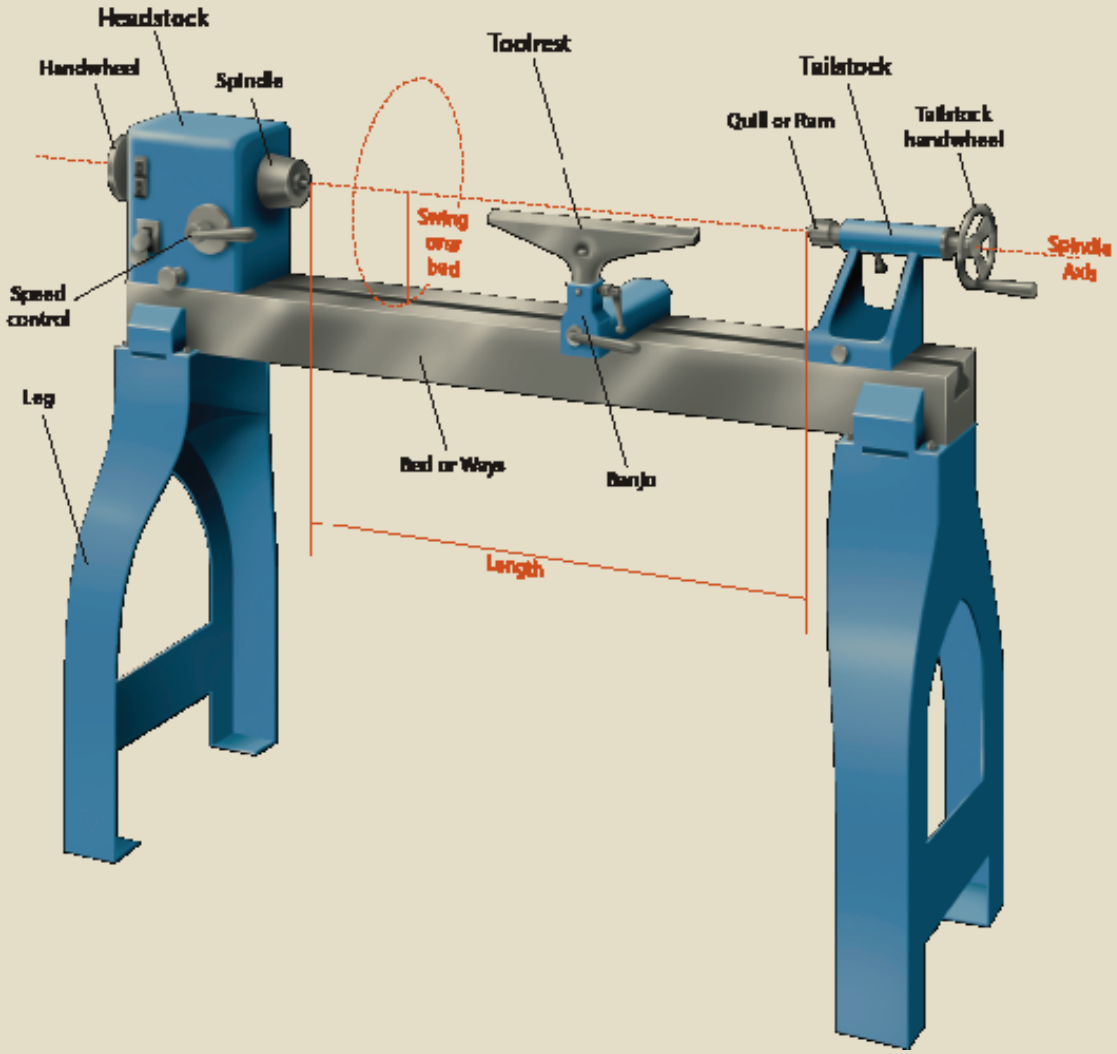
SPECIAL BONUS FEATURES

FUNdamentals Overview



AAW | AMERICAN ASSOCIATION OF WOODTURNERS

AAW | AMERICAN ASSOCIATION OF WOODTURNERS

FUNdamentals Overview

Dedicated to providing education, information, and organization to those interested in woodturning

TABLE OF CONTENTS

3 Lathe Parts and Accessories

6 Parts of a Turning Tool

7 Spindle Gouge Shapes, Angles

8 Skew Chisels and Parting Tools

9 Bowl Gouge Shapes and Angles

10 Scrapers Scrapers Scrapers

10 Carbide-Insert Tools

11 Measure Sharpening Angle

12 Grinder Angle

13 Grinder Angle with Protractor

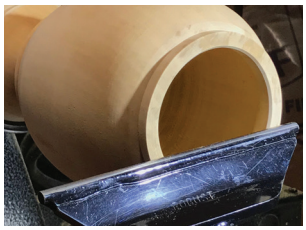
13 What is Bevel Rubbing

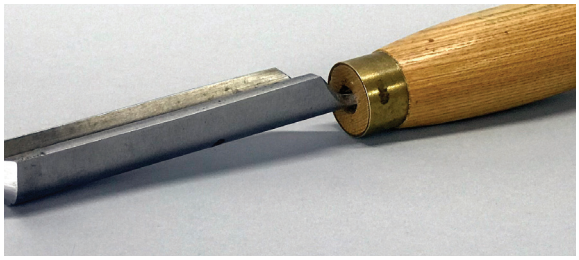
14 Grain Direction of the Lathe

15 Grain Direction and Turning Tools

16 Safety Tips for Turning

Front cover: AAW publications
Back cover: AAW publications





Woodturning FUNdamentals
is published by the
American Association of Woodturners
222 Landmark Center
75 5th Street W.
St. Paul, MN 55102-7704
651-484-9094
Toll free: 877-595-9094
inquiries@woodturner.org
woodturner.org

Executive Director
Phil McDonald
phil@woodturner.org

Program Director
Linda Ferber
linda@woodturner.org

Gallery Curator
Tib Shaw - tib@woodturner.org

Gallery Website
galleryofwoodart.org

Marketing & Communications Director
Kim Rymer

Managing Editor, *American Woodturner, Woodturning FUNdamentals*
Joshua Friend

***Woodturning FUNdamentals* Editor**
John Kelsey

AAW | AMERICAN ASSOCIATION OF WOODTURNERS
WE ARE TEACHING THE WORLD TO TURN

What's that called?

Lathe Parts and Accessories

If you are new to woodturning, these illustrations can help you learn the common parts of a lathe, as well as important accessories specific to **spindle** and **faceplate** turning.

The terms spindle turning and faceplate turning refer to the orientation of the wood grain relative to the **axis** of the lathe. Spindle orientation means the wood grain runs parallel to the lathe's **bed,** or **ways,** and spindle axis. Faceplate orientation means the wood grain runs perpendicular to the lathe's bed and spindle axis. As the name implies, spindle turning is how stair balusters, chair parts, and other furniture parts are made. Bowls and platters are generally turned in faceplate orientation.

Wood can be mounted in both grain orientations using the same methods and accessories.

