SPECIAL BONUS FEATURES

Safety Guidebook for Woodturners

BONUS FEATURES

- Shopping for Your First Lathe
- Tuning and Aligning Your Lathe
- Your First Bowl Gouge
- Sharpening Jigs
- Collect Dust at the Lathe

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Table of Contents

A Note About Safety

An accident at the lathe can happen with blinding suddenness; respiratory and other problems can build over years. Always take appropriate precautions when you turn.

Safety guidelines are published online at *tiny.cc/turnsafe**. Following them will help your continue to enjoy woodturning.

*Address is case sensitive.

AAW Lathe Safety Standards

Safe, effective use of a wood lathe requires study and knowledge of procedures. To avoid injury and make your turning experience as satisfying as possible, the AAW has prepared this booklet to help you understand and use safe practices.

While common sense should prevail, these standards will help you gain awareness of the many facets of woodturning safety and what to be on the lookout for as you gain experience. In addition, safety guidelines from an experienced instructor, video, or book are also good sources of important safety procedures.

We have divided this booklet into the major areas of woodturning safety. Be sure to review and understand ALL aspects of these guidelines before you begin to turn.

The Workshop and Turning Environment
- General Considerations
- Floor Mats
- Lighting
- Extension Cords
- Lathe Arrangements (multiple lathes)

Lathe and Turning Equipment
- Spindle Height
- Saws
- Grinders

Personal Protection Equipment
- Eye and Face Protection
- Respiratory and Skin Protection
- Hearing Protection

Blanks and Turning Materials

Safe Techniques

Safe Turning Speeds

Before Turning on the Lathe – a Checklist

First Cuts: ABC's

How to Be Prepared, Dennis Belcher
- A Safety Quiz and Safety Plan Sample

Edited by: John Ellis, Chair, AAW Safety Committee

The Workshop and Turning Environment

General Considerations

Don't use a lathe in damp or wet locations or in the presence of flammable liquids, vapors, or gases. Always keep a fully-charged fire extinguisher close at hand.

Frequently remove shavings from the floor while turning. Eliminate all slipping or tripping hazards from the floor around the lathe and work area.

Do not be distracted. Keep pets out of the shop. Ask family members to enter the shop carefully if the lathe is running, so you aren't startled, and to wait until you turn off the lathe before trying to get your attention.

Use a powered dust-extraction system to remove wood dust and other air-suspended particles while sanding or generating any form of dust. See Personal Protection Equipment, below.

Floor Mats

Having a good rubber anti-fatigue mat to stand on instead of a hard concrete floor helps reduce leg and back fatigue. A mat can also reduce damage to dropped tools.

Lighting

Keep your work area well lit. Adequate lighting is important not only for seeing the work but also for reducing eye fatigue and, over time, eye damage. Ideally each station should have good overhead lighting as well as a moveable work lamp to provide more direct light on the project. Lights which have protective shields are recommended.

Extension Cords

Avoid using extension cords if possible. Guard against electric shock. Inspect electric cords for damage. Use of extension cords that cross traffic areas should be avoided.

Lathe Arrangements - A note about the teaching environment with multiple lathes.

Being able to freely walk around each lathe has many instructional advantages.

If there are numerous turning stations, staggering the lathes or setting them at a slight diagonal to a wall prevents a woodturner from standing in the "throw line" of an adjacent lathe. This is less important with spindle work than when bowl turning where there is a greater chance of "flying objects" suddenly appearing.

There are better ways of making a turning session memorable than being clobbered by a wooden projectile. In some turning Schools, each turning station is divided by a screen, wall section, or tool panel. Where a tool panel is not provided it is important to have a small table or cart where woodturners can place their individual tools. They should be discouraged from placing their tools on the lathe bed.

Lathe and Turning Equipment

Read, thoroughly understand, and follow the label warnings on the lathe and in the owner-operator's manual.

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 for which it was not designed or intended.

Spindle Height

A good rule of thumb is that the spindle height should be somewhere around the same distance from the floor as a person's heart. It should be no lower than their elbow while standing in a relaxed position.

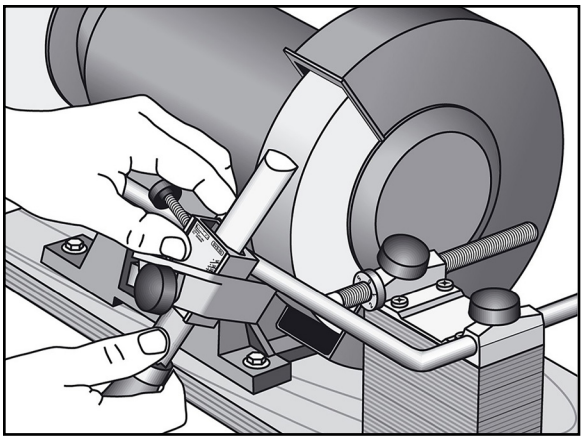
Saws

Many accidents to woodturners occur while using saws, especially band and chain saws. Learn and follow the safety guidelines for this equipment.

Grinders

When using a variable speed grinder, always start at its lowest speed and increase the speed only after the wheels have come up to full starting speed. The best fixed (single speed) for sharpening turning tools is approximately 1750 RPM, which is commonly referred to as "slow speed grinding." Many grinders sold today have a single speed of about 3600 RPM, which is much too fast for efficient sharpening.

While in the process of sharpening, use a light pressure on the tool against the wheel. Let the wheel do the work. Forcing the tool against the wheel in an effort to increase material removal is dangerous. It will significantly increase the heat of grinding, and worst case, can damage the wheel, even causing breakage.



While grinding, cool the tip of the tool frequently in a vessel of water. Although high-speed steels are not damaged by grinder heat, the tools can become so hot that they are dangerous to hold and can cause burns.

Before turning on the grinder, lightly tap the wheels to check for cracks. A cracked wheel will "thud."

When starting a grinder, always stand to the side of the wheels. During start-up and shut-down is when a wheel is most likely to shatter, and broken pieces may be sent at high speeds in the plane of the wheel.

NEVER grind on the side of the wheel.

Grinder wheels should be "dressed" frequently with a diamond-surfaced dressing tool. Dressing renews fresh cutting grit to the surface of the wheel and also insures a flat, true surface.

The platform of the grinder must be kept clean and free of nicks or other surface defects that could impede smooth movement of tools while grinding. Frequently clean the platform surface with alcohol or mineral spirits and apply a coat of paste wax to the surface and buff. (Treatment is similar to lathe tool rests.)

Before grinding tools, smooth off sharp corners that might catch while moving the tool during the grinding process (or along the lathe tool rests). Waxing the tools' shaft can also facilitate smooth movement.

Never adjust the platforms or jigs while the grinder is running.

Never try to slow the speed of a wheel after the grinder is turned off by rubbing it with any object.

Take care to not breathe the grinder or tool "dust." Clean (vacuum) the grinder area frequently.

Personal Protection Equipment

Eye and Face Protection

Having at least minimal protection in place to reduce the chances that flying projectiles will reach and damage the eyes or face should be a common sense no-brainer for ANYONE who intends to stand at the lathe.

Full face shields provide the protection needed for bowls, vessels, or any turning involving chucks and faceplates. At a minimum, use safety goggles or safety glasses that have side protectors when turning small items.

Properly adjust the hand-band and how to lift the shield for talking. Face shields should be kept clean and free of scratches.

Respiratory and Skin Protection

A major safety issue involving the use of personal protection equipment involves ensuring that the operator is adequately protected from fine particulates carried in inhaled air and carried deep into the lungs, particularly in repeated exposures over extended periods of time. Installation of an efficient dust collection intake at the lathe and other dust sources, coupled with a high air flow volume dust removal system (including particle filtration) is highly recommended.

Some people are particularly bothered by dust from woods such as cocobolo and other exotics, and the dust from grinding, sanding, and sawing can be just as harmful as that coming from the lathe.

In addition to respiratory hazards, be especially mindful that contact with many exotic woods, spalted woods, or many more common woods might give you skin reactions. Wash thoroughly after working with any woods that you aren't familiar with. Be particularly careful with bringing food or open beverage containers into the shop, as they easily attract dust that can be ingested, causing severe reactions. Some reactions may not be evident for up to several hours after exposure.

Hearing Protection

Although woodturning at the lathe is a fairly quiet endeavor, especially when compared to running other woodshop machinery such as surface planers, jointers, miter saws, and table saws, hearing damage can still be present, especially over extended periods of time.

Be sure to wear hearing protection during extended periods of turning, grinding, or power carving, or for any other operation that generates significant noise. There are numerous kinds of hearing protection devices available in different designs. Some prefer an earmuff style hearing protector with a spring-tension band that can be worn over the top of the head, behind the head, or even under the chin. Others prefer hearing protection that inserts into the outer ear canal as an ear plug which attenuates high noise levels before they reach the ear drum and inner ear anatomy.

Regardless of the style of hearing protection chosen, all are given a Noise Reduction Rating (NRR), and that hearing protection devices should be chosen which have noise reduction ratings NRR 25dB or higher.

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.

Safe Techniques

Stay alert. Watch what you are doing. Know your capabilities and limitations. An experienced woodturner is capable of lathe speeds, techniques, and procedures not recommended for beginning turners. Don't operate machines when you are tired or under the influence of drugs or alcohol.

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.

Pay close attention to unusual sounds or vibrations. Stop the lathe to investigate the cause. Don't overreach, keep proper footing, and keep your balance at all times.

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 drywall 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. A handwheel on the headstock simplifies this process of spinning the lathe by hand before turning on the switch.

ALWAYS 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.

Check the speed of the lathe before turning it on. Use appropriate speeds for all turning. ***See Safe Turning Speeds on page 9.***

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 area most likely for a piece to travel into 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.

