a maximum peeling and effective in use. With the existence of this machine can work in accordance hopes accordance with the wishes of farmers, as well as to increase the selling price is higher. In this study are analysing the problem, conceptualizing the design, manufacture schematic function block diagram, load calculation, material selection, until finally get a working drawing. The design method described with the design method used in the coffee peeling machines or machine depulper and the method is called the method of French design. Skin peeler machine coffee made with a capacity of 370 kg / h, using the prime mover's gasoline engine with a power of 5.5 Hp and rotation can be changed as desired change from 1400 up to 4500 rpm. Round to be changed by prime movers' belt - pulley with a ratio of 1: 5. While the engine has the dimensions of length, width and Height of each is 727 x 457 x 1110 mm with a weight of 103 kg.

## 1. Introduction

Coffee is a commodity crop that has an important role in economic activity in Indonesia. Coffee is also one of Indonesia's export commodities are quite important as producer foreign exchange other than oil and gas. In addition to the export opportunities more open, the coffee market in the country is still quite large [1] favourite beverage Indonesian society, both from the upper and lower classes, both men and women, from various regions in Indonesia have characteristics and flavour as well as the size of the coffee diverse, not least in the area Srikandi Village which is one of the coffee-producing areas in Indonesia. This type of coffee produced is Robusta coffee beans with a characteristic round shape. The number of seeds per kilogram is 2300-4000, grow height 400- 700 m above sea level with a temperature of 24-30 degrees Celsius. Raw coffee beans are green and when mature will turn red. Fruit mature period is 9-10 months [2].

Heroine village is one of the coffee productions centres in West Java. This famous coffee with sweat flavour taste and fragrant aroma is preferred by consumers in the area of West Java even outside of Java. Unfortunately, the price of coffee in the village is very low, so their income is limited. With the selling price received by the lower city, of course, this is a problem for farmers. And if only the coffee fruit in though before it is sold, it will raise the selling price. But in fact, many obstacles faced, so that farmers feel the need to evaluate their farm, whether they should be continued or switched to other crops that might add to his income.

The value added in the processing of products namely the difference between the value of the products to the value of raw materials and other inputs, but not including labour a). The process of value-added forms if there are changes in the shape of the original product, so that the formation of this important value added by farmers to increase their income. Business purposes b), the business objectives



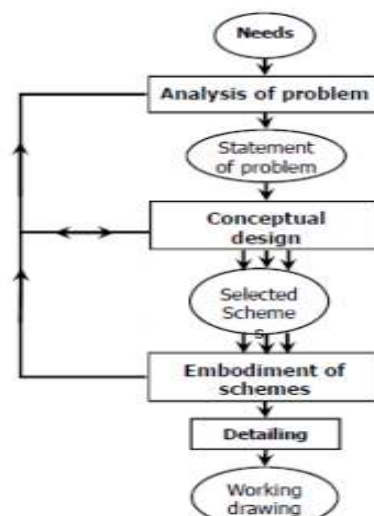
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to be achieved through innovation is to create added value to a product. This processing is one form of innovation that can be done, so that the coffee community goals can be met. Product development is also an activity that requires contributions from almost all functions in an enterprise, but three functions that Became the centre of product development items, namely marketing, design and manufacturing [3]

## 2. Method and Material

According to George Dieter Eggert (2000), is a collection of design decisions made in determining the process used to determine the shape of the object desired by the customer needs. In general, the design can be interpreted as the beginning of the business activities to realize the existence of a product that is needed by a person or a group to facilitate the activities done.

French method [4] In the design of a planning process that must be done properly and sequentially. Activity in the design process is called phase. The phases of the design process are different from one another. Each phase also comprises of some activity called steps in phases. One description of the design process is a description which consists of the following phases, namely:



**Figure 1.** Design process is a description which consists of the following phases

- Analysis of the Problem
- Statement of Problem
- Conceptual Design
- Selected Scheme
- Embodiment of Schemes
- Detailing
- Working Drawing

### 2.1 Analysis of the Problem

Process and the results of recognition of the problem or inventory problems. In other words, the analysis of the problem is one of the research processes that is arguably the most important among other processes. Problem research (research problem) will determine the quality of the research, even it is also to determine whether an activity can be called research or not. The research problem in general can be found through the study of literature (literature review) or through field observations (observation, survey), and so on [5].

### 2.2 Statement of Problem

The formulation of the problem (problem statement) was the focus of attention of researchers in carrying out their research process. The formulation of the problem is a clear picture of the issues you need to resolve or improved through research. The formulation of the problem is the result of more in-depth

review of the issues arising from the field which is usually only in the form of signs (symptoms) that feels or looks that the research report described in the background research. So that the formulation of the problem must be connected with the research background and the object of research, or in other words have a common thread. The process of review of issues in the research background should also be accompanied by the process of finding out if there are issues that have been discussed by others or not, if there had been previous discussion whether adequate or not.

