Bowl Saving:
A Comprehensive Discussion in Two Parts – Part 2

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This tutorial is a companion to the Bowl Saving article written by Lyn Mangiameli. In the first article, Lyn discussed the attributes of the four bowl-saving systems on the market today: the Stewart slicer, the Woodcut Bowl Saver, the McNaughton Bowl Saving system, and the Oneway Easy Core system.

This tutorial will focus on the procedures for using the tools to best effect. Because I am encompassing all of the coring systems, I will break this tutorial into three sections. The first section will discuss center saving purposes and approaches; terminology; tool design and their impact on the coring process; and stock preparation. The second section will focus on how to layout the cores and select your knives. The final section will cover the actual use of the tools including set-up and coring; as well as a few related topics like lathe power and speed.

CENTER SAVING TUTORIAL - INSTALLMENT #1

I wish to acknowledge three people in particular who have given me the most education on center saving systems: Don Owen, a local turner here in San Diego, and Mike Mahoney, who I have had the pleasure to watch perform his coring magic many times. Finally, I want to thank Steve Russell who wrote a very fine “how to” for the McNaughton system and has traded ideas with me via the internet for a number of years.

As Lyn mentioned in the previous article, most of my experience is with the McNaughton coring system for center saving. I have played around a bit with a friend’s Oneway center saver, and have taken a few cores with the Stewart slicer. I have watched demonstrations of all the tools mentioned in Lyn’s article (McNaughton, Oneway, Woodcut and Stewart), and have concluded that they all can perform coring adequately, but with different size ranges, shape flexibility, and ease of use.

This article will focus generically on how to get the most out of your coring system. When I have a suggestion regarding a particular tool, I will do so in the course of this article. Otherwise, all of my comments are applicable to all of the tools with the understanding at each tool has its own varying degree of flexibility.

While McNaughton offers knives for coring from the headstock side of the blank, and you can do the same thing with the Stewart Slicer, I will limit my comments to using these four systems from the tailstock side of the blank. These principles, however, apply to headstock coring too. The main limitation to headstock coring is that the headstock is in the way.

Much of my article may seem over-kill for what you are trying to accomplish. My education, however, is as an Industrial Engineer. I am trained to observe manual procedures in their tiniest details and to document those procedures for others. So, I have tried to explain the layout, knife selection, and tool use in detailed and precise terms that, hopefully, all can understand.

When it comes to coring, most turners that I know fall into one of three categories:

1. Those that are intimidated by the tool either because they saw a complicated demonstration or the tools seem confusing.
2. Those that have a tool, but didn’t understand the layout process, the geometry of the tool, or how to correctly set it up, so they have become frustrated and have given up.
3. Those that have overcome their initial fears and have become functional, if not proficient with their tools.

If you fall into the first two groups, hopefully, there is enough information here to nudge you into the third category.

Purposes of Center Saving:

Center saving has three main purposes. One is to obtain bowl blanks for final turning or for drying. The second is to create an artistic set of nested bowls where the goal is to obtain as many pieces with matching forms. The third purpose is to minimize turning time and waste material. In other words, it is potentially faster and less messy to core the center away with one of these tools instead of turning it away with a gouge. I mention these three purposes because they can often cause you to select different coring approaches.

Terminology:

So that the discussion is clear, here are a few terms defined:

- Blank, remaining blank – The block of wood that will have its center removed.
- Core – The inner bowl blank resulting from the center saving activity. Cores can be blanks in successive coring activities.
- Coring – The process of center saving. I will use "coring" and "center saving" interchangeably.
- Knife, blade – The coring tool itself inclusive of the cutting tip and supporting, curved armature.
- Gate – The support structure that positions and retains the blade as it cuts
- Kerf – The resulting, circular gap which results from a knife entering into the wood.
- Radius – The measurement from the blade to the center of the circle that the blade represents.
- Pivot point – The center of the circle around which each blade moves during a cut.
- Diameter – The outer size of the resulting bowl blank measured from one edge of the rim to the other side.
- Depth – The resulting height of the bowl blank when sitting on a flat surface, measured vertically from the flat surface to the rim.
- Break-off tenon – The stub that results when a knife does not travel all the way through the blank and the core is pried out causing the wood to fracture at the center of the core.
- Nest – A set of bowls cored from one block of wood.

