

Sharpening Primer

Tips and tricks for
sharpening knives
and tools with
waterstones

 **DICK**
FINE TOOLS

Introduction

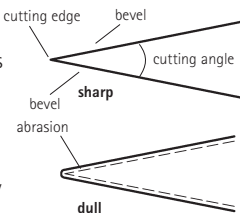
Opinions on how to sharpen a dull cutting edge are widely divergent - even among professionals. We favor the method used for hundreds of years on the sharpest blade of all, the samurai sword:

Sharpening with waterstones.

This method is suitable for sharpening knives and tools alike. It will be introduced in the following as well as a wealth of tips and tricks from our sharpening experts.

What defines sharpness?

Technically speaking, this is where the two beveled edges of a blade intersect. The bevels define the cutting angle; the point of intersection creates the cutting edge. So the goal of sharpening is to regrind the beveled surfaces precisely in order to recreate a perfect intersection.



The attainable level of sharpness depends on four factors:

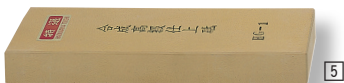
- **The grit of the sharpening stone**
(the finer the grit, the sharper the result)
- **The structure and hardness of the blade**
(the finer and harder the structure, the sharper the blade can become)
- **The geometry of the cutting edge** (the smaller the cutting angle, the lower the cutting resistance)
- **Last but not least, the proficiency of the sharpener**

Sharpening stones

Sharpening with waterstones has the following advantages:

- The steel's hardness is not affected since no heat is generated.
- The cutting edge can be shaped exactly (no rounding like with felt and rubber wheels).
- The sharpening process is not dangerous (no flying sparks).
- Wide array of grits available.
- The necessary equipment is affordable.

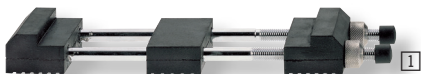
As a **basic equipment**, a combination stone with a grit of 1000 and 6000 [1] is sufficient (e.g. No. 711006). For more demanding tasks, stones with grit 220 [2] (e.g. No. 711000), 2000 [3] (No. 710991) and 4000 [4] (No. 711021) as well as a very fine grit-8000 [5] polishing stone (No. 711020) are recommended. A Nagura stone [6] (No. 711301) can be used to produce a polishing paste.



During use, waterstones must remain rigid and not slip. To ensure stability, use a sharpening stone holder with non-slip rubber jaws **1** (No. 711101), a rubber underlay, or a non-skid mat **2** (No. 705364).

As an alternative to Japanese waterstones, diamond sharpening stones can also be used. DMT stones (USA) are a particularly good choice. Made with monocrystal-line diamonds, these tools are extremely wear resistant and renowned for their perfectly flat surfaces.

The double-sided DMT sharpening tool Duo Sharp **3** (No. 705372) comes with a practical base and is recommended as a supplement to Japanese stones. It is also excellent for flattening the backs of plane or chisel blades.



Synthetic waterstones may be **stored** in a plastic container, submerged permanently in water. Natural waterstones should be stored dry.



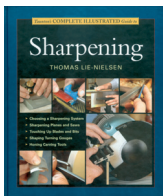
A dash of vinegar or disinfectant should be added to the water to prevent algae growth. Household cleansers, however, should not be used since they attack the stone's bonding. In order to prevent cracking, sharpening stones should never be exposed to frost! When using highly calcareous water, don't let the stones dry out too often; otherwise, lime builds up and reduces the stones' efficiency. Sharpening stones should be handled carefully. Keep them flat (see page 12), clean and free of oil since oil prevents the stones from absorbing water, limiting their abrasive effect.

Book recommendations:

Taunton's Complete Illustrated Guide to Sharpening, by T. Lie-Nielsen.

No. 713774

With this book, exacting plane builder Thomas Lie-Nielsen has produced the most comprehensive and technically substantiated work on the topic of sharpening to date. Step-by-step instructions and tips on restoring sharpness to dull instruments are included for knives and a range of woodworking tools including chisels, axes, saws, plane blades and power tools. An essay on steel and an overview of sharpening equipment complete this comprehensive guide. 216 pages, over 750 color photographs, hardcover, 240 x 285 mm.



