



## UNDERSTANDING WOOD FINISHING USING THE JAPANESE WOOD BURNING TECHNIQUE (*SHOU SUGI BAN*) IN ARCHITECTURE

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### Abstract

**Purpose** : This study aims to give insights regarding Shou Sugi Ban to a degree that becomes known to more people.

**Research methods** : Applies a literature study method that works by analyzing the data collected. The source of the data is mostly taken from journals, research articles, books, and online websites.

**Findings** : Shou Sugi Ban is a Japanese technique of finishing wood by charring the surface with fire. This technique is environmentally friendly because it naturally makes the wood impossible to absorb moisture so that the wood can be protected from termites and mold. Generally, there are five steps to a perfect Shou Sugi Ban: (1) materials preparation, (2) burn process, (3) surface prep or sanding, (4) stain process, (5) finish process. In architecture, this wood finishing is appropriate for exterior and interior.

**Implications** : The information provided is to be able to add insight and knowledge about one of the natural finishing techniques that still looks beautiful but is environmentally friendly. So later, the advantages of finishing Shou Sugi Ban can be more widely known and utilized in the development of architecture.

**Keywords** : wood finishing, architecture, shou sugi ban, burning.

### INTRODUCTION

Wood is commonly used in different types of interior design themes. In order to enhance the appearance of the wood surface, it is necessary to do the final step of the finishing process. Basically, the finishing process not merely gives attractive characteristics to the wood surface, but also preserves the furniture from pests and climate change. These technological advances, somehow, enable people to choose different techniques of wood finishes.

Generally, wood finishing technique can be considered under two categories: (1) surface finishes, (2) penetrating finishes. Surface finishes applied on the entire surface of wood material so that it does not create a natural texture of the wood. This technique can be done by applying a duco paint on the top of the wood to create a protective layer, such as HPL and tacón. Meanwhile, penetrating finishes offer a more natural look. In other words, this technique can maintain the natural texture of the wood very prominently. Additionally, penetrating finishes are more likely to change the colour of the wood and are



merely used for a very unique texture of the wood in which teakwood. Nevertheless, this category is still very popular among Indonesians and appropriate for exterior and interior.

*Shou Sugi Ban* or *Yakisugi* is a Japanese technique of finishing wood by charring the surface with fire. These are several benefits of using *Shou Sugi Ban*:

- a) The burning process creates a black layer resulting in very unique and ancient finishes.
- b) One of the challenges in using wood is termites. To treat termites, termite drugs containing chemicals are usually used. However, with the *Shou Sugi Ban* can protect the wood from termites and other problematic insects.
- c) It makes the wood resistant to moisture, water, and fire.
- d) *Shou Sugi Ban* finishing technique does not use chemicals and is environmentally friendly.

Even though *Shou Sugi Ban* has so many benefits and become increasingly popular worldwide, this finishing technique is less used often in Indonesia. Besides, the majority of them prefer to use melamine or French polish.

Therefore, in this study, the writer intends to scrutinize more about *Shou Sugi Ban* in architecture. This study also aims to give insights regarding how environmentally friendly the *Shou Sugi Ban* is to a degree that becomes known to more people.

## RESEARCH METHOD

This study applies a literature study method that works by analysing the data collected. The source of the data is mostly taken from journals, research articles, books, and online websites. Later on, the result of this study will be explained through a descriptive-analytical method.

## FINDING

Cited from Nofrial [1], the finishing process is the final-step of any woodworking project. According to Yuswanto, this process can make a wooden surface look desirable. Additionally, the finishing process can be very protective of the wood and resistant to certain types of damage. Another statement regarding wood finishing has also been stated by Muhajirin. He said that the finishing process aims to enhance the appearance and its durability by applying several coats of finish onto the wooden surface. Finishing process is quite similar to a painted technique because both techniques applied a coating performance. However, the scope of wood finishing is actually larger in reality, including stripping, sanding, staining, and etc. Staining is the most important part of the finishing process because this process can greatly affect the final result of the product. There are many different types of wood stain, either from natural alternative or synthetic wood stain. For instance, varnish wood stain, melamine polish, wood paint polish, and etc.

A higher price does not always mean the quality of the product is superior. According to Retnowati [2], there are factors that affect product quality. However, the experience of labour is the most important factor affecting the quality of a product. Before making a decision regarding the appropriate finishing techniques, we need to fully understand what the final result would be. Additionally, there are several things that should be considered in the process of finishing, including money, durability, aesthetics, performance, and etc.