Tool Geometry:

Before going into the use of these tools, tool geometry needs to be discussed.

First, the Stewart Slicer will deliver conical cores. You will not be able to cause the core to be a hemisphere no matter how hard you try. The tool simply plunges straight into the wood with a straight cut. The only variations you can cause are the pitch of the cone and the diameter of the cone. This is also true for the McNaughton straight blades. From this point on, I will only refer to the Stewart Slicer, but the comments apply equally to the McNaughton straight blades which come in all three McNaughton sets.

The other three tools all have blades that form arcs of a circle. All of their designs are based upon a circle. In other words, each tool cuts around the center of a circle with a given radius. What this means is that the resulting kerfs from the Woodcut, the McNaughton and the Oneway systems will all be circular with a constant radius. This is most easy to see with the Woodcut and Oneway systems because they are designed to pivot around the center of a circle. The McNaughton system, however, does not physically connect to the center of a blade’s circle. The user, therefore, will need to imagine it. If you need to prove it to yourself, lay each McNaughton blade on a circle template similar to what Craft Supplies sells and observe that every blade lies exactly in a circle as shown in Figure 1.

Figure 1 - McNaughton blades are circular

There are many people, however, that can get the tools to take different core shapes. They do this, by manipulating the knives through multiple trajectories into the wood for a desired core-shape. These manipulations, however, come at a cost to the turner. By making multiple cuts in one kerf location, the resulting kerf is deliberately widened and the resulting core is made smaller. I would suggest that if you want a different core shape, you would be better off cutting the largest core that you can, and then shaping the core with a gouge in a subsequent operation.

Bowl Design Guidelines and Procedure:

When you are planning to core a blank, you are limited by four parameters. First, you are constrained by the maximum size of the blank that you have. The blank will limit you by its depth or its diameter. Second, the knife you select will fix the radius of the cut. Third, the starting entry point of the knife on the face of the blank will dictate the rim diameter of the removed core and the thickness of the remaining blank. Finally, the starting angle of the knife will define how deep or shallow your cut will be, providing a taller, upright core, or a flatter, broad core. All of these will be considered during the layout of the blank. Also, as you read this procedure and gain experience, you will find that the steps I list can be overlapped and executed in different sequences as needed. I have deliberately outlined a very sequential process for clarity.

Step #1 – prepare the blank

The first step in center saving is to prepare the blank to be cored. The preparation is quite simple and sets up the turner for the planning activity that comes next.

- Mount the blank between centers to turn the outside profile of the largest bowl. Plan for the foot to be at the tailstock end.
- If a natural edge blank, adjust the blank to get the two high spots and two low spots at the same height relative to the bowl.
- Shape the bowl including a robust tenon for a compression grip. Don't skimp on the size of the tenon for coring. Coring induces a lot of stress on the mounting. The tenon should be slightly dovetailed to mate with your chuck and the area adjacent to the base of the tenon must be ***FLAT*** so that the top of the jaws has a flat surface on which to index.
- You could choose to use a faceplate, but I do not recommend it because there are so many mounts and remounts in the coring process. Some would argue that if you core from the inside bowl to the outside, you only need one mounting and this is true for the coring process. However, as I will explain later, the chances are good that you will not optimize the nest for the largest bowl when starting from the middle and working out. On the other hand, by going from inside to out, you can immediately reverse and jam chuck the core to form a tenon or flat for mounting of the core—and you don't have to mess with all the remountings.
- Finish the outer profile of the largest bowl.

At this point, you are ready to plan the detailed nest. I will cover that in the second portion of the tutorial.

CENTER SAVING TUTORIAL - INSTALLMENT #2

In the first part of the tutorial, I covered general center saving issues, language and tool design, as well as stock preparation. In this section, I will discuss the layout process including how to select the correct knife for each cut.

Step #2 – plan the nest

The second step in center saving is to layout or plan the coring activity on your blank. To accomplish the first step, you need to know four things.

