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Cattle Milking Machine Maintenance Portable Model Bodypack

Roni Suhartono[1]*, Adhan Efendi[2]

Politeknik Negeri Subang[1,2]
*E-mail: roni@ac.id

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Abstract

Cow milking machines are used to help farmers in mountainous areas in the milking process. The problem faced is that it takes a schedule and selection of appropriate engine maintenance methods so that the milking machine for cows is not easily damaged. This study aims to make a schedule and determine the engine components that must be treated. The data obtained are then processed descriptively qualitatively. The results of the study concluded: (1) the maintenance of a portable milking machine with a bodypack model is carried out every day using the Inspection, Small Repair, Medium Repair, and Overhaul (ISMO) methods; (2) the main components to be examined are the electrical parts of the machine, the machine box, the putting straw, the milk container, and the carrying case;

Keywords : Cow, ISMO, Milking Machine, Bodypack Model.

INTRODUCTION

Dairy cows are the main producer of milk for human consumption. The need for cow's milk is now increasing, so milk production must also be increased. However, the milk produced must be hygienic, not polluted and its quality guaranteed, so handling, equipment, milking must be done properly (Putra, Widyantara, and Christian. 2016). The equipment that can be used by farmers is a cow milking machine. A milking machine is a semi-automatic machine for milking cows (Himam, S. 2008). This machine is not made for just one cow, but mostly one set of components of the tool is made to milk 200 cows per hour. The system of the device circuit consists of a vacuum pump, a regulator (measuring device), and a pulsator.

There are various types of milking machines in the market, but the price of a cow milking machine is quite expensive, ranging from Rp. 17 million to Rp. 25 million (Himam, S. 2008). The results of the observations of the research team at the People's Breeding Center (SPR) Cinagarabogo Subang Regency in June-July 2018 that several problems were found, namely: (1) farmers have not been able to buy milking machines that are sold on the market now because they are very expensive, (2) breeders find it difficult to operate a cow squeezer machine, so a machine that is easy to operate is needed, (3) a milking machine is now deemed by farmers to be less suitable for small-scale farmers because the machine requires a large space and is less effective if used by farmers in mountainous areas.

Based on the above problems, the research team is interested in designing and manufacturing a portable cow milking machine that is effective, efficient, and inexpensive for small-scale farmers in mountainous areas. This cow milking machine is expected to help the milking process so that the production of cow's milk in Subang Regency can increase significantly. However, the machine must be maintained, so that after going through the manufacturing process. The cow milking machine can work and maintain its optimal condition.

METHOD

Definition of Cow's Milk

Milk is a commodity that is needed by people of all age groups to meet nutritional needs (Pertiwi and Purnama, 2011). In Indonesia, people generally consume cow's milk. Along with population growth, increased income, and changes in lifestyle, including diet, consumption of cow's milk in Indonesia is increasing from year to year. This can be demonstrated by the increase in milk consumption from 6.8 liters/capita/year in 2005 to 7.7 liters/capita/year in 2008, or equivalent to 25 g/capita/day (Directorate General of Livestock Production Development, 2009). Added by Riyanto (2012) Dairy products are food products that are important for health because of the content contained in them.

carbohydrates 3.5%, K 4.3 mg/100 g, Ca 143.3 mg/100g, P 60 mg/100 g, Fe 1.7 mg/100 g, Vitamin A 130 (SI), Vitamin B1 0, 3 mg/100 g and Vitamin C 1 mg/100 g. Milk also contains small amounts of other components such as pigments, enzymes, and leukocytes (Goff and Hill, 1993).

Factors Affecting the Quality of Cow's Milk

According to Budianto and Usmiati (2008), several factors that affect milk quality include the timing and sequence of milking, season, disease, food, milk adulteration and microbial activity. Milk quality can also be affected when handling related to water quality and cleanliness of equipment and transportation from farmers to dairy companies (Gran et al., 2002). Most of the milk is produced from smallholder dairy farms. Because breeders have low financial capital, so the cages, milking equipment, and water availability are very limited so that the quality of the milk produced is low, especially the high TPC value so that the alcohol test is positive. This triggers the milk to be discarded due to the rejection of milk by the IPS. Therefore, the requirements for the components of milk quality and the threshold determined by the IPS must be agreed between the farmer and the IPS through the cooperative. Milk quality requirements are based on SNI 101-2782-1998 (National Standardization Agency, 1998).

Quality milk can be obtained with good management including sanitation of milking operational equipment and the environment (feed, cages, operators), cleanliness and health of livestock, as well as cleanliness of water sources and handling of milk after milking (Budianto and Usmiati, 2008). In addition, it is necessary to apply healthy food handling methods including the environment, production methods/equipment, handling, storage and transportation, washing, maintenance and labor, according to Codex recommendations (FAO and WHO, 1997). Quality control and safety of dairy foods need serious attention because they are related to the increasing consumer demand for food that is safe from all forms of contamination, both physical, chemical and microbiological. Consequences that can be caused by contaminated food is the emergence of disease,

People's dairy farms in Indonesia are generally incorporated in a dairy cooperative. Dairy agribusiness is a commodity that is easily damaged, has a high risk, therefore it needs careful handling and specialization. Specialization fosters good abilities and skills. Expertise requires competencies that can be learned through regular and continuous education. The behavior of farmers who often do not care about milk safety issues needs attention to always be fostered, directed and convinced of their awareness in an effort to improve the quality and safety of milk food (Budianto and Usmiati, 2008).