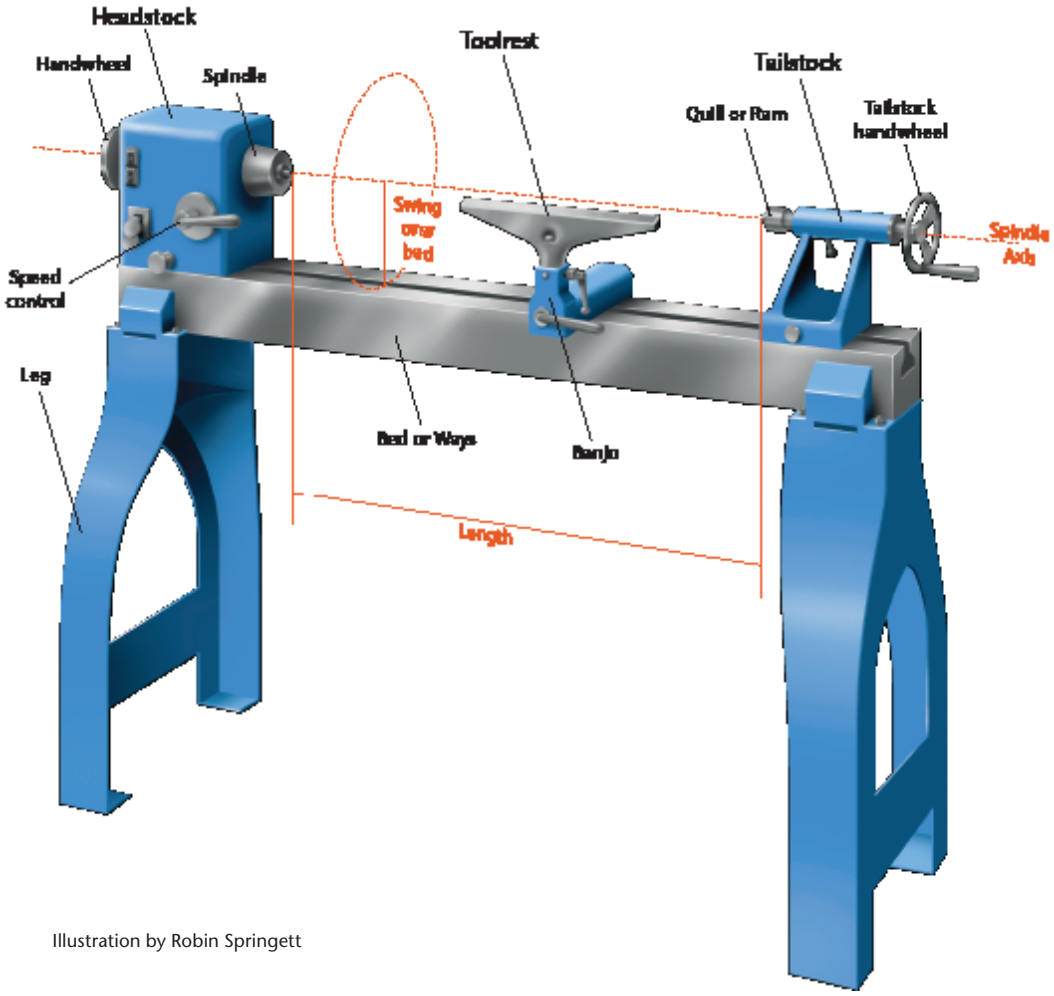


Illustration by Robin Springett

Lathe parts

Lathes from various manufacturers differ in some ways, such as motor systems, speed adjustments, size, and other features. But the basic premise and major components are common to all of them.

The **headstock** is the drive end of the lathe, and the **tailstock** supports the workpiece at the other end. The **banjo**, which holds the **toolrest**, slides along the ways and locks into position. The position of the toolrest can be adjusted up and down or rotated at any angle to the workpiece.

You can determine the size (or capacity) of a lathe by knowing some key dimensions. The **swing** (or swing over bed) refers to the maximum diameter workpiece that can be turned on that machine. Doubling the measurement from bed to spindle will give you the swing. **Length** refers to the maximum distance between points in the headstock and tailstock, the longest piece you can turn between centers.

Four-prong drive center (spur drive)

Steb center

Safety center/dead center

Some lathes allow for outboard turning, with the workpiece mounted on the outside (**handwheel** end) of the headstock. This allows larger diameter pieces to be turned, since the limitation of swing over bed does not apply; lathes that don't allow the toolrest to swing outboard will need a floor stand for the tool rest. While workpiece diameter can be larger with outboard mounting, it should not exceed the lathe's ability to handle the extra mass.

Spindle and accessories

The **spindle** is located in the headstock and varies in size, depending on the model. The lathe **motor** drives (or turns) the spindle, typically via belts on pulleys. Spindle speed (rpm) may be controlled by mechanical pulley changes or by electronic controls. Most lathes have a spindle lock to prevent rotation while you mount wood or accessories. "Forward" means the top of the spinning wood comes toward the operator (counter-clockwise when viewed from the tailstock). Most modern lathes (but few older designs) can switch to "Reverse" for sanding and finishing.

The spindle has a female Morse taper on the inside and male threads on the outside. These two features, which vary in size by make and model, allow you to mount accessories and turn wood. If a lathe spindle is noted as 1" x 8 tpi (or 1x8), that means its diameter is 1" and it has eight threads per inch. Any screw-on or Morse taper accessories will have to be compatible with this sizing.

Drive centers

Drive centers commonly have a male **Morse taper** that fits the opening in the headstock spindle, but some varieties are made to be mounted in a **four-jaw scroll chuck**. The Morse taper or chuck keeps the drive center firmly in place, along with workpiece pressure applied from the tailstock. The motor drives the spindle, which rotates the drive center, which turns the wood.

Four-prong drive center (spur drive)

Versatile drive providing positive grip in the wood; use with dry or wet wood, for turning spindles and roughing bowls and vessels.

Steb center

Characterized by its teeth, which bite into the wood; use with dry wood, turning spindles.

Safety center/dead center

Also called a cup (or ring) center; use with dry wood, turning spindles. Bite in wood is determined by tailstock pressure—lighter pressure between centers allows the wood to stop turning in the event of a catch.

Faceplate

Faceplates have female threads so they can be screwed onto the male threads of the spindle. Holes in the surface of the faceplate allow you to screw the wood to the faceplate from the back. Faceplates come in a variety of sizes to accommodate larger or smaller workpieces; they are mostly used to mount bowls and platters in transverse, or "faceplate," orientation, and also for purpose-made chucks and jigs.

Faceplate

Scroll chuck

Scroll chuck with woodworm screw

Scroll chuck with woodworm screw

Scroll chuck

Four-jaw chucks have female threads so they can be screwed onto the threads on the spindle. When you tighten a four-jaw chuck using its key, its jaws close concentrically, so you can grip a round tenon (or spigot) as a way of mounting wood. When you loosen a four-jaw chuck, the jaws expand concentrically, so you can open the jaws into a recess in the wood as an alternate way of mounting wood. Most scroll chucks have interchangeable jaw sets for increasing their size range. Some chucks have interchangeable inserts to fit different lathes.

Scroll chuck with woodworm screw

Most scroll chucks are designed to grip a woodworm screw. A hole drilled in the turning blank can be threaded onto the screw to mount the wood on the lathe. Especially useful for roughing bowls in green or dry wood.

Tailstock and accessories

The **tailstock** slides and locks along the bed to suit the workpiece; for safety, it should be engaged whenever possible. The **handwheel** moves the **quill** (or ram) over a range of several inches and also locks in place, to adjust the holding pressure on the workpiece. The quill has a female Morse taper into which tailstock accessories, notably chucks for drill bits, can be inserted and held.

