

Japanese Blades

Traditional sharpening methods

by Toshio Odate

Although most woodworking apprentices begin training at the age of 13 or 14 years, I was 16 when my parents decided I should apprentice to a *tategu-shi*, the craftsman who makes doors, *shoji* (screens) and room-dividing panels. My starting master was my stepfather, which was unusual. It was common to be sent to apprentice with another craftsman for at least the first two to three years for spiritual as well as technical training. My stepfather was very strict and believed a father could not teach his own son. The first day he said to me, "From this day on we are total strangers. I will treat you like a common apprentice, maybe harder. You should call me master, not father." He did as he said.

A *tategu-shi* apprenticeship lasts five years. Two additional years, the first and last, are done as a service to the master, extending the relationship to seven years. The first year is spent working in the household and studio doing errands and assisting the master's wife. At this time you are beginning to learn the manners and attitudes of a craftsman through observation. The seventh year is spent working as a craftsman without salary to show appreciation to your master.

An experience in my third year that is still important to me helps to illustrate the relationship a craftsman has with his tools. I had saved a little pocket money given to me by my master and other craftsmen for doing errands. But as my daily needs were taken care of by the master, there was little reason to have or spend money. On the first and fifteenth day of the month we would take a half day off, but only after the master's tools and my tools were taken care of and the shop was cleaned. I was finally free around two o'clock. You can imagine just how precious those hours were to me. One afternoon I took the train to a store that was well known for its fine tools. There I purchased a plane that had been made by a famous blacksmith. At the time I did not know his name or the fine quality of his tools. All I knew was that the plane was expensive. On the train I was so overjoyed I unwrapped the plane and held and looked at it all the way home. I knew I couldn't show the plane to anyone because people would laugh at me—I was still a novice. I couldn't even keep it in my toolbox for fear someone would see it. I enjoyed the plane every evening while in my room. After the lights were turned out, I kept the plane by my bedside.

One day it was raining, and everyone was fixing tools. I don't remember why—it wasn't a day off—but my plane was now in my toolbox. I was pretending to fix my tools but was really looking at my plane. All of a sudden my master was standing behind me. It was too late. He asked, and I had to tell him I had bought it. He took the plane and showed it to the other craftsmen. They, too, thought it was a wonderful tool but teased me because I still did not know how to appreciate its greatness. They took the blade out of the block and examined it carefully. They talked about it for a long time, then gave it back to my master. My master came to me

holding the plane in his hand and told me simply that the plane was too good for me. He took it away, and I never saw it again. I had expected that to happen.

Tools are made to be used, and great tools have to be used by great craftsmen. The plane was not for me and should not have been mine only to keep in a cabinet. I should have had greater respect for the tool and the craftsman who made it. It was a very painful and expensive lesson, but I learned.

Sharpening Japanese blades—Most Japanese woodworking tool blades are made by laminating steel (figure 1). High-quality Western blades also used to be made this way. The edge of the blade is thin and extremely hard and is supported by a thick, soft steel. The center of the back of the blade is hollowed-out to facilitate keeping the back completely flat. Most blades are beveled on one side, except for ax-like tools, which are beveled on both sides with hard steel laminated in the center. Plane blades, chisels and knives are made in the same manner, and the methods for sharpening them are similar. Once you have learned the techniques of sharpening plane blades, which are the most complicated, you will be able to sharpen any flat blade.

A new plane is usually ready to use, but most Japanese craftsmen will recondition it to suit their own preference. The optimal bevel angle depends on the quality of the blade and on the kind of work you are doing. Until you know otherwise, it is best to maintain the original bevel angle of the blade.

If the edge of the blade is not finished when purchased or is badly chipped, a grinder can be used to start the sharpening process. When I worked in Japan I did not have a grinder and always used a coarse stone, as was the custom. Mechanical tools were generally not used. Today a wide variety of machines and tools is available to make dressing or redressing a blade faster and more accurate, but sharpening itself, honing the final edge, has to be done by hand.

