THRESHING MACHINE WORKING PLAN DESIGN USING BREAK DOWN MODEL FOR RURAL IN PRODUCTION IMPROVEMENT

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ABSTRACT
Thresher is a rice seed threshing tool. Threshing is an integral part of the process in rice post-harvest management, in which the rice that has been harvested is threshed to separate the grains from the rice straw. One of the main problems faced by the farmers, especially during the post-harvest time is the difficulty to carry the thresher to the harvest site since it is inaccessible for four-wheeled vehicles to reach the sites, and thus the further transport is conducted by manpower of at least six people using bamboos to bear the rice. Data gathering method is conducted by separating the parts of the thresher in four categories namely the frames, the feeding parts, the thresher, and the cover, and then data of each production by 30 observations, and the result of farmers productivity using the thresher is able to produce 1.900 kg.

Keyword: production increasing, thresher tool design.

INTRODUCTION
1.1. Research background
Thresher is a rice seed threshing tool. Threshing is an integral part of the process in rice post-harvest management, in which the rice that has been harvested is threshed to separate the grains from the rice straw. The working principles of the thresher are by bearing the rice straws so that the grains will fall off. One of the main problems faced by the farmers especially in the post-harvest time is the difficulty to carry the thresher to the harvest sites, in which the thresher has a big body and the field is difficult to reach, especially in the rural areas where the fields are in the hills and the dikes are narrow. It is inaccessible for four-wheeled vehicles to reach the sites, and thus the further transport is conducted by manpower of at least six people using bamboos to bear the rice. To overcome this problem, there is a need to handle the post-harvest management so that it can reduce the difficulty in carrying the thresher so that they will have longer working hours, and production increasing.

1.2 Problem formulation
1. How is the Thresher designed using the Break Down System for rural areas?
2. How can the Thresher increase the farmers’ productivity?

1.3 Research objectives
The research objectives are as follows:
1. To design the thresher using Break Down System for rural areas
2. To increase the thresher productivity

LITERATURE REVIEW
Grain will be separated from the stalks or straw through a blower that produces wind. These winds can make a power to separate the rice from the straw. The rice will come out under thresher and the empty hay and grain will be separated from the grain that contains rice. Regulators used to modify the speed (rpm) are adjusted based on the type of rice. To obtain a more detailed picture of the Thresher Machine system design.

Tools and machine of the rice harvester
In improving the harvest production using the Break Down system in rural areas in this thesis title, one of the aspects that have to be suppressed as low as possible is the thresher transport problem and the lost production harvest time. Meanwhile, in the working performance improvement aspect is on how to suppress the time needed in planting in a certain unit area. This is done so that the greatest result can be achieved in the fastest time by losing production time and working efficiency as minimum as possible.

The tools and the harvest machine consist of many types that are categorized based on the types of the plants and the propulsion power of the machine, also in traditional ways or in semi-mechanic way up to the modern way. Based on the types of the plants, the tools and the harvest machine are categorized to the harvest crops including grains, sugar cane, grasses, cotton and tubers. As for the form of crop seeds divided its kind for rice, corn and beans.
Rice post-harvest handling process

Harvest and rice threshing are activities that go in line and are united. Harvest using ani-ani (knives) is followed by manual threshing. Smashing the rice straws on timber and stepping the rice straws have long gone and replaced by using sickles and smashing, and then cleaned using manual tool by Japan. Harvest using sickles and manual threshing are still widely done in Indonesia, of about 90% and 70% of the farm unit.

RESEARCH METHOD

Research time and setting
Research Time in “Designing Rice Thresher Machine using Break Down system for rural areas” in Segeri-Pankep Regency and Technique Laboratory in Universitas Islam Makassar.

Research procedure
The procedures in designing the rice thresher using break down system for rural areas consist of:
- designing the base form of the media,
- frame making,
- designing form/frame model,
- cutting the materials based on the measurement on the picture,
- connecting the frame by welding,
- painting the frame.

Processing and data analysis
In this research the processing and data analysis stage conducted are as follows:
1. Processing and data analyzing using working hour study
2. Processing and data analyzing using data homogeneity test
   a. Calculating average time (cycle time), b. Conducting data homogeneity test. Homogeneity test is done to identify the extreme data, which is data that is too big or too small and bias too far from the average trend. Based on the homogeneity test result, the extreme data are discarded and not included in subsequent data processing.
3. Data processing using data adequacy test
   Conducting data adequacy test is to determine the number of observations that should be taken using confidence level of 95% and the degree of accuracy of 5%. Based on the formula 6, it can be concluded that if \( N' \leq N \) then the data is enough.
4. Determining the normal time and standard time after obtaining the standard time.