First, you must decide what shape of bowl to turn. Do you want a hemispherical bowl? Do you want a taller, upright bowl? Do you want a broad, flat bowl? Do you want a conical bowl?

Next, you need to decide how thick each remaining blank needs to be after the core is removed. If the wood is green, I advise you to use the "1 in 10" rule. Make the thickness of the blank be one tenth the diameter of the bowl. This will allow for wood movement during drying. Also, you should make sure that each cored blank is uniformly thick before drying to minimize cracking. If the wood is dry, cut the wood as thin as you dare for the desired bowl thickness. Keep in mind, however, the coring blades do not leave a finished surface on the inside or outside of the bowls, so both surfaces will need to be re-turned. You must allow for a little bit of wood to accommodate the finishing cuts. Also, if you turn a large bowl very thin, it will be very difficult to finish turn because the wood will be quite flexible near the rim. In cases like this, a bowl steady rest might help.

Third, you must decide if the cored blanks will remain a nested set or be sold or given individually. This is an aesthetic consideration. Nested sets look great when each bowl in the nest echoes the others in the nest. All the pieces should reflect the same general shape. An excellent example is the 5-piece set by Mike Mahoney as shown in Figure 2. For example, in a set of three, a hemispherical bowl next to two smaller conical bowls will look awkward. All nested sets should also have a pleasing size sequence. As an example, if you make a set of five bowls, but blow through the bottom of #3, when the bowls are lined up, the missing bowl will be obvious.

Figure 2 – Mike Mahoney nest

Finally, if you view a blank as a cylinder, you have two limiting dimensions to consider before coring. One is the diameter of the blank and the second is the depth or thickness of the blank. One or the other of these two dimensions will limit the maximum number of cores you can take from a blank, given that each remaining blank has a given thickness.

Keep in mind that the knives of all these systems form convex or conical cores. If you want a concave profile, core a conical shape and re-turn the blank into an outward sweeping bowl. In all cases, you should plan the form or shape of the bowl to take the best advantage of the wood: the grain patterns, the natural edge of a burl, the desired shape of the finished product, etc. It is rare that the best core is equal to the maximum sized core. Always optimize the form during layout.

Simple layout plan:

The simple method for planning the core is to figure out the radius of the blank. Determine how thick the outside bowl should be (thick for green wood, for example, and thinner for dry wood), and then mark the blank. Now mark the blank about a half inch in from this first mark. This accounts for the width of the kerf. Now repeat marking bowls and kerfs until you have marked out the smallest bowl you want to turn.

The engineer's layout approach:

The procedure to determine the maximum number of blanks is as follows. Starting with the largest potential blank, for each bowl blank to be removed, add the thickness of the remaining blank, T, to the width of the coring tool's kerf, K.

Material needed for one core = T + K

Repeat this calculation for each desired bowl blank.

Outer blank = $T_1 + K_1$

Core #1 (Blank #2) = $T_2 + K_2$
Etc.
Core (N-1) or Blank N = $T_N + K_N$

Also, determine the radius of the small, inside core and call this D.

When complete, add all the core values together. The sum total cannot exceed the radius of the beginning cylinder, nor can the total exceed the thickness of the blank. Remember when considering maximum allowable thickness to discount wasted mounting wood such as where screws are located.

Layout Example #1 – A shallow blank:

You have a bowl blank that is 16" in diameter and is 6" thick.

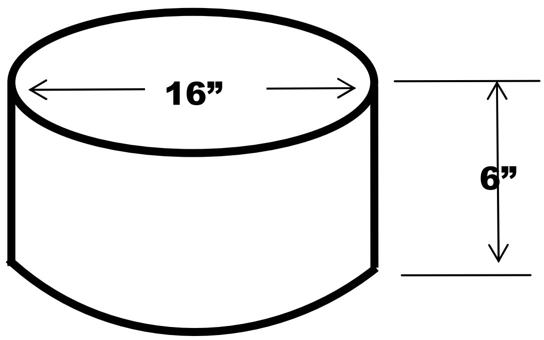


Figure 3 – Shallow coring blank

Assuming that all your blanks are sized as shown below (measurements are the radius dimensions), and each kerf is ½" wide, your layout will proceed as follows (largest blank to smallest core):