According to Aruni et al. [3], *Shou Sugi Ban* or *Yakisugi* is a traditional technique of wood finishing that has been used for centuries in Japan. This finishing technique works best with soft-wood like cedarwood. *Shou Sugi Ban* offers the uniqueness of the charring process on the entire surface of wood material to create blackened texture. In order to receive good results and increase its durability, coating the surface of the wood with oil is needed.

In Japan, there are five-hundred years old buildings which were built using *Shou Sugi Ban*. *Shou Sugi Ban* was invented by the Japanese in the 1600s. The original reason for this wood burning technique was fire prevention because the Japanese houses were mostly made of wood at that time. The carbon layer of the wood created the fire-retardant which offered good protection against another combustion [4]. However, nowadays *Shou Sugi Ban* is not merely to reveal the natural beauty of wood colour and texture, but also to preserve wood.

Based on the research called “Study of Wooden Surface Carbonization Using the Traditional Japanese *Yakisugi* Technique ” [5], *Shou Sugi Ban* became the hottest trend back in the year 2000. This wood burning technique, later on, gained the attention of architects and designers in Europe and North American. *Shou Sugi Ban* has also become increasingly popular worldwide due to the beauty of the wood texture resulting from the combustion process and also its resistance against moisture and water. Additionally, this wood burning technique can reduce the risk of termite attack by increasing the pH value.

### **1. Wood Finishing Technique (*Shou Sugi Ban*)**

*Shou Sugi Ban* has been developed a lot lately either for its materials or techniques. Even though the traditional methods have and are still being utilised, the technological advances make it easier for people to perform *Shou Sugi Ban*. For instance, the wood burning process. During that process, using a blowtorch is the easiest way to perform a *Shou Sugi Ban* because this tool gives the opportunity to burn a wood with a direct flame without pausing. Additionally, we can also apply a thin coat of colour to the surface of the wood so that it can lead to varied results.

As we know, *Shou Sugi Ban* typically works best with Japanese cedar wood. However, other types of wood actually can be used to carry out *Shou Sugi Ban* as long as the materials readily available. The selection of material types is adjusted to the natural resources available in each region. Meanwhile in Indonesia, Dutch teakwood has been the primary and reliable material when it comes to *Shou Sugi Ban* because it has a beautiful characteristic of wood.

Additionally, its dark-charred top surface, somehow, adds the wow factor to the wood's price.

In order to understand the wood finishing process, the writer has elaborated the steps in the following paragraphs:

#### a) Step 1. Materials Preparation

Choose and prepare your wood. It is better to use a dry Dutch teakwood with the minimum standard of thickness ranges around twelve millimetres. Do not forget to clean them and remove all the dust and dirt.

#### b) Step 2. Burn Process

Now, it is time to enter the burning process. According to Ebner et al. [5], this process actually can be done in several ways. However, in this section, the three woods will be placed in a plank position so that it creates a triangle shape. Do not forget to take a rope and wrap it around to secure the shape and burn the wooden surface for five minutes. Position the arrangement of wood ties on an oblique basis so that the ashes of the remaining burning wood powder can fall. After that open the entire rope bond and place the pieces of wood in line with the position of the burning surface facing up.



Figure 1. Traditional Wood Burning Technique  
[Source : Ebner et al. [5]]

Alternative to traditional technique, we do not need to wrap the rope around to secure wood pyramid. Instead, just use a blowtorch to burn the wooden surface with a direct flame until it turns into charcoal colour. Do it slowly, set the distance 15 to 20 cm and keep going to get a flat burn result. Burning is carried out up to 3mm - 5mm the surface of the wood turns into a charcoal color.



Figure 2. Burn Process with a Blowtorch  
[Source : Youtube Video [6]]

Whatever the techniques are, the most important thing is actually to ensure the entire surface of wood material effectively burned. Additionally, be sure to work in a well-ventilated area with no flammable materials near.

### c) Step 3. Surface Prep

Once the wood cool down, it is time to prep for staining. Gently scrap the top surface of the wood by using an iron brush to remove the soot and ash. This step can also help to reveal a natural texture of the wood.



Figure 3. Surface Prep with Iron Brush  
[Source : Youtube Video [6]]

When expecting a rough or rustic wood texture, the process is enough to do with a wire brush. But to pull out some of the natural and smoother wood look, just sand it with ideally 240 until 320-grit sandpaper. This sandpaper process can be done manually or using a machine. Rub evenly until it gets the desired wood texture. Do not forget to wipe off the dust from each sanding with a damp rag.