Keep tools sharp and clean for better and safer performance. Don't force a dull tool. Don't use a tool for a purpose that it was not designed for or intended for.

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. ***See First Cuts: ABC's on page 10.***

Remove chuck keys, adjusting wrenches, and knockout bars. Form a habit of checking for these before turning on the lathe.

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.

Do not use cloth to apply finishing or polishing materials if you intend to contact a rotating object on the lathe. Never wrap polishing materials around fingers or hands.

When a lathe is running in reverse, it is possible for a chuck or faceplate to unscrew if it is not securely tightened or locked on the lathe spindle. Use spindle-locking screws in the faceplate or chuck if turning in reverse. Begin reverse turning with the lathe at slower speeds, increasing gradually, to avoid loosening the chuck or faceplate.

Never leave the lathe running unattended. Turn power off. Don't leave lathe until it comes to a complete stop.

Safe Turning Speeds

Suggested lathe speeds for various diameters of spindle stock are given below. If there is a question regarding whether a lathe rpm is set too high, chances are it is. It is best to work on the side of caution. A slower lathe speed may require more time to remove the excess stock, but will allow for safety turning. Cutting principles remain constant regardless of lathe speed.

Suggested Lathe Speeds: Spindle Turning

Diameter of Stock
1" or less: 3,000 rpm
1.5": 2,500 rpm
2": 2,000 rpm
3": 1,500 rpm
4" and larger: 1,000 rpm or less

Suggested Lathe Speeds: Bowl Turning

Caution: A formula published previously recommended maximum speeds based on diameter may allow speeds that are actually too fast for safe turning. That formula is:

Maximum Speed = D x RPM = 6,000 to 9,000 (where D = diameter in inches)

For example, a 6" bowl blank, using this formula, would be turned at maximum speeds of 1,000 to 1,500 RPM, which may be far too fast for unbalanced blanks. For unbalanced work, always start with speeds well below the range from the formula and increase only when completely balanced and free of vibration.

Before Turning on the Lathe

Checklist

A short checklist will help ensure that you are ready to turn on the lathe:

- ❑ Face shield on
- ❑ Blank properly mounted between centers: drive center point engaged in the end-grain
- ❑ Tailstock base firmly locked
- ❑ Tailstock ram not extended too far out, and live center pressed into the endgrain
- ❑ Tailstock ram locked
- ❑ Tool rest base locked firmly in position
- ❑ Tool rest set at proper height and distance from the wood to avoid contact
- ❑ Stand out of the "firing line"

Free Rotation

Spin the outboard hand-wheel with your left hand before turning on the lathe to confirm that the wood won't strike the tool rest. If this is always done before turning the lathe on, you will avoid problems after re-positioning the tool rest.

On and Off

Practice starting and stopping the lathe a few times before actually taking any cuts. Be able to find the switch and quickly stop the lathe in a matter of seconds. Listen for inappropriate or unusual sounds.

Check that all locking devices on the tailstock and tool rest assembly (rest and base) are tight before operating the lathe.

Ensure the blank is securely fastened.

First Cuts: ABC's

Every woodturner should remember the A B C's:

Anchor – Bevel – Cut

Anchor

Set the tool firmly on the tool rest. The forces of the cut must be taken by the tool rest in as direct a manner as possible.

Bevel

Always begin with the handle low, so that the bevel is the first part of the tool steel that contacts the spinning wood.

Cut

Slowly raise the handle until the edge engages that wood and begins to cut a shaving. Keep the handle as low as is possible while still producing a shaving.

How to Be Prepared by Dennis Belcher

You've read about safety and you've adopted safe practices in your workshop. You're collecting the dust, wearing your faceshield, keeping your head out of the danger zone, and avoiding cowboy stunts with large, irregular, and cracked chunks of wood. But by the very nature of what we do, accidents will happen. Here's a quiz that's designed to prepare you in advance, first by making you aware of some less-obvious things you can do to reduce your risks, and second, by increasing your awareness of what needs to happen after an accident occurs.

The challenge to you is to make a copy of the quiz, take it to your workshop, and complete each question. Take corrective action on those items you realize need to be improved. Bad habits can be changed, but only if we stop to consider the things we do that may be unsafe, and strengthen the safety practices we've learned.

- The nearest phone to use in an emergency is _____.
- Nearest hospital approved by my insurance carrier is _____ .
- Nearest prompt-care facility approved by my insurance carrier is _____.
- Ambulance service closest to my home is _____. They are _____minutes away.
- I summon an ambulance by calling _____.
- If I need help in the shop from my spouse or neighbor, I call _____.
- My shop fire extinguisher is located _____.
- The charge of my fire extinguisher was last checked on _____.
- I regard my dust collection system as ❑inadequate ❑adequate ❑good ❑superb.
- I consistently wear hearing protection in my shop ❑yes ❑no.
- The electrical service/supply in my shop is ❑inadequate ❑adequate.
- My plan if I develop an allergic reaction to a wood species is_____ .
- I have a faceshield ❑yes ❑no.
- I wear a faceshield or safety glasses/goggles when I turn ❑never ❑sometimes ❑always.
- I wear a dust mask or dust helmet when I turn ❑yes ❑no.
- I consistently use properly sized tools for each project. Large tools for larger pieces, small tools for small projects ❑never ❑sometimes ❑always.
- I have reviewed the near-accidents I have experienced on each machine that I own ❑yes ❑no.
- I know and stay out of the "line of fire" for my lathe ❑yes ❑no.
- I sit outside the line of fire when watching a demonstration ❑yes ❑no.
- I have a safety stop for my lathe that is out of the line of fire ❑yes ❑no.
- I use the tailstock when roughing out ❑never ❑sometimes ❑always.
- I use the tailstock when turning out-of- round pieces ❑never ❑sometimes ❑always.
- The tool in my shop that I most need to improve/change/review my work habits from a safety standpoint is_____ .
- I use a safety shield to protect spectators when doing a demonstration ❑yes ❑no.
- I clean and organize my shop regularly ❑yes ❑no.
- The woodturning tool that I am most afraid of is _____ .
- I need to change my use of _____to improve safe work habits.
- My body clock makes _____the most dangerous time of the day to work with power tools.
- The one thing that I should do to improve the safety of my shop is _____ _____.

Shopping for Your First Lathe

Ask the right questions before you buy

Buying a lathe—especially if it's your first—can be a confusing and difficult task. However, if you take the time to answer a few questions, you'll have a much better understanding of your needs. And when you have a good focus on the type and scale of projects you want to turn, your research will narrow down the field of lathes to a manageable number of choices.

Five questions, many possible answers

Before rushing to the lathe manufacturers' websites, begin your search by answering five questions:

1. What types of things do I enjoy turning? For example, you may enjoy making bowls, hollow forms, spindles, gift items, or other projects.
2. What is the size of the pieces I'll be turning? Be specific in both diameter and length.
3. How much space will I dedicate to this machine? Don't forget to also allocate space for storage of tools and lathe accessories.
4. Will I need to move the lathe often?
5. What is my budget?

The first two questions are usually the hardest to answer, especially if you're a novice turner. If you've just caught the turning bug (or plan to become infected), it can be difficult to know what type and size pieces you will be turning now and in the future. However, the answers to these two questions will heavily influence your decision-making on the next three questions.

I encourage prospective lathe buyers to reflect on these first questions and not answer hastily. Start by considering why you became interested in turning. For example, did you admire some bowls or hollow forms at the art gallery, or do you want to make components for a rocking chair? Are you thinking of making Christmas gifts for friends and family this year? Begin a project wish list, and also note the size of finished items.

Expand your search for prospective turning ideas by going to the library, surfing the Internet, and studying the instant gallery of the works of fellow members at the next meeting of your woodturning chapter. Again, take notes about items you might like to make one day, but also identify projects that don't spark your interest. By writing down likes and dislikes (pluses and minuses), you'll establish the boundaries of your personal woodturning interests.

One size doesn't fit all

Most experienced turners agree that there is no perfect lathe. Every machine is designed to perform specific tasks, and that gives it a range of both strengths and weaknesses. In some ways, choosing a lathe is similar to shopping for a vehicle: A compact car may offer good mileage, but it won't tow a boat.

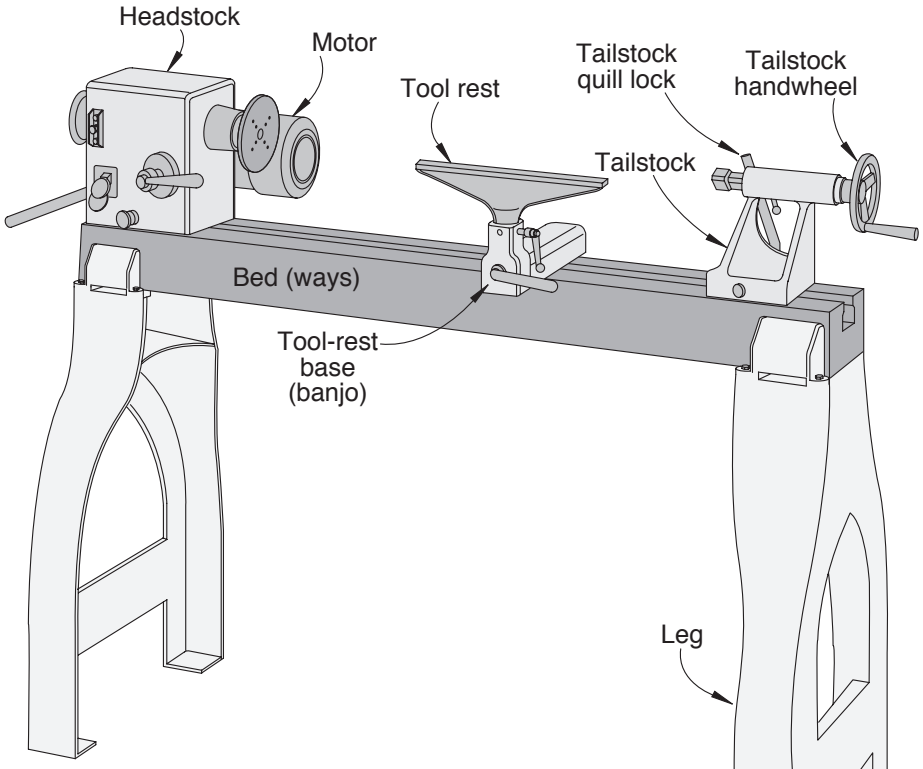
In a similar way, some lathes offer an incredibly low price while others offer top-of-the-line quality. (Bear in mind that precision machining and quality control significantly influence price.) You can easily move many small lathes, but these tools typically lack the ability to handle large or heavy

