WOODTURNING THE RIGHT WAY

How to Woodturining Properly

Woodturning the Right Way

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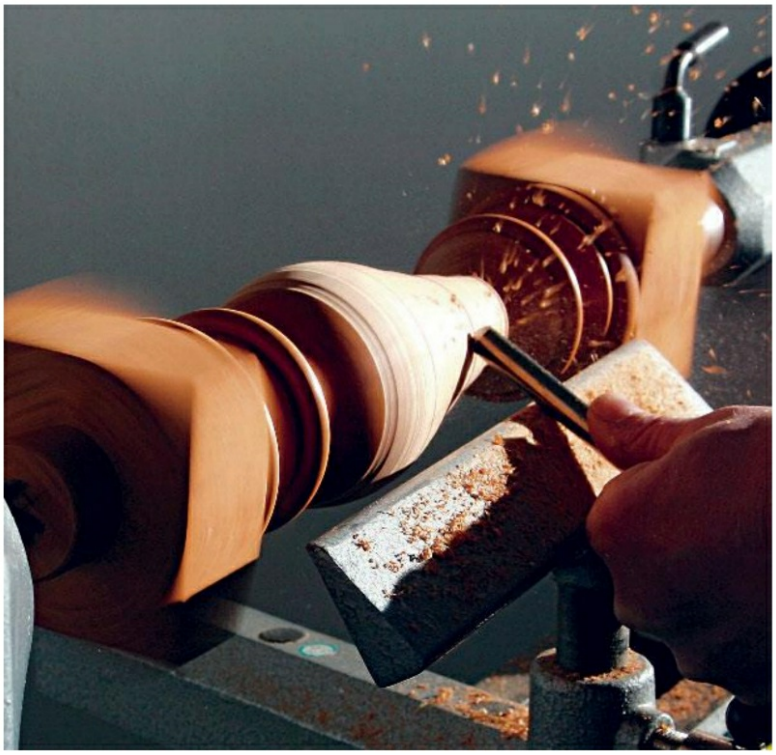
DEDICATION

Contents

Woodturning technique

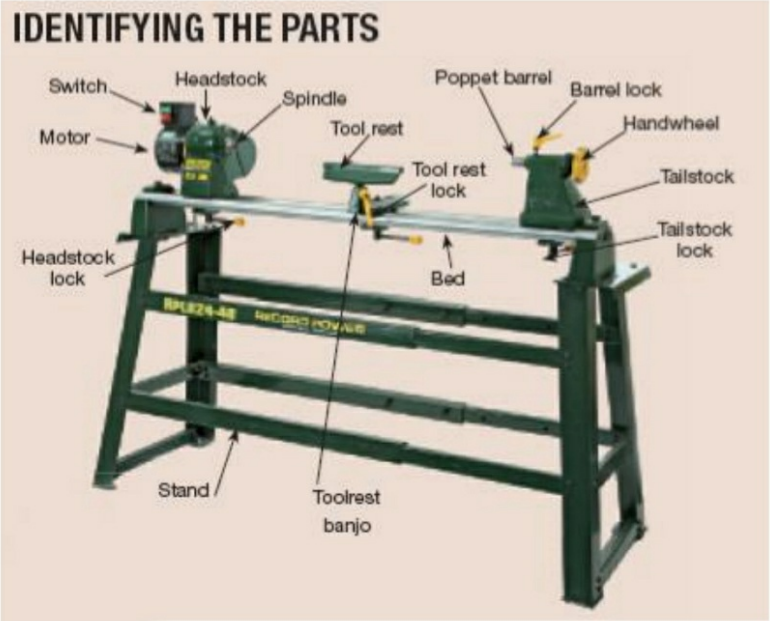


It's a bit obvious, but the fi rst thing a woodturner needs is a lathe. It's actually the world's oldest 'power tool' – see the panel (left) for a bit of history. As you begin to investigate what's available, you'll soon discover that there's a bewildering choice of models, with very different specifi cations and prices, and it's very easy to become confused about exactly what you require. If this is your situation and you need some help, then this feature highlights the main factors you

need to consider before you buy.

The lathe today

Woodturning has progressed enormously in recent years and is now no longer just a means of producing functional items, but is fast approaching the status of an art form. To fuel this massive increase in popularity and demand, many woodworking machinery manufacturers have hurriedly added lathes to their range, but a good machine requires a number of essential features that are often overlooked in the rush to get new equipment onto the market.



Cheap and cheerful

There are lots of very cheap lathes on the market that all look the same and appear to give you a lot for your money, photo 1. These machines are very much entry-level models, being suffi cient to get you started, but if you progress much beyond very basic work you will soon fi nd them very limited. Some even come with a stand and incorporate variable speed, but there is a defi nite correlation here between the price you pay and the quality you get.

Weight is good

As a general rule, the heavier and more substantial the machine, the

better. Vibration is the woodturner's worst enemy, particularly if the workpiece is long or out of balance, and there is nothing to beat sheer weight to minimise this vibration.