RESULT AND DISCUSSION
The result of the design of the thresher using break down system so that in the harvest time the farmers will not be burdened with the transportation problem of carrying the thresher the harvest result. These are the parts of the Thresher.
Design of thresher using break down system

Figure 1. Theriser using Break Down System for Rural Areas

Figure-2. Parts of rice threshing machine (Thresher).

<table>
<thead>
<tr>
<th>front frame</th>
<th>space thresher</th>
<th>Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retaining hanger Machine</td>
<td>Thresher / rolls</td>
<td>Gutters / table</td>
</tr>
</tbody>
</table>

a) The main structure is made of right angle iron and mild steel sheet that is the base for other components.

b) Threshing cylinder is made of strip iron with a diameter forming a cylinder. The threshing gears, which are made of iron and steel and put using bolt, are put in the crossing strip iron.

c) In the cylinder there are three important parts which are the feed table, thresher filter, and straws sieving sheet.

d) The feed table is located on the thresher cylinder. This feed table is attached to the cover of the thresher. This table leads to the straw sieving sheet behind the thresher machine. It is made of strip iron.

e) Thresher filter is located under the thresher cylinder, made of steel wires or steel iron in semicircle form.

f) Straw sieving sheet is put in the thresher cylinder with no thresher gears. This is made of strip iron.

g) The fan is made of plastic. It has 5 blades.

h) Power transmission unit, through puli and V belt from the thresher cylinder propulsion, fan and sieving movement of type V belt that is used is type B.

Production time analysis

Production time analysis is conducted using stop watch time study method with the consideration that the activities are done repeatedly. Thus it shows that the threshing activities are done by the workers. In this research the number of the cycles or measurements that are taken is 30 observations. Before it is processed to become the standard time, the data are computed using
statistical tests including data homogeneity test and data adequacy test.

Data homogeneity test
Data homogeneity test shows that based on the observations that are used as the control means, the mean, upper control limit, lower control limit are calculated using confidence level of 95% and accuracy level of 5%. The number of the observations is 30 observations. It is obtained that based on the homogeneity test result the operation average is \( \bar{x} = 18.12 \) minutes, upper control limit = 19, 16 and lower control limit = 17, 08. Then the data is homogenous, in which the observation is between upper control limit and lower control limit as shown in the figure below.

Data adequacy test
Using confidence level of 95% and accuracy level of 5%, from the body dimension measured for each dimension it will have deposit of no more than 5%. The number of observation is \( N = 30 \) observations, while \( N' = 1.38 \), or \( 30 > 1.38 \), then the data is enough.

Rating performance determination
Rating performance determination in this research is using the westinghouse rating system method including skill, effort, working condition, and consistency. Based on the determination system done by the workers, then the rating performance for the operation working condition can be calculated as follows:

- Skill (C1) = 0.03
- Effort (D) = 0.00
- Consistency (E) = 0.00
- Working Condition (C) = 0.01

so the adjustment factor = \( 1 + 0.04 \)

Allowance determination
Allowance determination using westing house is done by categorizing the types of allowance:

- Effort (A2) = 7.5
- Attitude (B2) = 2.0

Allowance determination using westing house is done by categorizing the types of allowance:

Using the cycle time formulas, normal time and standard time, the calculation result is obtained as seen in the table below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Average time (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cycle Time</td>
</tr>
<tr>
<td>2</td>
<td>Normal Time</td>
</tr>
<tr>
<td>3</td>
<td>Standard Time</td>
</tr>
</tbody>
</table>

The research result of the production time can be used as the calculation base for the working productivity of the farmers. Standard time for 100kg of grains is 21.84 minutes. The working hour is from 08.00-12.00 and 13.00-16.00 or 7 hours/day. Then it is known that the working productivity of the farmers using the thresher with the break down system is:

- 7 hours x 60 minutes = 420 minutes
- Standard time = 21.84 /100kg
- Daily target = 420/21.84 = 1900kg/day

CONCLUSION
a) Rice thresher using break down system consists of 4 main parts namely frame, thresher, cylinder, and cover. Thus carrying the thresher will be easier and only needs 3 people and the time needed is quicker.

b) Farmer productivity result using the thresher with the break down system is 21.84 minutes/100kg or a daily working hour can reach 1900 kg.

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