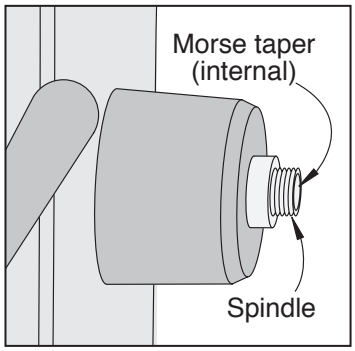
Lathe Decision-Making Chart

As you evaluate each lathe, assign it a number from 1 to 5 in each category, with a larger number reflecting a closer match with your needs.

Lathe Make/Model	Will handle projects that interest me	Has swing and length to meet my needs	Fits into available shop space	Ease of moving (if required)	Price	Total score

Illustrations: Roxanne LeMoine





pieces. Some lathes are purpose-designed for efficient bowl turning while others are intended for furniture parts.

What lathes are available?

Now you're ready to begin matching your needs to the lathes available in the marketplace. As you research various lathes, ask yourself how each tool's specifications meet your needs. You could even give each prospective lathe a score from 1 to 5 in each category to create an objective framework for evaluating potential lathes. See the Lathe Decision-Making Chart *opposite*.

Although the manufacturers' specifications are valuable information, you should be aware that the numbers sometimes require a reality check. For example, a lathe may physically have the capacity to hold a 20"-diameter bowl blank but lack sufficient power to move it or the mass to dampen vibrations from a large unbalanced piece of wood. If possible, check out the lathe in person at a local dealer, or discuss its capabilities with fellow chapter members.

Don't be overly influenced by which lathe got the top review in the latest publication or has a celebrity endorsement. After all, the celebrity or magazine writer won't be coming to your shop to do the turning for you. Instead, look for an opportunity to turn at the models that you're considering. Turning at a machine, even for just a few minutes, may reveal valuable information that's impossible to get by reading or conversation. Think of it as test-driving a car: You want to make sure you and the lathe are a good fit for each other.

Learn lathe jargon

The equipment specific to each art or trade has its own specialized vocabulary, so be sure that you understand the terminology. In some cases, a single term can include several technologies, and you'll need to get further details to truly understand what the manufacturer means.Variable speed is a case in point.

Many wood lathes are listed with a variable-speed feature, yet there are several methods that manufacturers use. The least expensive and easiest method is via a **Reeve's drive**. This system uses two V-shaped pulleys and a single belt to transfer power from the motor to the spindle. A lever adjusts the width of the pulley on the spindle. (The width of the pulley on the motor is then adjusted with a spring.) When you move a lever on the headstock, the spindle pulley is either spread apart or pushed together. The belt, which travels up and down on this pulley, then interacts with the motor pulley and causes it to move inversely (widening a spindle pulley causes the motor pulley to contract).

Although this method does produce numerous speeds without the need to stop the lathe, it does have drawbacks.

First, this type of drive typically won't produce speeds below 400 rpm. Second, the lathe must be rotating to adjust the speed, and that creates a possible safety issue. Third, the system's reliance on a loose belt and a number of moving parts leads to a loss in torque as well as potential maintenance situations.

More sage advice

Michael Mocho: Become familiar with rpm

Proper rpm is a major factor in getting a good quality surface directly from the tool. The smaller the diameter, the faster it should spin. Although variable speed isn't essential, it sure makes turning more efficient.

A good range of speed should be between 500 (or slower) and 2,500 rpm, though smaller work sometimes requires up to 3,200 rpm.

Avoid the older gap-bed models. Although this design appears to offer more capacity, it really doesn't once you figure on using a faceplate or chuck. It makes it tough to get the tool rest into solid position when you are working up close to the spindle in some situations.

I also believe that an outboard handwheel is essential, and headstock spindles should also have a through-hole for the option of using vacuum chucks.

A faceplate or chuck screwed on should tighten against the spindle shoulder, with provision of tightening the grub screws onto the spindle notch (rather than the spindle threads).

The ability to reverse the rotation of the lathe is useful for some sanding operations, especially when turning bowls and when turning softer woods.

If you are turning a lot of wet wood, there are a few lathes now available with stainless-steel ways (the bed), though keeping the ways free of rust and grit is always important on any lathe.

Before you buy, make sure the tailstock doesn't slip when a workpiece is pressed between centers.

Bonnie Klein: You really need two lathes

You wouldn't buy a car without taking it on a test-drive, right? Before you buy a lathe, find someone who owns the lathe you're interested in and ask if you can turn on it. Most turners would be more than happy to invite you over to their shop.

I tell turners they need two lathes—a mini lathe and a full-size lathe. I just wish there was a really good full-size lathe on the market for about $2,000!

Mobility makes the mini lathe ideal to take to demonstrations, to take on vacation, and for small projects (up to 10" diameter) in your shop. If you are shopping for a mini lathe, put your money into a variable-speed model.

Without variable speed, you put too much load on the bearings and they get too hot, which reduces the lifetime of this important part.

There are upgrades you can make to a mini lathe. For example, Steve Sinner (ssinner@mchsi.com) makes a nice 6" machined tool rest (right; about $45). You will notice the difference!

Attach a mount on the top of the headstock for a Stay-Put Work Lamp (Craft Supplies USA; woodturnerscatalog.com). Jet makes a mini lathe stand with an accessory kit of locking casters.

Alan Lacer: Think used

1. Don't be afraid of an older lathe. Two of my favorite lathes in the shop were made pre-1940, with one of these made between 1910 and 1920. Other than bearings and inside tapers, not much can wear out if the lathe was not abused. Many items for the lathe can be found premade or custom made, such as faceplates, chuck inserts, belts, tool rests, tool-rest bases, drive centers, live centers, and the like. In addition to AAW chapter and newspaper classified ads, don't forget to search Internet sites including exfactorymachinery.com, redmond-machinery.com, Craigslist.com, and ebay.com.

In major cities, make inquiries at used machinery dealers as well as new dealers that take trade-ins or buy used machinery at auctions (especially from school settings).

2. Avoid lathes that have been abused and show any cracked castings for the bed or tailstock, severely damaged spindle threads, or a bent headstock spindle. The headstock spindle generally has the most machining of any lathe part, so replacing it can be expensive (this is not to be avoided, but be aware of the potential high costs).

3. The electrics can often be replaced, repaired, or upgraded. In the past, many who were searching for a lathe would avoid three-phase machines. This is no longer the case, as these can often be upgraded to function like most of the top-end machines today with a variable- speed controller/inverter. Another option is to use a phase converter (dynamic versus static), available from Enco (use-enco.com). Dealers Industrial Equipment (dealerselectric.com) is a source for parts to upgrade to a variable-speed system with motor and controller or to purchase a controller/inverter. Most motors and switches can be repaired or replaced, sometimes with a little more horsepower if you intend to do bowl and vessel work. Be sure to replace the motor with a totally enclosed model.

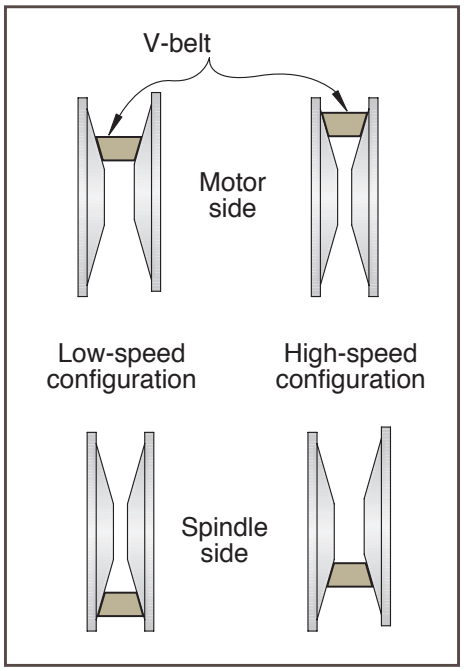
4. Look for a machine that uses Morse tapers rather than some other system. I have had a machinist convert a Roberts taper to a Morse taper on one older machine, but most turners will want to stay with Morse tapers. Size is not so critical as adapters are inexpensive and readily available through companies like MSC (mscdirect.com). I suggest taking one of your Morse taper centers with you to make sure it seats firmly into both the headstock and tailstock sides.

5. As many of the older standard lathes had only a 12"-diameter capacity, some turners have found it easy to block up the headstock and tailstock with metal or even wood blocks to achieve more capacity. My advice is to befriend a machinist to accurately mill some aluminum blocks to achieve this increase in capacity. Depending on the lathe, you will probably need to extend the belt length and replace the tool-rest base to come out farther and go higher. Oneway (oneway.ca) and others sell replacement tool-rest bases.

