

The Japanese Sword

The Art of MIYAIRI Yukihiro



MIYAIRI Yukihiro is a holder of the Important Intangible Cultural Property, *nihonto*, the Japanese Sword. Fundamental to his sword-making technique are the methods of crisscross forging, called *jumonji-kitae*, and *honsanmai*, a process in which three types of steel—*shingane*, *kawagane* and *hagane*—are welded together. *Shingane* is softer steel used for the core of the blade; hard steel *kawagane* forms the sides and top of the blade, while the cutting edge of the blade uses the hardest steel of all, *hagane*.

This complicated forging method, together with special heat treatments called *tuchidori* and *yakiire*, are what give the Japanese sword its distinctive qualities.

This video shows the entire sword-making process; a culmination of the almost magical forces of fire, water and craftsmanship.

DVD/Color 35'

Presented by The Agency for Cultural Affairs Produced by Iwanami Productions Inc.

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Prologue

MIYAIRI Yukihira is heir to SHIZUSABURO Kaneuji, one of the greatest swordsmiths of the early 14th century, and a leading student of the legendary SOSHU Masamune.



1. Tamahagane

The raw material, called *tamahagane*, is produced by smelting highly pure iron sand and charcoal. The red-hot *tamahagane* is placed on an anvil and pounded with a large hammer. It is then quickly quenched in water.



2. Stacking the tamahagane on the teko-dai plate

The *tamahagane* is struck and broken into little pieces for sorting. Only the best, densely compacted pieces are used.



3. Wrapping the stack of tamahagane in washi paper

The selected pieces of *tamahagane* are stacked and wrapped in Japanese *washi* paper. A mixture of clay and water is poured over the stack, which is then covered with the ashes from burnt rice straw to prevent oxidization.



4. Hammering the heated tamahagane

When the heated *tamahagane* reaches the correct temperature, it is removed from the fire and lightly hammered.



5. Jumonji-kitae

The *tamahagane* is folded in half and pounded flat. An incision is then made in the opposite direction to fold the metal lengthwise. This crisscross forging—*jumonji-kitae*—is repeated 14 or 15 times during the *shita-kitae* or preliminary forging process.



6. Producing oroshigane

2 types of refined metal or *oroshigane* are produced to create the beautiful surface patterns found in the famous swords of old.



7. Zuku-oroshi

Old nails and clamps are cut into fine pieces and melted to adjust the carbon content. As with the *tamahagane*, the refined pig iron called *zuku-oroshi* is folded and forged repeatedly in alternate directions. The *jumonji-kitae* process is repeated 10 times.



8. Hocho-orooshi

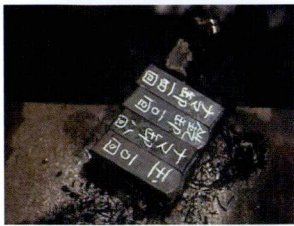
Hocho-orooshi is relatively soft iron, used mainly for the *shingane* or core of the blade.

The *orooshigane* technique is also used to refine the hardest metal, *hagane*. In *hagane-orooshi* the *jumonji-kitae* process is repeated 10 times, in contrast to 8 times for *hocho-orooshi*.



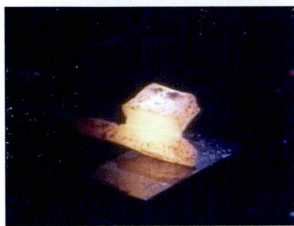
9. Stacking the bars of refined metal

The three types of refined metal are sliced into bars.



10. Making the kawagane

And now for the *age-kitae* or secondary forging process. Three types of metal are stacked on top of the *teko* plate—four parts of *hagane* to three of *zuku* and three of *hocho*.



11. Making the shingane

The *shingane* metal for the core of the sword is a mixture of seven parts *hocho* steel to three parts of slightly coarse *tamahagane*. It is folded horizontally six times.



12. Making the hagane

The metal for the cutting edge of the blade is eight parts *tamahagane* with two parts of *zuku*. This is folded 18 times into a 18mm rectangular cuboid.



13. Honsanmai-kitae

The soft *shingane* is sandwiched between two pieces of hard *kawagane*. The hardest steel of all, *hagane*, which will form the cutting edge of the blade, is placed on top of the *shingane*. The three types of steel are welded together in a process known as *honsanmai-kitae*.



14. Sunobe

The completed billet is now heated and gradually hammered out into the length of the sword. This process is called *sunobe*.



15. Cutting off the tip of the blade obliquely

The *kissaki* or point of the blade is made by cutting off the tip of the *sunobe* obliquely so that the cutting edge is shorter than the *mune* or spine. The blade and *kissaki* are heated and shaped little by little.

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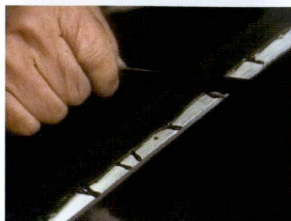
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16. Shaping the blade

Finally, the blade is further shaped using a file and chisel.



17. Tsuchi-oki, applying the clay coating

Yakibatsuchi, a mixture of water and clay powder and charcoal dust, is applied liberally over the blade except for the cutting edge which receives only a thin coating. This way, when the blade is tempered, the cutting edge becomes hard, whilst the body remains relatively soft, giving the blade its distinctive qualities.



18. Yakiire

The *yakiire* is done after sunset to make it easier to judge the temperature by the color of the flames. The color is carefully monitored to ensure the entire blade is heated evenly. The moment the flames turn yellow, the blade is quickly quenched in water.



19. Polishing the sword

MIYAIRI polishes the sword himself to check for scratches and examine the quality of the work.



20. Nakago

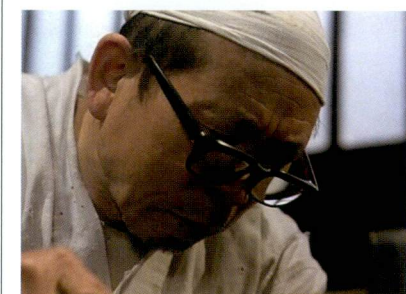
Finishing the *nakago*, the part that is inserted into the handle, MIYAIRI makes a hole to hold the *mekugi* or pin that locks the blade in place and acts as a shock absorber.



21. Finishing

The sword is now handed over to another dedicated craftsman, the sword polisher. The polisher meticulously rubs the blade with a series of polishing stones. This process enhances the beauty of the blade and completes the work of art.

Producer TAKAHASHI Hironobu
Director YAMANOUCI Tokio
Camera Operator YAGI Yoshinori
Lighting FUJIKI Yoshikado
Master Swordsmith MIYAIRI Yukihira
Sword Polisher ONO Kokei
Narrator Barry GJERDE
Music TAKEMITSU Toru
Sound Recording
Katto Isamu Tokyo T.V. Center Co., Ltd.
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Telecine TOKYO KO-ON, Inc.
Executive Production
Kiroku Eiga Hozon Center



Profile of MIYAIRI Yukihira

Born in the town of Sakaki in Chikuma City, Nagano Prefecture in 1913, MIYAIRI Yukihira (born MIYAIRI Kenichi) was a master swordsmith.

In 1963, he was recognized as a holder of the Important Intangible Cultural Property, *nihonto*. He died in 1977.