Revolving live center

In the early days of modern turning, a dead center (or cup or ring center) was used in the tailstock. Since it does not rotate, wax had to be applied to lubricate the spinning wood. This tailstock accessory has been supplanted by the revolving live center, which spins freely on steel bearings; some models have interchangeable points in various styles and sizes. Today the tailstock dead center is obsolete, but it is still used in the headstock as a safety drive.

Revolving live center with ring and point

Revolving live center with cone (or cone center)

Drill chuck

A drill chuck (sometimes referred to by the brand name Jacobs chuck) is the same type of chuck you'll find on any drill press. Mounted in the tailstock of a lathe, it holds drill bits horizontally for boring into wood that is mounted on the headstock. The wood rotates while the drill bit, which does not rotate, is advanced by the tailstock handwheel. Some chucks tighten with a key, while others tighten by twisting a ring.

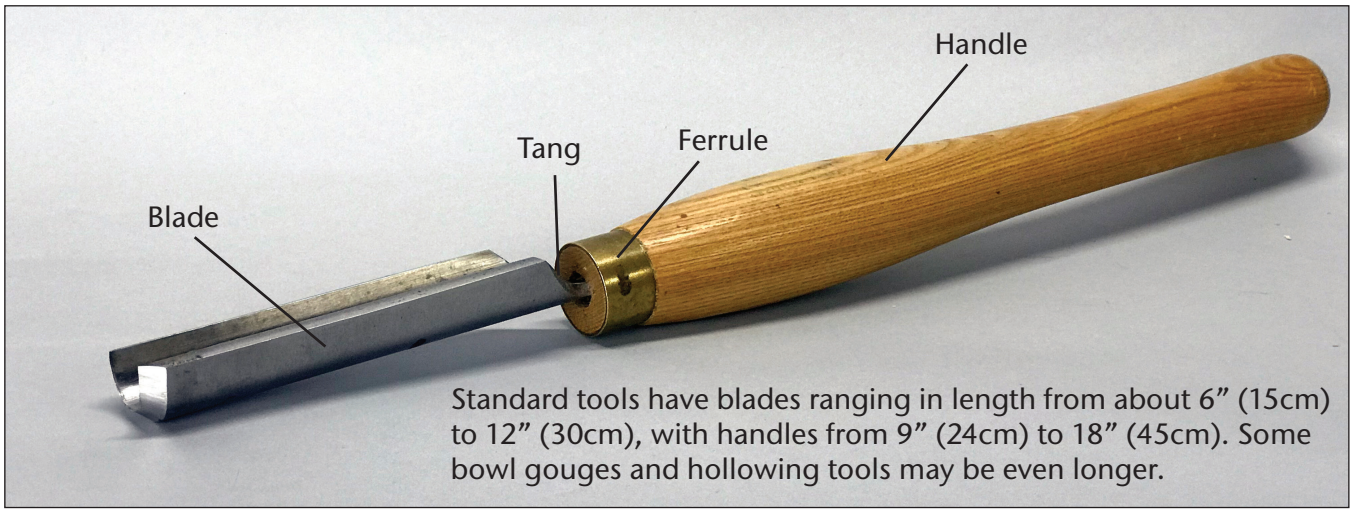
Revolving live center with ring and point

Revolving live center with cone (or cone center)

Drill Chuck

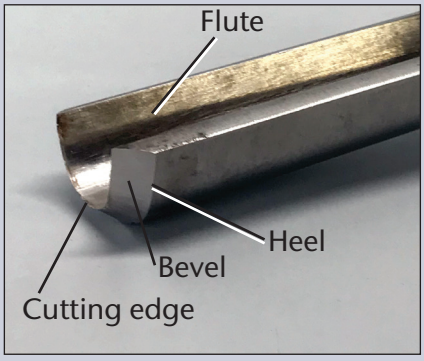
FUNdamental Overview

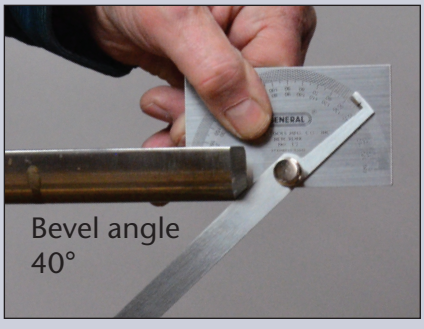
Parts of a Turning Tool



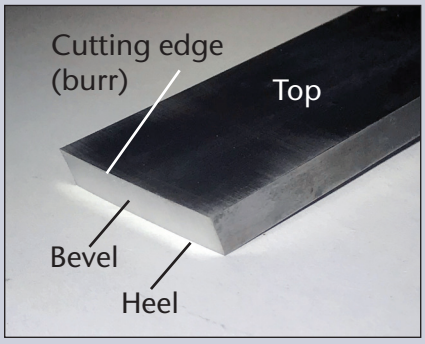
Standard tools have blades ranging in length from about 6” (15cm) to 12” (30cm), with handles from 9” (24cm) to 18” (45cm). Some bowl gouges and hollowing tools may be even longer.

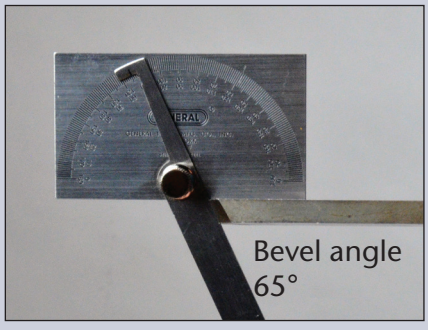
Gouges

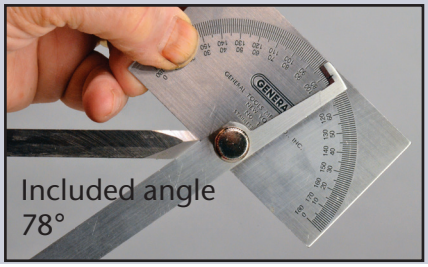




Scrapers



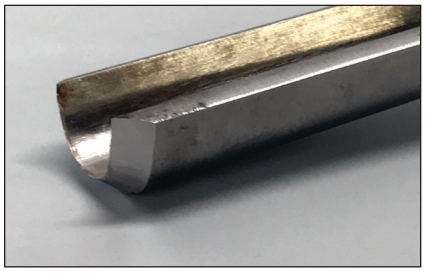


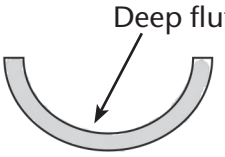


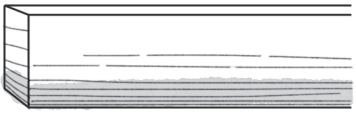
FUNdamental Overview

Spindle Gouge Shapes, Angles

Spindle roughing gouge



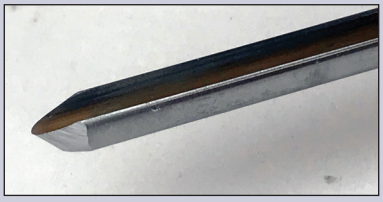


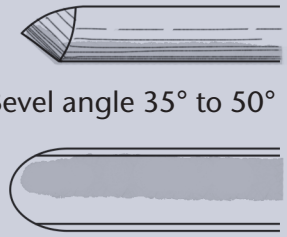


Bevel angle 40° to 45°

The spindle roughing gouge is only for cutting long grain in spindle orientation, anything else risks a dangerous catch. Size range: 3/4” (20mm) to 1-1/4” (32mm) in width.