1st bowl (16" dia):	6 ½" to 8" radius	(1 ½" thick)
1st kerf	6" to 6 ½" radius	(½" wide)
2nd bowl (12" dia)	4 ½" to 6" radius	(1 ½" thick)
2nd kerf	4" to 4 ½" radius	(½" wide)
3rd bowl (8" dia)	3" to 4" radius	(1" thick)
3rd kerf	2 ½" to 3" radius	(½" wide)
4th bowl (5" dia)	1 ½" to 2 ½" radius	(1" thick)
4th kerf	1" to 1 ½" radius	(½" wide)
inner core (2" dia)		(1" radius)

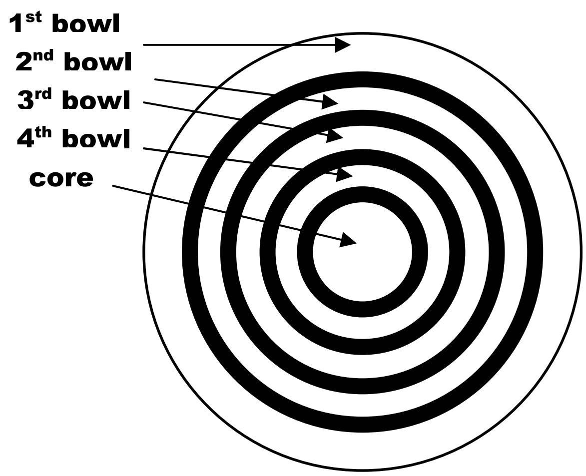


Figure 4 – Face of shallow coring blank with kerfs laid out

The problem with this layout, however, is that the original blank is only 6” thick. The largest two bowls including kerfs will consume 4” of thickness. The third bowl plus kerf will consume another 1 ½” of thickness. At this point, the remaining core is 5” in diameter, but only ½” thick. Therefore, you will only be able to get the first three bowls out of blank

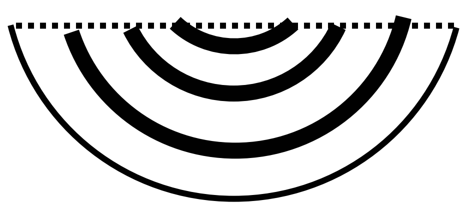


Figure 5 – Side view of shallow coring blank with kerfs laid out

Looking at the side profile in the figure above, you can see that the resulting set is not a true hemisphere, but something less.

This example assumes that each knife selected for each cut is exactly the needed radius. If you have to pick blades that are close, but not perfect, you will loose a bit more wood because you will fail to extract the largest core possible. If you pick a slightly larger radius, the resulting core will be slightly flat (more conical), but with a risk of cutting through the lower side of the outer blank. If you pick a slightly smaller radius, the resulting core will be more rounded, but may not be quite as deep.

> **Helpful Hint**: When in doubt about which blade to select, pick the smaller radius. This is so that if you err, you are more likely to mess up the core than the remaining blank. In other words, you want to make decisions that will protect the largest bowl (the "money" bowl).

Layout Example #2 – A tall blank:

You have a bowl blank that is 12" in diameter and is 10" thick/tall.

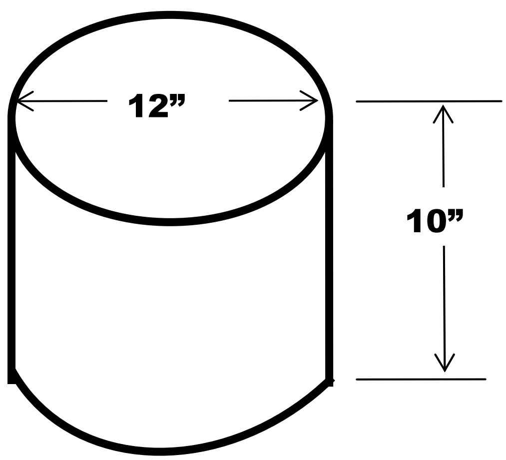


Figure 6 – Tall, slender coring blank

Assuming that all your blanks are sized as shown below (measurements are the radius dimensions), and each kerf is ½" wide, your layout will proceed as follows (largest blank to smallest core):

