

Turning Irregular Off-Center Work

Safely

Tom Ronayne

I have been turning wall hangings for many years, gradually moving from small pieces with a single turning center to large out-of-balance work with irregular shapes and multiple centers. All of my pieces are turned with the headstock rotated 90 degrees to the lathe bed, and for safety, my lathe is bolted to the floor to prevent it from vibrating and/or moving across the floor. This type of turning can only be done safely on a variable-speed lathe. Following are several additional considerations for turning such pieces safely.

Aligning centers

One challenge I faced from the beginning was accurately mounting a



The carrier disk in these photos is 31½" (80cm) in diameter, and the irregular-shaped workpiece measures 24" (61cm) long.

workpiece with a marked center on the pre-marked center of a plywood carrier disk. Getting one directly aligned with the other usually required guesswork and often resulted in the piece being slightly off-center when rotating on the lathe. I was stuck with this imperfect method until the thought of using laser crosshairs to center my workpiece

came to me. My solution was to mount a laser above the workpiece, always pointing its crosshairs vertically down onto the carrier disk. I use a Stanley Cubix laser, as shown in *Photo 1*.

Consider carefully how the carrier disk will be mounted on the lathe with the workpiece attached, especially when using a large disk. There are four bolts shown in *Photo 2* that are threaded into a faceplate behind the plywood disk. This is a very secure method.

Mount a ¾" (19mm) plywood disk to your lathe and true up the outer rim. It is vital that the true center is marked on the plywood carrier disk. Bring up the toolrest to center height and press the point of a pencil into its center as it is rotating. This will give you the true center of the disk.

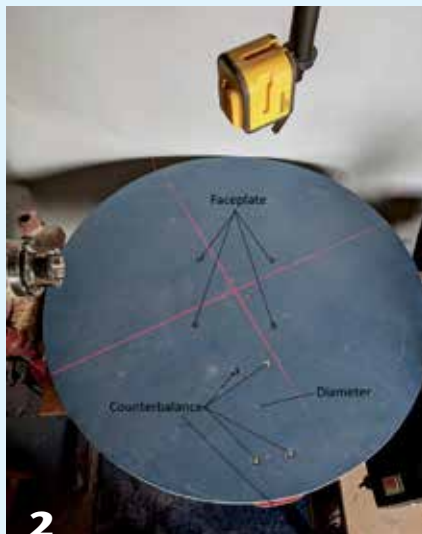
Remove the disk from the lathe and place it on a level surface, beneath the laser. Important: Every time you center a workpiece beneath the laser, the carrier disk must be level. Turn on the laser crosshairs, position the center of the disk in the crosshairs, and clamp the disk in position. Double-check that the center of the disk is still in the crosshairs, as you must recenter the disk if it moves.



Laser crosshairs align centers



The author fitted a crosshairs laser to a camera monopod above the lathe bed, allowing the laser to be slid up and down as required. The closer the laser is to the workpiece, the finer the crosshairs.



Mark your intended center (or centers) that you wish to turn on your workpiece. Position one of the marked centers on the workpiece in the laser crosshairs and clamp it to the carrier disk. It is now centered on the disk's center.

Fix the workpiece to the disk (see below for two mounting methods). Again, double-check that the center of the workpiece is still in the crosshairs; reset it if the center has moved out of the crosshairs. The disk and workpiece are now ready to be attached to the lathe for turning.

How to fix workpiece to disk

Method 1—backboard

Screw a backboard, at least $\frac{3}{8}$ " (10mm) thick and larger in size than the workpiece, to the back of the workpiece. Predrill at least six countersunk holes through the backboard around the workpiece to allow you to screw it to the carrier disk (*Photo 3*).

With the crosshairs centered on the disk and the disk clamped in place, slide the workpiece and its backboard below the crosshairs and position the marked center of your workpiece in the crosshairs. Clamp the workpiece to the disk, then screw the backboard directly to the disk through the pre-drilled holes. Remove the clamps and then attach the disk and workpiece to the lathe.

Method 2—holding blocks

Make softwood holding blocks that will clamp the workpiece to the disk without having to drill holes in your workpiece (*Photos 4, 5*).

Center the crosshairs on the disk and clamp the disk in place. Position the center of the workpiece in the crosshairs and clamp the workpiece to the disk. Position the holding blocks so that it is not possible for the workpiece to move in any direction. Screw the holding blocks in position. Always use two screws to prevent the holding block from rotating as the disk rotates on the lathe. Remove the clamps and then attach the disk and workpiece to the lathe.

