WOODTURNING FUNDAMENTALS

American Association of Woodturners
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Drive centers...

...demystified

- *Shopmade finishes*
- *Turn a tool handle*
- *Weed pot develops spindle skills*
- *Protect your lungs!*

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WOODTURNING FUNdamentals

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Cover: A multitooth drive center powers a bowl mounted between centers. Kurt Hertzog, photo. *See page 5 for more on this topic.*

Drive centers

by Kurt Hertzog

In spindle and some facegrain turning, the work is driven and held captive between centers. Every drive center is engaged with the work in a temporary and non-fastened method.

Most spindle and some facegrain turning can be done with one of four categories of drives: two-spur, four-spur, multitooth drive (MDC), and safety center drives.

Most drive centers are available in various Morse tapers as well as versions to be clamped into a four-jaw chuck. I find that I have use for all of the types of drive centers covered here.

In addition to the most common drive centers, you will encounter pin chuck drives, friction drives, screw drives, and mandrels. As your turning tasks become more diverse, you'll probably find cause to add a few of these specialty drives to your collection.

Chucking a bowl blank between centers offers tool access around the form and allows you to balance grain patterns or align the rim (on a natural-edged form, for example).

Two-spur (left) and four-spur drive centers.

An assortment of four spur drives. Whether taper or chuck mounted, all feature adjustable center points.

Two-spur drive centers

The two-spur drive has two spurs or "wings" to engage the blank. Most have an adjustable center point, allowing the drive center point to be tailored to the density of the blank material. Removing the point makes it easy to re-sharpen, but these centers are always used with the point set in place.

The most common use for two-spur drives in my shop is for driving green wood bowl blanks between centers. I will prep bowl blanks between centers to turn to round, complete the rough outside shaping, and cut the tenon for a chuck mounting or a flat surface for a faceplate. The two-spur model excels in green wood. With the spurs parallel to the grain, it engages the wood with less tendency to bore into the blank like a drill bit. Its use is limited in dry wood, where it tends to act like a splitting wedge, especially in end grain.

Four-spur drive centers

The four-spur drive center is the default driver included with many lathes. The four-spur will work for nearly anything provided it can be engaged into the end of the work piece. For dry wood turned on its long axis, this often requires the four-spur to be driven into the end grain. Whack the Morse taper end of the four-spur into the work to seat the center point and engage the spurs with the wood. Use the closest wooden driver of your choice—a mallet, a 2 x 4, or handy billet from the firewood pile.

But *never* strike a metal drive spur with another piece of metal. This is potentially dangerous and will also peen-over the end of the Morse taper. This in turn will interfere with the fit of the drive in the lathe, and can easily damage the inside of the lathe's Morse taper spindle—an expensive repair.

Four-spur drives tend to spin in green or soft woods. Whether the work is in facegrain or endgrain orientation, a two-spur drive will usually perform better than a four-spur in these situations.

As with the two-spur center point, the length of the center point in a four-spur drive should be adjusted based on the turning stock.

The author's collection of MDCs including an MDC-style revolving tail center. Whether taper or chuck mounted, all work the same and are incredibly versatile.

Multitooth drive centers

The MDC (Sorby's Steb is a well-known example) has a spring-loaded center pin with an outer circle of small teeth to engage the work. Advancing the tailstock center compresses the MDC's center pin and engages the teeth in the wood. By varying the tailstock pressure, the drive can be engaged lightly-to-forcefully.

One of the advantages of the MDC is the ability to manipulate a blank without turning off the lathe. Retracting the tail center sufficiently to disengage the teeth, yet maintain the center point engagement, allows the workpiece to be stopped by hand to gauge progress with the lathe still running. Further tailstock retraction allows the blank to be removed from the lathe. This same technique allows for loading and unloading by simply retracting or advancing the tail center with the work held only between the points. For the professional turner, this improves production efficiency, saves energy, and reduces wear on the lathe.

This drive center, like the others, is available in a variety of sizes to meet a range of applications. MDCs work best on dry or dense wood with a flat surface to engage.

A safety or ring center drive

Safety centers

The safety center goes by several names, including friction or ring-drive center. It has a center point, often adjustable, with the fixed outer ring providing the drive force through friction. Much like a lightly engaged MDC, the safety center slips against the work in the event of a catch. The turner can regulate the amount of force needed to cause the drive to slip by varying the tailstock pressure. For new students and particularly students working on their skew chisel skills, having the work stop while staying securely on the lathe eliminates much of the fear factor. Functional and useful for all turners, this drive center is often provided with a new lathe. This makes for a much safer learning environment for all.

Kurt Hertzog is past president of the American Association of Woodturners, a Pen Makers Guild council member, and past chairman of the Rochester Woodworkers Society. He has had over 185 woodturning related articles published internationally since 2012. An avid turner in all areas, Kurt is particularly interested in pens and ornaments. You can see his work and published articles at kurthertzog.com.

Specialty drive centers

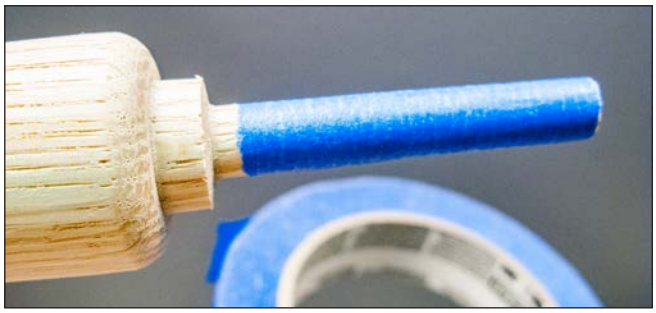
by Kurt Hertzog

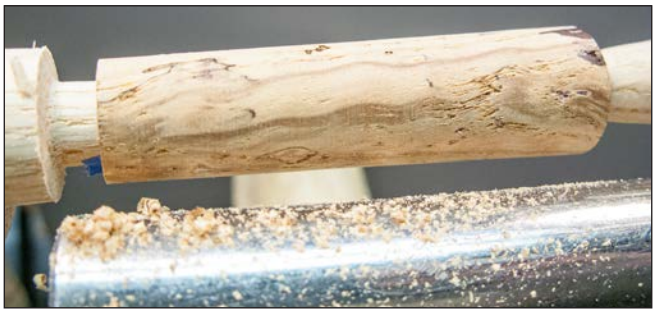
This drive center excels at holding green wood. The adjustable spikes are helpful for aligning grain and rims in natural edge bowls.

Closed end and friction drives for spindle turnings can be store-bought or shopmade.

These drive centers mount quickly in chuck jaws, providing greater support for the drives than Morse taper drives.

A friction drive for small-scale work. A hole bored in the end of the spindle captures the drive spur.





The fit of a friction drive can be fine-tuned with tape. With the hole drilled first, the outside turning is always concentric to the hole.

