

Electric Canting Innovation for Production Cost Efficiency in Randu7 Mulia Batik SMEs Probolinggo

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ABSTRACT

This research presents an effort to innovate electric canting by utilizing the micro heater element in solder (MHE), where MHE is active when it receives electricity. MHE acts as an element that converts electrical energy into heat, and with a relatively stable temperature, MHE can heat the malam liquid storage tube. The hot malam tube will be filled with solid malam until the malam melts and can be applied to cloth. In addition, an on off button is also installed which functions to transmit and cut off electricity to the MHE or in other words adjusts to user needs. The implementation of the use of electric canting started at Batik Randu7Start and then it can also be implemented at other hand-written batik SMEs in Probolinggo. The benefits of this electric canting aside from overcoming the problems that exist in UMKM Batik Randu7, what is no less important is being able to reduce production costs when compared to using manual canting. With this, it is also hoped that MSMEs can continue to grow batik and create competitive advantages in the market.

Keywords: Appropriate Technology, Canting Batik Electric, Innovation, Micro Heater Element



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INTRODUCTION

The Covid 19 pandemic that has hit the world has changed sectors in the order of life including the economic sector. During the pandemic, almost all sectors that supported the Indonesian economy, including MSMEs, experienced. Most MSMEs have experienced a decrease in production due to a decrease in sales (Nalini, 2021). However, after the determination of the pandemic to become endemic, MSMEs in Indonesia began to move (Wely Putri Melati, 2022). The existence of MSMEs makes many contributions to the economy such as having the potential to reduce unemployment through providing employment, has the potential to increase the regional and national economy and reduce income inequality (Hasanah et al., 2020). MSMEs need to innovate and take advantage of many things that can support business development, one of which is technological progress. Technological developments have been widely used by humans in everyday life, including MSME business actors for production cost efficiency and performance effectiveness (Dahlan, 2017).

Utilization or appropriate technological innovation will have an impact on the sustainability of MSME businesses (Mirzam, 2021). Optimal utilization of innovation will have an impact on the development of MSME businesses (Amalia et al., 2012). The use of appropriate technology is also able to make MSMEs competitive after the pandemic turmoil (Zahra et al., 2021).

Batik Randu7 Mulia is a new MSME located in Randupitu Village, they produce written batik using manual canting. After making observations related to the batik production process, several problems were found, namely the first seepage of malam liquid in the canting container. The two raw materials for canting are not durable because they are made of wood which rots easily and the malam liquid reservoir is very soft. The three electric stoves used tend to be unstable in temperature, so the malam liquid is easily scorched and electricity consumption tends to be wasteful. So that some of these problems motivated us to try to innovate electric canting with solder as the main ingredient. The use of solder as the main ingredient is with the consideration that solder has a more stable temperature so it is hoped that with this electric canting innovation it will be able to solve existing problems and the most important thing is production cost efficiency.

The heating element contained in the solder can act as a good conductor of electricity. If grouped based on the material, the heating element is divided into 3 namely metallic elements, sheet elements and ceramic elements (Meriadi et al., 2018). According to Wang et al., (2020) a good heating element must meet 3 conditions, namely:

- a. Physical Requirements. Includes resistance to high temperatures, corrosion resistance, and durable
- b. Electrical Terms. Covers low power consumption, high heating resistance
- c. Thermal Conditions. Includes good heating capacity and high conductivity.

In addition to the problems of easy seeping and not lasting long, the use of manual canting also tends to be inefficient in terms of production costs. Due to the use of an electric stove which has a temperature range of 200 - 350 W, it is difficult for users to regulate a stable temperature, so that it is prone to wastage of electric power. One of the things that is marked is that there is often a black liquid in the pan. Besides that, use of malam also tends to be wasteful with the heating system in a frying pan using an electric stove. Based on this, we took the initiative to make electric cantings whose temperature tends to be more stable and not wasteful for malam use and their application is as easy as manual cantings. The first step in designing an electric canting is observing the batik printing process carefully, then calculating the production costs (the canting part) incurred for one production process. The next stage is identifying and selecting other supporting materials that can be used to replace the existing functions of manual canting. Components such as refrigerator filters are considered to replace the malam liquid reservoir function in manual canting. Apart from being able to solve existing problems, the electric canting innovation is also expected to be an inspiration for several parties to create and use appropriate technology that can support the efficiency of the production process.

METHODS

Heat is one of the important elements in everyday human life that can be generated through radiation, induction and so on. Heating elements have recently become an interesting topic, especially in the industrial world (Lee et al., 2020). Heating element systems are generally grouped into external and internal heating systems (Jeroish et al., 2022). In this study, the main component in making electric canting is the use of a Micro Heater Element. The way MHE works is to convert electrical energy into heat energy to further melt the solid malam through the "contact" heating technique. MHE is obtained from a modified electric soldering iron. In addition to the main components, there are also supporting components, namely:

- a. Refrigerator filter (Strainer Refrigerator) which is then modified as a malam liquid reservoir.
- b. Cables and plugs that function to connect electrical devices to a power source.

- c. The on/off button functions as a liaison and breaker of electrical power.
- d. The eye of the canting or cucuk canting which functions as a place for the malam liquid that has melted.

The main components and all supporting components are put together to form an electric canting which is expected to be one of the innovations from the problems that arise from the use of manual batik canting. In addition, the use of electric canting is expected to reduce production costs which seem wasteful.