### d) Step 4. Stain Process

The coloring process is an optional stage, it depends on the appearance of the desired final result. If you want the final result with the natural color of burning wood, then this stage can be ignored. But if you want to add another touch of color to the wood, this process can be run. Here is the difference in appearance between wood that goes through the coloring process and that does not.



Figure 4. Perbedaan tampilan permukaan kayu original dan yang diwarnai  
[Source : Reference [7]]

The staining process in *Shou Sugi* tire wood finishing can use wood stain water-based. Once the wood stain is diluted with water, brush evenly on the surface of the wood. So that the burn effect does not disappear, you should give a thin layer of color. The trick is to rub the paint layer that is still wet by using a sponge or dry cloth.



Figure 5. Coloring process with a brush  
[Source : Youtube Video [6]]

The application of color can be use using a brush or a spray. Once the entire surface is flat, let stand until the paint is completely dry to be able to continue to the next stage.

#### e) Step 5. Finish Process

This is the final coating process. Finish process aims to protects the wood from termites and other problematic insects. Additionally, this process helps to maintain the natural texture of the wood very prominently. The final coating process can be carried out after the coloring process in step 4 is complete. However, if the wooden planks do not go through the staining process, the final coating process can be carried out after cleaning the charcoal in step 3.

Giving a final layer on the wood surface can be done using natural materials such as oil. According to Retnowati [2], the oil layer cannot protect the wood from impact or scratches because rubbing in oil is the most common way to preserve wood because the oil does not create a 'film' layer on the wood surface. It will seep down into the pores and make it water-resistant, besides oil can also make the wood shine naturally

Not merely using oil, we can also use clear coat on wood. Clear coat is a liquid product that is commonly used for wood finishing. In contrast to oil, applying clear coat will create a film on the surface of the wood and bring out the wood's natural beauty. For a rustic wood look, you can use a matt or matte finish, while for a more modern look you can use a glossy or semi-glossy finish. Another advantage is that the clear coat protects the wood surface from impact. Even though there are many benefits of using this product, clear coat contains a lot of chemical content which make them environmentally unfriendly.

## 2. *Shou Sugi Ban* in Architecture

Discussing about architecture means that there will be a connection to exterior and interior. Cited from one of the books called "Interior Theory" [8], design interior is an integrated system that incorporates all aspects of the architectural design. As a result, those parts are interconnected and influenced each other. There are several purposes regarding the topic: (1) increasing functions, (2) giving aesthetic values, (3) increasing the psychological aspects. In order to manifest those purposes, there are several things that need to be considered, such as the size of an area; the relationship between indoor and outdoor areas; the arrangement of area use; the elements of design, including the materials and finishing techniques; and etc.

As for the *Shou Sugi Ban*, it is actually quite flexible to apply this wood finishing technique. Since this technique makes the wood resistant to moisture and water, *Shou Sugi Ban* becomes appropriate for exterior and interior. Additionally, we can also apply this technique for furniture or even decorative elements. For instance, the following picture below:



Figure 6. Villa Meijndel in Netherlands used *Shou Sugi Ban* finishing on the outdoor wall building  
[Source : Griffiths [9]]

In Europe, *Shou Sugi Ban* has been widely known. Meijndel Villa is one of the buildings which was built using that technique. The glass façade in architecture, somehow, generates a very modern atmosphere. Meanwhile, the vertical wooden boards and the black-charred texture also make the whole building to blend with surroundings.

Besides of that, *Shou Sugi Ban* can be applied to any kind of furniture. Cited from Kerdiati [10], furniture plays a very important role in aesthetic functions. That's why a good furniture should be able to be comfortable to use, while also having to be able to make the look of the space more beautiful. Based on the location of the placement, furniture can be classified into two categories: (1) indoor, (2) outdoor. Outdoor furniture generally using weather-resistant materials to prevent them from certain types of damage.



Figure 7. *Shou Sugi Ban* in Furniture  
[Source: Research Team, 2019]

What makes *Shou Sugi Ban* unique and aesthetically pleasing is actually its bright colours and natural beauty of wood texture in which very suitable for nature, Japanese, and industrial themes.

The wood material, which is finished with the *Shou Sugi Ban* technique, aims to add to the aesthetics of the building. According to Sofiana [11], aesthetic is one of the most important aspects that must be considered in design. There are two judging criteria for aesthetic in a design: (1) elements of design, such as point, line, plane, space, colour, and texture, (2) principles of design, such as harmony, balance, contrast, proportion, emphasis, and rhythm. These two criteria are the rules used in the process of creating beauty, so that the resulting design can provide an aesthetic experience to those who see and use it.



