Learn To Master the Kel McNaughton Center Saver

by

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The Kel McNaughton Center Saver System (now generally known as the Kelton Center Saver, the McNaughton Bowl Saver, the Kelton Saver and the Kel McNaughton Coring Tool) enables you to easily produce one or more bowls from a single block of timber. Removing several bowls from the center of each blank saves time, money and allows significant conservation of expensive, or highly figured timbers. Typically, you can save one rough blank for each inch to inch and a quarter of thickness.

Four-inch blanks therefore, can be expected to yield three to four blanks, depending on the wall thickness and profile required. Advanced McNaughton tool techniques are capable of producing significantly higher numbers of saved bowls per blank. The Kelton coring system is capable of producing “nested sets” (smaller bowls that nest, or fit inside each other), from an area that would ordinarily be turned away as waste shavings.

The Kel McNaughton system works equally well on traditional side (face) grain, end grain and natural edge blanks. This center saver system utilizes three sets (jumbo, standard and mini) of curved and straight blades that allow the turner to achieve various bowl profiles. The thickness of each bowl wall can also vary, depending on the turner’s wishes. Hard dense timbers and burrs cut the best, however you can successfully core most species without difficulty. Softer timbers, or those that tend to leave a fuzzy surface when cut (Cottonwood, for example) can also be easily cored by simply enlarging the width of the kerf.

The Kel McNaughton Center Saver coring blades operate much like a scraper, or parting tool and therefore put a lot of stress on the blade, toolrest holder (banjo), lathe and the fixing. I recommend only heavy-duty chucks, or faceplates for safety reasons. This center saver system is best suited to heavy-duty lathes with powerful 1.5 to 3.0HP or larger motors, but it can be adapted to some smaller lathes with 1hp motors. If in doubt, consult a local pro or the manufacturer before proceeding.

Figure1

In Figure 1, Texas Honey Mesquite bowls are ready for coring with the McNaughton Center Saver. The largest blank is about 18" in diameter.

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Preparing the Bowl Blank for the McNaughton Center Saver

I prefer to rough out the bowl blank between centers with a large 1.5" four prong drive spur to form a dovetail tenon boss for my Vicmarc VM140 chuck. If you prefer, a screw center chuck, or faceplate may be used to rough out the blank. On very large and heavy blanks, I use a Oneway 10" heavy duty faceplate. If you use a faceplate for the fixing, install a screw in every available hole.

Figure 2

Mesquite bowl blank mounted in a Vicmarc VM140 scroll chuck with the 5" dovetail jaws. (Figure 2)

Turn the outside shape to rough dimensions. The tenon boss (dovetail spigot) should be formed of sound wood to handle the coring stresses produced when using the center saver. I prefer to use the large 5" dovetail jaw set when coring the blanks when the profile will accommodate the larger jaw set, switching to the smaller 3" dovetail jaw set when necessary. On larger blanks, I prefer the Vicmarc multi-segment dovetail jaw set, which can grip a 10" or larger tenon when set-up properly.

Do not allow punky, cracked, or unsound wood on the dovetail tenon boss for safety reasons. When turning the dovetail boss, insure that the dovetail is well formed with a straight 90° shoulder for the chuck jaws to rest against. This is an important step to reduce vibration whilst coring. The bowl blank is then mounted in the chuck and the jaws securely tightened. Although my Vicmarc VM140 scroll chuck can grip in either compression or expansion mode, I prefer to use it in compression mode whilst using the McNaughton Center Saver for added security. For large or heavy blanks, use 95% – 98% of the available tenon depth your chuck jaws will accommodate. This will give a more secure hold, whilst preventing the tenon from bottoming out in the chuck jaws.

Preparing the Front Dovetail Recess

Once the bowl blank has been mounted in the chuck, the front surface of the bowl should be turned smooth. To facilitate easier mounting of the saved cores for subsequent coring operations, I developed a method to use the same chuck fixing to mount the cores quickly for turning the dovetail boss on the bottom of the core. Although you could simply mount the core between centers to form a new dovetail boss, I find it's much easier to simply turn an inner dovetail recess on the face of the bowl blank. This recess is then used for all subsequent mounting operations to turn the dovetail boss on each saved core.

Figure 3

In Figure 3, the interior dovetail recess is completed. The Vicmarc chuck will be expanded into this recess to turn the dovetail on the bottom of the bowl for the next coring operation.