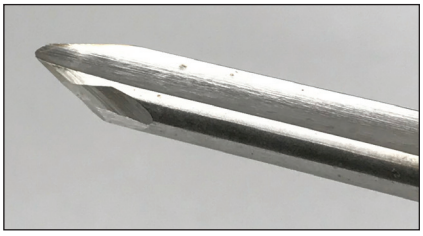
Spindle gouge

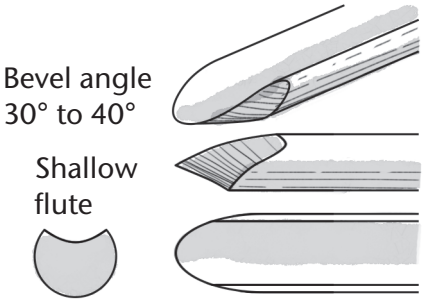




The versatile spindle gouge is useful in all types of turning and grain orientations. Gouges are measured by widest diameter from 1/4” (6mm) to 1/2” (12mm); 3/8” (9mm) is a good general-purpose tool.

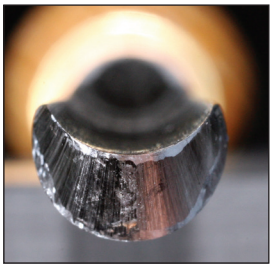
Detail gouge





Detail gouges have a long nose, shallow flute, thick body, and long bevel.

Gouge orientation



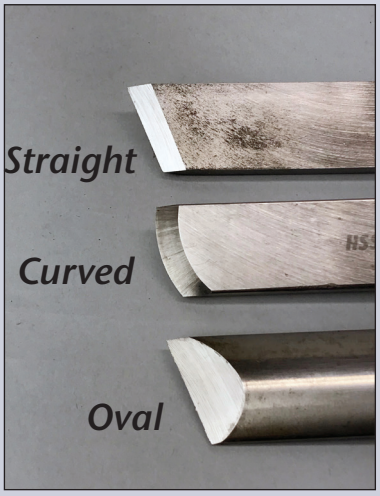
Open = flute faces up, 12 o’clock position

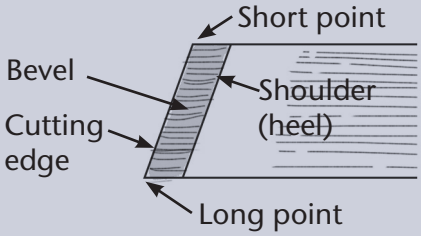
Closed = flute faces right (3 o’clock) or left (9 o’clock).

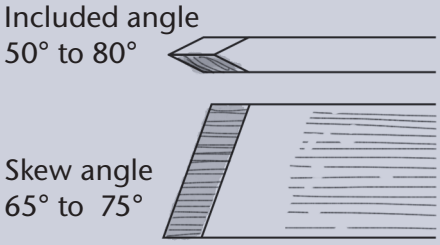
FUNdamental Overview

Skew Chisels and Parting Tools

Skew chisel

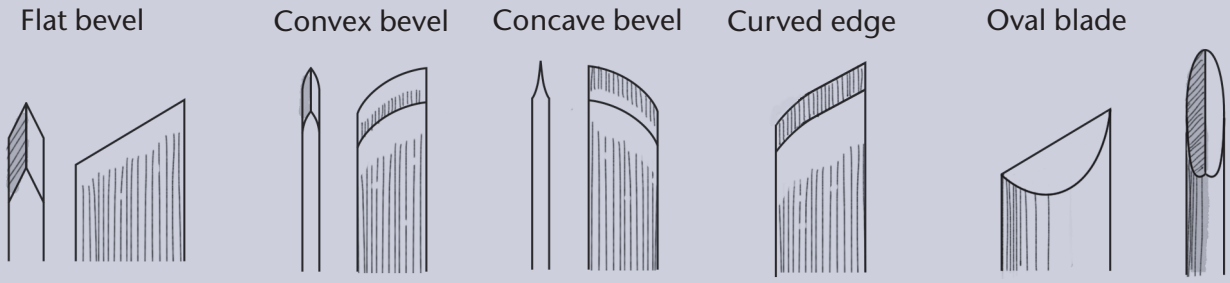




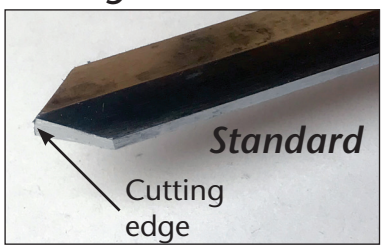


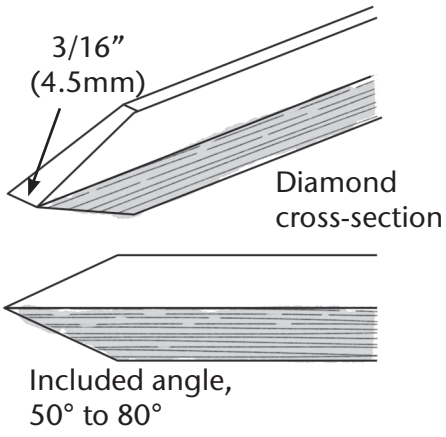
Skew chisels range in width from 1/4” (6mm) to 1” (25mm), with 3/4” (20mm) a good starter size. Skews can make precise cuts and leave clean surfaces on spindles. Skews are various:

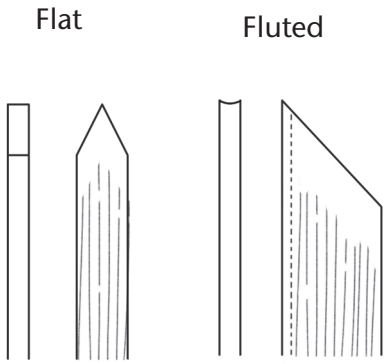
The blade may be rectangular in section, or oval.
Some turners prefer a curved cutting edge.
The bevel may be ground flat, concave, or convex.



Parting tool







The cutting edge of a standard parting tool is about 3/16” (4.5mm) wide with the blade about 3/4” (2cm) across. The included bevel angle ranges from 50° to 80°. Thin parting tools are about 3/32” (2mm) wide. Some parting tools have a sharp flute ground into the blade’s bottom edge.

FUNdamental Overview

Bowl Gouge Shapes and Angles

Bowl gouge

Photo by Glenn Lucas

Fingernail grinds

Traditional grind

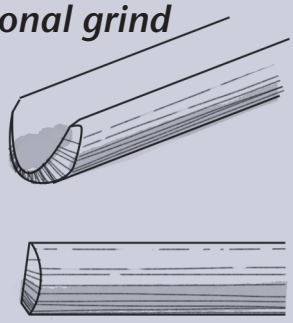
V-shaped flute

U-shaped flute

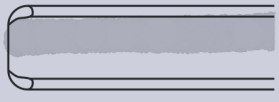
Bowl gouges, ranging from 1/4” (6mm) to 1/2” (12mm) in width, have deeper flutes than spindle gouges. Flute profiles may be V- or U-shaped.

Bevel angles affect what shapes the gouge edge can reach. Long wings can remove a lot of wood quickly.

