THE DESIGN AND BUILT OF “ALAT PENYISIR SIKAT PISANG”

Mohd Rosli bin Saad*
Tel: +6019-4155191  Email: rosli@psp.edu.my

Farrah Waheda Binti Abdullah**
Tel: +6019-4495191  Email: farrahwaheda@psp.edu.my

*Mechanical Department, Politeknik Seberang Perai, Penang, Malaysia.

**Information Technology Department, Politeknik Seberang Perai, Penang, Malaysia

ABSTRACT
Banana (Musa Sopientum L) is one of the important fruit growing areas in Malaysia throughout the state. In 1982 the entire area under banana cultivation in Peninsular Malaysia is 15,384 hectares. Cutting of the bunch often become problems for farmers or workers of banana plantations. During the process of cutting down bunches of banana from the stalk using a traditional methods such as a knife, that take a lot of time to cut the bunches off from the stalk, bananas also still had a few cuts, scratches and bruises. Therefore, “Alat Penyisir Sikat Pisang” is a project aimed for cutting bunch of bananas from the stalk to gain a nice and neat cutting-edge and at the same time, it will save more time in that cutting process. Advantages of this tool “Alat Penyisir Sikat Pisang” is so easy to use and does not require highly skilled workers. This tool also is not causing damage and scratches bananas. Another advantage of this tool is it can sweep faster than the traditional way.

Keywords: bananas cutter, banana bunches and agriculture

4.0 INTRODUCTION
Banana (Musa sopientum L) is one of the important fruit growing areas in Malaysia throughout the state. In 1982 the entire area under banana cultivation in Peninsular Malaysia is 15,384 hectares. This is almost 21.5% of the total area of fruit production as a whole. This amount is slightly higher than the generality of durian. Johor, Pahang and Perak are the main producing states. (Muji Paramuji 1996). Bananas are harvested raw and ripened artificially. The maturity of banana is indicated by drying of top leaves, change in colour of fruits from dark green to light green and tendency of the floral end of the fruit to fall by slightest touch. The mature fruit becomes plump and all the angles are filled in completely. When tapped the fruit gives metallic sound. The method of harvesting depends on the height of the plant. Low growing varieties are harvested by cutting through the bunch stalk about 30-35 cm above the top hand. With taller varieties, the stem of the plant will be partly cut through to bring the bunch down within the harvesters reach.

Sweeping of the bunch often become problems for farmers or workers of banana plantations. During the process of cutting out the bunches of bananas from the stalk using a traditional method such as a knife, the bananas had a few wound cuts or scratches and also imperfect cutting-edge of bananas.
bunches, even though the workers are skilled person and using a sharp knife. To overcome the above problems, a few organizations such as Assessment Institute for Agricultural Technology, North Sumatra has created and modified the sweeping of banana bunches. In sweeping activities of fruit bunches of bananas, the fruit in the comb are free from cuts, scratches, and the tool is very simple to use it. (House of agricultural technology research Sumatera Utara 2009).

From existing equipment, we have expanded the idea to design a more simple equipment also user-friendly and flexible to facilitate workers during sweeping of bananas bunches. The objective of this tool is to get a neat and perfect cutting-edge of bunches also prevent the banana from having cuts and scratches. This tool is called as “Alat Penyisir Sikat Pisang” has designed in a circular shape and coupled with a crescent-shaped tool that acts as a banana bunch cutter to cut a neat and uniform cutting-edge of banana bunches tier to tier. In addition, it also comes with a handle to pressure the cutter during cutting the bunches.

5.0 METHOD AND DESIGN

In this section, described the renovation project planning, research methods and several boxes methodology concept project proposal selection of new listed. In this section, also some comments on the project planning stage is determined by the flowchart. To implement this method a number of levels shown before it is built and then works perfectly. Design concept of this project was based on appropriate use, selection of appropriate materials, measurement, security and methods of implementation. It manufacturer needs to consider to ensure that the project produces good results for use.

Draft for Project Implementation

Draft measures planning and implementation has been divided according to level from the beginning to the end process is completed.

![Flow chart of the steps of project implementation](image)

**Figure 2.0: Flow chart of the steps of project implementation**

**Project implementation procedures and measures**

Procedures and project implementation will facilitate the implementation of the project carried out in accordance with planning requirements. Procedure and production project based on the plans that have been made. This is a necessity to avoid occurrence of errors during the production of the
project. Reforms in terms of the design concept used in most banana bunch cutter in banana plantations (Figure 2.1) are reviewed in terms of the quality of cutter, durability, and design. The material used is non stainless steel. In fact, it used a lot of force to cut a bunch of bananas. Process innovation of existing products is a renewal process with the selection of materials and produce better designs.