Machine maintenance

According to Sofyan Assauri, (2004) machine maintenance is maintaining the condition of the machine in a ready-to-work condition. Added by Adhan and Roni (2018) that machine maintenance consists of maintenance and repair. The types of maintenance are:

1. **Preventive Maintenance**
   Machine condition maintenance activities that aim to prevent machine damage and detect machine damage opportunities that arise when the machine is operated.
2. **Corrective Maintenance**
   Machine condition maintenance activities carried out when the machine is not working optimally due to damage to the machine condition.

Research Design and Methodology

The research design began with a literature study at the Subang State Polytechnic library, checking the condition of the milking machine, making a maintenance schedule, expert validation, and finished. The data obtained are then described in a qualitative descriptive manner.

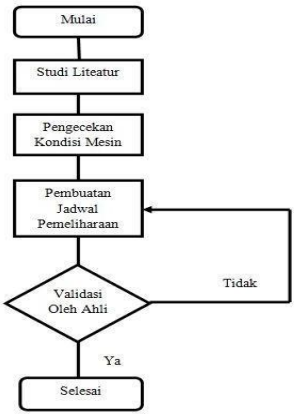

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Figure 1. Research Methodology Flowchart

Research Sites

The research was carried out at the Subang State Polytechnic Laboratory.

RESULTS AND DISCUSSION

Study of literature

The research team conducted a literature study in the form of seeking information and materials related to the maintenance process on cow milking machines either through books or journals at the Subang State Polytechnic library.

Machine Condition Check

A milking machine is a machine thatused to help the milking process of cows and easy to carry around. Basically all milking machines consist of a) Vacuum Pump b) Pulsator c) Milk claw d) Tea cup and e). Milk container (Bucket).

Figure 2. Milking Machine Condition

The general condition of the machine after the manufacturing process and field testing suffered some damage. The damage can be repaired immediately and the maintenance process is carried out with the Inspection, Small Repair, Medium Repair, and Overhaul methods with routine

maintenance carried out every day. Every day was chosen by experts because of the milking machine which must always be in sterile conditions.

Figure 3. Machine Box Cleaning

Inspection and cleaning of the nipple straws (Teat cup). The inspection and cleaning process is carried out with hot water, hot water is intended to kill the germs that exist after the milk suction process. During the inspection process it was also found looseness in the rubber that could cause leakage, this was immediately repaired by replacing it with a new one.

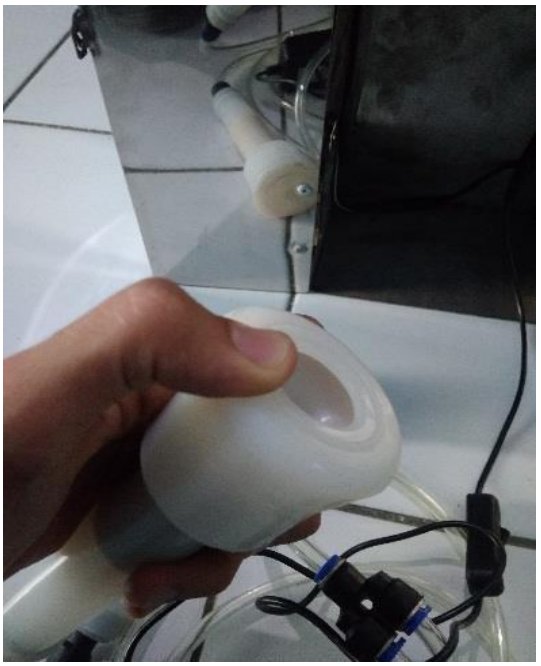

Figure 4. Putting Straw Inspection and Cleaning

Subsequent maintenance is carried out on the part of the milk container for the cow's milking machine, the container is in good condition, it's just that routine cleaning must be carried out on the inside of the container from the rest of the milk that sticks.

Figure 5. Milk Container Cleaning

Daily Maintenance Schedule Pembuatan

The schedule making process is carried out based on the data obtained in the field after the milking process. The condition and cleanliness of the milking machine became the main concern which was then consulted with a machine maintenance expert, namely Mrs. Susilawati, M.Pd. as a machine maintenance lecturer at the Subang State Polytechnic. Based on the results of the validation, it was agreed that daily maintenance was carried out using the Inspection, Small Repair, Medium Repair, and Overhaul methods. Some of the components that were treated were the electrical parts of the machine, the machine box, nipple straws, milk containers, and bag supports. The following is a schedule that has gone through the expert validation stage.

Table 1. Machine maintenance

No	Component	Week 4 Maintenance						
		Use 1 minute	Use 2 minutes	Use 3 minutes	Use 4/Min	Use 5 minutes	Use 6/Min	Use 7/Min
1	Buffer Bag				I5			

2	Main Bag					I5		
3	Machine Box			I5				I5
4	Electricity	I_{10}						
5	Straw Nipples	I_{10}	I_{10}	I_{10}	I_{10}	I_{10}	I_{10}	I_{10}
6	Milk Container	I_{10}		I_{10}		I_{10}		I_{10}
Number of Minutes Per week		140						
Inspection		70						

Information:

I = *Inspection*

Clean the disc mill machine after use.

CONCLUSION

Based on the research conducted, several conclusions were found, namely: Bodypack model portable milking machine maintenance is carried out every day using Inspection, Small Repair, Medium Repair, and Overhaul (ISMO) methods; The main components that are inspected are the electrical parts of the machine, the machine box, nipple straws, milk containers, and bag supports; Routine maintenance is proven to be able to maintain and extend the life of the bodypack model portable milking machine.

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