

Polishing Process and Mathematical Modeling of Polishing Drying on Wood

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Abstract: Wood polish is a coating of wood to make it look better. Wood polish is also useful for protecting wood from wood stains. In the wood polishing process, the formula for Moisture Ratio is obtained $MR = a + bt$, with a and b empirical constants on the drying model and the value depends on the ambient temperature.

Keywords: Environmental Temperature, Moisture Ratio, Wood Polish.

Introduction

Wood polish is the process of coating wood to make it better and more durable. The price of wood polish is relatively cheap. The benefits of wood polishing are to make the wood shiny and make the wood durable and the wood looks good.

Mathematical modeling of the wood polish drying process is to calculate the length of time for drying the moisture content of the wood. This modeling produces the formula for Moisture Ratio on wood polish. The value of the moisture ratio is the value of the water content of a material at a certain time with a constant weight of the material.

Materials and methods

How to polish wood is as follows; First, we prepare the materials. The polishing material used is Taiyo AA 240 size sandpaper made from Aluminum Oxide, satisfied with the size 63.5 mm Eterna Paint Brushes brand, Ultrane Politur P-O3 UV Propan brand with natural matte color, thinner Ampala Super Gloss Quality brand. Second, we prepare the wood to be polished. The wood to be polished must be dry and free from dirt containing oil. After that we sand the surface of the wood. Third, we

dilute the politur. We dilute the polish with thinner. The ratio of the polish with the thinner used is 10: 1. We should use a mask, to avoid gas poisoning from the polish and thinner. Fourth, we apply polish and wait for it to dry. After the polish is dry, we sand it and we apply the polish and wait for it to dry.

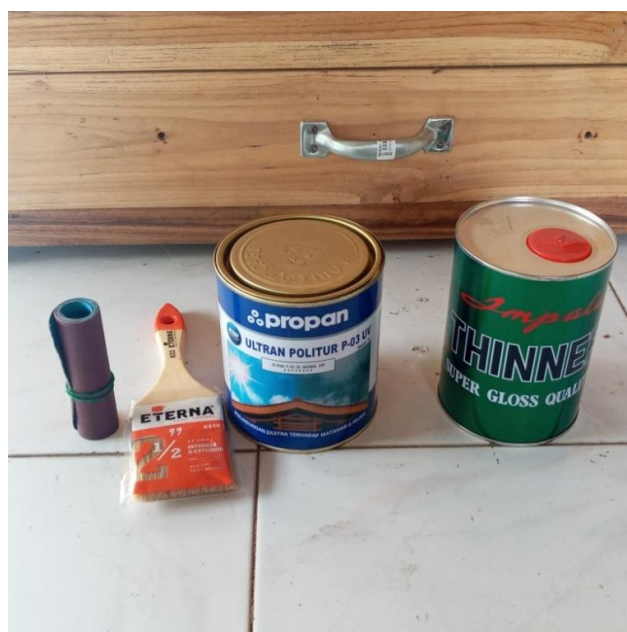


Figure 1. Wood Polishing Material



Figure 2. Wardrobe Before Polishing.



Figure 3. Wardrobe After Polishing.

Results and Discussion

This mathematical model refers to Sugiyanto (2020) on wood melamine. In melamine wood, the value of the Moisture Ratio, $MR = 1 + at$. The polishing process is carried out at an ambient temperature of 31°C . Drying polish takes 20 minutes. Moisture Ratio Value, $MR = 1$ at time $t = 20$ minutes and $MR = 0$ at 0 minutes. We can write

$$\begin{aligned}(t_0, MR_0) &= (0, 1) \\ (t_1, MR_1) &= (20, 0)\end{aligned}$$

We get the linear equation

$$\frac{t - t_0}{t_1 - t_0} = \frac{MR - MR_0}{MR_1 - MR_0}$$

We get $MR = 1 - 0.05t$. The general moisture ratio formula for wood polish is $MR = 1 + at$, where a depending on the ambient temperature. Figure 4 is a curve of Moisture Ratio against time.

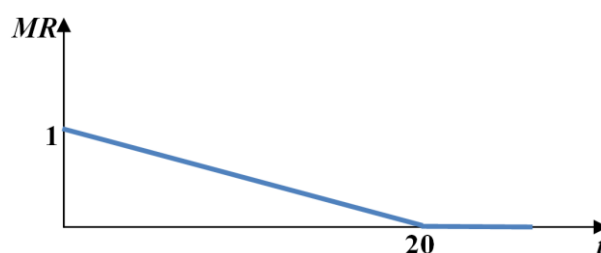


Figure 4. Moisture Ratio Curve against time

The formula for Moisture Ratio on wood polish is

$$MR = \begin{cases} 1 - 0.05t, & 0 \leq t \leq 20 \\ 0, & t > 20. \end{cases}$$

Conclusions

The wood polishing process is a wood coating that is useful for wood durability and beautification of wood. The formula for Moisture Ratio on wood polish is $MR = \begin{cases} 1 - 0.05t, & 0 \leq t \leq 20 \\ 0, & t > 20. \end{cases}$

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Conflict of Interest: The authors declare that there are no conflicts of interest concerning the publication of this article.

References

- Sugiyanto, S. (2020). Melamine Processing and Mathematical Modelling of Melamine Drying in Wood. Kaunia: Integration and Interconnection Islam and Science, 16(1), 9-11.