Traditional grind

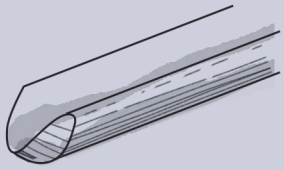


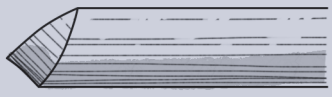
Bevel angle 50° to 60°



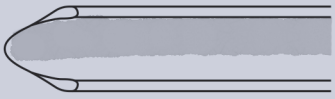
Rake angle 0° to 25°

Fingernail grind



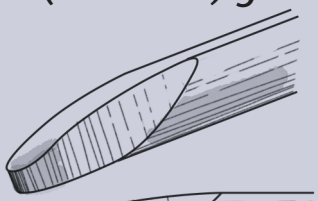


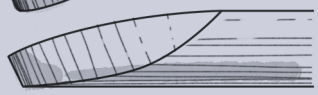
Bevel angle 35° to 45°



Rake angle 40° to 50°

Irish (Ellsworth) grind





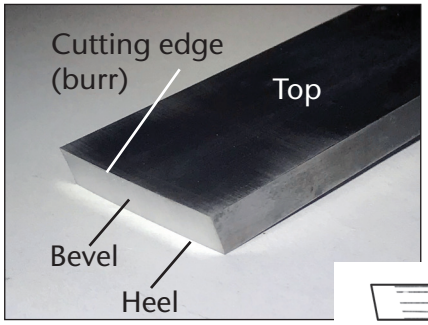
Bevel angle 55° to 65°

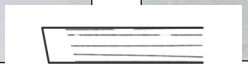
Long wings swept back

FUNdamental Overview

Scrapers Scrapers Scrapers

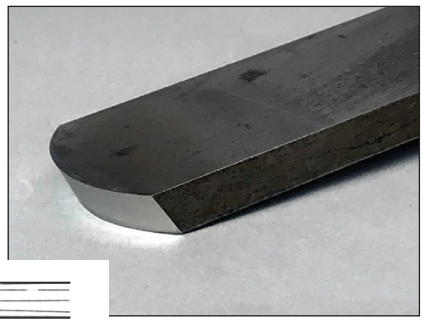
Straight



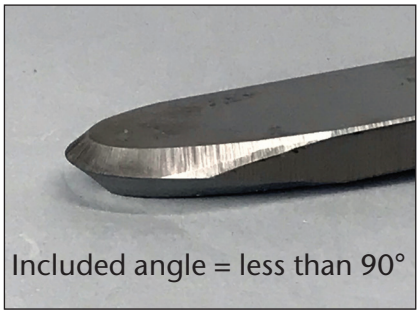


Bevel angle 65° to 80°

Curved



Negative rake

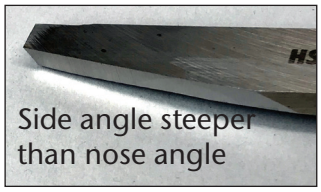


Radius

Hollowing

Adjustable hollowing

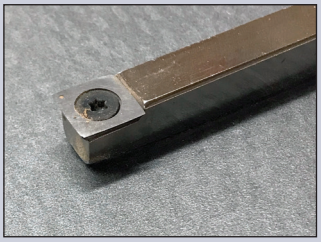
Side-cut box



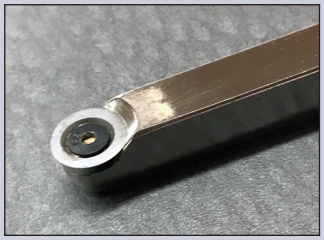
Scrapers are made in myriad shapes and range from miniature size up to about 1-1/2” (38mm) wide and 1/2” (12mm) thick. The cutting edge is a raised burr at the top of the bevel. Scrapers can cut in all wood grain orientations. They cut best held flat on the toolrest or angled slightly downward, with the cutting edge at center height. Negative rake scrapers make light finishing cuts.

Carbide-Insert Tools

Square



Round



Point

Cupped

Carbide tools have a steel shank carrying a carbide cutting bit held in place by a small Torx screw. Flat bits scrape while cup-shaped bits cut.

Carbide tools stay sharp a long time; dull bits can be honed on a diamond plate but ultimately must be replaced.

Ask an Expert
Measure Sharpening Angle?

1. Plant the base of the protractor on top of the tool and move the arm to touch the ground bevel. Read the angle, this heavy scraper is 70˚, at the mork on the arm.

Q What do you mean by bevel angle and grinding angle and sharpening angle? Are these the same? How do you measure the grinding angle of a turning tool? What's the simplest gauge or protractor or whatever to use, where to you put it on a scraper, and on a gouge, and on a skew?
—Larry Green, Bethel CT

A Basically, grinding angle is the included angle of the steel measured from the top of the tool. And yes, bevel angle, sharpening angle, and grinding angle are all the same, though there is some disagreement over how to measure it.

The scraper is the simplest. If you take a length of steel with a rectangular cross section and grind it flat and square across the front, that would be 90˚. Most turning scrapers are ground less than 90˚, somewhere between 70˚ and 80˚, as in **1.** Some would call that 10˚ to 20˚ off square. For the sake of having the same language, and on our AAW forums this seems to be the majority view, so let's agree to measure from the top.

Photo **2** shows some of the tools you could use to measure the bevel angle. I think the simplest is the protractor shown at bottom right, it's unambiguous, inexpensive and readily available on line or at hardware stores and home centers. Use it as shown in **1:** set the body on top of the tool. Read the angle at the small engraved mark on the top of the movable arm.

2. Measure the grinding angle with any of these protractors. The round gauge at left is made for turning tools. The simple mechanic's protractor at the right is all you need.

Photo **3** shows a spindle gouge and **4** shows a skew that has been ground on both sides. If I measure this angle so the gauge is touching both bevels, a machinist would call it the included angle. An included angle is the angle between two sides of a triangle.

Most turners sharpen on a round grinder wheel, which leaves a hollow bevel, as you can see in **3:** measure it from high point to high point. Some belt or flat wheel sharpening machines leave a perfectly flat bevel. ■
—John Lucas, Tennessee

3. This gouge has been hollow-ground at 55˚. Look closely where it touches the movable arm to see the hollow grind.

4. Measure the grinding angle of the skew across both bevels. This slender skew has an included angle of 26˚.

Ask an Expert
Grinder Angle?

Q Now that we agree on what is the grinding angle, how do you set the vee arm or platform of a grinder for that angle?

A You can make a very simple plywood jig for setting the angle of the toolrest or the vee arm on sharpening systems. It is based on a three-point method developed by the Australian turner and writer Mike Darlow. The triangle-shaped jig has one leg fitting in the vee arm or sitting flat on the toolrest. The other two points touch the wheel. This pretty much guarantees that the setting will be repeatable.