6. Bearings do wear out and, depending on the quality and how well shielded from dust, may need replacing. On most lathes these are not that difficult to remove. A simple test is to turn a short cup shape from a piece of hard material like maple, mounted on a faceplate or quality scroll chuck. First turn a cylinder, then hollow to about 1", thinning the walls to around 1⁄8" or less thick: Is there a noticeable "thick-and-thin" appearance, or even breaking through in spots? This can be a sign of worn bearings or, the worst case, a bent spindle. Also feel the bearing smoothness when turning the spindle by hand as well as note any sound coming from the headstock.

7. If indexing is one of your intended uses, inspect the indexing wheel if possible. On some lathes, the indexing wheel is notoriously stripped of a number of holes (probably by starting the lathe with the pin locked or using it as a spindle lock to remove chucks). Sometimes these are replaceable, but you might have to resort to a homemade version that usually mounts on the outboard side of the lathe.

Reeve's Drive



DC variable speed combines a DC motor with a controller. The system converts your household AC power into DC power, and then adjusts the speed by varying the voltage into the motor. The operator uses a dial to easily control the speed. This type of drive can be unreliable because it may not produce the necessary torque required for turning wood.

The third system, **AC variable speed**, uses an inverter and a 3-phase motor. The inverter converts your household AC single-phase power into 3-phase power, then adjusts the motor's speed by varying the frequency delivered to the motor. This system, also dial-controlled, adjusts easily. AC variable speed can cover a wide range: from 0 to more than 3,000 rpm. (See Michael Mocho's comments.) When the drive involves only a few pulleys, this system delivers exceptional torque. Unfortunately, this convenience and capability come at a hefty price.

Additional buying points

Other considerations include what accessories are available for the lathe. Bed extensions easily increase the length capacity of small lathes and are relatively inexpensive compared to a lathe with a long one-piece bed.

The Morse taper size and spindle thread deserve consideration. The #2 Morse taper is the most common one used at woodturning lathes, and numerous accessories are available in this size. Additionally, check the headstock's threads. Common thread patterns are 1" × 8, 1¼" × 8, and M33 × 3.5. Manufacturers offer a wide variety of chucks, faceplates, and other gadgets for these spindles.

The bottom line

For most turners, price can often be the deciding factor in determining which lathe to purchase. But giving too much consideration to price can be a dicey proposition. An inexpensive lathe that meets your needs can be a wise choice. But sacrificing satisfaction to save a few dollars is no bargain. On the other hand, spending more money than necessary won't guarantee happiness. Consider the lathe as an investment toward achieving results, and you'll help maintain a good perspective.

If you are just beginning and aren't sure what your needs will be in the future, you may want to consider one of the numerous mini lathes on the market. Most of these lathes can handle pieces 10" to 12" in diameter and 12" to 48" between centers. Choosing a starter lathe like this may compromise the size of pieces you can turn, but with common spindle sizes and Morse tapers, you can purchase accessories that will fit an upgraded lathe purchased later. (See Bonnie Klein's comments.)

If an occasional project requires the use of a larger lathe, your local turning chapter can be a valuable resource. Many chapters own lathes that are available to members at minimal or no cost. There also may be chapter members who are willing to offer the use of their larger lathe.

Don't rule out the used tool market. (See Alan Lacer's comments.) You may find a high-quality lathe just waiting for a new home. Although some of these lathes may be in need of a major repair, others may require only minor maintenance before they're ready to produce fresh shavings.

So whether you decide to purchase a top-of-the-line, full-sized, fully accessorized lathe or a bargain-basement (or even garage sale) treasure, do your research and make sure it will meet your needs. Don't be concerned with the manufacturer's selling points. Instead, ask yourself whether you will need each of its features and if they are worth their cost to you.

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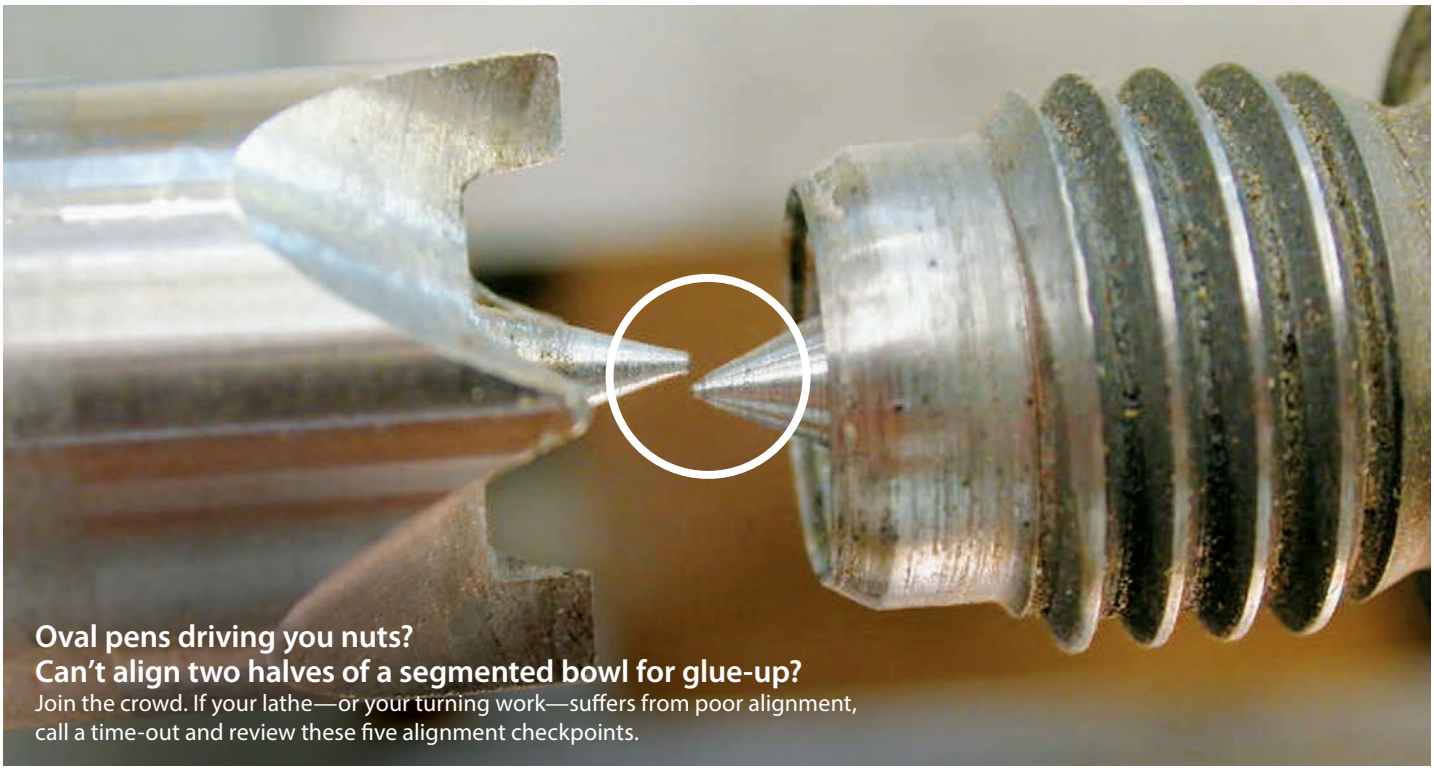
*A resident of Des Moines, IA, **Brian Simmons** is a writer, teacher, and has demonstrated at local and National AAW Symposiums.*

Tuning and Aligning Your Lathe

Five easy checkpoints to get your turning in line



Oval pens driving you nuts?
Can't align two halves of a segmented bowl for glue-up?
Join the crowd. If your lathe—or your turning work—suffers from poor alignment, call a time-out and review these five alignment checkpoints.

1. Tailstock does not align with the headstock

To check the alignment of your headstock and tailstock, insert a live center into the tailstock and a spur drive into the headstock. Make sure that the points are not dulled or bent in either the spur or the live center—this will mislead you in your measurement.

Bring up the tailstock to within 1/4" to 1/2" from the spur center, then tighten down the tailstock and quill. Now, observe the alignment of the two points. If the points are misaligned, you can compensate by placing a shim under the appropriate corner(s) of the tailstock to adjust the alignment. Often a sheet or two of paper will be adequate to shim the tailstock.

For more exaggerated errors, contact the lathe manufacturer for repair or replacement of the tailstock or tailstock quill. An extreme case may require reboring of the Morse taper on the tailstock quill.

If the lathe headstock is bolted to the frame or ways as with the Jet mini-lathe and Delta Midi, you can realign it with the addition of a permanent shim under the appropriate corner. On other lathes such as the Oneway, for example, you can align the headstock by adjusting the jack screws provided for that purpose.

If you own a Nova 3000/DVR, you can reposition the lathe ways themselves, as they are screwed to the headstock unit. Be sure to follow the instructions in your owner's manual for all adjustments noted above.