1st bowl (12" dia):	5" to 6" radius	(1" thick)
1st kerf	4 ½" to 5" radius	(½" wide)
2nd bowl (9" dia)	3 ½" to 4 ½" radius	(1" thick)
2nd kerf	3" to 3 ½" radius	(½" wide)
3rd bowl (6" dia)	2" to 3" radius	(1" thick)
3rd kerf	1 ½" to 2" radius	(½" wide)

inner core (3” dia) (1 ½” radius)

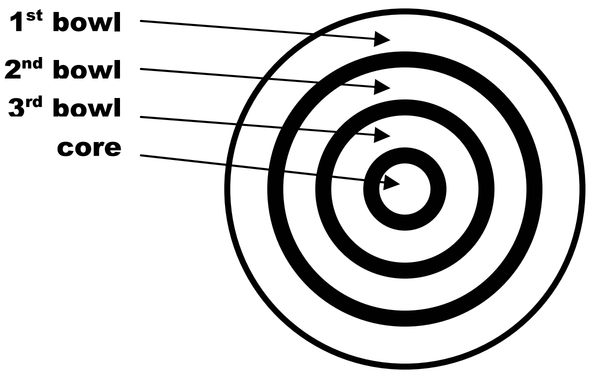


Figure 7 – Face of tall coring blank with kerfs laid out

With this blank, if you cut hemispherical cores, you will waste about 4” of wood thickness. To better utilize this blank, you can use larger radius knives to make deeper cuts into the blank as illustrated below.

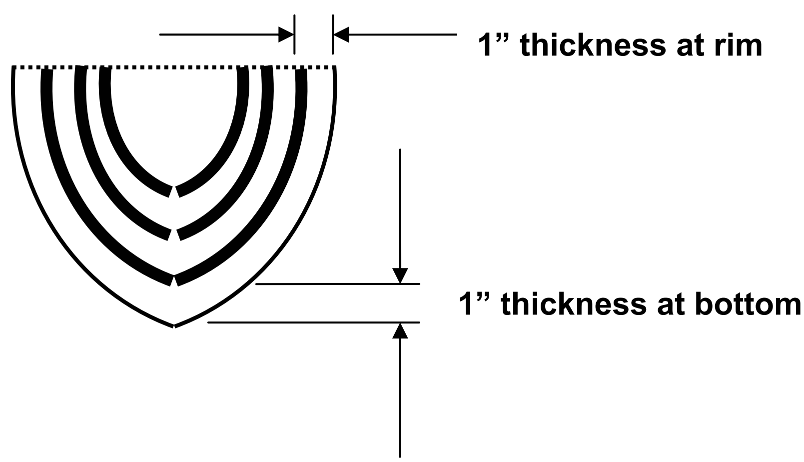


Figure 8 – Side view of tall coring blank with kerfs laid out

Looking at the side profile in the figure above, you can see that the resulting set is more upright with pointed cores. Each bowl can then be shaped individually at a later time, such as after drying. Please note that the thickness of each bowl blank in the bottom should be approximately the same as the thickness of the same blank at the rim. Uneven thickness is a generally a bad design for finished bowls and is problematic if the cores are to dry successfully.

Helpful Hint: Draw a side view of the original block of wood to scale on graph paper. Plan the entry point and stopping point for each blade on the graph paper. Include space for the width of the kerf. Draw in the desire cuts. Keep in mind that:

- Each kerf must be circular (have a constant radius). Use a compass to draw the cuts if it helps.
- The center point for the kerf (compass point) does not need to be on the axis of rotation or on the face of the block.

Step #3 – select knife for each kerf

The layout step helps you to visualize how the cores being removed will be shaped. In order to actually accomplish the task, however, you need to select appropriate knives for each cut.

Many demonstrations and illustrations of these tools show that hemispherical cores can be taken. Of course, this is true. In these cases, the radius of the knife will equal the radius of the kerf as drawn on the face of the blank.

