



## Shoe Lasting With Manual Techniques



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### **ABSTRACT**

*Shoe last is a foot imitation used in the process of making footwear. The shoe last can be plastic, aluminum, or wood. Footwear last can be made of wood with manual techniques. The making of shoelast using manual techniques is thought to have advantages since it can produce a large size and dimension suitability with the feet used as the models. The purpose of this study was to identify how the craftsman utilizes his body to manually make a precise shoe last. The research employs the observation method. The authors make observations on the manual process of making shoelast. The research found that pattern making is the first step in making a shoe last. Three techniques of manual shoe last stages are used. They are the strong swing technique to form the basic shape, the light swing technique to form a global shape, and the filing process to form a detailed shoe last.*

**Kata Kunci:**

Acuan, Teknik, Manual

### **ABSTRAK**

Acuan merupakan sebuah benda tiruan dari kaki yang digunakan dalam proses pembuatan alas kaki. Pembuatan acuan dapat menggunakan bahan plastik, aluminium, dan kayu. Pembuatan acuan alas kaki dengan teknik manual, dapat menggunakan bahan kayu. Pembuatan acuan alas kaki dengan teknik manual diduga memiliki kelebihan berupa tingkat kesesuaian ukuran dan dimensi yang tinggi dengan kaki yang digunakan sebagai model. Tujuan dari penelitian ini adalah untuk mengetahui bagaimana perajin mendayagunakan tubuhnya untuk dapat membuat acuan yang memiliki ketepatan ukuran yang tinggi secara manual. Metode penelitian yang digunakan adalah metode pengamatan, penulis melakukan pengamatan dalam proses pembuatan acuan secara manual. Hasil dari penelitian ini adalah, pembuatan pola merupakan langkah awal dalam membuat sebuah acuan. Terdapat tiga teknik dalam tahapan membuat acuan secara manual yaitu, teknik ayunan kuat untuk membentuk bentuk dasar, teknik ayunan ringan untuk membentuk bentuk global, dan proses pengikiran untuk membentuk detail acuan alas kaki.

## INTRODUCTION

A last is a mold that is used instead of a foot. The process of making footwear requires a mold that is similar to the shape of the foot to attach the shoe top to the outsole of the shoe. Shoe last is important to ensure shape and size fit in the making of footwear. The shape and size suitability will lead to the production of comfortable footwear. In the book *Basic Shoemaking* (2013) for any style of footwear, only one size and one form of footwear last are needed to make a pair of shoes. It will be possible to create a mold that fits the foot very well. In practice, shoemakers cannot make shoes that fit everyone due to different numbers, sizes, and shapes.

Shoe last can be very personal. It relates to the size of the foot that fits the needs of each person's footwear. However, it is not possible to make a truly personal last, because it is not possible to make a last for one piece of footwear for the sake of mass production. Therefore making personal last is usually done for special purposes and not for the benefit of mass production.

The general concerns in making shoes are shape and suitability. To get the expected shape and suitability of the footwear a mold which is commonly called a template or last in English is needed. The last commonly used in shoe factories are usually made of wood, but the last used in rubber shoe/canvas factories are made of aluminum alloy because resistance to high temperatures is required in the vulcanization process (Basuki, 1984). The lasts used in large companies are mostly made of plastic or aluminum. Micro and small industry (IKM) or home industry still uses wood-based last. The last made of wood is easier to obtain in relatively small quantities than the last made of plastic or aluminum because most of them have to be purchased in large quantities.

In the Hong Kong Polytechnic journal entitled *Design and Making of Shoe Lasts* (2013), it is described that last is traditionally made of wood since the material is the most effective and economical. To date, shoelast is still made manually for footwear modifications and special orders. Wooden lasts are currently made manually based on special orders. Wooden lasts are made manually because the making of wooden molds is no longer effective for mass production. Most of them are made manually based on special requests regarding the model and size. Footwear is something unique. In the making of footwear models, special raw materials are needed to produce good quality last. The quality of this last will affect the durability. In addition, the quality of the raw materials also affects the shape of the last (Abimanyu, 2018).

To be able to insert the mold into the semi-finished shoe, no other steps are required in the making of the mold, but because the leather is stretched very tightly during the process of attaching the shoe top to the mold, some methods are needed to facilitate the removal of the mold from the shoe. This is done by cutting the mold in half and creating a hinged heel. The finished last can be easily inserted or removed from the shoe. When inserted, they have the same quality, as if the pattern and the top of the shoe are one part (Dooley, 1912).

When the shoe top is attached, the last does not require special treatment. But once the top has been attached to the mold, the process of removing the mold becomes difficult. This is because when the shoe top is attached, the leather of the shoe top stretches tightly around the mold. Therefore special treatment is needed to release the last. The mold is cut into two parts or hinges are put in the mold. What is meant by cutting a mold in half is to make a part of the mold detachable separately from the whole form? Making last by a manual method is still considered important because the manual method has some advantages for special size. In other words, manual last is mostly made for special personal demands. In addition, the last made with manual techniques is widely used for footwear with special functions, which require specific dimensions to suit their needs.