Add a counterbalance

Heavy off-center workpieces will be out of balance while rotating and may cause the lathe to “dance” across the floor—a dangerous situation! It is best to fit a counterbalance to the carrier disk to help the workpiece run true, without excessive vibration or lathe wobbling or moving.

The counterbalance I use is a piece of plywood bolted to the back of the carrier disk with a countersunk groove along its center (*Photo 6*). On the back side of the counterbalance, a flat metal weight is attached to two bolts in the groove (*Photo 7*). This weight can be slid along the groove as needed and locked in position with wingnuts.

The centerline of the counterbalance is fitted along one of the two diameters drawn on the back of the disk (*Photo 8*). The workpiece is fitted to the front of the disk along the same diameter line, opposite the counterweight.

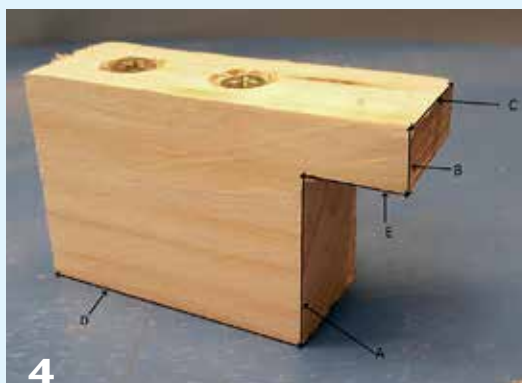
Rotate the disk by hand and slide the weight to a new position until balance is achieved, then lock the weight in its final position. The disk will be in balance ▶

Mounting method 1—backboard



First, screw the backboard to the back of the workpiece, then screw the backboard to the carrier disk. Note the laser crosshairs aligning the intended turning center of the workpiece with the center of the disk.

Mounting method 2—holding blocks



Softwood holding blocks “clamp” the workpiece to the carrier disk.

The three critical measurements are A, B, and E:

A: Must be $\frac{1}{8}$ " (3mm) less than workpiece height, allowing the screw closest to the workpiece to exert sufficient downward pressure.

B: Must be no less than $\frac{3}{8}$ ".

C: $1\frac{1}{4}$ " (32mm) or greater depending on workpiece size.

D: Must be long enough for two screws.

E: Must extend no less than $\frac{3}{4}$ " over workpiece surface.

Adjustable counterbalance



6 Front of counterbalance unit, with a countersunk groove.



7 Back of counterbalance unit, with metal weight attached via wingnuts.



8 Back of carrier disk, showing mounted counterbalance unit (at right of disk). Workpiece is mounted on opposite side of disk, in line with counterbalance. Adjust the position of the metal weight until good rotational balance is achieved.

Safely positioned lathe controls



9 Ensure you can safely reach the lathe controls during turning. Never reach across or near the spinning workpiece/carrier disk. Reposition the controls as needed.

when it randomly stops in any position after it is rotated by hand. Rotate the disk a few times to be absolutely sure it is in balance. If it keeps stopping in or near the same position, it is not balanced.

Lathe safety

Turning large off-set workpieces is best done on lathes with variable speed, as this allows you to start its first rotation gradually at a very low speed.

Results



Large, irregular-shaped work with multiple centers can be turned safely.

Safety Note: Your lathe's on/off switch must be placed in a safely accessible location during turning, as shown in *Photo 9*. You do not want to have to reach past a large rotating disk to change the speed or to turn the lathe off. If your lathe's on/off switch cannot be moved to a safe location, consider plugging the lathe into an extension cable of suitable gauge with an integrated on/off switch that can be located in a safe position.

Ensure the variable speed control is set to zero and confirm that the workpiece has not loosened before switching the lathe on. Rotate the disk/workpiece slowly by hand before engaging the lathe motor, especially if the workpiece is heavy and/or off center. This lessens the strain on the motor as it begins to rotate. Increase the speed of the lathe very slowly until you reach a

speed that you are comfortable with and where there is no vibration of the lathe. Now you can begin turning.

Final thoughts

One of the biggest constraints on any turner wishing to do this type of turning is how to position the toolrest in front of a large disk. Some modern lathes come with attachments that facilitate the positioning of the toolrest away from the bed bars. In my case (my lathe is a 28-year-old Sorby), I had to weld some scaffolding bars and square section together to position my toolrest (visible in *Photo 8*).

There is a lot of work to do in preparing the carrier disk for your first turning, but once it is done, it is only a matter of attaching the workpiece and then balancing it each time you move to a new center. ■

A member of Craobh Cúig Déag, a woodturning club in Dublin, Ireland, Tom Ronayne has been turning for nearly thirty years and enjoys the challenge of making odd and unusual pieces, especially wall hangings.