All of the systems, however, will allow you to vary the shape of the core from a taller, narrower form, to a wider, flatter form. In both of these cases, you will select a blade with a radius that is larger than the diameter or the depth of the blank might suggest.

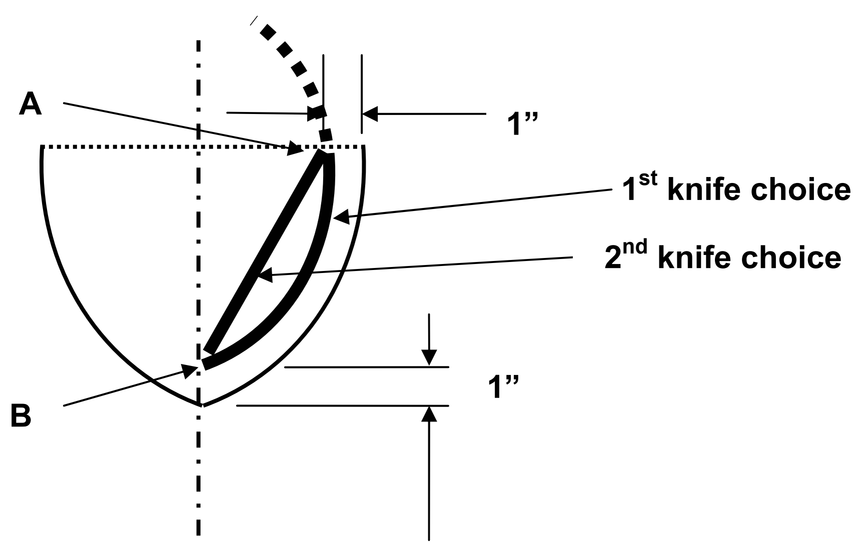


Figure 9 – Side view of tall coring blank with two alternate knife kerfs

Figure 9 shows a tall form where the core thickness is 1”. In this example, the start of the cut is at Label A and the completion is at Label B. The goal here is to have a knife cut from A to B without going through the side of the outer blank.

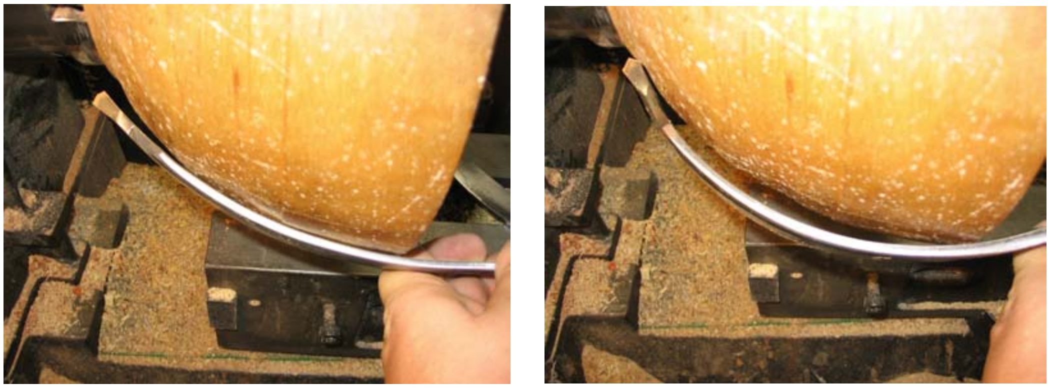


Figure 10 – Holding a blade to the outside of the form to best determine the radius of the blank and radius of the kerf. Fit a blade as shown on the left, and then select the next smaller blade for the core as shown on the right.

Assuming that you have turned the outside of the blank to the desired shape, one method for selecting a knife is to hold candidate blades against the outside of the form as shown in Figure 10. When you find a blade that matches the desired profile, notice the path of the blade and the angle that the blade enters the wood at the rim. This would correspond to the dotted line in Figure 9. Then select the next smaller radius from the set. This corresponds to the first knife choice as indicated on the right side of Figure 9. If you use the Stewart Slicer, the second knife choice as shown on the right side of Figure 9 highlights that kerf. In both of these cases, the thickness of the bowl at the rim and at the bottom is about 1". You can also choose a straighter curve than the 1st choice if you want.

If you choose a knife with too small of a radius, you will get a kerf that looks like the 3rd path illustrated on the left side of Figure 12.

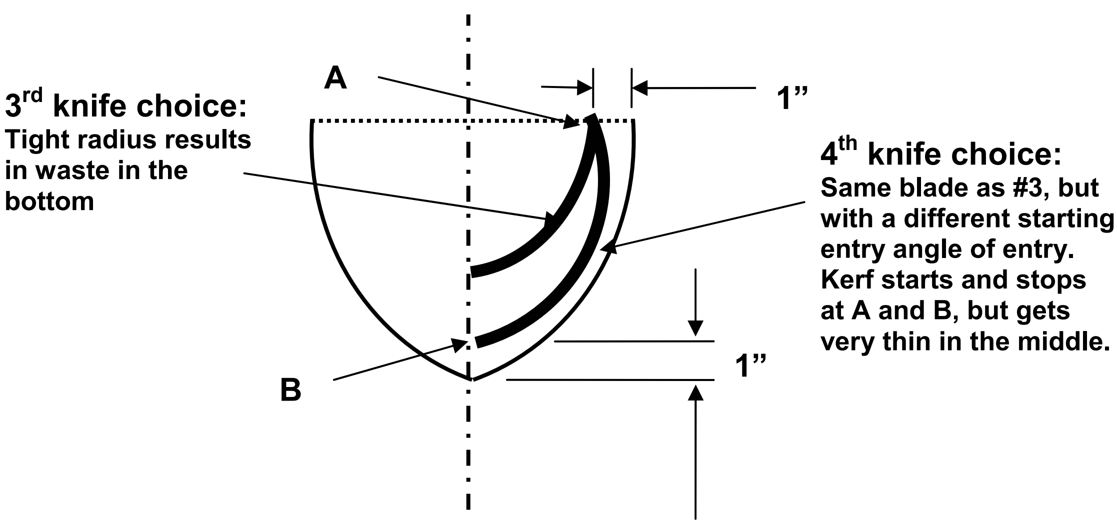


Figure 11 – Side view of tall coring blank with two additional knife kerfs

If your path keeps the minimum bowl thickness at one inch, then the inside cut will result. In this case, the remaining blank will be 1" thick at the rim, but will be much thicker in the bottom. By using the same knife, however, and changing the entry angle, you can join points A and B, but the thickness of the outer blank will be very thin in the middle of the bowl as shown.

The same principles apply to broad, flat bowl blanks. By turning the outer profile and matching the knife to the form, you can increase your chances of selecting the best knife radius.

> **Helpful Hint:** In the Oneway and Woodcut systems, the knives are integral to the pivoting mechanism and do not allow for the user to hold the knife against the side of the bowl's outer profile.

- Cut cardboard or hardboard templates which correspond to each knife in your coring arsenal as shown in Figure 12.
- If you still find it difficult to select the correct knife, draw a side view of the outer blank to scale on a large piece of paper. You can then actually lay your knives on the paper to select the correct blade and to determine the correct entry angle.
- Because the Oneway and Woodcut systems have the pivot integrated into the blade, the amount that you can vary the pivot point is restricted. This means that the Woodcut system will be the most restrictive in allowing variation, and will tend to force you toward hemispherical cores. The Oneway system will be a little more restrictive than the McNaughton system.
- Another method of selecting knives is to hold the prospective blade directly above the piece to be cored to get a downward visual of the blade superimposed on the blank. I have done this, but, if the lathe is too high, you might need a step stool to position your eyes over the piece.
- A final method to select blades is to draw a cross sectional template of the blank to be cored and lay the prospective blades on the template similar to what is shown in Figure 1.

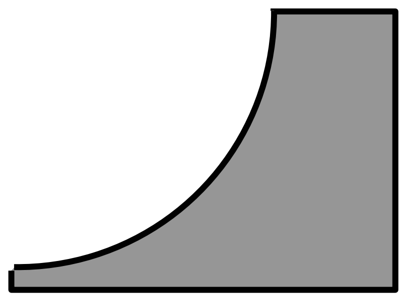


Figure 12 – Sample template for blade radius determination as shown in Figure 10.