In the journal *The Hong Kong Polytechnic* entitled *Shoe Last Design Templates* (2013), footwear last are designed to represent the feet, but since the last is also used for the production process, shape, and fashion, the shape of the last becomes slightly different from the actual foot shape. In a journal entitled *Shoe Last Design Templates*, he explained that making footwear last is

not merely adjusting the size of the foot. Although the size and dimensions of the feet are the main points, there are additional aspects in the form of adjusting the shape of the last with the growing fashion.

The shape and fashion of footwear last can be freely adjusted in the manual technique. In addition to prioritizing the size and dimensions of the feet used as models, making footwear last also considers the suitability of the shape of the type of last. The craftsman utilizes his body to shape a piece of wood into a shape in such a way to form a last. What technique does the craftsman use to accommodate a last model plan to become a piece of a wooden template?

Understanding the technique used will teach us new knowledge because the making of footwear last using manual techniques requires the most appropriate size and dimensions. Making footwear last based on the exact size and dimensions of the feet cannot be done in bulk. It can only be done manually upon request. Getting a shoe shape that fits the desired foot size and model requires detailed measurements of each part of the foot and the application of manual techniques.

## **METHOD**

The researchers are interested in researching the topic of the manual technique of footwear last making. This topic is interesting because it is closely related to the researchers. In this study, the researchers made a direct observation to the manual technique of footwear last making. The researchers make an observation guide that contains the points that will be observed and makes a research protocol. The observation points include activities, settings, tools, and materials. The observation guide includes such activities of the work process in the application of the manual technique of footwear last making, the steps taken to make wooden footwear last with manual techniques, and the techniques used by craftsmen in shaping it in such a way from a lump of wood into footwear last with a certain desired model. The setting is observed to identify the location of workplace, parts, and layout of the craftsmen's workspace. The tool to support the manual making of footwear last is observed. Besides that, different tool use, variations of tool use, and purpose of the various tool use are also observed. In addition, researchers also observed the effects of variations in the use of tools on the raw materials used.

The materials used in making the footwear last were also observed. In the Journal of CORAK Vol 6, No 02 (2018), the selection of material for footwear last with manual techniques has to meet special criteria. These criteria are interrelated in the special conditions of wood to shape wood as a last. The related criteria are the level of wood hardness and the direction of the wood fiber. The level of wood hardness is related to the resistance and durability of the resulting mold, while the direction of the wood fiber is related to the direction of shrinkage. Therefore, if the wood last shrinks, it will still have the same size.

In the making of footwear last using manual techniques, the type of raw material will have to refer to the previously conducted research. It has to be comply with the guidance for the hardness of the wood and the direction of the wood fiber.

## **RESULT AND DISCUSSION**

This study aims to identify how to make manual footwear last. To answer this question, the researcher observed the whole manual process of making the last from the initial to final stages. The manual technique of making the footwear last requires several important sequences. The sequence includes, among others, the design of the model, the selection of the materials, the techniques, and the special tools.

### **A. Model plan**

The initial stage to make footwear last manually is making the last model plan. The plan can be a verbal or visual statement. This planning stage include the expected completion time. The statement is made to make sure that the footwear products will meet the customer's wishes regarding the condition and size.

The feet will have to be measured to ensure the achievement of the desired results. The measurements are taken at some important points on the feet. The measurement includes the length of the sole, the length of the heel to the metatarsal bone of the foot, the width of the foot in the metatarsal bone, and foot fatness (diameter at the metatarsal bone), the diameter of the waist foot, and the ankle. The measurement location points are important in determining the dimensions of the last being made.

After the measurements are complete, a 2-dimensional design pattern is made from the side. On the sole of the last, the shape is drawn according to the sole being measured. For the depiction on the sole, the distance between the actual image of the foot and the desired design image on the toes is given. The purpose of this treatment is to leave room for the toes to move because when they are used to making footwear, the feet always move dynamically when walking. Therefore a little room for the movement of the toes serves to gain comfort.

In making this last, the plan is easier to realize when verbal and visual statements related to the desired last model are made because, during the observation, the craftsmen repeatedly observed the image provided by the customer to adjust the model. Adjustments are based on verbal statements, visual appearance, and various sizes to find comfort or compatibility.

#### B. Raw material

The footwear lasts are manually made using wood as the raw materials. The raw materials must be hard, ductile, and less moist wood to reduce the size shrinkage. Wood must be hard because when it becomes a last, the wood will be beaten during the lasting process. In the technology and shoe production book (2013), lasting is a process in shoe assembly where the upper component of the shoe is pulled onto the shoe insole to be attached.



Figure 1. *Lasting Process*

If the wood is not hard enough, the blows on the lasting process of the shoe will affect the visual appearance of the last. With the use of hardwood, even though in the process of lasting the shoe experiences blows on the mold, it will not change the shape of the mold used. The ductility criterion is also an important point. The wood must be ductile criteria to keep it from being easily broken, because sometimes some types of wood, even though they meet the hard criteria if hit continuously the wood will break.