For this reason, it's better to buy a lathe that is cast rather than fabricated, but this inevitably often involves greater cost. However, do remember that unlike a lot of other machines, you will often spend hours working at the lathe. Consequently it needs to be as smooth and quiet in operation as possible, so always think carefully about the quality and buy the best you can afford.

Photo 1. Cheap lathes appear to give you a lot for your money

Photo 2. You need a distance between centres of at least 30in…

Photo 3. …and a swing of at least 9in between spindle and bed

Bed and swing

When you are buying a lathe, there are two capacities you need to consider. The distance between centres determines the maximum length of workpiece you can turn. For general work you will need at least 30in, and preferably 36in, photo 2. Incidentally, lathe dimensions are still mainly given in imperial measurements; for metric buffs the equivalents are 760 and 915mm. Longer beds are available, and whilst these may appear attractive, they can add to any vibration problems unless they're properly braced, so this is one instance where it is better not to buy too much capacity unless you have the specific need for it.

Another useful measurement of size is the 'swing' of the lathe, photo 3. This is the height of the main spindle above the bed and therefore determines the maximum diameter of work you can turn, unless the

head rotates round. For anything remotely approaching serious work, you need a swing of at least 9in (230mm), but in practice the bigger the better.

Bench or floor mounted?

A professional turner will probably need a heavy-duty floor-standing lathe, but for the home woodturning enthusiast a bench-mounted model will probably be quite sufficient, photo 4. These bolt down to any convenient work surface, but this must be really solid. The advantage of mounting it on your own workbench is that you can get the centre height just right – a serious consideration if you anticipate doing a lot of turning in the future.

Photo 4. A bench-mounted model like this will suit most woodturning beginners

Stands and storage

Several manufacturers provide leg-stands as an optional extra if you don't want to build a bench. These stands vary from a rather crude folded steel or tube arrangement, to a more rigid affair with provision for a tool shelf, photo 5. Bear in mind that the performance of your lathe depends on how well it is mounted, so buy a leg-stand only if it looks man enough for the job.

Photo 5. Some more rigid leg-stands include provision for a tool shelf

Photo 6. Under-bench storage helps to give a stand useful extra mass

A homemade wooden bench is often better at absorbing vibration than a crude metal stand, and it can change the whole operation of the lathe. If you are short of space in the workshop, you can build in a lot of storage for tools or raw materials under the lathe, which also

helps to give the structure a bit more mass, photo 6.

The lathe bed

The bed is made from either heavy metal bars or tubes, photo 7, but some machines still feature a flat cast bed. This may be quite crude on the cheaper machines, or a work of art on top-of the-range models, photo 8.

Whatever the construction, it must be strong enough to support both the tailstock and the tool-rest without any flexing, and allow free and easy movement of them both. It must also permit shavings to fall through unobstructed and should sit well clear of the bench, so you can slide the tools underneath it without banging the sharpened edges.

Photo 7. The lathe bed is made from heavy metal bars or tubes

Photo 8. More expensive beds are solid castings that are almost a work of art

Photo 9. Some imported models have what looks like a huge headstock

Photo 10. The bearings should be good quality heavy-duty ball races

Photo 11. Tapered bronze-sleeved bearings give greater support than ball races

Photo 12. The headstock may have the facility to swing round through 90°

Photo 13. Swinging the head off-centre keeps tool handles clear of the bed

Photo 14. You need an additional tool rest for turning big-diameter bowls

Photo 15. A headstock you can move along the bed is a big advantage

Photo 16. A spindle thread size of ¾in x 16 tpi is the industry standard

The headstock

This is the heart of the machine and needs to be really solid, and preferably cast. Fabricated headstocks are rarely heavy enough if you need to turn large or out-of-balance work. The headstock also needs to have a good spread between the bearings to ensure maximum rigidity of the spindle.

Some imported models have what looks like a huge headstock, , photo 9, but when you remove the belt cover the two spindle bearings are actually quite close together. A small bearing spread like this will causes problems with rigidity, particularly on large diameter work, so always look for a machine where there is plenty of distance between the bearings.

The bearings themselves should be good quality heavy-duty sealed

ball races, photo 10. Some machines have a tapered bronze sleeved bearing which gives much greater support than ball races, although it does require occasional adjustment. However, when set up correctly this arrangement supports the spindle over a much greater length and provides totally smooth and vibration-free running, photo 11.

A swinging head

The headstock may be permanently fixed in line with the bed, or it may have the facility to swing round so that the spindle ends up at right angles to the bed for bowl turning, photo 12.

I would rate this swinging head as an essential feature on a lathe; the real advantage is not only for bowl turning, but also for any turning where you have to work over the bed. Swinging the head just a few degrees off-centre allows you to work with the tool handles clear of the bed, photo 13. Although you can still work off the standard tool-rest with the head swung a little, for big diameter bowl turning you will need an additional bowl rest to maximize the capacity, photo 14.