There are oilstones and there are waterstones; in Japan we used only waterstones. Many Japanese craftsmen prefer natural stone, but it is difficult to find large stones that have an even consistency. Today, manufactured stones are readily available at an affordable price. Three stones (coarse, medium and fine) are needed. When sharpening (and not redressing) a blade, only the medium and finishing stones are used.

When using a waterstone, water must be added constantly, or the pores of the stone will clog. Keeping the surface of the stone clean gives a faster grind. Japanese craftsmen keep a bucket of water next to the stone, or they have a sink-like wooden box beneath the stone (figure 2).

In sharpening, be sure to wipe the blade before changing to a finer grade stone to keep from transferring coarse particles. Before changing stones you should allow the stone you're on to dry during the last few strokes. This results in a smooth transition to the next stone. As the stone dries, the pores of the stone clog slightly, thus acting as an intermediate grit.

How the blade is held during sharpening is important. The plane blade is held in the palm of the right hand with the index finger extended (photos, right). Place the first two or three fingers (depending upon the size of the blade) of your left hand in the space created by the right thumb and index finger. Your fingers will maintain pressure on the blade so as to steady the bevel. The left thumb, placed under the blade, will provide support for the back.

The angle of the blade on the stone has to be constant

Fig. 1: Blade structure

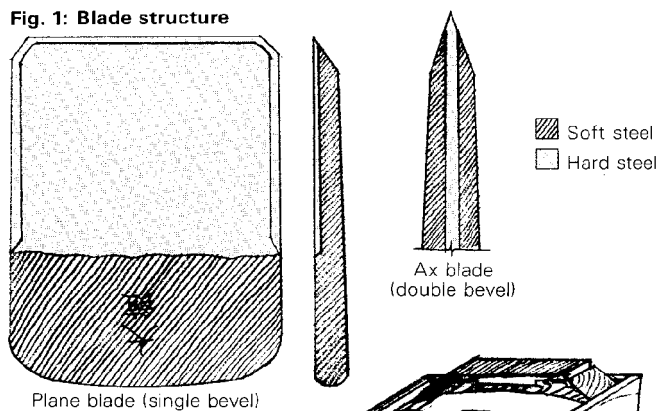


Fig. 2: Waterstone sharpening stand



Front has been removed to reveal construction.

Water-filled stand accommodates coarse, medium and fine stones.



To sharpen the bevel, hold the blade in the right hand, index finger extended to press in back of the bevel. The fingers of the left hand fit between the index finger and thumb of the right hand, also pressing in back of the bevel. Position the thumb of the left hand to support the blade at the back. Keep the angle of the blade on the stone constant while rubbing back and forth.

Fig. 3: Bevels

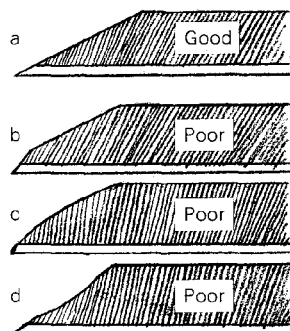
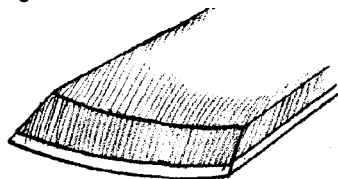


Fig. 4: Plane-blade bevel



A plane blade must be sharpened flat from the edge to the top of the bevel but slightly convex across its width, to keep the corners from digging in. Roughing-plane blades should be more convex than smoothing-plane blades. The convexity shown is exaggerated for illustration.



