

Manufacturing of Automatic Recycling Handwashing

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ABSTRACT

This study is a research and development (R&D). Data were collected by observation and documentation of practical work. Data analysis using descriptive qualitative. The research aimed to make an automatic hand washing device using sensors in terms of preventing the spread of the corona virus. The results showed that: (1) The manufacturing process includes the steps of reading design, tools and materials, manufacturing, assembly, and finishing; (2) Automatic hand washing equipment can work well and has been tested at community Health centers Kasomalang in terms of preventing the spread of the corona virus; (3) Design and manufacturing results are appropriate and suitable for use.

Keywords

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

Introduction

Subang Regency is one of the regencies in West Java which is the center for the development of the manufacturing and container industrial areas. The industrial production process in this area was hampered at the beginning of 2020 due to the corona virus pandemic. This virus forces workers to be laid off and some work online. Subang State Polytechnic Campus in collaboration with PT Master Engineering tries to provide innovation in the engineering field by making automatic hand washing tools. Added by Efendi. A, Nugraha, A. dan Baharta. R [1] that mention Subang state polytechnic campus aims to be one of the best vocational campuses in Indonesia.

The corona virus is spreading rapidly and ferociously around the world. Corona virus disease 2019 (COVID-19), which is caused by a new type of coronavirus, known as severe acute respiratory syndrome coronavirus-2 [2]. Added by Albert Manero et al [3] the corona virus was first detected in Wuhan, China. In Indonesia alone 600,000 thousand people are infected by this virus. Adequate hospital facilities force each individual to maintain his health through wearing a mask, washing hands, and maintaining a minimum distance of 1 meter. Compliance with hand washing is important in terms of preventing disease transmission [4]. The World Health Organization emphasizes that [5] the process of washing hands must ensure clean water and sanitation of hand washing equipment. This is an effort not to let the hand washing place become a source of the spread of the corona virus.

Currently, many hand washing tools have been developed, in Subang Regency, in general, they still use manual hand washing tools that are moved by a tap. Manual hand washing is very risky for crowds of people and a source of the spread of the corona virus. Previous research such as R.S. Milasi, M. Reza, Lucas C [6] created a multi-functional handwashing device that works automatically. Washing hands must use hand washing equipment that is clean, hygienic, and wash hands properly [7]. Another researcher

Robert E. Newell [8] also patented a hand washing device that works automatically using sensors. Apart from cleanliness, another factor in designing a hand washing device is the layout and ergonomics of the hand washing machine in terms of making it easier for users to wash their hands [9]. Some researchers developed a hand washing tool using "Press Tap" which focuses on using hand washing tools to make them easier to use [10]. Based on the data above, researchers and the industry will develop an automatic hand washing device that goes through the design, manufacture and trial stages. This research is a follow-up research conducted by the research team. It is hoped that the manufacture of automatic hand washing devices can prevent the spread of the corona virus in hand washing places, especially in Subang Regency.

Method

This type of research is the study of research and development (R & D). Retrieval of data through observation and documentation of practical work. Data analysis using descriptive qualitative.

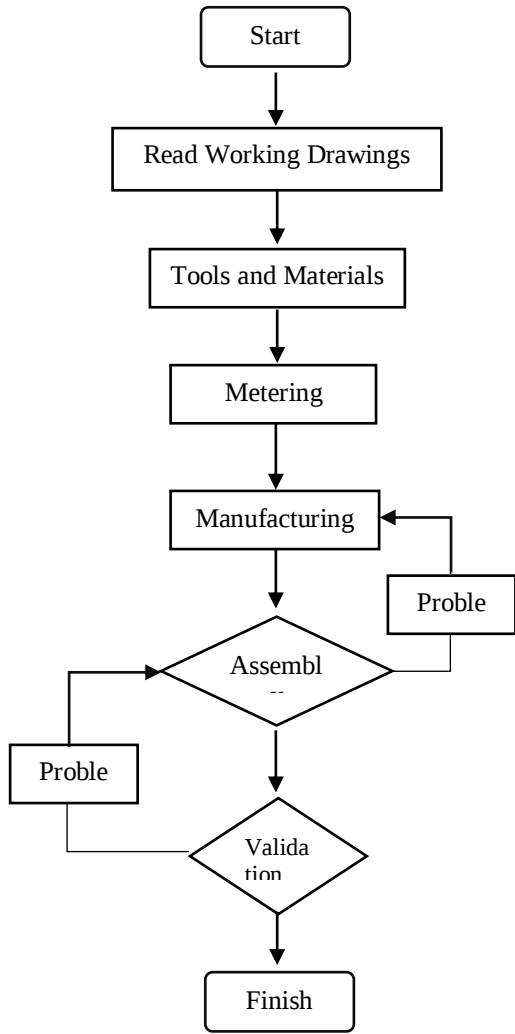


Figure 1. Research Flowchart

The first step is to read the design of the handwashing device. This is the main thing that needs to be done before the framework process. This process aims to facilitate and minimize the problems that occur during the working process so that the results are in accordance with the design of the framework design; prepare and identify the tools and materials needed to support the work easily and in accordance with the classifications needed to make the frame. Measurements are done by prepare materials that will become the mainframe of the handwashing device. After that, enter the connection process or assembly which includes the placement of osmosis, battery, gallons, and other components that work into one unit. After being tested, validation will be carried out by experts from PT Master Engineering. If declared valid, the manufacturing process is declared complete.