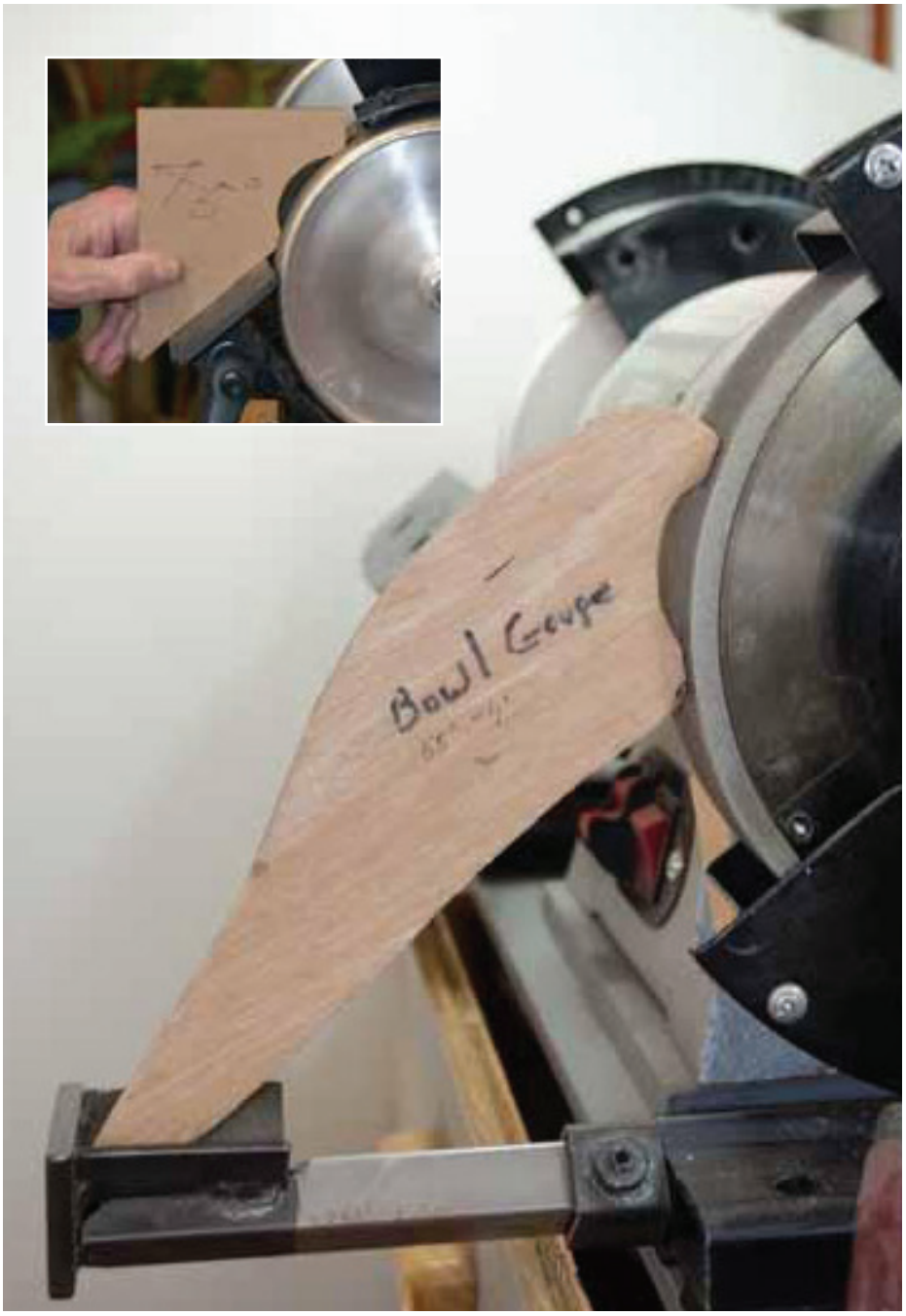
If you want a precise angle there is some trial and error. Begin by grinding the tool to the angle you want, set the V arm or toolrest to duplicate that grind and then make the angle gauge.

Make a long triangle of MDF or 1/4" plywood that fits in the vee jig and comes up to the wheel. Confirm that the vee arm presents the tool to the wheel. Confirm that the vee arm presents the tool to the wheel the way you want it. Then set the triangle in the vee arm and place it beside the wheel so you can trace an arc of the wheel on the plywood. Cut that out, then cut out the smaller arc to leave two small areas touching the wheel.

I use a similar jig for the grinder's flat toolrest, with one side of the plywood triangle sitting flat on the toolrest. Then you can draw the same type of arcs to touch the wheel in two places.

To use the tool you set the narrow end of the triangle in the vee arm of the sharpening system and adjust this arm until the two points of the arc touch the wheel. Now it is set perfectly every time, even if the wheel changes size from wear. I find this far more repeatable than single point distance devices. ■

—John Lucas, Tennessee



Shopmade angle jigs set the sharpening system's platform rest, inset, and vee arm, to grind a gouge. Indexing from the guide apparatus, each jig touches the wheel in two places.

Ask an Expert
Grinder Angle with Protractor?

Q How can I use a protractor to set the grinder toolrest? These sharpening systems don't have any angle scales on them.

A Here's a way to get pretty close, though you will have to fiddle with it. Set the angle protractor to exact grinding angle you want to reproduce. Bring the grinder toolrest as close as possible to the wheel. Then place the edge of the protractor on the toolrest with its movable arm pointing upward, and press its corner right onto the wheel where the tool would make contact, with the machine turned off of course.

Now sight the protractor arm against something vertical on the other side of the workshop a door frame or a window. Adjust the toolrest until the protractor arm lines up with that protractor arm lines up with that vertical target. Test the grind. The angle won't be exact, but it will be within a couple of degrees, close enough for woodturning and within the range of fiddling.

This low-tech eyeball method only works when the grinder toolrest is level with the wheel center. Tangents to circles are always at right angles to diameters. So when the wheel diameter is level, its tangent is perpendicular, or vertical. ■

—John Kelsey, Lancaster PA

Setting the angle - Plant the protractor on the toolrest and sight a vertical across the workshop. This works when the grinder platform is as close as possible to the wheel.

Ask an Expert
What is Bevel Rubbing?

When you grind a tool to create a sharp edge the ground surface is called a bevel. The sharp edge of this bevel is the toe and the blunt edge is the heel.

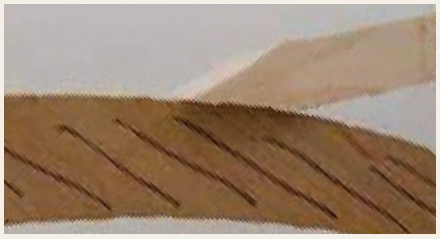
When you start a cut, remember ABC: Anchor, Bevel, Cut. Anchor the tool on the toolrest. Then touch the Bevel of the tool to the wood. Then lift the angle until the edge starts to Cut.

The bevel controls the depth of cut. Lift too far so you aren't rubbing the bevel, you get a catch because the tool tries to cut too deep. Move the handle down too far and it levers the tool out of the wood, it stops cutting.