If you are restricted with regards to space, many of the swinging head machines also allow you to move the headstock bodily along the bed,

which is a great advantage if the end of the machine has to be up against a wall, photo 15.

The spindle is key

The headstock spindle is threaded to take a range of screw-on accessories such as chucks, photo 16, so you need one with a standard thread or you'll be limited in the range of extras you can buy. On many smaller lathes, a thread size of ¾in x 16 tpi is the industry standard, which makes upgrading your machine less costly.

This which means that you can then take all your threaded accessories with you, rather than renewing them with the lathe when you upgrade it. This is an important point, as you will often have a substantial investment tied up in chucks and other accessories.

Morse tapers

It is essential that your lathe is also equipped with Morse tapers in both headstock and tailstock. This is a universal means of installing centres and a range of other tooling, photo 17, and does not restrict you to using only the original manufacturer's fittings.

There is a huge range of Morse taper kit on the market, but if you buy a lathe with only screw-on fittings you are very restricted as to what you can use. Morse tapers are commonly No 1 or No 2 on the smaller lathes; the bigger the number the thicker the taper. The tapers just push into the headstock and are then knocked out afterwards with a bar that runs through the main spindle.

If the spindle is solid, there needs to be a centre ejector which screws onto the spindle nose before you insert the taper, photo 18. Take great with these tapers and keep them clean and undamaged, or they will start spinning inside each other, which as well as causing them damage, will lead to inaccuracies when you are using fittings such as drill chucks.

Photo 17. Morse tapers are a universal means of installing centres

Photo 18. A solid spindle needs a centre ejector screwed onto the spindle nose

Photo 19. A three-or four-step pulley gives a speed range of 400-2000rpm

Photo 20. Some lathes use cone

pulleys to change the lathe speed

Photo 21. Modern electronic control offers infinite variation of speed

Photo 22. Memory functions can remember your favourite speed settings

Motor and drive

A small lathe will need a motor of at least 1/3hp, particularly if you envisage turning bowls, but bigger is better in this case. In order to give some speed variation, the motor is usually fitted with a three or four-step pulley and a matching one on the spindle, photo 19, to give a speed range from about 400 to 2000 rpm. This is achieved with a belt, which is moved around on the pulleys to select the required

speed. The traditional V belt has now virtually been replaced with the more efficient fl at poly V type, which gives a smoother, vibration free drive as it has no lumpy joint.

Some lathes achieve the speed variation in other ways. This may be mechanical, where a lever operates two cone pulleys, so changing their diameter and therefore the speed, photo 20. This system does work, but it is prone to wear belts very quickly and is rather noisy. Also, you can only change the speed whilst the lathe is running. So if you finished the last job at top speed and now want bottom, you firstly have to switch the lathe on and reduce the speed before you can mount the work, all of which is a bit fiddly and time consuming.

Electronic controls

The ultimate for speed changing is an electrical speed control, which gives you infinite variation of speed at the turn of a knob. This is usually reserved for the top-of-the- range lathes, but in the past electronic speed variation has suffered from loss of torque at low speeds. Fortunately modern electronic technology has largely overcome this problem, usually by operating a three-phase motor through an inverter off a single phase supply, photo 21.

State-of-the-art electronic speed controls have memory functions that can remember a selection of favourite speeds. They can also sense incidents such as dig-ins and then instantly shut down the power, photo 22.

Photo 23. A magnetic switchbox can be fixed wherever you're working

Photo 24. The tailstock barrel needs plenty of travel for drilling work…

Photo 25. …and should be drilled through to allow for long hole boring

Photo 26. A cam lock on the tool rest is easily accessible from the front

Photo 27. Tool-rests are available in a range of different lengths

Easy-reach switchgear

Whatever your motor type, make sure that the switchgear is easily accessible and doesn't get hidden by large workpieces. I prefer to have the switch (or at least a separate 'off ' button) at knee height for emergency situations when you have both hands full. Some machines have a magnetic switch-box, photo 23, which allows you to move it around at will depending where you are working.

Reverse gear

Motors with a reverse facility are a valuable aid for sanding, and are quite safe to use on between-centres work. However, if you engage reverse with a piece of faceplate work, there is always the possibility that it will unscrew itself, so lathes with reverse should feature a faceplate locking system.

The tailstock

This needs to be as substantial as the rest of the lathe, as it has to provide fi rm support for between-centres work. Make sure that it slides freely and locks firmly onto the bed. The tailstock barrel is moved backwards and forwards with the hand-wheel and needs plenty of travel for drilling work, photo 24. It should be bored with a Morse taper to match the headstock, and should also be drilled right through to allow for easy removal of the tailstock centres and for long hole boring, photo 25.