Result and Discussion

Read Work Drawing

At this stage, the researcher has designed an automatic recycled handwashing device using the Autodesk Inventor application. The validated design was then applied to the manufacturing

process.

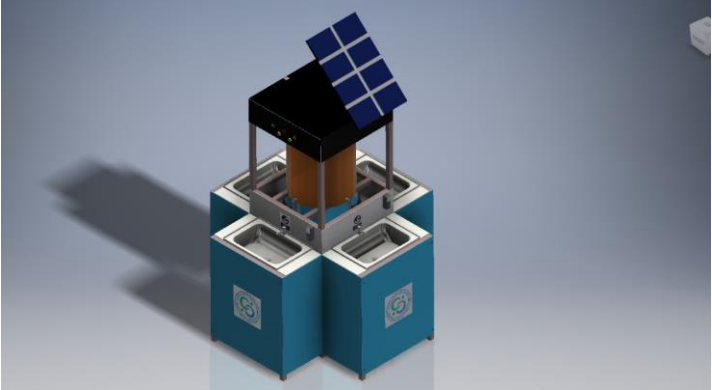


Figure 2. Automatic Hand Washing Design

Tool and Materials

Making automatic handwashing equipment requires tools and materials in the manufacturing process. Some of the main tools needed are solar panels as a storage source for solar energy, then osmosis as a water filter, and a temperature sensor placed on a water tap.

Metering

This stage is a measurement of the material to be cut to become the mainframe for an automatic handwashing device. After being cut according to the working drawing on the design. The connection process is carried out so that it becomes a mutually supportingt.



Figure 3. Measuring and Cutting Process

Manufacturing

Mainframe Making

The process of making the mainframe is the most important thing at this stage. The manufacture must be following the size of the existing design drawing, if it is not suitable then some components will not be able to be arranged into one unit. The mainframe serves as a support for water tower and a holder for solar cell.



Figure 4. Mainframe Making

Assembly of Water Tower, Osmosis and Pump

After the mainframe was made according to the design, the research team then installed several components on the automatic hand washing device, namely water tower as a place to hold water, osmosis as a filter to sterilize water, and a pump as a source of power to attract and drain water to the faucet.



Figure 5. Osmosis Installation and Pump Testing

Assembly Solar Cell dan Sensor Faucets

Solar cells are a source of components to absorb solar heat which will then be stored in batteries. The battery is connected to the inverter to convert the current from ac to dc. This electric current is the main source for moving the pump. While the sensor is installed on the faucet as a regulator of the pump on/off working. The use of sensors is expected to reduce touch when handwashing tools are used.



Picture 6. Installation of Solar cell and Sensor Faucets

Finishing Automatic Handwashing Tool

The final stage is painting automatic handwashing tools and testing the performance of automatic handwashing tools. This is intended to see the capacity of the battery power, the running of the pump, and the functioning of the sensors installed in the tool. The results obtained are handwashing tools that can be used evenly for 6 hours. When 6 hours of water in tower must be filled immediately. This is because osmosis works with a small tap, so the use of water when washing hands compared to filling and filtering using osmosis will take longer.



Figure7. Handwashing Tools Finishing and Testing

Validation

Validation is carried out by experts from PT Master Engineering, the main guide in expert validation includes the suitability of design drawings with the machines that have been made.

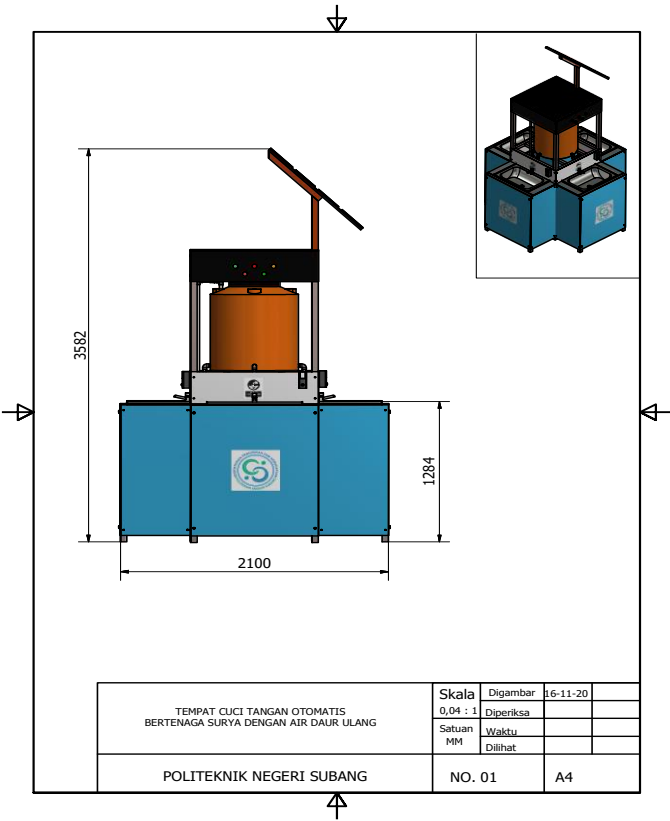


Figure 8. Validation of Conformity Design and Tools

Conclusion

Based on the research conducted, it can be concluded that:

1. The manufacturing process includes steps to read the design, tools and materials, manufacturing, assembly, and finishing.
2. Automatic handwashing tools can work well and have been tested at Kasomalang community Health centers in terms of preventing the spread of the coronavirus.
3. Design and manufacturing results are appropriate and suitable for use.

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