The Complete Guide to Sharpening by Leonard Lee.

No. 713554

Finally, a book which takes the mystery out of sharpening tools correctly. In this informative and easy to understand book, toolmaker Leonard Lee presents the most effective and fastest ways to accomplish every sharpening task. 245 pages, 160 sketches, 255 b/w photographs, softcover, 220 x 285 mm.

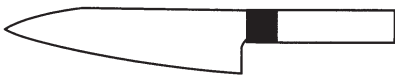


DVD: Schärfen mit Wassersteinen

No. 713707

This film demonstrates how to professionally sharpen chisels, plane blades, carving tools and kitchen knives using whetstones. It introduces the diverse types of stones and explains in detail the correct posture, procedure and movement to use with different tools. This sharpening method has been used on Samurai swords for hundreds of years with enormous success. Some of its advantages include ensuring your blades have a good service life, exact geometry and breathtaking sharpness. DVD, 20 minutes, **in German**.



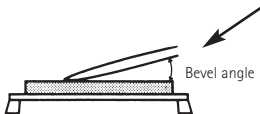


Knives

The appropriate method for sharpening a knife depends on the quality of the steel. Many common kitchen knives made of stainless steel have relatively soft blades (52-56 Rockwell). Routine use causes the cutting edge to bend, making the blade dull. Sharpness can be restored by reforming the cutting edge with a burnisher. However the durability of the edge still will be weak. For good edge retention, hard steel - like that used in Japanese kitchen knives - must be used. And since abrasion is required to sharpen hard steel, sharpening stones are the ideal sharpening method.

Handling the knife

For sharpening knives, a waterstone with a grit size of about 1000



should be used first. Soak the stone in water for a few minutes before placing it on a slip-proof surface. Position the knife blade diagonally on top of the stone at an angle as close to the recommended angle as possible.



Recommended cutting angle = the angle at which the bevel edges intersect: 10°-18° for cooking knives, depending on the knife's purpose; 20°-30° for utility and outdoor knives; ca. 25° for carving knives.

While maintaining the desired angle, use straight movements to grind the blade lengthwise on the stone, and be sure to use the stone's entire surface. Use your right hand to hold the knife's handle and rest your right index finger on the blade (Fig. 1). The fingertips of your left hand should be spread close to the cutting edge and used to exert pressure.



*When guiding the knife, **keep your fingertips away from the stone's surface** to avoid scraping the skin and causing a painful injury.*

Pressure should be exerted on the cutting edge when grinding in both directions and extra care should be taken to **keep the recommended angle as constant as possible**. Rocking and tilting movements will round the bevel, creating uneven blade geometry.



Fig. 1: Sharpening the front of the blade

Standard, **double-bevel knives** require sharpening on both sides. After the entire length of one side has been sharpened, turn the knife over and sharpen the opposite side - the handle is now held in the left hand (Fig. 2). For blades that are simply dull from use, not damaged, about 20-30 strokes per side should suffice.



Fig. 2: Sharpening the back of the blade



*If you rinse with water regularly the stone has its highest efficiency. If you rinse less, some slurry will build up. This polishing paste may be welcome to smooth out the grit-steps between the different stones. To see how the blade and the stone are interacting, look at the **sharpening tracks** on the wet surface of the stone. A balanced and rhythmic **sound** is another good indicator that the blade is being sharpened evenly.*

When grinding with coarse- and mid-grit stones a noticeable burr develops at the cutting edge, which can be felt with a fingertip. (Fig. 3).

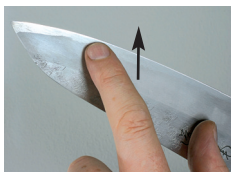


Fig. 3: Feeling the burr

Honing

The term honing refers to the process used to remove the burr created during sharpening. Before beginning, rinse the blade to remove the particle remains of the prior stone.