When a burr has been raised on the flat side of the blade from sharpening the bevel on the medium and fine stones, flip the blade over and hold it with the fingers of the right hand around the back and the thumb extended to press on top of the bevel. Lay the blade flat on the fine stone and bring the thumb and fingers of your left hand to bear on the corners of the bevel. Rub hard back and forth until the burr has been bent back to the bevel side. Continue to rub the blade alternately on the bevel and the flat side until the wire edge falls off.

while sharpening; the surface from the edge of the blade to the top of the bevel must be perfectly flat (figure 3a). This is particularly important for chisels, which are sometimes used like planes, with the bevel riding on the wood—the flatness and smoothness of the bevel help to control the cut and also contribute to the strength of the edge. A double bevel or a convex bevel (figures 3b and 3c) will cause plane blades to skip when cutting hard grain or knots. If the beveled surface is slightly concave (figure 3d), maximum control and also support for the fragile hard-steel edge are sacrificed. Hollow-ground bevels are easier to hone, but there are disadvantages: They do not produce the strongest edge, and they are especially bad for laminated blades.

While the bevel must be perfectly flat from the edge to the top, plane blades require additional shaping: The edge must be slightly convex (figure 4) to prevent the corners of the blade from cutting into the planed surface. The shape is produced by subtly varying the pressure on the blade from side to side during the stroke. The convexity of the edge of a roughing-plane blade should be more pronounced than that of a smoothing-plane blade.

Japanese craftsmen sharpen not on a bench, but with their stone, or their stone stand, on the floor. The squatting position allows you to bring your weight to bear on the work. The orientation of the blade on the stone depends on the size of the blade and the training of the craftsman. Some craftsmen

are taught to sharpen with the edge of the blade always perpendicular to the stroke. This probably produces the strongest edge, but it requires keeping the elbows in close to the body, not their most natural position. I usually sharpen with the blade angled at about 30° to the stroke. This allows me to lock my hands and wrists and still move freely from the upper arms. Another advantage of this position is that it provides greater support for the bevel on the stone to steady the angle during the stroke. The greatest support comes from holding the blade parallel to the direction of the stroke; then there's little chance of rocking the bevel. To hold the blade this way, the stone must be at bench height, and you stand alongside the stone, rather than behind it. I use this position for very thin blades and also for gouges.

The blade should be sharpened on the coarse or medium stone, rubbing back and forth until a burr appears across the edge. To detect the burr, rub the back of the blade gently with your finger; it should not be quite visible. Switching to the finishing stone, sharpen in the same manner until the whole bevel is mirror-smooth. Turn the blade over and hold it with the fingers of your right hand around the back and your thumb extended to press on the top of the bevel. Bridge this thumb with the fingers and thumb of the left hand, pressing on the corners of the blade (photo, left). Rub 15 to 20 times with the back flat on the stone until you can feel the burr bent back to the bevel side. It is important not to sharpen the back of the blade until this time, and only on the finishing stone. Repeat the finishing process back and front until the burr falls off. Resist the temptation to peel the burr off as this will leave a raw edge. Sharpening is now complete.

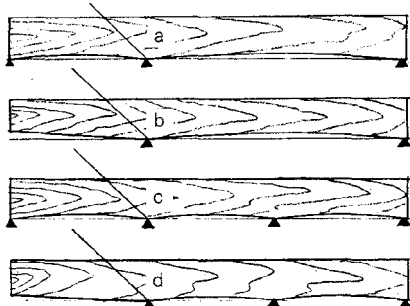
Maintaining the flat back—The back surface of Japanese blades is unique in that the flat between the hollow grind and the blade edge is extremely narrow. It is common knowledge among Japanese craftsmen that the blade performs best just when this flat is narrowest. After repeated sharpenings finally make the flat disappear, a new flat has to be created. If the blade is wider than 3/8 in., Japanese craftsmen usually strike the edge of the soft steel with the corner of a small hammer on the bevel side of the back so as to bend the steel down slightly. It requires considerable skill to do this right because the hard steel of the back of the blade can crack from the slightest vibration of a misdirected blow. Most Japanese craftsmen have had this experience, including myself. I can remember hiding a blade from my master. If one wants to acquire the skill, one must take the chance and practice. I prefer using the corner of a hard wooden block, but some use the corner of an anvil. Either way, place the back of the blade on the corner, making contact 1/4 in. to 3/8 in. down from the edge in the middle of the blade, exactly opposite where you will strike with your hammer. Tap lightly and repeatedly along the center two-thirds of the width of the blade (photos, opposite page), moving the blade between taps to position the corner underneath the hammer. Depending on the thickness of the blade, 15 to 25 taps should push out the hollow in the back enough to produce a flat at the edge after grinding.

