



Workholding aids & chucking – part 5

Kurt Hertzog continues his workholding series and this month decides to look at the subject of chuck selection and safe use

Depending on your vintage, you'll use the term engineering chucks or just plain chucks. Regardless of the term used, having a chuck or family of chucks can open a world of flexible workmounting techniques to you. It doesn't matter what you make as your product or your avocation, there is a chuck system that will let you quickly and easily mount your work.

There are manufacturers around the world making chucks so your choice of manufacturer can be based on initial cost, family of products, flexibility, or

patriotic pride! The prices range from very modest at the low end to pretty pricey at the high. Any chuck purchase should be looked at as a long-term investment. Chucks should last a lifetime, so buying a quality product will not only serve you well for as long as you need it, but it will fetch a better return when it is time to part ways.

In addition to the basic general purpose chuck, there is a host of special purpose chucks that will cater to special turning projects be they multi-centre, eccentric, or special needs holding items. We'll explore

those in a future section. This time, we'll cover the basics of chucks, chuck systems, and good practices for accurate and safe operation.

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CHUCK SELECTION

Your first question when getting into chuck mounting is how will your needs grow? If you have a specific need and will never move beyond it, you can buy based on that. Most will grow into other areas of turning as time goes on so considering the long term when beginning your chuck purchases will be valuable. When selecting a chuck, consider your budget, service use, and expandability. Light duty applications call for one body size and heavier duty calls for a different body size,

different design, and construction. Nearly all of the manufacturers make a generic body that is specifically adapted to your lathe by use of a threaded insert. That allows for mass production and economies of scale for the most costly part of the chuck, the body. While there are some supremely heavy-duty chucks, most fall into the medium duty and heavy duty with a wide assortment of optional jaws and special inserts. Even though the jaws may look to be interchangeable – and a few are – between

different brands, use extreme caution since the hole centres, interlocking keys, and other features may be different enough to cause damage and/or present unsafe conditions. I've found that by picking a brand that offers me the product offerings to address most of my needs, I can stay in that family and reap the benefit of interchangeable jaws, screws, and adjusting keys. Some brands have more selection than others in the jaw options such as depth of jaw. There are also very specialised jaws for some applications.

In smaller and special application chucks, you often have no choice of adjusting method. By design, you'll have to use 'monkey bars.' In the medium duty bodies, you sometimes have a choice. There are proponents of both. Some favor the amount of force that can be exerted by using the monkey bars while others despise the ungainliness of trying to position the work while fiddling with two adjusting rods. Both methods are used successfully so pick your favourite. I'd suggest you experience and try

out both types in real operation before you commit. Nearly every chuck manufacturer delivers their chuck with a standard set of jaws, an adjusting wrench – or bars – a jaw screw wrench, and a mounting screw. This mounting screw makes for easy mounting of a blank by threading the screw into a hole after fastening the screw into the special gripping area of the chuck jaw. Imagine turning a bowl. By mounting the chuck to begin with, you can use the screw to mount

your bowl blank, do the rough shaping and turn the mounting tenon – spigot – for mounting in the jaws. At that point, you can take the blank off the screw, remove the screw, and mount the bowl blank in the chuck for hollowing. Some chuck makers even offer drive centres and other options that will let you leave your chuck on the lathe through a variety of turning processes.



ABOVE: Chucks and chuck families are available in sizes and service ranges for almost all facets of woodturning. Among the various manufacturers, you can find the mini sized through to the heavy duty



ABOVE: Once the manufacturer and service range has been selected, there is a wide range of optional jaws available. Jaws are not usually interchangeable among manufacturers

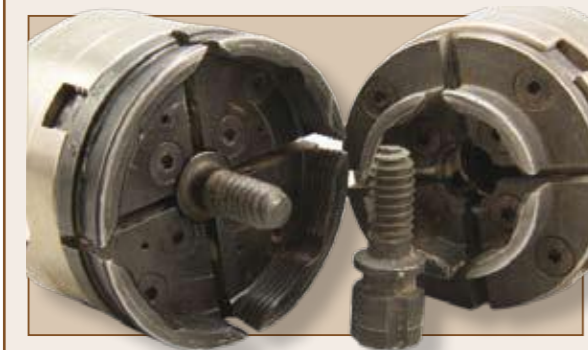


ABOVE: Even within the size range and functionality, there are options to select from based on your particular type of turning. This brand of No.3 jaws are available in the standard and deep depth

RIGHT: There are special purpose jaw and chucks. These are for pen blank drilling. A future series part will cover the wide range of special purpose chucks such as eccentric, multi-centre, and more



RIGHT: Depending on size, manufacturer, and price point, nearly all chucks have one of two adjusting styles. They are either a gear rack and key mechanism or 'monkey bars' more



LEFT: Most brands provide a screw as standard equipment for their general purpose chucks. This screw, clamped in special features in the jaws allows for mounting bowls and other blanks without removing the jaws



MAIN: In addition to the provided screw, there are other optional jaw clamped features. Depending on the manufacturer, there are various sized spur drives and steb centre drives

ACCURACY AND SAFETY

Keeping the jaws on the right manufacturers body is only part of the accuracy and safety equation. Some manufacturers will tell you exactly where each jaw belongs. This assembly location will yield the best results so following the maker's guidance is suggested. To create a spigot that will accurately position the work requires that you cut the proper angle, or lack of, on the mounting tenon or spigot. The work will rest on the top of the jaws and be gripped by the jaws to secure the work. It is important that you never have the work touch the bottom of the chuck since that surface hasn't been cut with

respect to the axis of rotation. You want the jaws to engage sufficient material but have daylight showing completely around the bottom. Crisp corners where the jaws engage as well as the daylight will insure accurate mounting. Virtually all of the chuck makers will provide an adapter designed to butt flush to the lathe spindle flange. However, there are a few lathes around where this doesn't occur. If they don't mate flat to flat, use a thin spacer to make them mate rather than using the threads for alignment.

The last idea to share is grain. If you have a cross grain mounting, the grain orientation to the jaws does make a difference. Take a

look at the colours on the bowl blank and think about it a bit. End grain and face grain will not maintain the same clamp load. Equalising things as well as checking the chuck tightness often is a wise idea.

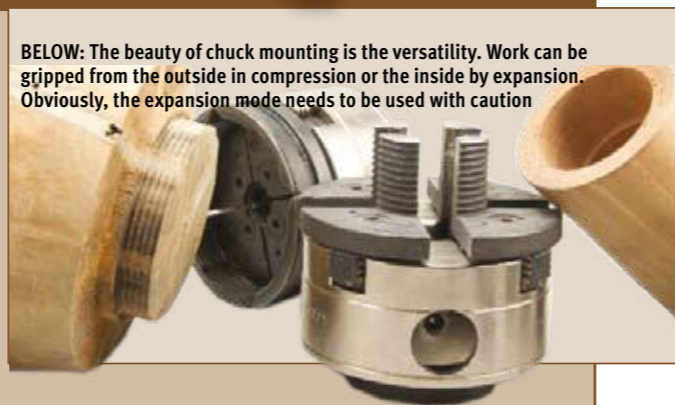
While costing a bit of money, I think you'll find that the freedom and flexibility you'll get with a chuck will far outweigh the cost and the initial outlay. Chances are your chuck will outlast your lathe, so it's worth looking at this as a lifetime investment. Buy the best you possibly can, do some research into which chuck best suits your needs and explore the potential that this versatile mounting system provides. ●

GRIPPING THE WORK

The beautiful part of using a chuck is the flexibility of the system. Not only is there a host of jaws available in almost every size and shape, but you can use them by clamping the work and compressing to grip or by expanding the jaws into a hole or recess. Pepper mills, bowls, lidded boxes, hollow forms, and more lend themselves to expansion holding. Care must be used to balance the force that can be applied without causing destruction of the work and the amount of force required to do the desired turning operations. Not only can you easily mark or cause material fracture but you can also create unsafe conditions by asking too much of the mounting method you are

using, especially when working with an expansion grip. As with all forms of workholding, using the tailcentre is good practice regardless of the mounting method you use. Take it out of play only when you must by the operations needed.

Whether you are gripping green or dry wood, plastics, bone/antler, metals, or other material to be turned, you will need to create a spigot on the material for the jaws of the chuck to grip. There are two types of jaws. Again, proponents of each will swear by the dovetail or straight wall jaw types. I've used each and find them both workable. The only caveat is that you will cut your spigot to cater to the jaws you are using.



BELOW: The beauty of chuck mounting is the versatility. Work can be gripped from the outside in compression or the inside by expansion. Obviously, the expansion mode needs to be used with caution



BELOW: The jaws for most chuck manufacturers fall into two major categories. There are the straight wall with ribs and teeth and the dovetail style with inside and outside reversed



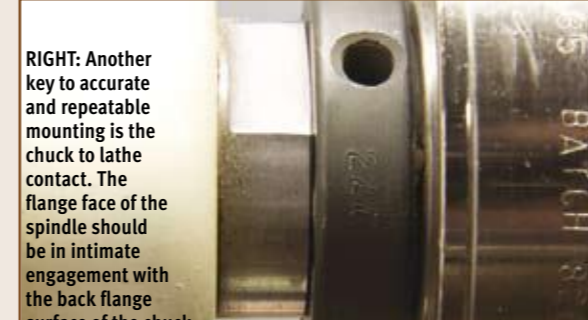
ABOVE: To provide maximum accuracy and safety, the manufacturers often identify the jaw and mounting position. If so noted, following their indicated assembly directions will yield the best results



ABOVE: Mounting for best accuracy and safety requires that the work rest on the top jaw surface is cut appropriately for the jaw style and in contact with the jaws, yet isn't touching the bottom of the jaws



ABOVE: With maximum jaw engagement, referencing to the work from the top jaw edge, and the 'daylight' completely underneath the work you can be assured of the most concentric mounting possible



RIGHT: Another key to accurate and repeatable mounting is the chuck to lathe contact. The flange face of the spindle should be in intimate engagement with the back flange surface of the chuck

RIGHT: The jaw orientation to the wood grain is not often thought of. Clamping an end grain mount doesn't need special consideration. Clamping any other orientation requires a bit of thought for best results