Fig. 4: Honing the blade lengthwise

For honing, use a stone with a minimum grit size of 4000. Place the blade lengthwise onto the stone (Fig. 4) and **grind it in the direction of the cutting edge**. At this stage, the blade can be held at a slightly steeper angle (1° - 2°) than that used for grinding to ensure the burr is removed completely. As a rule, a few light strokes are required on each beveled edge in alternation before the burr can no longer be felt with the fingertips.



With increasing delicacy, reduce the amount of pressure placed on the blade - too much pressure will distort the finely ground cutting edge. When finished, rinse the knife thoroughly in warm water. Carbon-steel blades should be treated with a little oil to prevent rust.

Single-bevel knives

Japanese knives with a bevel on only one side of the blade are slightly hollow-ground on the back side. For this reason, only the cutting edge and the back of the blade should touch the sharpening stone when laid flat. Only the beveled side should be sharpened, but both the beveled and back sides should be honed. During honing, the entire surface of the blade can rest on the stone (Fig. 5), whereas the surface of the sharpening stone must be **absolutely flat**.

Damaged blades

Damaged cutting edges and broken tips are not reasons to discard much-loved knives. Finely ground, very hard Japanese knives in particular can suffer an occasional nick when handled roughly. To achieve the necessary level of abrasion, use a stone with a grit-size of 80 or 220 (Fig. 6) or a water-cooled sharpening machine (e.g. Tormek or Shinko). Place the blade perpendicular to the stone and grind the entire length of the cutting edge down to the damaged spot. For this radical procedure, a rough-grit diamond stone (Fig. 7) serves well.

The bevel can now be ground onto each side of the blade in the desired angle using coarse-grit followed by fine-grit stones. Thereafter, follow the guidelines provided above.

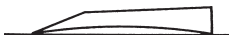


Fig. 5:
Grinding a single-bevel blade



Fig. 6: Nicked blade



Fig. 7:
Using a diamond whetstone



Fig. 8: Repaired knife

Sharpening the tip

To sharpen the tip of a knife, raise the handle until only the front of the blade touches the stone (Fig. 9). Using one or two fingers, press the tip down and grind it lengthwise on the stone using a straight sharpening motion.

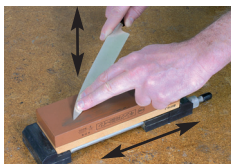


Fig. 9: Sharpening the tip



Protect yourself from injury, especially when working with damaged knives or when using sharpening machines. We recommend ProHands® cut resistant gloves (No. 707650).

Testing sharpness

The softer the material to be cut, the sharper a blade must be to cut it. That's why the sharpness of Miming - the fabled sword of the Nibelungen from the Germanic saga "Wieland the Smith" - was tested on a felt hat floating in a stream. When it sliced the hat effortlessly, its sharpness was proven. A similar test was performed on a blade created by the legendary Japanese samurai-swordsmith Masamune. According to legend, his sword was placed in a creek where a maple leaf swam around it out of respect for the blade's sharpness.



Fig. 10: Testing sharpness with a ripe tomato

A ripe tomato is perfect for testing a blade's sharpness. The ability to slice one without exudation is one of the most veritable tests of a kitchen knife's sharpness. Professionals can judge sharpness by simply glancing at the cutting edge - a so-called "silver line" should never be visible.

Storage and care

Each knife should be stored separately in a silverware drawer or a knife block. **Magnetic knife holders are not recommended** since they magnetize the blades; this complicates the sharpening process by causing abrasion particles to stick to the blade while sharpening. High-quality knives, even those with stainless-steel blades should **never be placed in the dishwasher**. The high temperature combined with salty water leads to intergranular corrosion and ultimately destroys the blade. Carbon steel, which is not stainless, remains the metal with the finest structure that takes on the best cutting edge. These knives should be **oiled** regularly with odorless, food-safe **camellia oil** (No. 705280).

Surface blackening or rust films caused by oxidation can be removed with a rust eraser (No. 711531) - just add a little water and rub the affected area (Fig. 11). Chrome polish, such as Gundel-Putz® polish and whetting paste (No. 705262) is also suitable.



Fig. 11: Cleaning with the "rust eraser"



Rust (iron oxide) is simply an aesthetic flaw that does not harm living organisms. As a trace element, iron is actually essential. As a cutting underlay, we recommend cutting boards made of wood or soft plastic - contact with glass, ceramic or metallic surfaces should be avoided.

Sharpening with the Tokico® Knife Sharpener

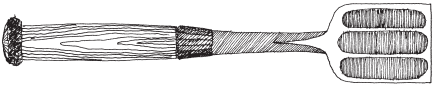
The majority of commercial knife sharpeners are not suitable for high-quality Japanese knives.

One exception is the Tokico® knife sharpener (No. 705373) (Fig. 12).

With this tool, all single- and double-bevel blades can be sharpened easily and quickly. Simply moisten the blade and pull it through the slit 3-10 times. The attainable degree of sharpness is limited by the relatively coarse grit (400) of the stone.



Fig. 12: Sharpening with the Tokico® sharpener

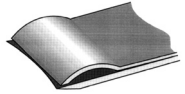


Tools

For sharpening tools, the same types of stones used for knives are sufficient.

Truing the stone

When sharpening tools with straight cutting edges, it is essential that the sharpening stone be completely flat. Check that the stone is plane by placing the edge of a ruler on top of it. If light shines through at any point, the stone is uneven and must be ground down using one of several methods. The easiest of these is truing with a ceramic block (No. 711298). After adding ample water, rub the truing block in a circular motion across the sharpening stone's surface until it is completely flat (Fig. 13).



Concave cutting edge of a plane blade caused by sharpening with an uneven stone.



Fig. 13: Truing a sharpening stone with a ceramic truing block

An alternative is to wet a piece of coarse sandpaper (80-120), place it on an even surface, and sharpen the stone on top of it. A specialized truing grille (No. 711297) functions similarly.

Tools with straight cutting edges (chisels or planes)

For a chisel or plane to function well, it is essential that the back of the blade be completely flat, not concave or convex. As a rule, the backs of new blades should be made plane before their first use.

For this purpose, we use a diamond stone or a steel lapping plate (No. 713600). With the latter, the blade is worked with silicon carbide powder and water under high pressure (Fig. 14). The powder grinds into a fine paste that has an additional polishing effect. Subsequently, the blade's bevel is sharpened at an angle between 22° and 35°, depending on the tool's purpose. For checking the bevel angle (Fig. 15), we recommend using a bevel gauge for tool edges (No. 707261) or a mini protractor (No. 717141).



Fig. 14: Straightening the blade with a steel lapping plate



The smaller the bevel angle, the lower the cutting resistance and the more delicate the cutting edge.

Determining the optimal bevel angle is a process that depends on the type of wood, the cutting method, and the quality of the tool's steel. Several trials may be required.

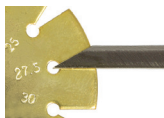
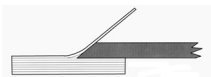


Fig. 15: Checking the bevel angle



Low cutting resistance



High cutting resistance

To a large degree, tools are sharpened in the same manner as knives. First, the bevel is ground using a 1000-grit stone (Fig. 16).

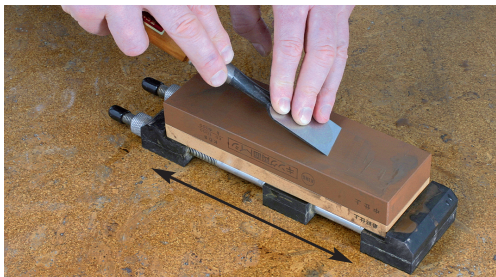


Fig. 16: Sharpening the bevel

The bevel is placed on the stone diagonally and ground using straight movements while the angle is kept as constant as possible.

Rocking and tilting movements should be avoided.

In order to work efficiently and to wear the sharpening stone evenly, the entire surface of the stone should be used.

When finished, proceed to a 6000- or 8000-grit stone and hone both the bevel and the back of the blade (Fig. 17).

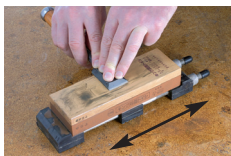


Fig. 17:
Grinding the back of the blade

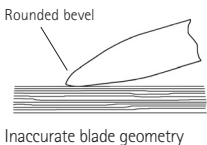


To improve the honing effect and give the blade a mirror polish, a Nagura stone (Fig. 18) can be rubbed onto the sharpening stone to create a fine-grain polishing paste.

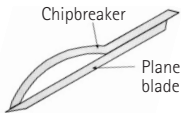


Fig. 18: Using a Nagura stone to create a polishing paste

A rocking motion while sharpening will cause the blade to take on an inaccurate rounded geometry. Similar rounding of the bevel is caused by fast-moving felt polishing wheels, which we do not recommend.



To ensure that a plane functions well, it is not sufficient to sharpen the blade alone. The chipbreaker, also needs to be flat in order to guarantee a secure fit with no play and to prevent clogging with wood shavings.



Securely fitted Chipbreaker and plane blade

When sharpening thick (Japanese) blades that have a large contact surface area, maintaining a constant angle is easier than with thin blades. One way to check how evenly pressure is being applied is to look at the tracks on the sharpening stone.

A honing guide (Fig. 19) is very useful for helping maintain an exact bevel angle (e.g. Veritas No. 707168), but all honing guides have the same disadvantage - their rollers can damage the sharpening stone's surface. They are also relatively cumbersome and make it difficult to use the entire surface area of the stone, which is necessary for even wear.



Fig. 19: Sharpening with a honing guide

Carving gouges

Concave carving gouges can also be sharpened with whetstone blocks. To avoid cutting the stone's relatively soft surface, however, these tools should be ground from side to side (Fig. 20) using a slight rotating movement. Again, the recommended angle needs to be kept as constant as possible.

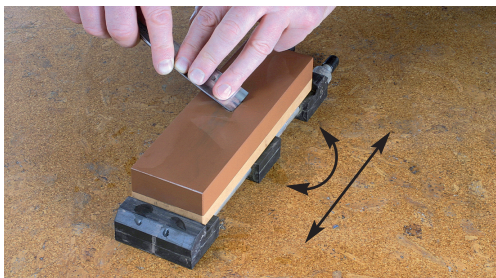
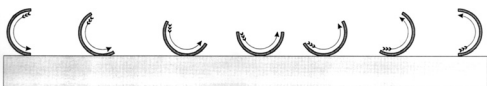


Fig. 20: Sharpening the bevel of a carving gouge



Rotating the blade while grinding across the length of the stone

Proceed to a finishing stone and, finally, remove the burr from inside the sweep with a slip stone (Fig. 21). This is a fine-grit stone with a molded edge and a radius smaller than that of the gouge's sweep. The slip stone should be placed inside the sweep and moved up and down. The inner and outer edges of gouges and turning tools are often additionally polished with leather, either by hand using a strop or mechanically, like with a Tormek® sharpening machine (Fig. 22). The profiled leather honing wheel (No.705190) makes polishing very quick and easy.

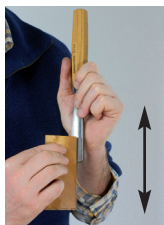


Fig. 21: Finishing with a slip stone



Fig. 22: Finishing with the Tormek® profiled leather honing wheel



By gluing a piece of thin leather to a sanded block of wood, you can create a finishing block in any shape you choose.

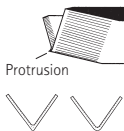


V-parting tools

Both exterior bevels on these tools can be sharpened with a flat sharpening stone in the same manner as chisels. The challenge lies in removing the same amount of metal from each wing to ensure the blade geometry remains even. For finishing the interior, a v-shaped slip stone with a sharp edge is required. (If necessary, a slip stone can be modified using sandpaper and water.)



When sharpening v-shaped tools, a protrusion often develops at the base of the v where the two edges meet. This occurs because the blade is thicker here than in both wings. To prevent such a protrusion, round this corner prior to sharpening.



Turning tools

In general, turning tools are made of very hard and resilient HSS or PM steel that is difficult to sharpen with waterstones.

Consequently, we recommend using diamond stones or a Tormek® sharpening machine.

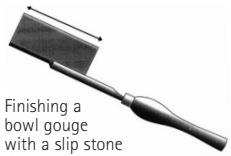
The machine's universal gouge jig (Fig. 23)

makes it possible to sharpen turning tools quickly and with reproducible results, even if the blade's geometry is complicated.

After sharpening the outer bevel, remove the burr from the interior by hand using a slip stone or a profiled leather wheel, as with gouges.



Fig. 23: Sharpening a bowl gouge using the gouge jig of a Tormek® sharpening machine



Finishing a bowl gouge with a slip stone

Scraper blades

The scraper blade is the simplest of tools and perhaps the most difficult to sharpen. New, straight-edged scraper blades generally require truing prior to use.

A diamond stone or a flat file in combination with a straightening clamp (No. 703526 or 704901) is good for this purpose. After truing, the cutting edge and both sides should be smoothed (polished) using a fine-grit whetstone.

Finally, the scraper blade should be placed on a stable surface with the cutting edge slightly overhanging the end, and a burnisher should be used on both sides until a burr is created (Fig. 24). To create a razor-sharp cutting edge, turn the burr over using either a burnisher or a special sharpening tool.



Fig. 24: Turning the burr with a Carbur burnishing tool (No. 703533)



When sharpening and working with scraping blades, it's a good idea to wear cut-resistant gloves (No. 705652)!

Scissors

Scissors should be disassembled prior to sharpening, and only the bevels of both the upper and lower blades should be sharpened. For this purpose, a fine-grit diamond block is ideal (Fig. 25). While keeping an exact bevel angle and adding a bit of water, a few strokes are usually sufficient to restore sharpness. When using a Tormek® sharpening machine, the special jig makes it easier to hold the correct angle (Fig. 26). The burr created on the back of the blade should be removed with a finishing stone, as with single-bevel knives (page 9). Apply a little oil to the joints and reassemble. Finally, make sure the cutting action is smooth and not too tight.



Fig. 25: Sharpening with a diamond block (No. 705367)



Fig. 26: Sharpening with a Tormek® sharpening machine

Outdoor tools

For outdoor tools like axes, sheath knives or pruning shears, compact, retractable, multipurpose diamond sharpeners are particularly practical (e.g., the DMT diafold whetstone fine/coarse, No. 705391). Simply place the axe or knife to be sharpened on a surface (Fig. 27) and stroke the sharpening stone across the cutting edge bevel while holding it at the correct angle. Apply some water during the sharpening process. Pruning shears for branches and bushes (Fig. 28) should be disassembled before sharpening. Typically, only the cutting edge on the beveled side is sharpened and honed.



Fig. 27: Sharpening an axe with a multipurpose diamond sharpener



Fig. 28: Sharpening a pruning-shear blade with a diamond stone

Testing sharpness

The biggest challenge for any woodworking tool is presented by cross-grained wood. Only really sharp chisels or bench planes leave a smooth surface after cutting against the grain (Fig. 29).



Fig. 29:
Cutting cross-grained wood

Maintenance products

After sharpening, each blade needs some special care.

To prevent corrosion, apply an acid-free rust-prevention oil, like camellia oil (No. 705280) or Ballistol® (No. 705270).

For removing dirt or grime, we recommend the polish and whetting paste Gundel-Putz® (No. 705262) or Uchiko polishing powder.

To combat rust, reach for a rust eraser (711530).



A thin application of oil does more than prevent rust. It also improves the running action of many tools, like chisels, scissors or the soles of bench planes (for the latter, paraffin should be used).

In order to shorten the arduous path towards sharpening proficiency, we recommend our one-day **sharpening courses** (www.dick.biz). Taught by experienced master craftsmen, these courses impart the fundamental knowledge required to create perfect cutting edges. As with every craft, the motto "masters don't just grow on trees", applies to sharpening. Practice with patience and concentration and success will be your reward. But should it prove elusive, you are welcome to use our sharpening service or to call our sharpening master Helmut Hans at +49-991-9109922 for advice.



Sharpening Primer



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