When the core has been extracted from the blank, remove the outer bowl, reverse the core and use the chuck to expand into the recess on the front of the blank. The bottom dovetail can be easily turned at this point, without having to mount/remount the chuck, another jaw set, or a drive spur. In a production studio, time is money and this method of using the center saver is fast and efficient.

Another method to quickly turn the dovetail boss on an extracted core is to reverse the core into the bowl it was just removed from. The tailstock's revolving center is then brought up and secured. The tailstock's ram jams the core into the bottom of the bowl (effectively a jam chuck at this point) allowing the lower dovetail boss to be turned quickly. Still another method is to simply collect the extracted cores and batch process them between centers, using a drive spur and the tailstock. This method requires removal and remounting of the fixings multiple times and is much less efficient than using the inner dovetail recess, or reverse core jam chuck method.

McNaughton Center Saver Cutter Tip Maintenance

It is important to keep the cutter tip on the McNaughton Center Saver coring blade sharp and to maintain the specialized grind on the front lower section of the blade tip. I typically use a grinder to sharpen the tip and a round diamond hone to touch up the edge periodically between corings. Only grind or hone the face of the cutter, never on the top. On some timbers that contain lots of silica, it is not uncommon to have to hone the edge during the coring operation. On most timbers though, this is not required as the metal used on the top of the center saver blade tip holds an edge extremely well.

Tip: If you find that you have to exert much force to get the blade to cut, you probably need to sharpen it. Keeping the center saver cutting tip sharp allows the blade to cut efficiently with less heat build-up. A future article will explore advanced coring methods and ways to modify the cutter tip to increase the number of saved bowls per blank. Note: Whilst the cutter tip comes from the manufacturer with a relatively straight front, I prefer to grind a shallow concave into the front face of the cutter tip. This allows the tip to move through the blank easier and increases the overall coring speed.

Update: The Kelton Center Saver now ships with cutter tips on the knives that are ground to a point instead of the relatively flat face of previous models. If you have the older set of knives, you can regrind them to a point to match the new configuration or grind the slight concavity in

the front of the knife tip as mentioned in this article. Both tip configurations work and it's really a matter of personal preference. If you have one of the newer styles with the point on the knife tip, it's better to maintain that shape.

Setting up the McNaughton Center Saver System

Install the desired center saver blade in the tool handle and secure the three grub screws on the side and top of the handle. Place the tool rest T-bar into the lathe's banjo. The T-bar assembly is comprised of three components, the mounting post which fits into the lathes banjo, the T-bar assembly (known as the surfboard) and blade turret gateway.

The toolpost is inserted through the lower portion of the T-bar surfboard and into the bottom of the blade turret assembly. The top of the toolpost should be lubricated with a light to medium machine oil before assembly. (This applies to earlier versions of the center saver that did not feature a locking screw on the turret assembly).

The tip of the blade should be set at centerline or slightly higher. When the cutter tip is at the correct height, lock the tool post into the banjo securely. Tip: WD-40, or a general purpose lubricating oil should be used to lube the blade travel gateway. Green timbers may spray a lot of water and extractives out during coring. Some of these extractives, when combined with the shavings, can be very sticky and cause feeding problems as you try to advance the blade forward. Lubricating the travel gateway will help to eliminate this problem.

Caution: The blank must be held very securely or it may fly off! With the bowl blank mounted in the chuck/faceplate, bring the front of the T-bar holder assembly as close to the front of the blank as possible. Rotate the blank by hand to insure the front of the cutter, or the turret assembly does not bind on any portion of the wood blank. Securely tighten the banjo and the toolrest. The T-bar should be at the rear, with the blade gateway in the front. Verify that the cutter tip is correctly positioned at the centerline, or a bit higher. The front of the blade is installed in the gateway slot and the rear of the blade is placed under the top of the T-bar holder. The blade must be kept under this T-bar while coring blanks. The toolrest holder on the center saver is designed to handle the stresses and vibration of the coring operation.

Complementary Arc Sighting Process

The most frequent question asked in my demonstrations of the McNaughton Center Saver System is how I determine the angle in which to set the blade, to insure the blank is not penetrated too deeply. There are many ways in which to sight the blades travel to determine the final depth location of the blade.

To efficiently sight the blade's penetration arc, I developed a procedure known as the "complementary arc sighting process." This procedure is lightning fast, simple and if correctly performed, virtually guarantees that your blade will end up in the desired position in the bottom of the blank.

When using the complementary arc sighting process with the Kelton Center Saver, follow these simple rules.

* With the blade mounted in the T-bar turret holder, set the left tip of the blade at the desired wall thickness on the front face of the blank.

* Observe the left side of the subject bowls wall curve.

