



Turning small things

Kurt Hertzog looks at the equipment and processes required for turning on a small scale

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I am often asked the question about lathe size by those new to woodturning. What size lathe should I buy? The answer of course depends on: what you intend to turn, not only now but into the future; how much space you have available; what is your budget; and more. The advice I usually give

is to buy the biggest lathe you can within the space and budget available. You can always turn small items on a big lathe but not vice versa. Those that start their turning lives with smaller items such as pens, bottle stoppers, lidded boxes and similar, almost always progress to larger items. In this issue, we'll focus on turning smaller items. For those who started with mid-sized or large turnings, we'll cover the key needs on various different-sized lathes and some of the important points you'll need to consider with small turnings. While you may not need a 660mm swing lathe to turn pens, you can certainly use this. The key to turning smaller work on a lathe is to have the ability to hold the work safely and accurately and present the appropriately-sized tools, close enough and with good support. Often, the ability to get a tool rest in close and of a size that fits well is the stumbling block on larger equipment. We'll cover a variety of workholding devices that will be helpful

but don't feel that you need bankrupt yourself at the woodturning supplier. Many workholding methods can be created in your own shop and sized specifically to your end goal. A review of the Workholding Series in *Woodturning* 235 to 250 may assist you: this series contains a wide variety of workholding fundamentals and techniques along with tips and tricks to help you solve your workholding problems.

Safety

Just because you may be turning things that aren't terribly large doesn't mean you can slack on safety. Your eye and breathing protection are still imperative as small debris and the sanding dust can be just as harmful as larger debris. You need to have your appropriate PPE in place regardless of the size of your turning. Complacency in the workshop is responsible for far more accidents and injuries than currently get reported and publicized.