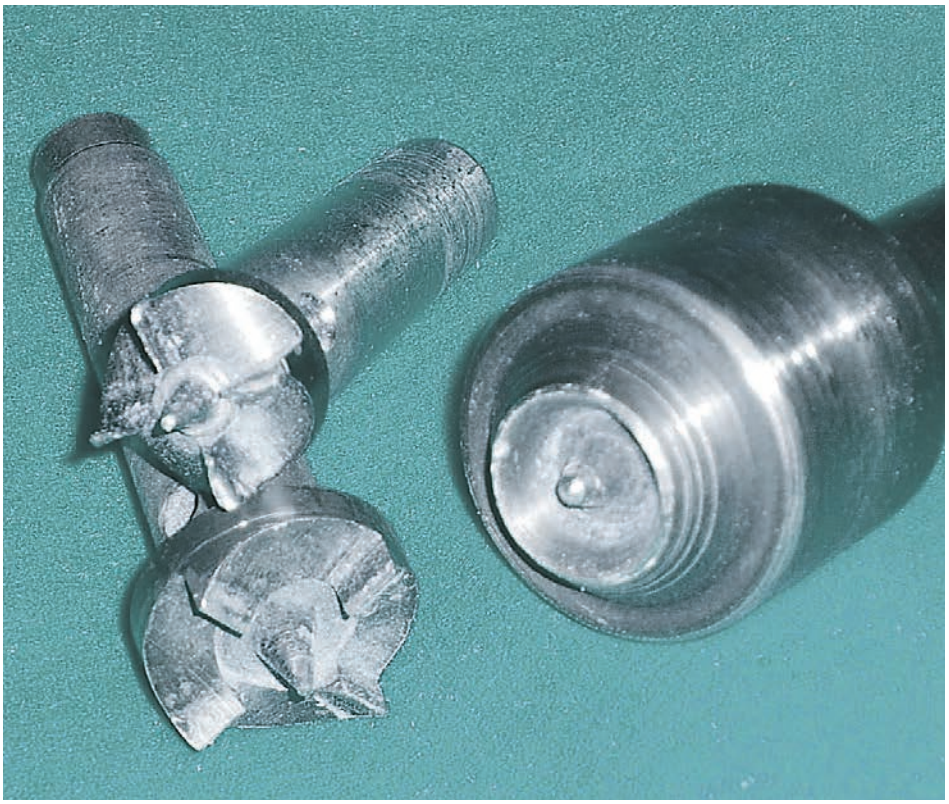
On lathes with a rotating headstock, the click stop positioning may not be accurate enough to return to perfect alignment. A double-ended Morse taper will aid in regularly realigning the headstock each time it is moved.

2. Live center does not run true

Inexpensive live centers, centers with worn out bearings, or poorly designed live centers like the examples shown cause problems. If the live center was inexpensive, just discard it and upgrade.

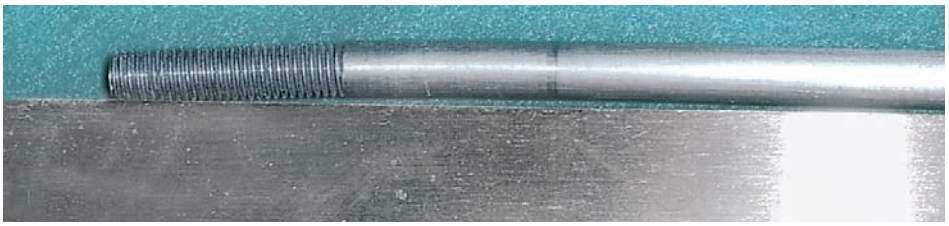
One of the causes of a live center becoming out of true is excessive wear of the bearings due to operating the lathe with a headstock/tailstock misalignment. Angular pressure on the live center will rapidly increase the radial runout to an unacceptable point. (Oneway advertises that the radial runout of its live center system is less than .001 inches.)

If you have a reliable live center that's repairable, consider replacing the bearings. For a minimal fee, you can return many live centers for bearing replacement.



3. Too much pressure applied to the mandrel in penturning

If your pen barrels are oval and you've checked the first two solutions, applying too much pressure to the tailstock when tightening on the mandrel may be the culprit. The amount of pressure applied should be just enough to stabilize the mandrel shaft and minimize vibration from the turning activity. Too much pressure bends the shaft as shown.



A crooked live center point will also cause the mandrel to operate eccentrically and will enlarge and distort the alignment dimple in the tailstock end of the mandrel shaft. The better designed mandrels allow the user to replace the shaft when it becomes bent or the dimple has excessive wear.

4. Poor centering with vacuum chucks

If you align a bowl or vessel in your vacuum chuck and it slips or won't

Tips to improve your accuracy

- Always clean the female Morse tapers before inserting any accessory.
- Remove all defects or burrs from the surface of male Morse tapers.
- Store and protect spur drives and live centers from scratches and dings. Find a place near your lathe where these valuable attachments won't get beat about by lathe tools, hammers, and accessories.

hold the desired alignment, the cause may be related to the material used to seal the vessel to the chuck. Foam rubber and other soft, flexible seals may vary in density throughout the material, thus not compressing equally everywhere, causing the vessel to be forced out of alignment.

Vacuum chuck design and the shape of the vessel also tend to exaggerate this problem. A round vessel held against a rounded chuck surface may exhibit this problem more readily.

To improve centering, try each of these solutions: Replace the material, readjust the material, or buy thicker (or thinner) stock.

Silicon rubber works well but is difficult to attach to the chuck because there's no known effective adhesive for this material.

On a finished edge bowl, consider using a flat plate as a vacuum chuck, thus spreading out the hold over a large area and minimizing the problem.

5. Hole-drilling errors

Improperly mounting a Jacobs chuck on a Morse taper may cause centering problems when drilling holes in the end of a project. To avoid this problem, be sure that you properly seat the Morse taper in your tailstock, then run the quill out far enough that the drill chuck completely seats—no further. Bring the tailstock up into close proximity of the work and lock down the tailstock before drilling.

Other drilling issues may not be related to the alignment but be caused by the drill wandering from hard, winter-growth grain and into softer summer growth. Solve this issue by creating a small pilot hole for the drill point. Brad-point or Forstner bits also reduce this drifting problem. Always be sure that the bit you select is sharp.

***Jim Rodgers**, author of* A Lesson Plan for Woodturning *and past President of the Bay Area Woodturners Club, is the Director of turning programs for Mt. Diablo Unified School District. Visit Jim at www.jlrodgers.com.*

Collect Dust at the Lathe

Learn the basics and your lungs will love you

Peter Fedrigon knows dust. For more than 20 years, he's hopscotched across the country as a consulting engineer on dust collection, air filtration, and system design.

For the 650 employees at the L. & J. G. Stickley factory, he designed a monster system with three 150-hp fans that suck wood dust from the plant and blow it into a towering filter dubbed the "baghouse."

He watches over 40-plus systems. At a Wrigley Brothers plant in Gainesville, Georgia, the system protects the lungs of 850 employees from sugar dust.

Variety? Peter has designed systems for rock crushers, tobacco, clay, and peanut shells. And of course, plenty of wood dust.

In the mid-1990s, he started Oneida Air, which his daughter and son-in-law now run.

In sprawling factories, there are rigid OSHA standards for dust levels, which could get out of compliance from poor dust collection and improperly maintained return air from bag-room filters.

Of course there are EPA standards for the air vented outdoors. And the explosive dust must meet National Fire Protection Act requirements.

"All the factors that apply to industry also apply to our home shops," Peter says. "Think about this: The EPA doesn't allow dust masks in factories—the dust collectors have to do all the work. That's the way it should be in your shop, too."

Peter can quote dust statistics until your eyeballs roll into the next ZIP code. But his bottom line message is simple: "If you like to turn, you'd better get yourself a dust collector."

Peter is just as strident about the importance of dust collection for the AAW turners as he is about his consulting jobs. When he's home, Peter relaxes at his lathe.

Members of the Central New York Woodturners are fortunate to have him as an active member. Peter estimates that he's set up or upgraded dust systems for more than 50 members. And of course, he's always eager to talk about his favorite topic—dust.

I turned for four or five years and only occasionally wore a mask. Now, I have asthma from breathing wood dust. Bad situation—I pay for three days if I get even a puff of sawdust in the nose.

I recommend moving as much air as you can when you sand. Take good care of your lungs!

—David Ramsey, Phoenix-area segmented turner and retired hospital executive

Microns and your lungs

If you're considering adding a dust collector to your shop (and you should), you could easily get lost in a sea of technical jargon. You'll find more explanations in the sidebar "Dust Terminology."

Most of the advertising material speaks about the ability to gather dust whose particle size is measured as micrometers, or microns.

Here's what you need to know about microns:

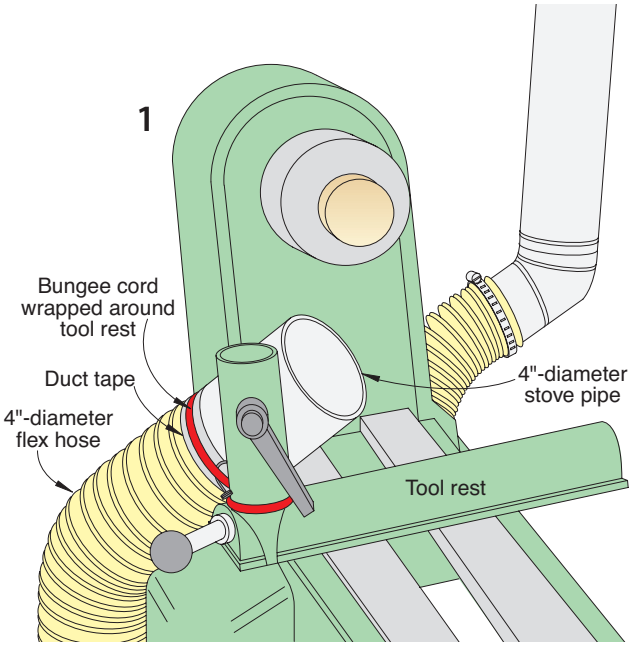
- There are 25,400 microns in an inch. The period at the end of this sentence is about 320 microns in diameter.
- It is the tiny particles which you breathe in that damage your lungs. The dust from 1 to 10 microns in diameter is the nasty stuff that is harmful to lung cells and causes respiratory problems—coughing, nosebleeds, sinus problems, emphysema, and bronchitis. That may explain why you develop a cold after you spend a lot of time sanding. The finer you sand, the finer the dust particles.