* Whilst sighting the bowls exterior curve (left side) from above, move the curved blade into a position that closely matches the exterior curve of the bowl wall and lock the banjo into position.

* When the two curves (exterior bowl wall curve and blade curve) match, your penetration will follow that preset penetration arc.

* Since you have already set the desired wall thickness, the complementary arcs will insure a successful coring, virtually eliminating the possibility of thin bottoms in your saved bowls.

Preparing to Core the Blanks when using the McNaughton Center Saver

Insure that the blank can rotate freely before beginning the coring process. Although the complementary arc sighting process may sound difficult, it takes less than five seconds to perform. If you prefer, a thickness gauge is available as an optional accessory with the center saver and can be obtained from the manufacturer. This gauge will show the thickness of the saved bowl during the coring process, eliminating shallow or inconsistent bowl walls.

Tip: The Kelton Center Saver gauge mounts to the handle of the center saver and can be used to easily track the wall thickness during the coring process.

Turn on the lathe (slow speed) and bring the blade near the edge of the spinning blank. Remember to KEEP THE TOOL HANDLE PUSHED UP during the entire coring operation against the underside of the T-bar assembly. Allowing the blade to drop will cause a catch and may cause damage to the blade. The wall thickness you chose depends on many factors, including the profile desired and the drying characteristics of the subject species.

I typically use a one half, to one inch thick wall on smaller bowls with most timbers. On larger bowls, I use 10% of the bowl diameter to determine the optimum wall thickness as a general rule. On timbers that experience extreme movement during drying (like Madrone Burr and Chinese Tallow for example), up to 15% of the diameter of the bowl may be used to determine the necessary green wall thickness.

Beginning the Bowl Coring Process with the McNaughton Center Saver

Gently advance or plunge the blade into the wood, (PUSH UP ON THE HANDLE) and direct the blade forward through the turret gateway. Once the blank has been penetrated about an inch, carefully withdraw the blade and open up the kerf a bit on the outside to look like an upside down “Y.” This allows the chips to eject much easier. Re-enter the wood and continue gentle forward pressure cutting the desired interior curve. Stop often and check your progress.

Try to make the interior cut as smooth as possible when using the center saver to facilitate chip ejection. You do not want a jagged interior wall, as this will prevent free ejection of the chips. I do not use or advocate the “fishtail” method of coring the blank. It leaves a jagged interior wall that can cause chip ejection problems. At times, I make the kerf about 1.25x cutter width for easier chip removal, but only if the blade tends to bind with fuzzy timbers like Cottonwood, or similar timbers.

Figure 4

Figure 4 shows a shallow Roman Ogee bowl blank halfway through the coring process.

Sometimes the kerf will clog up and bind the blade with chips and shavings. It is best to turn off the lathe and withdraw the Kelton Center Saver blade to clear the bind. If the clogging continues and you have repeated difficulty, spray the blade with a lubricant spray. This will help the chips to slide over the blade and exit easier. It is also important to keep the blade clean. I use sandpaper, or a chemical cleaner to remove any accumulated extractives. If you notice any burning or scoring in the kerf, withdraw the blade and enlarge the kerf slightly.

When you start coring, the early material that is ejected is a mixture of ribbon shavings from the side grain and dust from the end grain. When you get down to the last quarter of the coring, the ejected material is mostly dust from the end grain and it flows out easily. Hard and dense timbers produce more dust like chips and softer timbers produce more ribbon shavings. When I get within one-half to one inch of the bottom, I stop the lathe. A small wedge or hammer is then used to break the interior tenon (hit the side grain) and remove the core.

After you remove the core, take a bowl gouge and make a cleanup pass on the interior. When the center saver is used correctly, there should be no burn or scorch marks on the saved core, or outer bowl walls.

Figure 5

In Figure 5, with the coring operation complete, the core is now ready to be mounted on the Vicmarc chuck for additional bowls to be saved.

To remount the core, turn a tenon on the bottom (between centers/drum chuck/etc.) and repeat the coring process. I usually turn an interior dovetail boss on the face of the bowl blank to speed up turning the core later. Some turners prefer to core the smallest bowl first (from small to large); others prefer to concentrate on the largest bowl (from large to small). It's up to you, as either method will work. The interior of the bowl is cleaned up after coring with one pass from a bowl gouge. This step is not necessary, but I prefer to have a smooth interior on my roughouts.

Having said that, I always prefer to core from the largest bowl to the smallest. The large outer bowl is my main money bowl; therefore my focus is always on the larger bowl. The remainder of saved bowls extracted from the interior of the large bowl are pure lagniappe. You can use the McNaughton Center Saver to “save” natural edge, end grain and side grain blanks equally well, with proper set-up.

Figure 6

In Figure 6, the core has been reversed mounted back on the Vicmarc chuck using the interior dovetail recess on the front of the core. The core is ready for the dovetail to be formed on the foot, and then the blank can be reversed and additional cores removed.

In my production studio, the McNaughton Center Saver has become a valuable tool for saving not only bowls, but time and money as well. It does however, require a little practice and patience to master, just like any other woodturning tool. If possible, try to see a demonstration of the McNaughton Center Saver tool in action. If a picture is worth a thousand words, then a demonstration is worth a thousand pictures. Also, when you first begin using your McNaughton Center Saver, make sure you practice on some inexpensive timber until you become proficient. Like any new tool, you will make some mistakes but with practice and patience, you can master this most valuable of woodturning tools.

Using the McNaughton Center Saver on Low Power Lathes

I have developed a method to speed the coring of bowls/platters when using the McNaughton Center Saver (standard model) on smaller Nova 3000 and shortbed Woodfast type lathes. These lathes typically have one, or one and a half horsepower motors. This method was developed because I am frequently asked to demonstrate the use of the McNaughton Center Saver.

In my studio, I use a Oneway 2436-3HP lathe that has plenty of torque to spare. I have cored over 10,000 bowls using the McNaughton Center Saver and I feel it is a must have for any serious bowl turner. However, most of the time in my demos I do not have access to a Oneway lathe. Typically, the demo lathe is a Nova 3000, or a shortbed Woodfast.

When I first began demonstrating the McNaughton Center Saver on these smaller HP lathes, the lack of torque was quite frustrating. I quickly found out that my regular method of using the McNaughton Center Saver on larger lathes, needed to be refined. The McNaughton Center Saver system was designed to be used with larger and higher horsepower lathes.

When coring on smaller lathes like the Nova and Woodfast, the motor would frequently bog down or even stop. Production turners do not like to “stop” for anything and the constant bogging of these motors was unacceptable. I kept thinking there had to be a better way, so I began experimenting on ways to compensate for these low horsepower motors.

Many of my experimental methods were a failure, or offered no significant differences in processing speed. Changes in the size of the tip and various insertion methods were the only changes that brought incremental speed, or efficiency advances.

Undaunted, I began to focus on these two areas and began to break down the actual coring process into logical steps. Then, I concentrated on the areas that were at the core of the problem and ways to reduce the stalling of the motor. When these areas were identified, I focused on ways to overcome the inherent limitations of lower horsepower motors and improve the coring speed. Of course, I'm not a magician and I cannot make a one horse motor act like a three! However, I wanted to make that one horse deliver every ounce of power it had. My method involves two stages: 1.) Redefining the cutter tip profile and 2.) Adoption of a “Fluid-Pulsed” insertion procedure. When these two changes are combined, turners with lower horsepower lathes will not see quantum leaps in efficiency, but they will enjoy a faster and more efficient coring process.

Step 1: Redefining the McNaughton Center Saver cutter tip profile - recommended for advanced users only. You can still gain efficiency without making this modification by using the insertion procedure outlined in step 2.

The McNaughton Center Saver operates much like a scraper. The cutting tips on the knives are manufactured with the end of the tip wider than the body of the blade. This allows for clearance in the cut and facilitates efficient chip/shaving ejection. However, smaller lathe motors lack the torque necessary to engage the full width of the supplied cutting tip, without compromises in coring efficiency. Therefore, a reduction in the size of this tip would create a slightly smaller “parting cut.” Less wood removed would ease the stress on the motor and help to eliminate stalling.

You must pay close attention to the shape of the tip as supplied by the manufacturer. Endeavour to maintain this relationship (tip end wider than blade body) when you make these modifications. Release the blade from the handle. It will be easier to grind when it is out of the heavy handle. I make two grind modifications, one to each side of the cutting tip. A small amount of material (~1/16") is removed from the side length of each cutter tip, whilst maintaining the design of the cutting profile.

This should result in a reduction of 1/8" from the width on the end of the cutter. Further reductions will compromise the clearance of the blade in the cut and the free ejection of the

chips/shavings. Next, grind a slight concave into the front face of the cutter tip. This will facilitate a faster and more efficient coring process. The depth of the concave modification to the tip should not exceed 1/16" from the front face.