RESULTS AND DISCUSSION

The manufacture of electric canting requires precision and skill, especially regarding the use of supporting tools such as grinding machines, ragum, vises, pliers and screwdrivers. In addition, this electric canting has its own uniqueness, which is designed by utilizing several electronic device components so that it is more practical and has many advantages compared to manual canting. Some of the advantages of electric canting compared to manual canting are shown in table 1 below :

Table 1. Comparison of Manual Canting and Eelectric Canting

	Canting Manual	Canting Eleketrik
Energy Saving	-	✓
Risk of leakage and seepage	✓	-
Heating stability	-	✓
Cucuk canting easily clogged	✓	-
Malam liquid burns easily	✓	-
Easy to apply for beginners	-	✓

Souces : Observation Results by the Author

The following steps are carried out in the process of making electric canting:

- a. The first stage is modifying the solder. The step taken is to remove the soldering iron with the help of a screwdriver to then place the refrigerator filter as shown in Figure 1.

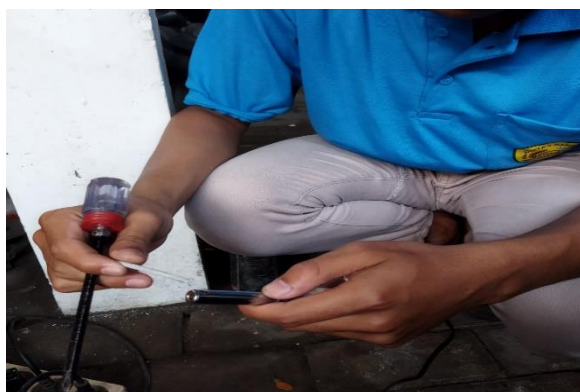


Figure 1 : Solder modification process

Source : Author Documentation

- b. The second stage is modifying the refrigerator filter to become a reservoir for malam liquid using the help of a grinding machine as a cutting tool and ragum. Refrigerator filters that are shaped like tubes were chosen as a substitute for malam liquid reservoirs with several considerations, namely the material is stronger and thicker so it lasts longer. Apart from that, the next reason is

that it can hold more malam liquid than manual canting. The refrigerator filter modification process is shown in Figure 2.



Source : Author Documentation

- c. The third stage is joining the solder tip with the modified refrigerator filter using a screwdriver and bolts as shown in Figure 3.



Figure 3 : The Process of Combining Canting Tubes and Solder
Source : Author Documentation

- d. The fourth stage is attaching the cucuk canting tip to the end of the refrigerator filter using iron glue as the adhesive as shown in Figure 4.



Figure 4 : Canting Cucuk Installation Process
Source : Author Documentation

- e. The sixth stage is replacing the cable and soldering plug and installing the on-off button as shown in Figure 5. The purpose of using the on-off button is to connect and disconnect electricity according to the needs of canting users.



Figure 5 : Electric Canting After the Process Replace the Cable and Installing On/Off Button
Source : Author Documentation

After going through the assembly process and feasibility testing as shown in Figure 6, the electric canting is ready to be used by workers at UKM Batik Randu7 Mulia. Apart from having the advantages as shown in Table 1, this electric canting innovation also has other advantages, namely saving production costs for UKM Batik Randu7 Mulia. Calculation of production cost efficiency obtained through a comparison of production cost calculations with manual canting and electric canting is shown in Table 2.



Figure 6 : Trial Results of Electric Canting
Source : Author Documentation

Table 2: Comparison of the Costs of Batik Production Using Manual Canting and Electric Canting

Cost	Manual Canting	Electric Canting
Electricity cost (7 hours / day)	Rp. 63.000	Rp. 12.600
Malam	Rp. 8.000	Rp. 6.400

Total Cost of Production (Canting Division)	Rp. 71.000	Rp. 19.000
Number of Production Units	2	2
COGS Per Unit	Rp. 35.500	Rp. 9.500

Source : Production Cost Calculation Results By the Author

The picture 6 shows the results of the canting test on primis cloth which showed that there was no seeping or burning malam liquid. The table 2 shows that electric canting can save production costs as much as 27% compared to using manual canting. The results of this electric canting innovation support Amalia et al., (2012 and Mirzam, (2021) which states that appropriate technological innovations can help the development of MSME businesses, in this case through production cost efficiency. In addition, the results of the electric canting innovation prove that the utilization of MHE in solder can play an optimal role to support efficiency (Jeroish et al., 2022; Lee et al., 2020).

CONCLUSION

Based on the implementation and evaluation program in UMKM Batik Randu7 Mulia, there are several conclusions can be drawn as follows: In terms of usefulness, electric canting can solve problems faced by batik craftsmen related to the use of manual canting. Electric canting supports production cost efficiency of Randu7 Mulia Batik. So that the efficiency of production costs will bring a competitive advantage to MSMEs Batik Randu7 Mulia. This electric canting innovation can provide knowledge to Batik Randu7 Mulia UMKM in particular and batik business actors in general, that the use of electric canting will not only provide efficiency in production costs but also efficiency in the production process so that they can achieve effective and efficient performance. This innovation is expected to be an idea for creative business actors in developing other similar appropriate technologies so that they can become a driving force for the development of MSMEs. So that with the development of MSMEs, the regional economy in particular will also increase.

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