Tool-rest and slide

The tool-rest assembly is another vital part of the lathe, the main requirement being that it is quickly and easily adjustable. The actual locking mechanism varies from machine to machine; some use a simple clamp and lever under the bed, whilst others use a cam type of

lock, photo 26, which is easier to use as it is accessed from the front of the lathe. Always check this point before you buy.

The tool-rest itself needs some vertical height adjustment and should lock into the holder with a simple handle that works effectively; there must be no movement possible once it's locked. For general use the rest needs to be about 10in (300mm) long, and made of heavy cast construction so that there's no vibration when you are working at the end of it.

Alternative length rests are available, photo 27. You will probably need a shorter one at some stage. For very long work there is a rest with two stems, but this requires an additional tool-rest holder.

Look out for part 2

where Alan introduces the basic woodturning tool kit, and explains how to separate the wheat from the chaff

Making a choice

So now you know all about the lathe, how do you choose one to suit your needs?

Firstly, consider the type of turning you will be doing. If you will mostly be turning spindles, then there's perhaps no need for a swinging head model, but rigidity of the bed and good between-centres capacity are important features.

On the other hand, if you think your main interest will be bowl turning, a swiveling head is vital but between-centres capacity is less important. You'll also need plenty of motor power for big-diameter bowls.

If you want to do a bit of everything, try to decide on the biggest diameter you want to turn and choose a lathe accordingly.

Think also about how often you will use the machine. If you anticipate being an occasional user making a few simple furniture parts, then a basic model is all you'll need. But if you think you will spend a lot of time at the lathe as your skills and ambitions grow, then you will need the extra power and weight of a larger machine.

As you go further up the range you will find this extra power and solidity allows you to turn more quickly and confidently. You can take deeper and more ambitious cuts, and the ease of use of features such as electronic variable speed control make turning more intuitive and enjoyable.

Above all, bear in mind that woodturning is an addictive hobby, so try to buy in as much spare capacity as you can afford now to save expensive upgrades later on.

Beginners Guide to Woodturning

Are you looking to get into Woodturning? Then you've come to the right place. Follow these five steps and you'll be well on your way.

1. Make some friends with experience.

The best advice I can give to everybody is join the local wood turning club or association, there you will be able to get some of the best information about all the perspective's of wood turning.

Meeting people whom have the same interest as yourself, will encourage you and start you in the right direction.

Many of the members have had years of practice and each will have

there own preferred method of turning, favorite lathe, and tools.

Listen closely to any advice you receive especially concerning the safety aspect.

Of course there is always the local library for books, and the internet where you can contact Wood Turners from all over the world.

Many professional wood turners have produced exceptional video's of themselves turning everything from hollow forms to box's and pens.

2. Get yourself some wood.

To start with go to your local timber merchant or carpenters shop and purchase all the scrap wood of at least 2" x 2" x 6" and larger.

This will be used to practice on, it doesn't matter if it hard or soft wood as the more types you initially use the better.

The reason buying wood is recommended is that the timber will be dried and of reasonable quality, which makes for better turning material.

3. Get yourself some tools.

Turning is an art form, just as painting, and music, both of which have to be practiced daily.

When you first start to turn I would advise you to purchase the following tools and limit yourself to this basic set.

For Bowl Turning:

1" skew chisel.

1/2" super flute gouge.

3/4" or 1" roughing gouge

3/8" bowl gouge

1" or 3/4" square end scraper.(Heavy)

Parting tool

For Spindle Turning:

1/2" skew chisel

Three spindle gouges 1/4" 3/8" 1/2"

3/4" roughing gouge

3/8" beading chisel

Parting tool

All of the above items should be made of High Speed Steel.

Sharpening Devices

Dry Grinders

This is an essential piece of shop equipment especially for the wood turner, this is probably the most affordable piece of machinery that you will buy, costing $40 to $100.

I prefer a 6" x 1" carborundum stone, also the grinder should be slow running.

As there is a risk of burning the tool when running at hi-speed, and if you are not very careful it is possible to remove too much steel, and end up with a misshapen tool.

However as time goes on and you become accustom to the speed of sharpening, so you will find that the lighter the touch the better the grind.

A small container of water should be available at all times to cool the tools before they become discolored and loose there hardness.

Wet stone grinder

Most wet stone grinders are slow very running approximately 70rpm. is the standard, but these stone are invariably soft and wear fast, needing frequent truing and reshaping.

The edge they produce is superior to the dry grinder, but the cost of the can be very high in comparison.

You can expect to pay anything from $140 to almost $400 for the best.

4. Get Yourself a Lathe.

There are so many lathes for sale these days, its hard to choose which one to buy.

There are many things to look out for when buying a lathe, a few of which I have listed here.

My first lathe was a cheap Chinese lathe which constantly needed repair, but it lasted long enough for me to earn enough money to buy a Myford, on which I completed some more adventurous items.

Size

Small If you have no real wish to turn large bowls or vase's, and your real interest lays in turning pens, small boxes and items of a small

delicate nature a machine with a bed of 16" or less would suffice, with a ¾ hp or less motor.