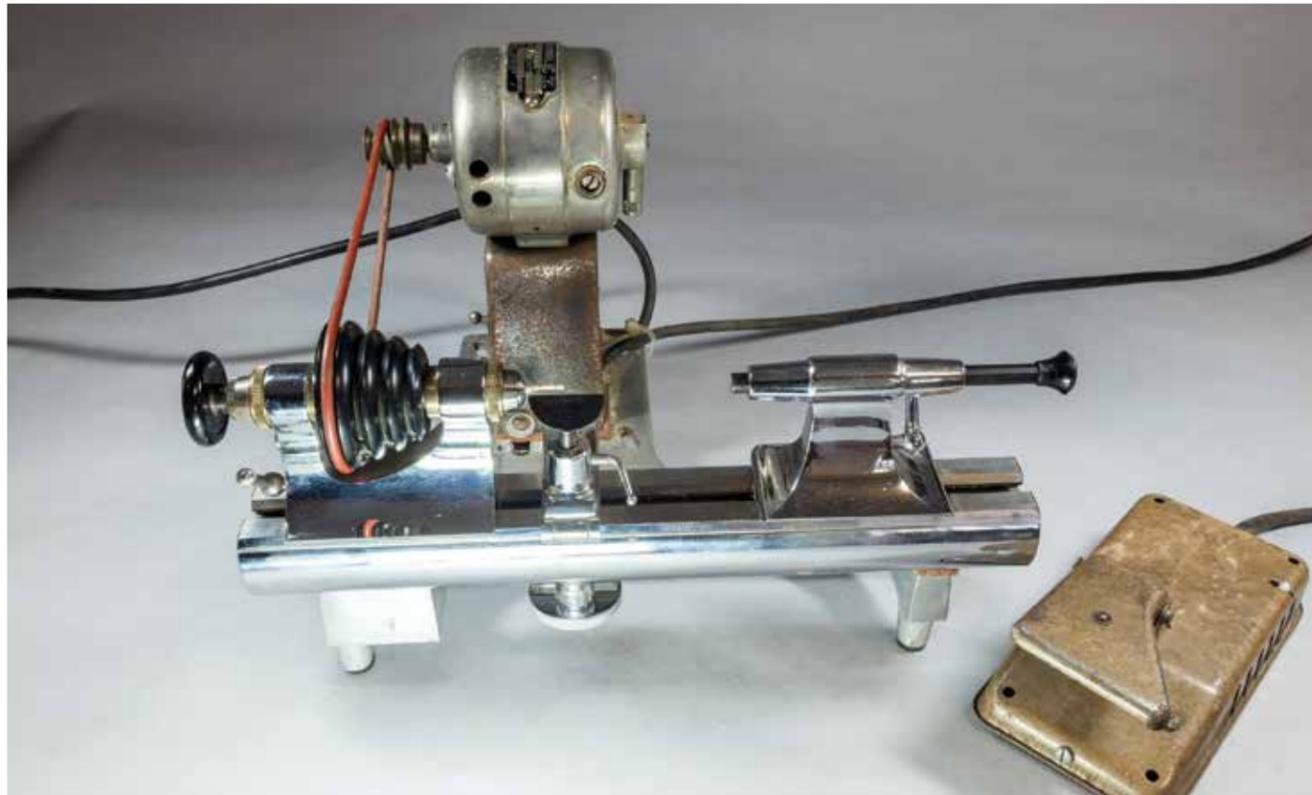
Lathes

Regardless of the size of lathe that you own, you can do smaller and miniature work provided that you can hold the material and the lathe runs true enough for the size of work you plan. Obviously, a 660mm swing might be overkill but it certainly will work. Whether you turn on a full-sized lathe or a jewellers lathe, running true is key as is the ability to get in close with a 'right' sized tool rest. You may not be using the tail centre for your projects. Many will be done as faceplate-type holding alone. If so, the alignment of the tailcenter with the headstock will not be a critical point for these turnings. You'll turn with respect to the headstock and all will be created on that axis of rotation.

If you do need to incorporate the tailcenter for your work, it is key that the headstock and tailstock alignment is as good as can be.

Any alignment errors can only aggravate your efforts for precision work. This simple alignment check, and adjustment if needed, is quickly and easily done and is important to perform regardless of what you are turning. Once done, it probably will never need to be done again, although checking on occasion is a wise idea. No special tools are needed. You can perform the alignment check with two spur centres that have a sharp point inserted. Be certain that the Morse tapers in both the headstock and tailstock are clean prior to inserting the drive centres in each. The centres need only be seated firmly by hand: no need to drive them into place with a lot of force. If they are seated in the clean taper, they'll work fine for this check. You can also use a couple of dead centres or a drive centre and tail centre

with a pin. Slide the tailstock forward until the tips of the two points just barely touch. Examine the alignment from the front and top along with the axis of both. If there is a mismatch, you can check your lathe for methods to correct for misalignment. Many have a set of bolts that mount the headstock to the lathe bed or ways. Depending on what type of correction is needed, loosen the bolts and shim the offending areas with tape, aluminum foil, playing card stock, or actual metal shim stock. This is a trial and error type of adjustment because once the bolts are tightened again, you may need to revisit the shimming operation. Repeat until you've achieved the best you can. This entire process is covered in more detail in *Woodturning* 254 if you'd like to find more information on the technique.



Lathes come from pretty big to pretty small: this fully functional variable speed jewellers lathe can be carried in one hand



Anything with a sharp point can be used to check headstock to tailstock alignment: take the time to check and adjust for error



Whether bolted from the top or bottom, nearly all headstock mounting holes have some room for minor alignment adjustment



When shimming is required for alignment, playing cards, tape, or a proper amount of folded aluminium foil will work well

Tools

If you usually turn 610mm diameter bowls, changing to turning bracelets may be a dramatic reduction in turning size for you. Your turning tool kit probably contains exactly what you need already. Of course 45mm roughing gouges aren't going to be useful if you begin doing lace bobbins. There are miniature tool sets available but I caution people to be very selective. Many of these sets aren't in the same league with our standard turning tools and are made

by vendors other than the usual makers. Their products are sometimes an idea of what we need rather than designed with experience-based input. Also, many of the sets that I've seen are very inexpensive due to poor material selection and finish. I am not for expense beyond what is appropriate but, for the most part unless you buy foolishly, you get what you pay for. If your regular tool kit has some smaller tools and they'll work as you need them, you are all set.

If you need smaller tools for your planned turning, you may need to adapt your own tools to suit. If you wind up getting into the incredibly small, you can start to adapt dental picks, sewing needles, and other purposed items to do your turning. Please be cautious when you use anything that wasn't expressly designed and built as a woodturning tool. Be certain that you aren't misusing something that can be a hazard to yourself or others.



Miniature turning tool sets are available but they require adaptation of most full sized grinding setups



There are smaller tools available from the usual woodturning channels but often are not standard stock with retailers



When turning small or miniature work, you can often press full sized tools into service with proper grinds



Miniature jewellers gravers or home built mini tools are needed to work on jewellers lathe sized turnings



I find that dental picks can be reshaped and ground to suit: they are available new and unused via ebay

Materials

One of the beauties of turning smaller items, especially miniature sized: you'll enjoy the luxury of not being concerned with material costs. If your end turning is going to be a goblet standing 2mm tall, do you care what the cost per pound or board foot is? Another advantage is that you can use materials that aren't available in bigger pieces. There are many materials that you can find in 25mm³ that regardless of cost, can't be found suitable for turning at 305mm³. When you think about the cost of the materials that wind up on the floor, barring the coring process,

turning an exotic wood bowl that is 305mm in diameter produces horrific waste while a 25mm bowl's waste almost doesn't require cleanup. Of course you can use virtually any species of wood but my recommendation is to branch out from the usual. Wood, even if it is particularly beautiful, doesn't have the same impact in a smaller size; smaller is relative of course. Moving to a 75mm bowl from your typical 610mm bowl really is downsizing. However a 75mm bowl will still show nicely figured wood well. Wood loses its beauty when you are turning a 12mm bowl.

Even the most stunning wood loses its marvel as you get smaller. Aside from wood, you can also choose plastics, bone, antler, precious metals, nuts, and more. Tagua nuts (*Phytelephas* spp.) work extremely well for miniature turnings. The troublesome void when used in a larger turning rarely presents a problem in smaller turnings. If you do decide to use wood, I'd recommend using species that are very dense. Small work does turn well from burl that is dense and will often show well depending on your finished size.



My favourites for small turnings are tagua nut, Corian, burls, blackwood (*Dalbergia melanoxylon*), and olivewood (*Olea* spp.). Bone and antler work well too.



Blackwood cuts nicely, will hold good detail, and can be sanded up to a point where no finish is needed.

Workholding

As mentioned above, smaller turning workholding lends itself to store bought items at a smaller scale. Virtually all of the full sized workholding devices, chucks, faceplates, and collets, can be purchased in a reduced size. These devices provide the same workholding advantages as the larger versions yet are more appropriately sized with lower mass and the ability to mount on smaller equipment. One of the cautions is to minimize the use of spindle adapters as much as possible. The higher quality adapters run very true but the further your workholding

device is located from the headstock spindle face, the more error that can be introduced. This is more noticable with mounting and remounting of the workholding devices but is good practice in general even with high quality adapters. The closer you work to the headstock, the better you'll be from a stability, strength, and accuracy standpoint. If you do require spindle size adapters, use the best you can find that provide the most true running operation. In addition to the standard mentality of workholding, don't overlook the parent material itself as the

workholding mechanism. You can secure the larger piece of your stock in any of the traditional manners and turn that stock to size. Depending on your planned result, you can size stock accordingly to minimize waste. This allows you to use the larger workholding devices for the smaller work on any lathe that the workholding device will fit. This large mass will sometimes be a bit of trouble on deceleration but this can be accommodated. Using the grub screw on chucks and some faceplates will keep the device securely threaded home when turning off the lathe.



Workholding chucks are available for the full-sized lathes through to jewellers lathes: be cautious of thread adapter runout



Inside collets are sometimes usable but outside collets are preferable. Collets provide for excellent holding and repositioning



Any sized chuck or collet can be used if you are willing to cut away and waste wood; I try to use mounts that hold near finished size

Helpful equipment

Good turning requires good lighting. Even with good lighting in your turning area, when turning items that are small, additional light is always helpful. Task lighting on goose neck stands allows you to get the light positioned exactly where needed. Standard shop lighting is usually insufficient and located too far away to adequately illuminate your work in process. Get as much light

as you can and get it in close. I find that magnifiers help as well. There are a host of companies that offer magnifying aids, whether they be mounted to your lathe and positioned as needed or worn on your head. The lathe-attached magnifiers work well and require little explanation. Mount them as needed provided you don't interfere with your work envelope or compromise safety.

The headwear magnifiers will require that you use the proper focal length. You'll need the eyepieces to be focused effectively from your normal head position when turning to the work in process. This will allow for normal turning stance with the aid of some magnification. Be certain that when using additional magnification that you still wear your PPE for eye protection.



You can never have too much light when turning small or miniatures: goose neck lamps allow for easy positioning



Magnifiers can be used: I favour a head-mounted one. Be certain you get the correct focal distance for ease of use

Turning and finishing process

There really isn't much in the process of turning smaller items that differs from the process of turning large items. If you are doing spindle work, you'll need to round your stock, shape and detail as needed, sand and finish, then part off. Being smaller and thinner, it will require a more delicate touch than usual. Flexing is a real issue to be dealt with to avoid chatter cutting. The usual good turning advice of sharp tools, high speed (being safer), and light touch is especially true. For faceplate-mounted work, you'll turn and reverse mount if needed. Jamb chucks, cut to fit, work very nicely for smaller turnings. The only big difference is the delicacy. Vacuum doesn't lend itself well because of the small cross-sectional areas under vacuum; there isn't sufficient gripping force available. Tape and hot melt often will be of much assistance to your mounting issues. You'll need to have light touch and do far less sanding than usual. Even with finer grits of abrasive, you will easily lose detail and dimension with sanding. Keep sanding to a minimum. If your turnings are small enough, abrasives can't even be brought to bear. Sharp tools and light touch will help you get a quality result and minimize the need for sanding. Depending on your base material, you may not need any finish. Miniatures aren't often subject to the same