To cut a curved surface you have to continually move the handle to guide (or rud) the bevel, to keep the cutting edge in contact with the wood. You control it by steering with the handle of the tool

Instead of "rubbing the bevel" I prefer "guiding the bevel". Ideally you should not put a lot of pressure on the bevel of the tool. The term "rubbing" implies pushing on the bevel. Gliding, on the other hand, implies sliding the bevel across the wood. I think it's a better description. ■

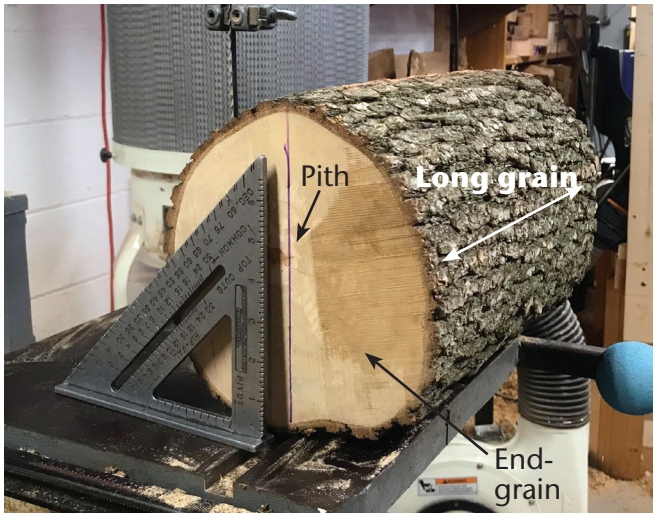
—John Lucas, Tennessee

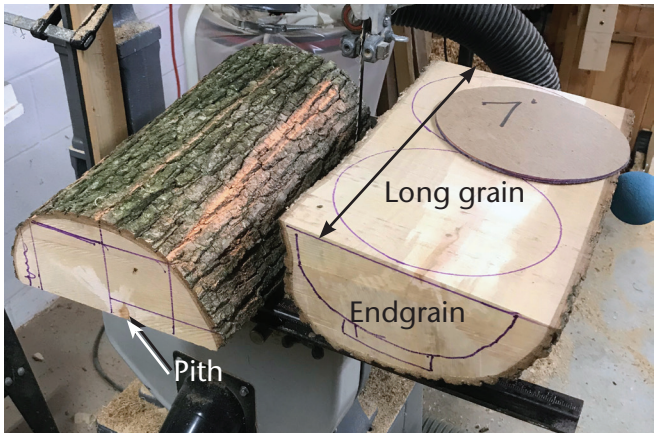


FUNdamental Overview

Grain Direction on the Lathe

Firewood-sized hardwood log, 9” dia (24cm) by 16” long (40cm), sawn down the middle yields two long-grain blanks for spindles or endgrain turning, and two crossgrain blanks for bowls or platters.





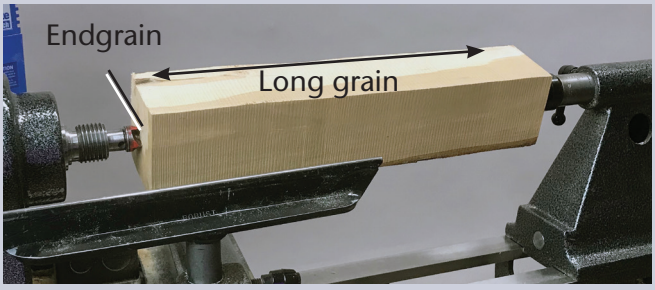
EXPLORE!

Click the blue box or scan the QR code to find out more..

tiny.cc/
sawlog

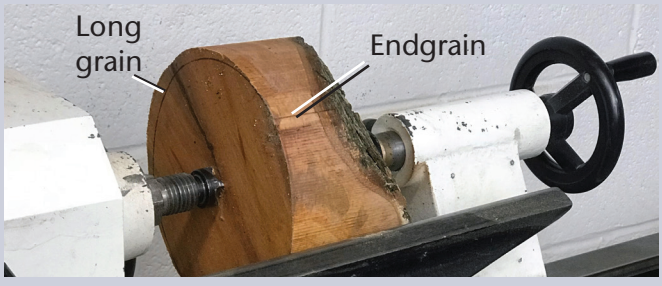
To bandsaw safely, stand the log on end or secure it on a sacrificial sled.

Long-grain blanks



Long grain parallel to lathe axis (spindle orientation)

Crossgrain blanks

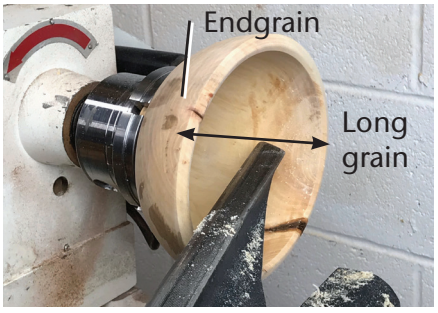


Long grain perpendicular to lathe axis (crossgrain, or faceplate, orientation)

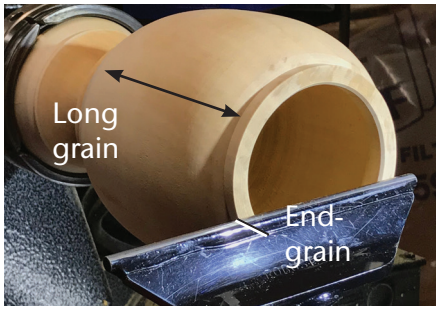
FUNdamental Overview

Grain Direction and Turning Tools

Long grain (spindles)

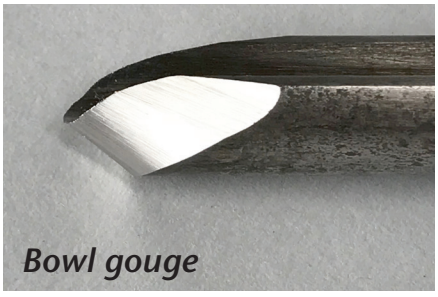


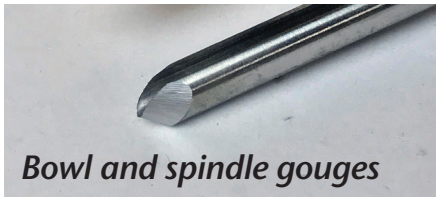
Crossgrain (bowls)

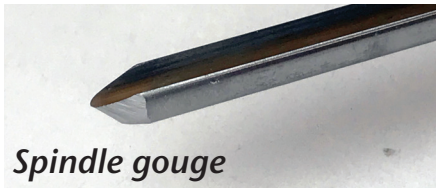


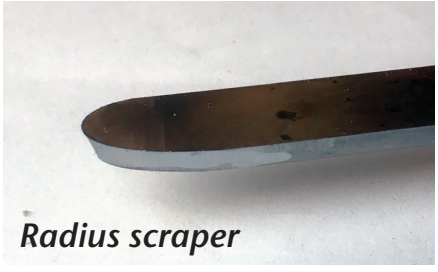
Endgrain (hollowing)...