Regular If your interests lay in larger items 12" and larger bowls and table legs, hollow forms I would suggest a lathe of 36"+ bed length and a 1hp+ motor.

The smaller of this type of lathe can be bench mounted, however many have there own stands of steel/cast construction.

Large Some of these lathes have a huge 5hp motor and massive bearings to enable them to spin the largest of timbers.

Principally used for bowls and hollow form work, these lathes are the possessions of professional turners.

Weight and Construction

The weight of the machines affects not only the price, but also its operation.

Heavier machines have less vibration, and are more stable.

You may purchase a 500 lb lathe and think you might solve this problem, this is not so.

Weight is only an advantage when the machine is of top quality.

A good high quality fine grained cast iron casting is the start of a good lathe.

Bearings are of utmost importance not only because they have to support on object spinning at high speed, but also to help dampen vibration.

Any good lathe will have three or four heavy bearings in the headstock (business end).

All tightening handles should be cast or steel, as plastic will break eventually.

One thing which can cause you some dismay is buying your lathe and the finding out that you can not get a chuck to fit it.

This has happened to me and it can be extremely frustrating.

Check out the headstock shaft size to make sure you can get the extras you might require later on in your turning career.

Price

We would all like a high quality lathe but unless you have an unlimited bank account purchase the very best you can afford, even if you have to borrow from the bank.

A lathe is like a workshop: it's never big enough, or has the features you require. Many lathes enable you to add on after, but at a price.

Supplier

This is where the advice of the club members really shines, if they have had a bad experience with a supplier, you can be sure that you will too.

Many Supplier's give you thirty days to return an item which doesn't meet your satisfaction, others offer a years warranty.

Read the small print carefully several times, if you are unsure about anything ask before placing your order.

The country of manufacture is also of importance if parts are not available in your home country.

Also, beware of things made in China as many items are of poor quality.

Some lathes are made to order, so you can expect to wait as long as six months for your new machine to arrive.

Others can be purchased anywhere, and are readily available.

Delivery

This can really be a head ache, as some manufactures will send their equipment out and you'll take a day off from work to welcome your new lathe home, only to find out it's going to be delivered the next day… to the curbside!

There are so many stories about deliveries, I always think you get what you pay for.

Try to insist that your delivery is tracked every step of the way, and is fully covered by insurance.

Watch out for the little extra's for assisting you to carry the machine

into the garage, there are several levels of service supplied by most freight companies, make good use of them.

If the lathe is very heavy get some friends around that day to give you a hand, the more the merrier, as many hands make light work.

Final Location

Locating the right spot to plant your newly acquired lathe can sometimes be a nightmare.

If you have a workshop with plenty of natural light this can be of a great advantage.

Most of us are forced to the basement, garage or some other room.

Wherever your locate your lathe it must be inaccessible to children,

phones, and interruptions of any kind.

My family realized how dangerous it can be when a piece bark flew of a natural bowl missing my wife by inches.

It scared her and that was the best thing as she learned not to disturb Dad when he's hiding in the workshop.

The workshop must be well lit have an adequate power supply as blackouts, and searching for fuses/breakers are annoying interruption.

Removal of dust and shavings is easier if one doesn't have to pass through the house.

5. Start getting some practice in.

Now that you have all your equipment and some material, it's time to start getting in some practice.

Practice between centers, turning it round using the roughing gouge, and skew chisel to form a cylinder.

Practice on a few pieces until you feel comfortable with the tools and the finish.

Don't throw away the imperfect items, but analyze them and find your own mistake's.

A lot can be learned by self criticism, but not by self praise.

If you are at your wit's end and need help call on a member of the club, many give advice and lessons freely.

Search the local library or the internet for courses, as the mistakes you teach yourself are hard to correct.

We all have to start somewhere, and the best place is with the guidance of a good instructor.

Happy Turning!

Woodturning Terms Glossary

General Terms

Woodturning

The craft of using the lathe to produce objects from wood between centers.

Green Wood

Freshly cut logs or timber.

Usually used to rough out forms to allow them to dry and then return later.

Many times used to a final form and allowed to warp artistically. The term refers to wet logs.

Definitions of Forms Produced on the Lathe

Open Form

A vessel in which the lip of the form is continuously increasing in

diameter.

Bowl

An open form.

Closed Form

A vessel in which the lip of the form increases from the bottom then decreases at some point toward the top.

Hollow Form

A closed form with a small opening at the top.

Spindle

A linear turned piece with the grain running from end to end.

Definitions and Descriptions of Equipment

Lathe

A device that holds and turns wood while a tool is used to shape the wood.

Headstock

The assembly on the lathe that contains the driving mechanism for the lathe.

It is attached to the lathe bed and usually has a spindle for mounting faceplates and inserting spurs or centers.

Tailstock

It is an assembly that moves along the bed of the lathe and can be clamped at any desired position on the bed.