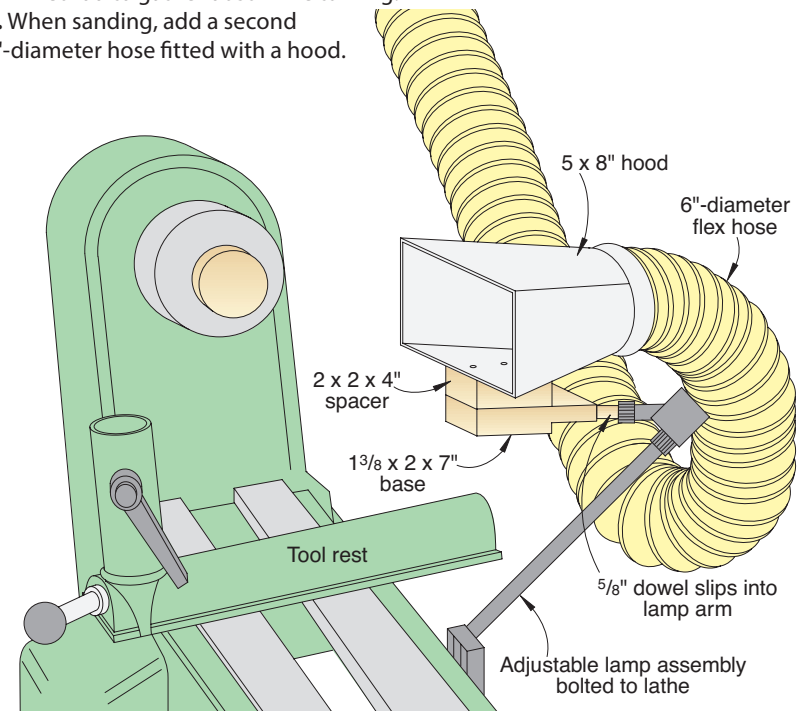
By comparison, wisps of tobacco smoke fit in the range of 0.01 to 1.0 microns. Of course, you know what damage tobacco smoke does to healthy lungs.

In your shop, you can sweep up the nuisance chips too big to enter your lungs. It's the tiny particles and sanding dust that should be your biggest concern.

Get after dust!

1. A method to gather dust while turning.
2. When sanding, add a second 4"-diameter hose fitted with a hood.





Collect dust at the source

Peter has a simple solution for gathering chips, shavings, and dust when he turns: He attaches a 4"-diameter flexible duct to his tool rest with a bungee cord, as shown in **Drawing 1**. "I don't even start up my lathe without turning on the dust collector," Peter says. "This duct is never in the way while I turn. The thin flex hose lets me move the tool rest around with ease."

When it's time to sand, Peter opens a blast gate to a second 4"-diameter duct fitted with a hood, as shown in **Drawing 2**. With two ducts running, he gets 600 to 800 cfm through his 2-hp cyclone system.

"I keep the hood opening small so the air can reach out to capture the dust. I'm getting about 99.9 percent of the dust collected right at the source.

"Remember that dust is a fire and explosion hazard, too."

The dust-gathering solutions *above* are typical of what he has set up for the home shops of Central New York chapter members and nearby AAW chapters (word of Peter's knowledge spreads faster than dust).

The filter factor

"Dust filtration is critical," Peter says. "If you can see dust migrate through the bags when you turn on your collector, your system needs immediate attention.

"It is important to understand the filter media and the efficiency of the media. Spun-bond polyester filter media in pleated filters is the best for your shop.

"The woven or felted polyester doesn't do as good a job because it can't hold back the high dust-loading that occurs in home shops. In addition, woven filters must be cleaned often."

When you choose filters, Peter suggests you select wide-pleated cartridges. Today's top-performing cartridges can filter 99.9 percent of the dust down to .02 micron.

A better two-bag collector

Peter has helped several chapter members upgrade a two-bag collector. Among his solutions:

- Replace the 30-micron bag (standard with many collectors) with a more efficient 1- or 5-micron bag. (The replacement bag will be larger.) American Fabric Filter (americanfabricfilter.com, 800-367-3591) provides technical support for aftermarket bags.
- Replace the top bag with a pleated canister filter, which provides at least four times the media surface over a cloth bag.For details, check with your original manufacturer. Donaldson Company (airfilterusa.com, 800-667-8563) is one online source.

A system for your shop

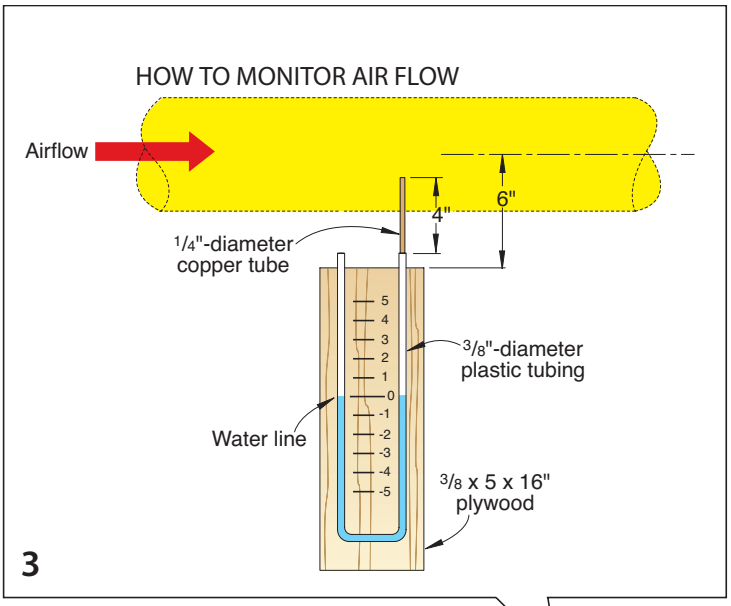
There's not one perfect system for every shop, but Peter's design looks something like **Drawing 4**.

Whatever choice you make for a dust collector, Peter urges you to keep it running in top form. To check his shop system's efficiency, he spent less than $5 in a U-tube manometer assembled from plastic and copper tubing

and colored water. This device, shown in Drawing 3, measures the static pressure required to push air through the filter.

On his system, Peter knows that if the pressure jumps by +1.5", it's time to clean his filter. For best results, Peter recommends that you install the manometer between the fan and the filter, as shown in Drawing 4. "You can even install this on your two-bag system. Poke a hole in the flex hose right before the bags. You'll see an amazing improvement if you monitor this."

You also can buy an 8" flex U-tube manometer for about $20 (dwyer-inst.com).



Understand fan curves

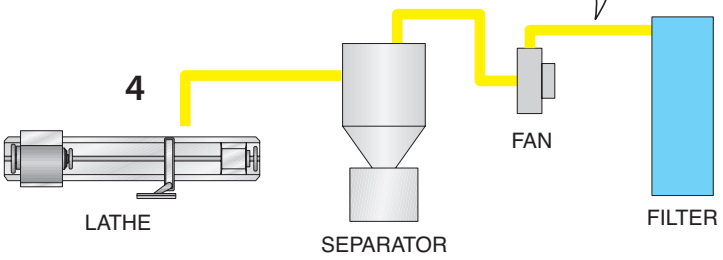
Okay, this is getting a little technical. But your lungs will love you if you just stick with this.

If you've gone to the trouble of checking your systems and efficiency, you'd better at least have a pedestrian knowledge of a fan curve. When adding a manometer to check on your system, the fan curve, as shown in Drawing 5, takes on new meaning.

In Peter's shop, he knows that with 8" SP (static pressure), he's getting about 880 cfm in his shop. See how an additional 1" of static pressure (resistance from clogged filters) drops his system from 880 cfm (blue line) to down to 600 cfm (red line). Result: much less suction to grab up all that sanding dust.

You may have noticed that your shop-vacuum barrel doesn't have to be full to lose its efficiency. The same story is being repeated in shops all across the country.

Be sure you know the true capacity of the system you're considering installing. Some companies advertise a fan of 1,200 cfm or greater. Sounds impressive, right? But add your duct work, as Drawing 5 shows, and the cfm drops dramatically.



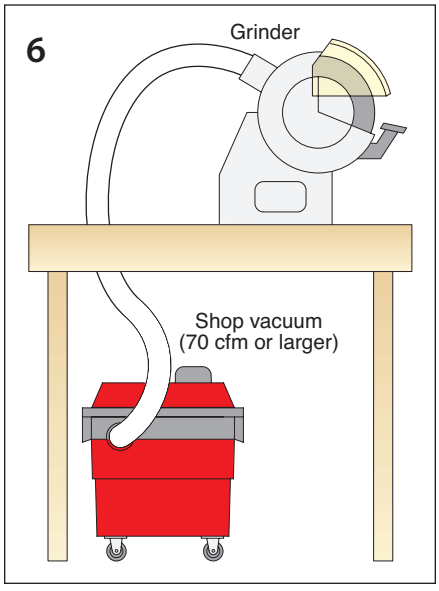
Separate grinder system

Don't forget to connect your grinder to a separate dust collection system. Because grinding involves sparks, you don't want this machine to share the same lines as your wood dust system.

Peter recommends a shop vacuum (at least 70 cfm) connected to your grinder dust port, as shown in Drawing 6.

"You can easily set up your collector so it automatically turns on every time you switch on the grinder," Peter advises. "It's real easy to switch the hose from one side of the grinder to the other.