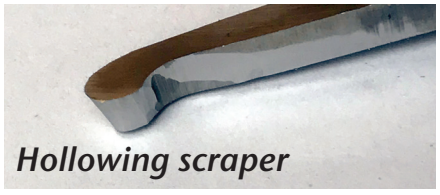

Spindle roughing gouge

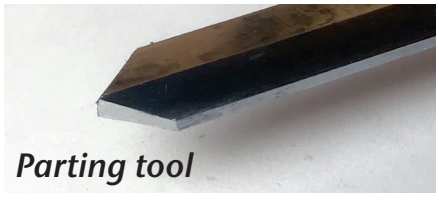

Bowl gouge


Bowl and spindle gouges

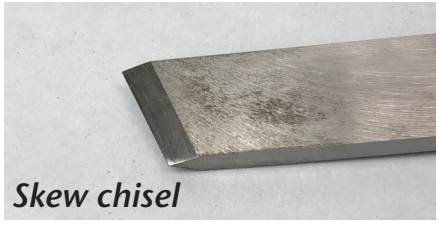

Spindle gouge

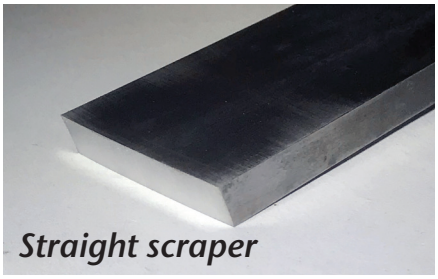

Radius scraper

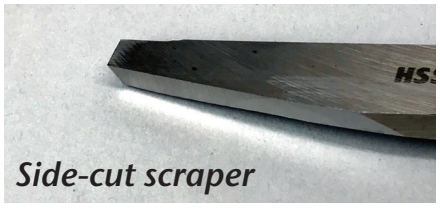

Hollowing scraper


Parting tool

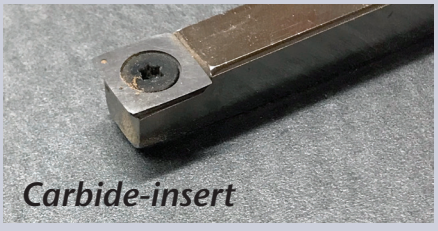

Adjustable hollowing


Skew chisel


Straight scraper


Side-cut scraper

Any grain orientation


Carbide-insert


Cupped carbide

Safety Tips for Turning

Safe, effective use of a wood lathe requires study and knowledge of procedures for using this tool. Read, thoroughly understand, and follow the label warnings on the lathe and in the owner-operator's manual. Safety guidelines from an experienced instructor, video, or book are good sources of important safety procedures. Please work safely.

ENVIRONMENT

- Don't use a lathe in damp or wet locations or in the presence of inflammable liquids, vapors, or gases. Always keep a fullycharged fire extinguisher close at hand.
- Guard against electric shock. Inspect electric cords for damage. Avoid using extension cords.
- Frequently remove shavings from the floor while turning. Eliminate all slipping or tripping hazards from the floor around the lathe and work area.
- Keep your work area well lit and well-ventilated. Use antifatigue floor matting at the lathe workstation.
- Use a powered dust extraction system to remove wood dust and other air-suspended particles while sanding or generating any form of dust.
- Do not be distracted. Keep pets out of the shop. When the lathe is running, ask family members to enter the shop carefully so you aren't startled and wait until you turn off the lathe before trying to get your attention.

EQUIPMENT

- Keep lathe in good repair. Check for damaged parts, misalignment, binding of moving parts, and other conditions that may negatively affect its operation.
- Ensure that all guards, belt covers, and other safety features are in place.
- Keep the lathe bed, toolrest holder (banjo), and tailstock mating surfaces clean and operating smoothly. Remove rust or debris that would cause binding.
- Keep turning tools sharp and clean for better and safer performance. Inspect frequently for cracks or defects. Don't force a dull tool. Never use a tool for a purpose that it was not designed for or intended for.

PERSONAL PROTECTION EQUIPMENT

- Using a full face shield is recommended for all woodturning operations, but especially for bowl, vessel, or any medium to large turned pieces involving chucks and faceplates. At a minimum, use safety goggles or safety glasses that have side protectors for turning small items.
- Fine particles from a grinder and wood dust are harmful to your respiratory system. Use a dust mask, filtering respirator, or a powered air filtration respirator (PAPR), in conjunction with a dust collection system and proper ventilation. Be especially mindful of dust from many exotic woods, spalted woods, or any wood that give you a skin or respiratory reaction.
- Wear hearing protection during extended periods of turning, grinding, or power carving.

BLANKS AND TURNING MATERIALS

- Turning stock should be physically sound and carefully inspected for cracks, splits, checking, ring shake, and other defects that compromise the integrity of the wood. Always be aware that defects may be present but undetectable through visual inspection.
- Exercise extra caution when using stock with any known defects, bark inclusions, knots, irregular shapes, or protuberances. Beginners should avoid these types of stock until they have greater knowledge of working such wood.
- Frequently stop the lathe and inspect the blank to determine if defects are being developed or exposed as material is removed. Discard blanks that have significant defects. Adding adhesives to attempt to "fix" defects in the blank is not advised. Do not rely on glue to keep a defective blank together.

TECHNIQUE

- Tie back long hair, bangs, and beards. Do not wear gloves. Avoid loose clothing, jewelry, or any dangling objects that may catch on rotating parts or accessories.

- When using a faceplate, be certain the workpiece is solidly mounted with stout screws (#10 or #12 sheet metal screws as a minimum). Do not use dry wall or deck screws. When turning between centers, be certain the workpiece is mounted firmly between the headstock drive center and tailstock center.
- Before starting the lathe, rotate your workpiece completely by hand to make sure it clears the toolrest, banjo, and lathe bed. Be certain that the workpiece turns freely. Ensure the blank is held securely by the drive center, faceplate, or chuck.
- Always check the speed of the lathe before turning it on. Use slower speeds for larger diameters or rough pieces and higher speeds for smaller diameters and pieces that are balanced. Always start a piece at a slower speed until the workpiece is balanced. If the lathe is shaking or vibrating, lower the speed. If the workpiece vibrates, always stop the machine to verify why. Ensure the lathe speed is compatible with the size of the blank.
- Be aware of what turners call the "red zone" or "firing zone." This is the area directly behind and in front of the workpiece, the areas most likely for a piece to travel as it comes off the lathe. A good safety habit is to step out of this zone when turning on the lathe, keeping your hand on the switch in case you need to turn the machine off. When observing someone else turn, stay out of this zone.
- Hold turning tools securely on the toolrest, holding the tool in a controlled but comfortable manner. Always contact the toolrest with the tool first before contacting the wood.
- Turn the lathe off before adjusting the toolrest or repositioning the banjo. Following these adjustments, again rotate the piece by hand to confirm that all parts of the piece will not encounter an obstruction.
- Always remove the toolrest before sanding, finishing, or polishing operations.
- Do not use cloth to apply finishing or polishing materials if it is intended to contact a rotating object on the lathe. Never wrap polishing materials around fingers or hands.
- When running a lathe in reverse, it is possible for a chuck or faceplate to unscrew unless it is securely tightened or locked on the lathe spindle. Use spindle locking screws in the faceplate or chuck if turning in reverse.

ROUTINE

- Check that all locking devices on the tailstock and toolrest assembly (rest and base) are tight before operating the lathe. Frequently check the tightness of chuck jaws throughout the woodturning session.
- Remove chuck keys, adjusting wrenches, and knockout bars. Form a habit of checking for these before turning on the lathe.
- Know your capabilities and limitations. An experienced woodturner is capable of lathe speeds, techniques, and procedures not recommended for beginning turners.
- Don't overreach, keep proper footing, and keep your balance at all times.
- Never leave the lathe running unattended. Don't leave lathe until it comes to a complete stop.
- Stay alert and watch what you are doing. Pay close attention to unusual sounds or vibrations. Stop the lathe to investigate the cause. Don't operate machines when you are tired or under the influence of drugs or alcohol. ■

WOODTURNING FUNDAMENTALS

is an informative digital publication and online learning portal aimed at new turners. Whether you're starting a new hobby or plan to become a pro, the projects, techniques, tips, videos, and resources in WOODTURNING FUNDAMENTALS will help you build essential knowledge and skills. The AAW publishes WOODTURNING FUNDAMENTALS digital publication free to members four times each year.

The ABCs of Woodturning

Anchor the tool on the rest.

Bevel rubs on the spinning wood.

Cut by lifting the tool handle to engage its sharp edge. Shavings fly, big fun!

AAW | AMERICAN ASSOCIATION OF WOODTURNERS

222 Landmark Center | 75 5th St W | St Paul, MN 55102
877-595-9094 (toll free) | woodturner.org