It contains a spindle that will hold dead centers or live centers and is generally but not exclusively used in spindle turning.

Faceplate

A metal or wood disk that mounts on the headstock spindle and woodstock is mounted to it with screws through the holes in the faceplate.

Chuck

Any device that holds wood in either jaws or wood is fitted into a cylinder of the chuck.

The chuck is mounted on the headstock spindle for working the wood.

Gouge

A tool that has a flute and produces a cutting rather than scraping action.

Roughing Gouge

A gouge with fairly thick walls that is used to rough out and round stock to cylindrical shape very fast.

The edges are not ground back and the angle around the whole edge is about 40 degrees.

By rolling the gouge you can use the whole edge.

Bowl Gouge

A gouge that has a medium to deep flute and is used to rough out and finish the insides of bowls.

Side-Ground Gouge

A gouge that has one or both of the sides ground back and can be used in a variety of positions to rough, smooth, sheer scrape, etc.

Spindle Gouge

A gouge that has a very shallow flute and is used to produce beads and coves primarily in spindle work (i.e. between centers).

Skew Chisel

Given the name because the cutting edge is at an angle to the side of the tool.

The cutting edge is usually ground to an angle of 70 degrees.

The length of the bevel is approximately twice the thickness of the steel.

Skews are used to make V cuts, beads, tapers and to smooth corners and cylindrical stock.

Parting Tool

Are used to make narrow recesses or grooves to a desired depth or to part a piece from the lathe.

A common type would be the diamond shape with the center being thicker than the outside edges to give the tool clearance and prevent friction.

Beading Tool

Usually made out of 3/8th inch square stock and having angles between 30 degrees and 45 degrees which is used to make beads and also can be used as a parting tool.

Scraper

Any tool that scrapes the wood off rather than cutting or shearing the wood.

A scraper will usually have a very blunt angle and a burr on the edge that does the actual scraping of the wood. It can be compared somewhat to a cabinet scraper.

Definitions of Methods and Techniques in Woodturning

Chucking

Mounting or holding a workpiece on some piece of equipment other than a faceplate.

Shear Scraping

A method of using a side-ground gouge or large scraper to smooth a form. Usually a green form.

Parting

Using a parting tool to remove a section of wood down to a certain diameter. A rough cut.

Reverse Chucking

The method of reversing a form on the lathe to turn away the waste at the bottom and finish off the piece.

Woodturning Lathe Speeds – Complete Guide

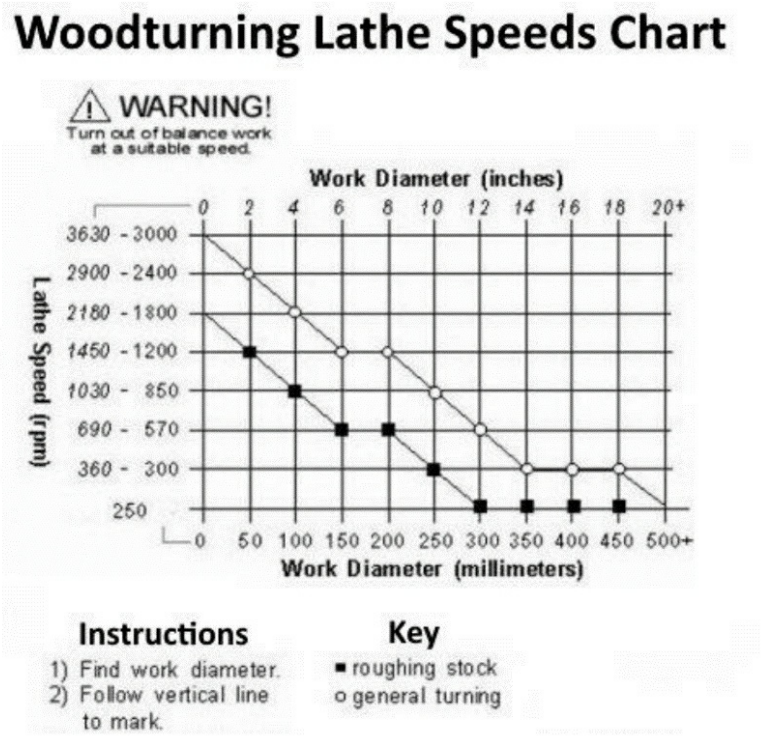
Inappropriate lathe speeds for woodturning, (read that to mean going too fast) is by far the largest cause of accidents.

It has been said that good judgment comes from experience, and that experience comes from making mistakes.

But mistakes hurt, and I would like you to gain some of my experience without experiencing the pain!

Woodturning Lathe Speed Chart

Before we get into the details and explanations, here is a basic chart showing approximate recommended speeds for turning work of different diameters.



Woodturning lathe speed chart

Note the warning for out-of-balance work.

Now let's get into the details…

Basic Factors of Turning Safety

There are basic safety factors in turning. Some of these factors are:

The size of the project being turned

The speed of the lathe

The size of the lathe

The method of holding the timber to the lathe

The balance of the timber

Proper tool handling

Proper safety equipment

If we use good judgment with all of these factors then we can turn safely.

What are Lathe Speeds?

For this article I want to start off by looking closely at "How fast are you going?", and the important considerations that go with speed.

First of all what does that question mean? How fast is the wood traveling?

There are two parts to this answer.

The first part of the answer is the RPM (revolutions per minute) that the lathe is running.

The second part of the answer is how large is the diameter of the turning.

Most lathes from the store have a range of about 580 to 2850 RPM.

Usually, there is a chart on the front of the lathe to tell you what RPM you will get from the different step pulley arrangements.

There are many situations where this speed range is way too high for safety.

An additional problem is that very often lathes have been modified with different size pulleys or variable speed motors.

Although it is possible to use different formulas to calculate the resulting RPM after these modifications, most people do not want to go through the math calculations.

(So I am not going to give you any math formulas. Instead I am going to give you something easier- a Tachometer!!!)

The Tachometer

For about six months I searched for an inexpensive tachometer to put on my lathe.

The only solution that I initially found was an expensive, ($220.) highly

accurate industrial tachometer from MSC.

This is permanently mounted on my lathe and gives very accurate readings. (It also looks kind of cute.)

After using the tachometer for a little while you know what your RPM is by the sound of your motor.

That means that I could turn my tachometer off most of the time or loan it to somebody in my club because I now have a good idea of what the RMP is just by listening to my lathe.

Recently I found an old Sears handheld tachometer that is pressed against the end of the spinning shaft.

This gives a direct readout while it is pressed into your morris taper.

Again with a little practice, you will learn what your RPM is by the sound of your lathe using the handheld tachometer as a reference.

In this way, one small inexpensive handheld tachometer could be used by your entire woodturning club.

Check with your machinist supply company to find this tachometer or a pawn shop to find a used one.

(Of course, not everyone in the club will need the tachometer. Some people do not take their lathes apart and put them back together again differently.)

The following are some general guidelines for RPM and size.

Guidelines of RPM versus Size

1. Small objects can tolerate higher RPM.

2. Large objects need lower RPM.

3. Out of balance objects need low RPM.

4. Thin vases need slower and slower RPM as they become thinner.

5. Soft, spalted, weak timber requires slower RPM.

6. Heavy-handed rough tool technique requires slower RPM.

7. Weak attachment of timber to the lathe requires slower RPM.

8. Small and lighter lathes require slower RPM.

It might be beneficial to spend a little bit of time in each category.

This might allow you to learn from my experience and not go through your own painful discovery process.

Small Objects Tolerate Higher RPM.

Small solid objects like pens or small boxes can tolerate very high speeds of about 1500-3000 RPM.

There are times when high RPM is desirable because your skew cuts better and cleaner at high speeds.

At high RPM you are almost always turning between centers. This adds a lot of stability and safety. A protective face shield is an absolute must.

There are times where you can work at high RPM for a while such as shaping the outside of a goblet, but they must drop to lower RPM while cutting the inside for the goblet.

Vary your speed when necessary!!!

Large Objects Need Lower RPM

Large objects need lower RPM for several reasons. The large piece weighs much more and will have a tendency to make your lathe vibrate.

It is necessary to reduce the speed of your lathe to below the vibration point. I

f the lowest speed of your lathe can not get below the vibration point then you must do something different before proceeding.

It is important to remember the larger the diameter, the higher the circumferential speed of the object at the same RPM.

In other words, the rim speed of a 1-inch diameter bowl that is spinning 1000 RPM is going 3,140 inches per minute. But the rim speed of a 12-inch bowl is 12 times faster, 37,680 inches per minute.

Obviously, the rim of the larger bowl is traveling faster and does not need as many RPM to make clean cuts with the proper tool.

Large heavy out of round objects must be turned between centers until they are round and in balance. It is very important when starting to

turn large objects to make sure the lathe is set to a low speed.

Many lathes from the factory do not have a low enough speed for a very out of balance object.

This last weekend I turned a large oak log that was out of balance. I had recently replaced my variable speed 2 hp motor with a 5 hp motor.

But I was tired of my low-speed RPM being 250 and dangerous for out of balance objects. I installed a jackshaft to reduce the speed from 250-1900 to a new range of 120-964 RPM. The 120 RPM made truing the out of balance log very safe.

I also had tremendous torque with speed reduction. The high in of the RPM may be too low for some applications.

Right now I am doing my high-speed RPM work on the Nova Comet Mini Lathe. (If you are willing and capable of taking your lathe apart there are many solutions to varying your speed.)

Out Of Balance Objects Need Low RPM

Large objects tend to be out of balance when you start turning them.

You might use your band saw or your chain saw to make the object a little bit more round.