Step 2: Adoption of the “Fluid-Pulsed” insertion technique. Typically, when you core with a McNaughton Center Saver, you begin with light pressure to start the cut. Once the blade is inserted, very little pressure is needed to continue the cut. When you reach a certain point, (usually midway or so) the blank will begin to suck the blade into the cut – most of the time. This is more evident with some species than others.

From this point on, little or no forward pressure is needed (you still have to push the handle UP into the “T” brace from start to finish) to complete the cut. However, smaller motors lack the torque to handle this type of insertion without bogging down, or stalling numerous times.

This is where the “Fluid-Pulsed” insertion procedure comes into play. When you begin your insertion, use light pressure to start the cut. Plunge in about one inch and carefully withdraw the blade. Make a slight “Y” in the face of the parting cut to help with chip/shaving ejection.

Re-enter the part and move the blade forward until it just touches the wood and begins cutting. From here on, you will be using the “Fluid-Pulsed” technique. Advance your cutter forward and begin cutting. The speed of the advance will be determined by your motor size. When you can see/feel/hear the motor starting to loose rev's, carefully withdraw the blade from the cutting edge - slightly. The blade is not removed from the part, only slightly withdrawn until it stops cutting. The revs will speed back up again and then, you re-enter the cut. When you feel the cut beginning to slow, carefully withdraw - (slightly) and re-enter when the revs are back up.

The action is one of a fluid pulse... Plunge into the cut until the motor starts to loose revs, withdraw slightly and re-enter the cut. The action becomes fluid through the rhythmic in and out pulses of the blade. This is a bit difficult to describe, but it is easy to get the hang of. Instead of advancing until the motor bogs down, or stops and waiting for the spin up, you keep the motor at or near full revs.

Also, I should point out that if you have one of the smaller lathes it is critical that you keep the cutter tip sharpened frequently! I like to go to the grinder for this, but I will at times also use a diamond hone to touch up the edge. How often to sharpen/freshen the edge depends on what timber you are coring and whether you are cutting a clean face or a bark edge. Bark is notorious for housing sand, mud, rocks and other edge destroying bad boys. The cutting edge on the McNaughton Center Saver blade has a special steel that offers long life, but it will lose its edge eventually. The tool cuts by means of a raised burr and the sharpened edge. Like any scraper, this burr or edge must be refreshed from time to time. I have become somewhat of a sharpening fanatic, not only with my gouges, but with the McNaughton Center Saver blades as well.

Turning is so much more enjoyable when your tools are freshly sharpened. I will typically resharpen, or hone between every few coring insertions, even if it does not need it. If you are turning woods with a high silica content, you may have to sharpen/hone the edge several times on very large corings. A freshly sharpened tip will cut freely through the timber. If you find that you have to use more than slight pressure to advance the cut, you need to sharpen/hone the tip.

I have successfully cored bowls/platters at/near capacity on Nova 3000 models and on shortbed Woodfast lathes that sported 1 HP motors. Demonstration timbers have included: White Ash,

Hickory, Bodark, Mesquite and Pecan-crete (the Pecan in Texas is so hard when dry, I call it Pecan-Crete because it's as hard as concrete…at least it seems that way!)

These are not wimpy timbers by anyone's definition! I hope my method will increase your efficiency as well as your enjoyment of the coring process. Timber is much too precious to waste, if you can possibly save it. You can core a bowl quicker than you can "hog" it out, without a doubt. Not to mention the tremendous decrease in shavings on the floor! If you have no use for your bowl cores, take them to your next turning meeting and give them to some of the new chaps. They are always looking for wood and will appreciate your kindness. Turners helping turners . . .

Other Options

Kel McNaughton also offers a mini McNaughton Center Saver blade coring set. These knives are ideal for coring small bowl blanks. The jumbo blade set offers much larger blades and is made for large, well-built lathes with large beefy motors. Please observe the manufacturer's safety recommendations when using this tool. Full instructions on use of the Center Saver are available on the Kelton Industries website, http://www.kelton.co.nz/ If in doubt about any procedure, consult the manufacturer, or a local professional.

Need More Help? If you are interested in learning more about bowl coring with the Kel McNaughton Center Saver System, check out our 2 hour, 20 minute, step-by-step video on bowl turning, which features a segment on using the Kelton Center Saver.

Safety Note: Always follow all manufacturers safety instructions before working with your lathe, or any of the tools or products you may use. If you are unsure about any operation, obtain competent professional instruction before proceeding. Use and wear all necessary safety devices during turning and observe safe woodturning practices to prevent accident or injury.

http://www.woodturningvideosplus.com/center-saver.html