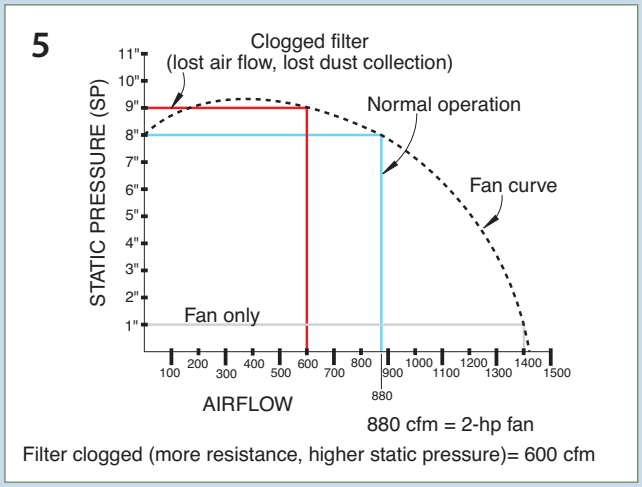
"Aluminum oxide and ceramic dust from grinder wheels are really nasty stuff. You're especially throwing off a lot of dust when you dress your grinding wheel."



A simple dust collection system at your grinder will trap aluminum oxide and other harmful dust from your wheels.

Illustrations: Roxanne LeMoine

Dust terminology



Okay. You've decided to make the investment in your respiratory system by reducing your sawdust. Now what?

Your dust collector fan creates the criteria that follow. If your fan can meet these requirements and collect dust, you have a good system.

If you're not a dust engineer, you could easily get sucked up in a dust storm of numbers and acronyms. Here are some key definitions:

Air Volume. The amount of air that is moved through the duct in a prescribed amount of time. Air volume is measured in cubic feet per minute, expressed as cfm. A roll-around shop vacuum may have a rating of 70 cfm; a complete system for a home shop (with blast gates, hoods, and ductwork) should be in the range of 600 to 800 cfm.

Static Pressure (SP). Moving air through a pipe, cyclone, or filter involves resistance. Stick your hand out of the car window and drive down the road at 5 mph—that's static pressure you feel. When the resistance from each of your machines is added together, the total is the amount of static pressure the fan needs to produce.

The above are all the things created by the fan and these are the necessary requirements your fan should overcome to perform as a reliable dust collection system.

Want to learn more?

Here's a website you can learn more about dust collection: allwoodwork.com/article/woodwork/gettingtoughondust.htm

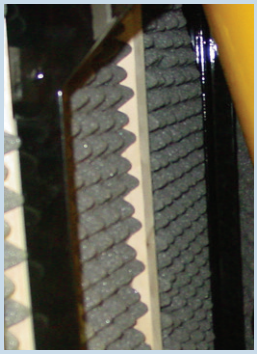
Control noise

Woodturners who do battle with dust wrestle another nemesis: irritating noise from the collector. The noise comes from the exhaust side of the fan; the higher the velocity, the greater the noise.

Many dust collectors now include a silencer or have silencer accessories (something like a muffler on an auto).

To the turners who use "too much noise" as a reason to avoid installing or running a dust collector in the shop, you need a better plan.

One strategy is to locate the collector beyond the shop (either outside or in an adjoining room). Morton Kasdan, a member of the Louisville Woodworkers Association, chose to locate his 3-hp cyclone collector in the center of his shop, which reduced the length of his duct runs.



Mortie dampened the noise in his shop, a converted three-car garage, by constructing a 3×2' closet framed by 2×4s and covered with 3/4"-thick plywood. (The top sections surrounding the external filters are larger.) Each side is lined with insulation panels, as shown at right. A hinged door makes it easy to empty the dust barrel; he can easily remove four clamps on one side for filter maintenance.

Mortie also added an insulated top over the closet that has 4"- to 6"-wide slots for air exchange. Perforated hardboard over the plywood panels expands his tool hanging storage.

Although the center location in his shop reduced the length of duct lines, Mortie lamented that "If I had it to do over, I would put the collector in the corner. I could control the noise better there. Regardless, the insulation has reduced the noise level significantly."

Your First Bowl Gouge

Options abound but it's best to start with the basics

For a beginner, buying turning tools can be a daunting task. Do you choose high-carbon steel, high-speed steel (HSS), or powdered metallurgy? What about cryogenically treated tools? Out of the confusion of tools available, which one do you really need? Sometimes it depends on what you turn, but even then, every turner seems to have a different opinion.

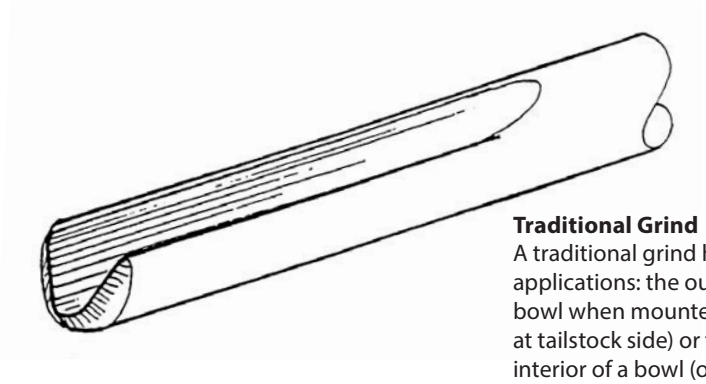
Before making a recommendation, I asked turners from beginner to professional what they own and what they would recommend for a beginner. Almost all recommended a 3/8" or 1/2" bowl gouge.

It's important to note that English gouges are designated by flute width while American gouges measure the diameter of the shaft. A 1/2" American gouge is about the same as a 3/8" English tool, so it's possible some turners were actually recommending the same tool.

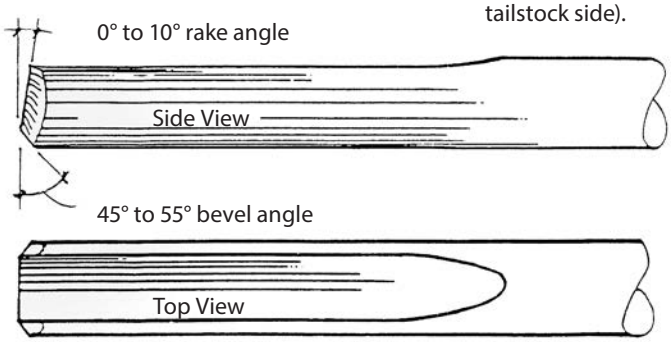
What steel?

Because high-carbon steel doesn't hold an edge and carbide is too hard to sharpen, most professionals favor high-speed steel and powdered-metallurgy tools.

You won't find new gouges manufactured from high-carbon steel or carbide. You'll choose between standard HSS (most are M2) and high-wear steels (often in powdered metal) like 2030, 2060, A11, and V15. Although cryogenically treated tools offer an advantage in edge holding, they are expensive for a beginner.



Traditional Grind
A traditional grind has some sound applications: the outside of a face grain bowl when mounted backward (base is at tailstock side) or for opening the interior of a bowl (opening is now facing tailstock side).



Illustrations: Angelo Iafrate and Roxanne LeMoine

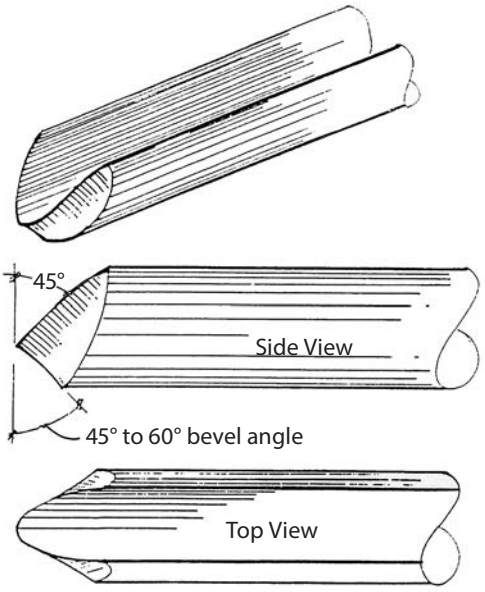
This 3/8" bowl gouge has a fingernail grind.

The bowl gouge will become the most versatile tool in your toolbox. With a properly ground bowl gouge you can rough-turn a bowl, form the outside and hollow the interior, and shear-scrape it to a smooth finish. The gouge is also fine for roughing end-grain boxes and hollowing vases. (It tends to scrape rather than cut end grain.)

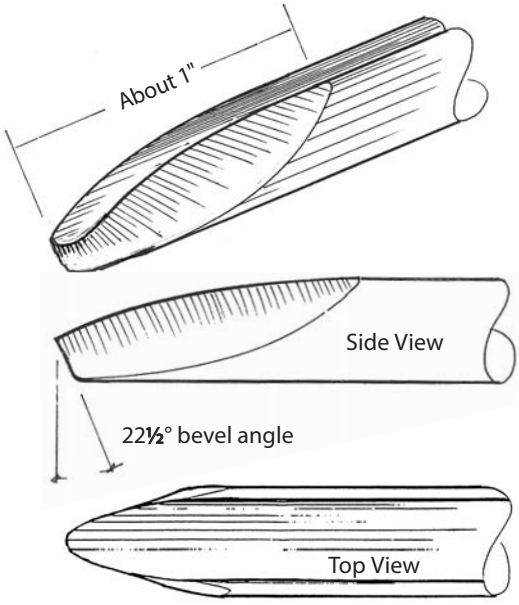
Some turners prefer a V-shaped flute, some a U-shaped flute, while others prefer the superflute, a shape somewhere between a V and a U. I have all three types at my lathe and find only minor advantages of one over the others. For a beginner, proper sharpening is more important than flute shape.

What profile?

Bowl gouges are available with tips ground to the manufacturer's standard profile or to a special profile developed by any of several well-known professional turners. The tip profile most often recommended for a beginner is the transition or fingernail grind. After experience (50-plus bowls), you may want to try



Transition or Fingernail Grind
Many turning instructors recommend the transition (fingernail) grind to new turners. You work the outside of a face-grain bowl regardless of the orientation. The ground sides allow limited shear-scraping.