Figure 2.1: Tool it is to cut bunches of bananas
See: http://sumut.litbang.deptan.go.id/ind/index.php/component/content/article/14-alsin/3-teknologi-penyisiran-tandan-pisang-barangan

Components used

Design of “Alat Penyisir Sikat Pisang” was built in advance by measurement that was analyzed. (Figure 2.2).The suitability measures is determined based on the size of the bunches of bananas. The choice of material is also determined based on the materials resistant to corrosion and easy maintenance. Screw and nuts are used to connect the hose cylinder mower blade so that it is more robust as well as welded. In addition, screws and nuts are also used to connect the handle of cutter. Cutter blade is the most important component because the blade will act as a banana bunch cutter to separate from the bunch of bananas from its stalk. Type of steel used for cutter is. Pipe cylinder is used as a main body. The material used is stainless steel. Furthermore, it is also connected to the cutting blade on the inside of the body using screws, so cutting the bunch of bananas can be done. Teflon Block is used on the connection between the holder with a cutter. It is fitted with a knife blade, and then two holes were drilled for inserting the bolt and spring to allow the cutter to move up and down.
Figure 2.2: Design and assembly of each part “Alat Penyisir Sikat Pisang”

Figure 2.3: Stainless Steel Pipe
Machining and Forming Processes

This process is the process of shaping the raw material according to the measurements that have been set before. The processes are the casting process and the cutting of stainless steel to make the body of the project, plates and knives as well as the formation of a Teflon block. In this process there is a process of drilling and internal thread. Besides that, the welding connection process is also done to make the connection stronger and more durable.

Figure 2.4: Drill hole

Figure 2.5: Machining (Teflon block)

Figure 2.6: Internal Thread
Manufacturing Process Main Part

The manufacturing processes for main parts are a cutter blade (Figure 2.8), handle (figure 2.9) and Teflon (Figure 3.0). Cutter blades are made of stainless steel materials. Design of this blade is a semi-circle shaped cutter according to form of the main body. Blade was sharpening for cutting purposes. Several holes were drilled on it to bind the blade with Teflon. This bond can be adjusted according to the height of the hole.

Handle is also made of stainless steel. For binding Teflon, drilling has been done to produce holes. The design is further enhanced with a sponge wraps to avoid hand injury when moving and press the cutting blade. Teflon (Figure 2.9) is a form of semi-circle. Teflon, blade and handle were drilled and fastened with screws and nuts.
The Manufacturing Process of Bunch Holder

Holder or retainer bunch is intended to strengthen the position so that it can hold a stalk of bananas during the cutting process. Spring is used to apply force to the holder to grip the bunch to be in stable condition.
Assemble and Finishing Process
Assembling and finishing process is the last process of the installation and connection of all parts with screws, nuts and bolts. Processes of finishing are painting the project also clean the impurities are also being conducted. The sharp edge also grinded for safety reasons. After all components finishing process has been completed, the project will go through the testing stage for cutting bunch of bananas.

6.0 DATA’S ANALYS

Product testing has been done and the result shows a neat and perfect cutting-edge have been done compared to cutting out the bunch of bananas from the stalk using traditional method such as knives. This is because this project is using the blade-shaped semi-circle, and the circle pipe, which is also affected the result as it same to a banana's stalk. In addition, the use of raw materials such as stainless steel is smoother than normal steel, which is easy corrosive and affected the cut.
During a test run for a bunch of bananas, sweeping is very smooth. This is because the blade is in a sharp condition. With helping the spring force that gives strength to the blade facilitate sweeping work. It is also able to push the blade down while removing the blade out of the loop cylindrical pipe and cut bunch of bananas from the bunch. Bunch of bananas can be cut properly using the “Alat Penyisir Sikat Pisang”. Result of this cutting achieves the standard grade farmers market.

Using a soft sponge on the handle also meets the security aspects of these tools. This is because, easier for users to hold the device comfortably. Maintenance of the blade is should be done often because the cutter will take a long time to blunt. Blades do not need to be sharpened regularly before the use, but only need to put oil on the blade so that the rubber around a banana not stick to the blade. It is will be sharpened when the device was used in three to four weeks depending on the quantity of bananas produced bunches. Product that we produce can be commercialized for banana planters to cut every bunch of bananas. Thus, with the advent of our project, it will help the farmers to earn more profits.

7.0 CONCLUSIONS

Advantages of this “Alat Penyisir Sikat Pisang” is so easy to use and does not require highly skilled workers. This tool also does not cause damage and scratches to bananas. Another advantage of this tool is it can sweep or cut faster than the traditional way. Among the most valuable things that we learned during this project is how to produce a quality product and test this product. Generally to create a project, it requires high skills and creativity. So with this project we can enhance skills and creativity in various category such as hardware, software, analysis of projects implemented in order to control properly. In addition, we can use as expanding and enhancing knowledge and experience after creating the project. Finally, “Alat Penyisir Sikat Pisang” could serve as an instrument related to the banana farmers. This tool is designed to operate properly, easy to use and easy to maintain.

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Appendix: