

Safety Guidebook for Woodturners



AAW | AMERICAN ASSOCIATION
OF WOODTURNERS

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.

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Edited by: John Ellis, Chair, AAW Safety Committee

Please work safely, ALWAYS!

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.

Please work safely, ALWAYS!

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.

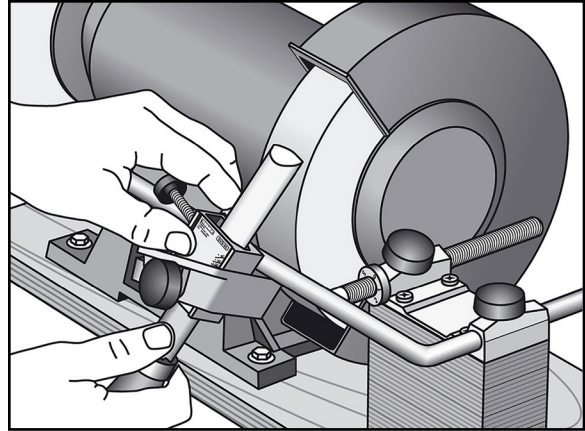
The platform of the grinder must be kept clean and free of nicks or other surface defects that could impede smooth movement of tools while grinding. Frequently clean the platform surface with alcohol or mineral spirits and apply a coat of paste wax to the surface and buff. (Treatment is similar to lathe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

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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.

Please work safely, ALWAYS!

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 IS FUN TURNING.

An accident at the lathe can occur with blinding suddenness. Respiratory and health problems can develop over time. Take appropriate precautions when you turn. Use face shields, safety glasses, and dust masks. Follow all manufacturers' safety guidelines. For more about woodturning safety, visit AAW's website at **woodturner.org**.

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:

$$\text{Maximum Speed} = D \times \text{RPM} = 6,000 \text{ to } 9,000 \text{ (where D = diameter in inches)}$$

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"

Please work safely, ALWAYS!

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 _____.

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LEARN. CREATE. CONNECT.

Stay plugged in to the worldwide woodturning community.

A membership with the American Association of Woodturners (AAW) is more than just a subscription to the *American Woodturner* journal. AAW is the world's leading resource for woodturning information, inspiration, and instruction. In addition to the journal, AAW members have access to publications including Woodturning FUNDamentals, Safety for Woodturners, mentoring publications and more, as well as a variety of services, website tools, grant opportunities, and specialty programming. A membership with the AAW will help you **LEARN, CREATE, CONNECT**, and stay plugged in to the worldwide woodturning community.



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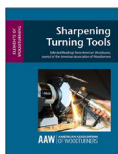
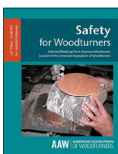
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