### 2.3 Conceptual Design

Conceptual Design the first stage of the stages of database design and create a conceptual data model from the company that will be created the database. The data model is created using document of user requirements specification.

### 2.4 Selected Scheme

Scheme is a form of a draft or an outline framework that includes a general description of how a goal can be achieved. Scheme does not explain the plan in detail and selected schemes usually a less formal.

### 2.5 Embodiment of Schemes

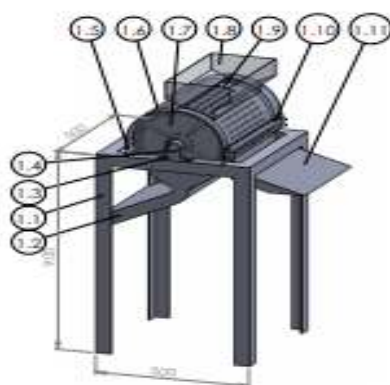
At this stage the elected schemes are elected or named to the function block diagram, function block diagram which explains how the process inputs and outputs on each element so that the elements - elements that are connected to produce movement. Besides this function block diagram showing the flow of force from the start of coffee sign up to be apart between the shell and roasted beans and also will be more visible the workings of the machine that is in the design.

### 2.6 Detailing

Detailing conducted in order to calculate the loads that occur on the machine, the selection of materials up to the manufacturing or production process. From The load calculation, get the coffee peeling machine capacity of 370 kg / h, using the prime mover's gasoline engine with a power of 5.5 Hp and rotation can be changed as desired change from 1400 up to 4500 rpm. Round to be changed by prime movers' belt - pulley with a ratio of 1: 5. While the engine has the dimensions of length, width and Height of each is 727 x 457 x 1110 mm with a weight of 103 kg.

### 2.7 Working Drawing

Working drawings are the end result of the design process, because the employment picture showed him the design details, ranging from dimensions, material to the driving element is used, so that these machines can be manufactured or produced.



| No.  | Part Name                  | Material                     | Qty    | Remark             |
|------|----------------------------|------------------------------|--------|--------------------|
| 1    | Mesin Depulper             | -                            | 1 Unit |                    |
| 1.1  | Rangka Depulper            | Besi SNI 37 30x50x5          | 1 pcs  | Sambungan las      |
| 1.2  | Saluran Keluar Kulit Kopi  | Plat besi tebal 1mm          | 1 pcs  | Coating            |
| 1.3  | Roller Block Bearing       | Standard material            | 2 pcs  |                    |
| 1.4  | Poros Depulper             | SNI S 45 C, Ø 20             | 1 pcs  |                    |
| 1.5  | Cover Samping              | Plat besi tebal 1mm          | 2 pcs  | Painting           |
| 1.6  | Cover Atas                 | Plat besi tebal 1mm          | 2 pcs  | Painting           |
| 1.7  | Body Drum Depulper         | Carbon SNI 37 30, tebal 10mm | 2 pcs  | srl plat machining |
| 1.8  | Saluran Masuk Depulper     | Plat besi tebal 1mm          | 1 pcs  | Painting           |
| 1.9  | Drum Depulper              | Stainless SNI 314            | 1 pcs  |                    |
| 1.10 | Saluran Keluar Biji Kopi   | Carbon SNI 37 30, tebal 5mm  | 1 pcs  | Machining process  |
| 1.11 | Saluran Pengarah biji kopi | Plat besi tebal 1mm          | 1 pcs  | Painting           |

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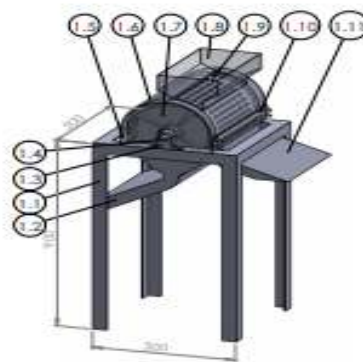
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**Figure 2.** Working drawings are the end result of the design process

### 3. Result and Discussion

The last phase is the Result and Discussion of the results of the test equipment design. Documentation is the end result of the design are made in the form of two and three-dimensional images. The picture is the end result of a design that contains all information in detail test equipment design, image detail components test equipment, and a list of materials used to form a test device.

Coffee peeling machines are made with a capacity of 370 kg / h, using the prime mover's gasoline engine with a power of 5.5 Hp and rotation can be changed as desired change from 1400 up to 4500 rpm. Round to be changed by prime movers' belt- pully with a ratio of 1: 5. While the engine has the dimensions of length, width and Height of each is 727 x 457 x 1110 mm with a weight of 103 kg.



**Figure 3.** Coffee peeling machines

### 4. Conclusion

Based on the results of data processing can be concluded as follows:

- The application of technology to the public at the coffee farmer groups can increase the selling price is very high.
- The machine is expected to assist them in processing, so the value of coffee sales increase.

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