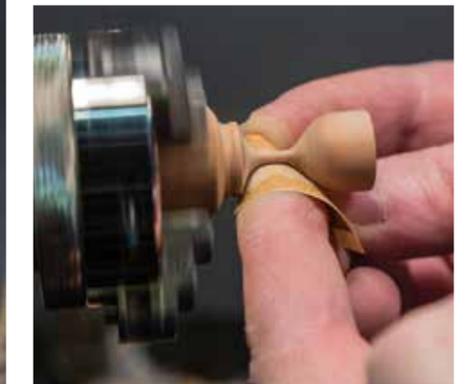
wear that large works endure. As such, minimal finishing is needed and is often just to punch things up a bit. With hard dense materials, usually a quick buff with Micro-Mesh products will bring up sufficient shine. Another issue with finishing done with added chemicals is the clogging of any fine detail. Spray or wipe-on finishes will tend to gather in the bottom of sharp corners or detail, taking away all of the crispness you took effort to create.



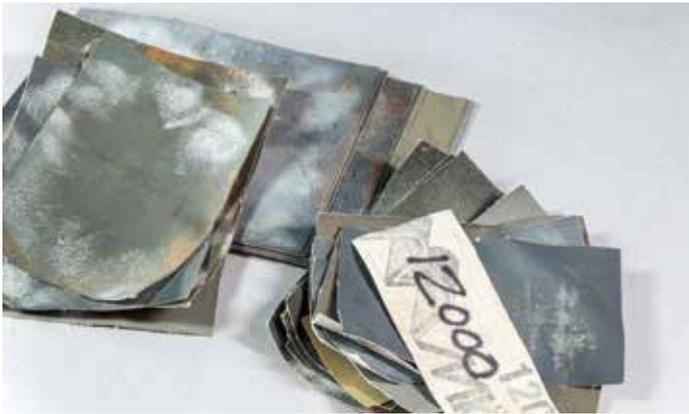
When I jamb chuck miniatures, I cut them snug and then wet the wood to effect the grip. The jamb chuck will swell to grip well



The jamb chuck allows for turning, sanding, and finishing. Easy removal without damage once dry



Regular abrasives work on miniatures but slow speeds and light touch are in order. Only finer grits are needed with clean cuts



Usually the Micro-Mesh range is sufficient. Cut your Micro-Mesh to fit the work being done and mark the back of smaller pieces



I usually use the fine abrasive products to get a sheen. When I do use any finish, it is a wicking in oil

Display

For the 75mm bowls, you'll display them as you would larger works. They will take far less space but can be laid out and handled much like any other turning. Smaller items may take some special care: not only are they more fragile but are also prone to being lost. Setting them out on the club show and tell table is a recipe for disaster. You'll probably want to put them into a

protective package of sorts. There are plastic display cases of a various sizes that work well to contain your turning, allowing for examination but protecting from rough handling or loss. Depending on their size, the clear plastic tubes for displaying and shipping pens will work. You can easily cut them down in length to the correct

size, allowing you to still use the press in top. Another method to secure miniature turnings is using gel capsules. Intended for medication, these are clear, small, and can be handled easily. The gel caps can then be pressed into a slotted block of wood, so that you can carry dozens of turnings in your shirt pocket.



Plastic pen tubes can be cut down with an Xacto knife to create carrying and display cases for turnings that could be easily lost or damaged



Some mini turnings from my collection: tops and eggs created by artist Betty Scarpino

Conclusions

If you haven't turned small and miniature, then just go for it. If you have a lathe, smallish tools, and some basic workholding devices, you have what you need to start into small work and miniatures. Will you be able to turn 2mm tall goblets with captive rings on your 60 year old bowl lathe? Perhaps not, but you can begin with what suits your limitations and then progress from there. Is there an ideal lathe to do small turnings? I suggest that if you can hold the work and present your tools as needed on a lathe that is aligned properly, you have everything you need. Don't use "I don't have [fill-in-the-blank]" as your excuse to not begin. Turning smaller work and even miniatures can open a whole new horizon for you. Take the challenge of downsizing your work: if you typically turn 610mm bowls, try downsizing to 50mm bowls. Once you succeed at those or if you are already turning 50mm bowls, have a go at 6mm bowls. Not only will you be able to stretch your materials budget, but depending on how much you downsize your work, you may be able to carry your past year's turnings in a paper cup. If you don't begin the journey, you'll never get there will you? Give yourself the challenge to try turning 'small'. ●



Regardless of the size of your lathe, tools, or typical work, see how easily you can create a pocket full of turnings