The time you spend using your chain saw or band saw to make your block rounder will be well spent. (Unless you have a very heavy lathe, in which case the extra work may not be necessary.)

The initial turning on the lathe will be safer, smoother, and easier on you and your lathe. But the block will not be totally round or balanced.

Therefore be careful when you start. Following are some guidelines to follow when starting any out of round stock:

Out Of Round-Before Turning On The Lathe:

1. Make sure your lathe is set to it's lowest RPM.

2. Set the banjo at the proper height. This is an important safety feature. The banjo can keep the log from coming toward you if it gets free.

3. Place the tail-stock live center and make sure it is secure. Turning between centers adds a lot of safety.

4. Rotate the log to make sure that it rotates freely and does not hit the banjo.

5. Have the ON/Off switch close by so that you can turn off the lathe in a hurry.

6. Take your time to get the log round. Adjust the banjo often so that there is very little tool overhang.

4. Vases Need Slower RPM As They Become Thinner.

As bowls become thinner and thinner they also become weaker and weaker.

The spinning of the bowl creates a centripetal force that makes the bowl want to "explode" outward.

Let's use our above example of a 12-inch bowl and a 1-inch goblet, both traveling at 1000 RPM.

For this example, the wall thickness is 1/8 inch. The actual strength between the fibers of each object is the same.

However, since the rim of the 12-inch bowl is traveling 37,680 inches per minute whereas the rim of the goblet is traveling only 3,140 inches per minute, the rim of the 12-inch bowl has much more strain on it.

That little 1/8 inch thickness of wood has a lot of strain on it. The 12-inch bowl is much more likely to "explode" at this high RPM.

Following are some rules for turning large thin vases:

Rules For Large Thin Bowls

1. Reduce the RPM as the bowl becomes thinner.

2. Thin from the tailstock to the headstock. Once you move on closer to the headstock you can not go back to the tailstock area. This would make the bowl break at the thin area closer to the headstock.

3. Make controlled delicate cuts with your tool.

4. Position your tool rest as close to the cutting area to reduce chatter.

5. Be reasonable on how thin you want to make your bowl.

6. Reinforce the outside of very thin bowls with packing tape. This will help keep the bowls from flying apart.

7. Stop every few seconds to check for uniform thickness. It is no fun cutting through the bottom curve of a bowl (which is easy to do).

8. As always wear a face shield.

5. ON/Off Switch Must Be Close

If you are going to turn large or out of balance objects it is necessary to have the on/off switch close to you.

You do not want to travel across the dangerous area where the log might be thrown to get to the off switch. It is not very difficult to install a second switch that is very close to your work area.. "Even the best-laid plans of mice and men go astray."

Sooner or later you will be glad that you were able to turn your lathe off in a hurry.

6. Heavy Handed Rough Tool Technique Requires Slower RPM.

Rough cutting technique is hard on the timber, the lathe, the tool, and the operator.

Use small pieces of timber to practice on. Develop good cutting technique.

When possible get individual instruction. There are many excellent videos that teach good cutting technique.

As your cutting technique becomes better you will be able to do larger and larger bowls safely.

7. Weak Attachment Of Timber Requires Slower RPM.

To safely turn large or out of round timber it is necessary to have the timber securely attached to the lathe.

I have a Stronghold and a Super Nova Chuck and I use both all the time. They are terrific accessories for the lathe.

However, for large out of balance turning a proper faceplate is much safer.

Most faceplates come with four holes for the screws to go through.

This is grossly inadequate!!! In between each hole drill an additional evenly spaced hole.

This will give you 8 screw holes on the outside of the faceplate.

In addition, there should be a hole in the center of the faceplate to help

you center the faceplate on your work.

Use large #8 metal screws because they have deep fins on the threads to grab the wood well.

Make sure that your 9 screws go into the wood deep enough.

The bigger and more out of balance the wood is, the bigger and deeper the screws need to be.

8. Small And Lighter Lathes Require Slower RPM.

Small and lightweight lathes can not safely turn large and out of round timber.

If you are a beginner and have a small lathe this is fine. Practice on small turnings.

Your present lathe will be excellent for learning good technique. Spend time developing good technique. If you later decide that your lathe is too small you can always trade up.

I use both a small lathe and a large lathe. My Powermatic has been weighted down with concrete, steel, and sand to weigh about 1000 pounds.

It has been geared for low speed. My Nova Comet Mini late is about 60 pounds and I use it for small high speed turning.

Both lathes do an excellent job for what they are intended for.

To make sure that you remember the speed setting for the different pulley settings you might want to tape the speeds to the front of your lathe.

Conclusion

Turning can be a safe, and fun business or hobby. These safety

guidelines should become second nature to you.

If you do not know the RPM of your lathe consider getting or borrowing a tachometer so that you can get a "feel" for what your RPM is at the different settings of your lathe.

Safety is cheaper and more fun than hospital bills. Safe turning to you.