Irish Grind
Experienced turners may prefer the more complicated Irish grind. It's a good tool for roughing bowls, detailing (with the elliptical front), shear-scraping, and smoothing the transition from sides to bottom.

the Irish (also known as the Celtic or Ellsworth) grind.

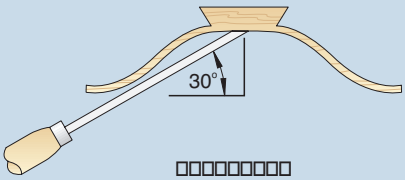
Using the Oneway Wolverine Sharpening System with the Vari-Grind Jig is an easy way to form a similar shape. Fundamentals of Sharpening, an AAW video, has excellent instructions on three techniques for sharpening a bowl gouge, making it easy to choose a method that works best for you. (For details, see woodturner.org/products.) The angles shown are typical ranges.

I'm confident that a ⅜" or ½" HSS or powdered-metal bowl gouge with a transition grind will get any beginning turner started on the road to enjoying bowl turning.

John Lucas *is* Shop Tips *editor for* American Woodturner *and a frequent demonstrator at regional and national AAW symposiums around the country.*

Allan Batty on angles of bowl gouges

What determines the grinding angle for bowl gouges is the type of bowl you are going to be making," writes Allan Batty in *Woodturning Notes*, an information- packed booklet available from Crafts Supplies (woodturnerscatalog.com)



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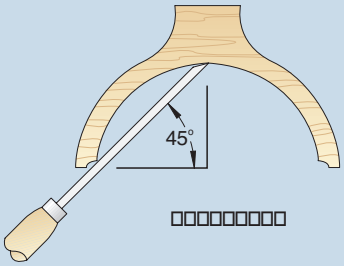
Drawing 1: "This is a shallow type of bowl. We have no restrictions placed on the gouge by the wall of the bowl. Therefore, none is placed on the angle of the tool."



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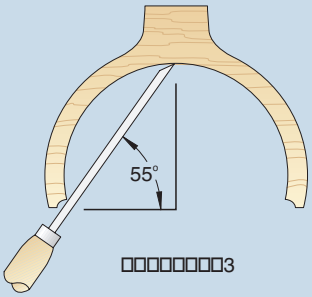
Drawing 2: "With this bowl, the wall restricts the gouge movement. As the depth does not exceed the radius, an angle of 45 degrees would be ideal to maintain bevel contact throughout the cut."



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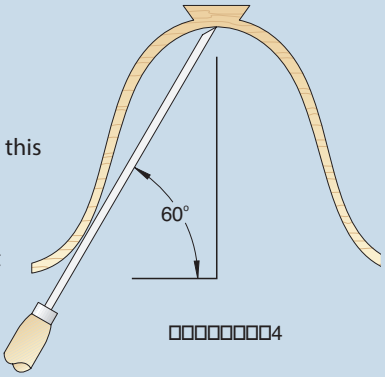
Drawing 3: "Here the restriction becomes greater as the depth has now exceeded the radius, which in turn, would require a shorter bevel angle of approximately 55 degrees. This would allow the bevel to contact right to the bottom of the bowl."

Drawing 4: "Now the depth has increased even further, which requires an even shorter angle (in this case approximately 60–65 degrees) to allow successful bevel contact."

"You can see that the determining factor is what type of bowl you want to make. An angle of between 45 and 55 degrees would be a good working compromise."



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Sharpening Jigs

Be sharp and stay safe when using these handy devices

As the use of sharpening jigs increases, so, too, do the instances of sharpening accidents. Injuries that result from fragmented grinding wheels and tools and holders that have slipped have sent woodturners to the hospital with serious injuries to hands and/or eyes.

Sharpening jigs were developed so that we could quickly and repeatedly produce a tool shape, bevel, and edge. When using these jigs, however, woodworkers need to be aware of some potential dangers. Tools can slide off the face of the grinding wheels and wedge between the wheel and the frame of the grinder; the arms of sharpening jigs can slip outward away from the wheel, causing the tip of the tool to move down the surface of the grinding wheel until the tool grabs at the wheel's equator and instantly wedges itself, fracturing the wheel and potentially injuring the operator's hand; tools can slip forward in the tool holder itself causing similar problems.

While mechanical failure of sharpening jigs contributes to some injuries, human error is usually the cause. Here's why:

- The person sharpening the tool is distracted and the tool no longer rides on the wheel. A quick turn of a person's head can easily cause the movement of a tool off a 1"-wide grinding wheel, jamming it between the wheel and the body of the grinder.
- An improper handhold on the jig can cause fingers to be driven into the still-running grinding wheel.
- Too much pressure is applied to the tool causing mechanical slippage of the jig's arm.
- Improper grinding-jig geometry is set, placing the tip of the tool too close to the maximum diameter of the wheel (the equator).
- The process of sharpening tools is hurried.
- Small-diameter tools are improperly placed in jigs not meant to handle their smaller size.

Proper use of grinding jigs

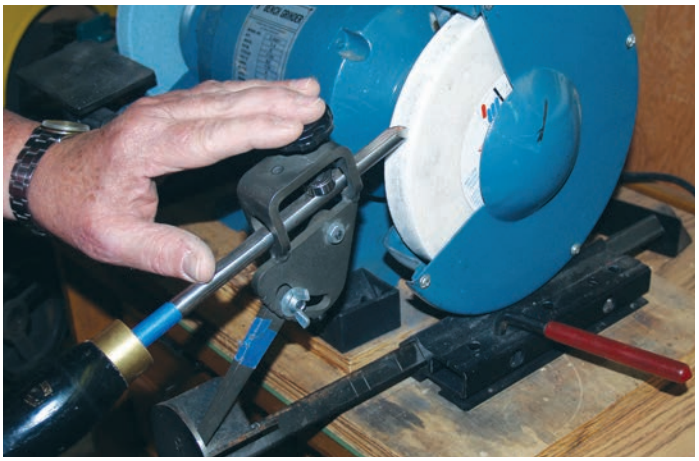
- Firmly lock the jig's extension arm and recheck it by pushing or pulling on it.
- Establish a more acute bevel angle on your turning tool. Placing the tool high on the sharpening wheel's surface reduces the possibility of an accident.
- Reduce the amount of downward pressure applied during sharpening; this will save tool steel and reduce heat buildup.

Wear safety gear

A faceshield or safety glasses should be worn while at the sharpening station. Eye injury is possible while sharpening as a result of flying

Using a simple shopmade template to set up your sharpening jig for repeatable distances saves time and tool wear.

Wrong way! If the sharpening jig slips, fingers will contact the rotating wheel before the jig does.



A safer way to hold the jig is on the top. If a slip occurs, the hand is protected.

Potential danger: Using a long fixture arm and a blunt sharpening angle brings the tip of the tool too close to the wheel's equator. If the arm of the jig slips or too much pressure is exerted, it could cause the tool to jam against the wheel.

debris. When dressing a wheel for cleaning or reshaping, wear a dust mask. The aluminum oxide dust from a grinding wheel is potentially damaging to lungs.

Proper hold

When holding the sharpening jig, never place your hand between the jig and the grinding wheel. Place one hand on the handle of the tool and the other on top of the jig. Accidents occur when the hand hits the rotating wheel during a slippage.

Light touch

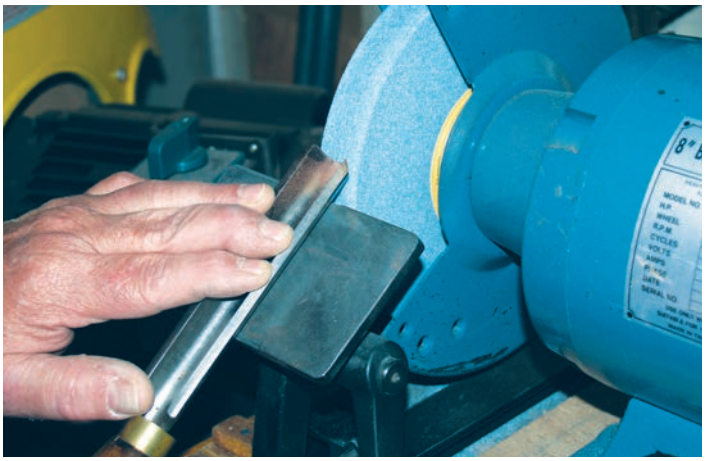
Sharpening should be done with a light touch; this reduces the amount of metal being removed and the heat buildup during the sharpening. A light touch also allows the operator to react quickly when a slippage occurs, perhaps saving a finger.

New sharpening jigs

Until recently, most sharpening jigs managed the sharpening geometry well, but still allowed for uncontrolled side movements that contributed to most accidents. Currently two manufactures, Sharp Fast and Oneway, have introduced jigs that eliminate the accidental sideways movement while maintaining the proper sharpening geometry. As a teacher of woodturning at both high school and adult levels, I would not be without such a jig!

***Jim Rodgers**, author of* A Lesson Plan for Woodturning *and past President of the Bay Area Woodturners Club, is the Director of turning programs for Mt. Diablo Unified School District. Visit Jim at www.jlrodgers.com.*

Better: Create a more acute bevel angle on your tool, which will place it higher up on the wheel in a safer position when sharpening.



Consider learning how to hand sharpen turning tools. This allows you to place a toolrest close to the grinding wheel, eliminating many potential dangers.

Safe woodturning is fun woodturning.

Safe, effective use of a wood lathe requires study and knowledge of procedures. To avoid injury and make your turning experience as satisfying as possible, the AAW has prepared this booklet to help you understand and use safe practices.

These standards will help you gain awareness of the many facets of woodturning safety and what to be on the lookout for as you gain experience.

We have divided this booklet into the major areas of woodturning safety. Be sure to review and understand ALL aspects of these guidelines before you begin to turn.

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Photos on front and back cover by Shawn Spence.