Grinding is accomplished with a flat steel plate 2 in. by 8 in. by 1/4 in. (stones are not flat enough), a pinch of carborundum powder (silicone carbide grain, grit #46) and a few drops of water. Mix the carborundum and water on the steel plate and rub the back of the blade, giving little pressure at the beginning, keeping the carborundum paste under the



Left, after repeated sharpenings, the narrow flat at the edge of the hollow grind on the back of the blade is worn away, and the hollow grind must be tapped out to provide enough metal to produce another flat. Back the blade on the corner of a wooden or steel block and tap lightly and repeatedly with the corner of a small hammer in the center of the bevel. Be sure the blade is supported directly behind where the hammer strikes; vibration can easily crack the blade. Below, when enough of the hollow grind has been tapped out, the back must be flattened on a steel plate sprinkled with carborundum and water. Use a length of wood to back up the blade and to provide leverage for gradually increasing the pressure on the blade as you rub it vigorously back and forth. As the carborundum and water become a fine paste, your whole weight is brought to bear. The result is a narrow, mirror-smooth flat at the edge of the blade. You can then sharpen the bevel and the flat on stones.

Fig. 5: Plane-sole contours



For truing (a), the sole is relieved so the plane contacts the work only at the front, the blade and the back. For roughing and smoothing (b), the whole back is relieved so the plane contacts the work only at the front and the blade. Both of these basic contours can be modified (c and d) to include more than one contact point in front of the blade. Exaggerated for illustration.



blade. Then slowly increase the pressure. Keep the surface of the plate moist, and maintain even pressure on the blade with both hands. For leverage place a piece of wood about three times the length of the blade over it and grip the wood and the blade together. Use the wood as a handle and rub hard for a few minutes, then wipe the carborundum paste off the blade to examine the back. If it's even but dull and rough, and you have a flat at the middle of the edge about $\frac{1}{16}$ in. wide, then gather the carborundum paste at the center of the plate and add a few more drops of water. This time press and rub as hard as you can until the paste is completely dry. Here's where working on the floor allows you to get your whole weight on top of the blade (photo, above). Look once again and if the back, all of it except for the hollow grind, is flat and shiny as a mirror, the work is done. If it is not, repeat the process. This is important because the more shine the edge has the sharper it will be. Western flat-back blades should be ground this way as well, so that the blade will keep its edge longer.

For a very narrow chisel (less than $\frac{1}{4}$ in.), it is not necessary to strike with a hammer. Use the carborundum powder and the steel plate. Obviously, the hollow grind will be shallower, but it will do the job.

Next, the corners of the blade are ground to an angle in order to prevent shavings from jamming in the plane body. Then the beveled edge is sharpened as described earlier. The

dimples left in the beveled surface from tapping out the hollow grind will disappear within two or three sharpenings.

Plane preparation—Sharpening is only part of the story; the plane body too must be prepared. The article by Ted Chase (*FWW* #20, Jan. '80) gives some good information. To it I should add that there are two basic contours for the sole of the Japanese plane—one for truing and one for roughing or smoothing. For truing, the sole is relieved so the plane contacts the work at the front, at the blade and at the back (figure 5a). This contour planes a perfectly flat surface because it removes only the high spots of the work, its depth of cut being limited both in front and in back of the blade.

For both roughing and smoothing planes, the whole sole behind the blade is relieved (figure 5b). Thus the plane contacts the work at only two points: at the front and at the blade. This configuration can take much larger shavings. In smoothing planes, the same contour allows the plane to follow the surface exactly, leaving a consistent shine to the wood. Both these configurations can be modified according to the requirements of the craftsman to include more than one contact point in front of the blade (figures 5c and 5d).

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