Figure 8. Variety of *Shou Sugi Ban* Designs  
[Source : Reference [12] [13]]

As we know, there is stain process in *Shou Sugi Ban* which allows to combine colours and patterns in more freedom way. This finishing can be used to make the wall panel look more prominent, by combining wooden boards of different colors and materials in one area. In addition, it does not always have to be arranged with one type of pattern, wooden boards can be arranged by combining various patterns to make it look more unique and dynamic. Hence, if we take a look at figure 6, it exemplifies how *Shou Sugi Ban* can be processed into various shapes and visually support the aesthetic aspects.

## CONCLUSION

The advancement in architecture is not merely limited to the functions of the building, but also other elements. For instance, aesthetic aspects, maintenance and environmental considerations. This is also reflected in the selection of materials and the type of finishing to be used.

The whole design of the building must be able to meet the basic human needs. In line with that, there are three purposes of design interior: (1) increasing functions, (2) giving aesthetic values, (3) increasing the psychological aspects. With all those benefits, *Shou Sugi Ban* has the potential to develop and adapt in the better building design.

*Shou Sugi Ban's* traditional finishing technique from Japan, which has been proven to have various advantages, is again being looked at to be applied to modern building designs. Adjustments and several developments were made to create a variety of finishing that is more diverse but still maintains its advantages. This is done to adapt to modern design today.

With the current environmental pollution issues, we should pay more attention to them. One way can be done by reducing the type of finishing with excess chemicals and switching to environmentally friendly finishing.

## REFERENCES

- [1] Nofrial, "Finishing Kayu Dari Bahan Alam," *Jurnal Corak Jurusan Kriya ISI Yogyakarta*, vol. 1, no. 1, Art. no. 1, 2011.
- [2] T. H. Retnowati, "Makalah Pengabdian Masyarakat : Teknik Finishing Kayu," Fakultas Bahasa dan Seni, Universitas Negeri Yogyakarta, 2009.
- [3] T. S. Aruni, B. Iskandriawan, and W. Waluyohadi, "Eksplorasi Material Kayu dengan Teknik *Shou Sugi Ban* pada Desain Tas Serial Wanita," *Jurnal Sains dan Seni ITS*, vol. 8, no. 2, Art. no. 2, Jan. 2020.
- [4] L. E. Hasburgh, S. L. Zelinka, A. B. Bishell, and G. T. Kirker, "Durability and Fire Performance of Charred Wood Siding (*Shou Sugi Ban*)," *Forests*, vol. 12, no. 9, Art. no. 9, Sep. 2021.
- [5] D. Ebner, R. Stelzer, and M. C. Barbu, "Study Of Wooden Surface Carbonization Using The Traditional Japanese Yakisugi Technique," vol. 15, p. 6, 2019.
- [6] Ayo Bikin Sendiri, *Trick Khusus Tukang Kayu - Teknik Shou Sugi Ban - Kayu Murah Jadi Mahal*, (Mei 2021). Accessed: Oct. 02, 2021. [Online Video]. Available: <https://www.youtube.com/watch?v=NOGgF5tu3wM>
- [7] "Shou Sugi Ban | Pionermillworks." <https://pionermillworks.com/shou-sugi-ban> (accessed Oct. 02, 2021).
- [8] A. A. Wicaksono and E. Tisnawati, *Teori Interior*. Jakarta: Griya Kreasi, 2014.
- [9] A. Griffiths, "Charred timber and glass villa by VVKH Architecten is embedded in a sand dune," *Dezeen*, Dec. 06, 2016. <https://www.dezeen.com/2016/12/06/vvkh-architecten-villa-meijendel-the-hague-netherlands-charred-timber/> (accessed Oct. 03, 2021).
- [10] N. L. K. R. Kerdiati, "Penerapan Bambu Resin Sebagai Material Dekoratif Pada Furniture," *Jurnal Desain Interior Sekolah Tinggi Desain Bali*, vol. 5, no. 1, pp. 1–8, 2018.
- [11] Y. Sofiana, "Memahami Estetika dari Sudut Pandang Desain Interior," *Humaniora*, vol. 6, no. 3, Art. no. 3, Jul. 2015.
- [12] "Shou Sugi Ban Technika," *Azúr Bagoly*, Jul. 21, 2017. <https://azurbagoly.hu/shou-sugi-ban-technika/> (accessed Oct. 03, 2021).
- [13] A. Holland, "Multi-coloured Wood Wall Hanging," *Unique Creations By Anita*, Jul. 05, 2021. <https://uniquecreationsbyanita.com/multi-coloured-wood-wall-hanging/> (accessed Oct. 03, 2021).