In addition, the hardness of the wood also ensures durability and insect resistance. Besides the level of hardness, the raw materials must have the expected fiber strain. The strain may be vertical or horizontal. The difference in fiber strain in one pair of footwear last will affect the



suitability of the shape of the last in one pair. The different strains of fibers will result different strains of shrinkage. Different shapes of footwear will lead to discomfort.



Figure 2. The strain of Wood Fiber

Judging from the characteristics needed in making footwear last, such types of wood as tanjung, rosewood, and acacia can be used. Among the three types of wood, acacia is the most ideal because cape wood is hard to find in the market, while only old rosewood can be used. Young rosewood will break easily. Acacia wood is not only easy to find in the market but it also contains oil. This makes the mold-making process easier and the wood will be more durable

### C. Technique

Broadly speaking, the technique used to make a manual last includes two stages, namely observing and forming. Observation is made at the beginning of the process and during the formation process. At the initial stage, the desired model is observed and then realized into a pattern consisting of a base pattern and a side view pattern. The pattern is adjusted to the customer's foot size. Meanwhile, during the mold formation process, the desired models and forms are observed. In forming a mold manually, several sequences that include making basic shapes, global shapes, and detailed shapes are taken. The basic form is made with the technique of swinging the ax with a long and strong swing. This is because the distance between the ax swing and the wood is around 70-80 cm. The swing can be said to be strong seen from the way the craftsman holds the ax handle, namely by gripping it firmly. Wood chipped with this technique looks great.

Then in making the global shape, the technique used is swinging the ax with a short and weak swing. The ax swing distance in this technique ranges from 15-30 cm from the wood.





Figure 3. Global Shape of Mold



Figure 4. Mold Filing Process

In this short swing, the strength is reduced, when compared to the long swing. The way to hold the ax handle in this technique looks different. The craftsman holds the ax with the thumb and forefinger at the top of the ax handle. Meanwhile, in the formation of details from the last, no ax is used. The shape is made with a file with curved and flat surfaces.

The details of the last are made by filing the last that has been installed on the clamp to ensure a firm hold.

The mold is filed circularly and sequentially. The file is held at the ends and the bases, then moved back and forth dynamically to the last that has been installed on the clamp tool. A curved file is supposed to shape the curved part, while a flat-file is supposed to smooth it out before the mold is sanded. The same process is carried out on the footwear last, either on the right or on the left. After it is felt that they have the same shape and dimensions, the two lasts are equated by holding the two lasts together and then equalizing the parts by gluing the two lasts. The process to equalize the last is carried out circularly.

The next step is making the footwear last lock. The footwear's last lock is shaped like a molded piece, which serves to help remove the mold from the welded footwear. The mold lock is important because it can facilitate the process of removing the mold from the top of the shoe that has been welded. This last lock is made by drawing the last surface on the back to the top of the last using a marker. After that sawing is done on the mark until the lock is released from the intact last.

The next stage is installing the lock by making a hole at the bottom of the lock arch as deep as approximately 1 cm to attach a piece of iron as a retainer to the lock to keep it from coming off easily. Metal pieces are installed by hammering on the mold. The molded piece at the top is



given a retainer to open or close the lock with a metal that has been bent at the end to hold the lock firmly.



Figure 5. Making Lock Sign



Figure 6. Application of Lock Hold

The locked molds are then sanded using coarse and fine sandpaper. Coarse sandpaper is used first to remove rough fibers. After the coarse fibers are removed, the molds fine sandpaper is used to smooth the surface. The last step is coating the mold with wax. The wax stick is rubbed evenly on the mold. After being flat, the former wax is rubbed with metal so that the wax can stick well to the mold. The use of wax on the last will result in longer durability, smoother surface, and insect resistance.



Figure 7. Finished Mold

#### D. Main points

The important point in the last-making technique lies in observing the ordered model and forming the last. In observing this model, the size and model have to meet the wishes of the customer. It is important to get the right size and pattern.

In the formation of mold, 3 techniques are used. A long and strong ax swing technique is applied by holding the ax handle firmly gripped to form the base of the last. A short and weak ax swing technique is applied with a different grip to form a global shape from the last, and a file technique uses 2 file surfaces, namely a file with a curved surface and a file with a flat surface. The filing is done by holding both ends of the file with the hands, then moving it back and forth dynamically following the curve of the last.

#### CONCLUSION

Based on the discussion of the research results, it can be concluded that the manual technique of mold making has some interrelated stages. Therefore, it can be concluded that:

- A. Making the initial pattern is an important point in the technique of making the manual last because the shape of the desired model must be depicted correctly and is representative of all the desired sizes.
- B. The technique of forming last consists of 3 kinds. The basic shape is made with a long and strong ax swing technique to reduce the surface of the wood significantly. To create a global shape, a short and weak ax swing technique is used. It aims to form the indentations to be close to the desired size. Therefore, the wood that is reduced at this stage is smaller when compared to the long and strong ax swing technique. Meanwhile, the details are formed with a file that has two surfaces, namely convex and flat. On the convex surface, the file is used to form the curved part of the template, while the flat part is used to smooth the surface.

#### APPRECIATION

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