At this point, you have accounted for all four bowl blank parameters listed previously:

- Maximum size of the blank that you have. The blank will limit you by its depth or its diameter.
- The knife you select will fix the radius of the cut.
- The starting entry point of the knife on the face of the blank will dictate the rim diameter of the removed core and the thickness of the remaining blank.
- The starting angle of the knife will define how deep or shallow your cut will be, providing a taller, upright core, or a flatter, broad core.

Now that the complete design of your nested set has been selected based upon the four parameters, I have a few design tips for you to consider. Some of these are repeated from the preceding text.

1. When planning a nested set from green wood, wall thickness must be provided for wood movement – just like when turning one green bowl.
2. When planning a nest in a flat surface blank, you can draw or scribe your kerf lines on the surface to help give you visual cues during turning.
3. Good natural edge bowl design suggests that the there be two high spots and two low spots on the rim. Otherwise, the bowl looks lopsided. Reorient the blank between centers, therefore, to achieve this visual balance. When turning a natural edge nested set, do this with each blank individually. Don't assume that by correctly orienting the large bowl, all of the smaller cores end up correctly oriented.
4. When selecting a burl for a natural edge nested set, try to find burls with domed tops as shown in Figure 13. By doing this, you can get more bowls from the blank. In the example shown, a flat blank (dotted line) yields a 4-piece nest, but the domed burl yields a 9-piece nest. Note that when doing this, you might be able to use the same knife radius for all cuts as shown here.

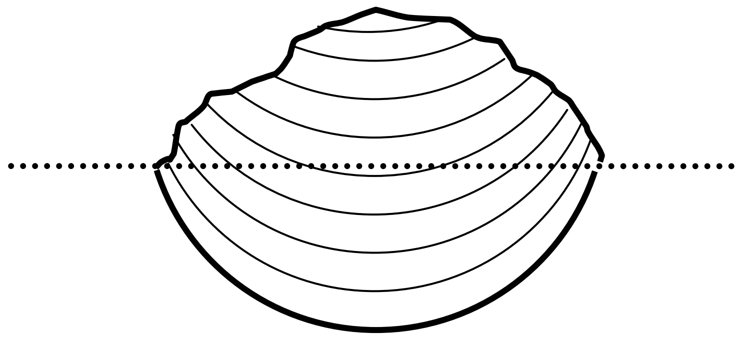


Figure 13 – Natural edge burl blanks yield more pieces if the blank is domed.

5. Related to Tip #4, you can core many bowls from a tall cylinder of wood by entering the blank from the side as shown in Figure 14.

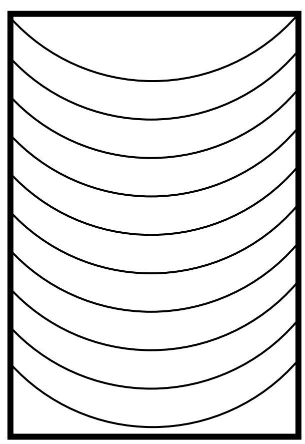


Figure 14 – Nested set from a cylinder of wood.

6. Don’t let the tools dictate the shape of the bowl. Just because you use a Stewart slicer and end up with a conical core, does not mean that you have to live with a conical bowl. Re-turn the cone into a pleasing shape.
7. Don’t let the size of the block of wood dictate the shape of the bowl. Make the best-looking bowl based upon the design you want and the features of the wood. A great looking 10” bowl set will sell a lot faster than an ugly 12” bowl set.
8. As you progress from largest bowl to smallest bowl, always protect the larger bowl in each operation on the set. In other words, be more willing to sacrifice the smaller bowl. The larger bowls are almost always more valuable than the smaller pieces.

9. With all of these systems, there are two possible approaches to coring. One is to take the smallest core first and work to larger cores. The second is to take the largest core first and work from largest to smallest. I recommend the latter because, if the layout ends up suggesting three and a half bowls, it is better to optimize the “money” bowl and let the “half” piece be in the small center rather than the other way around.

At this point, you are ready to start making chips. The last installment of this tutorial will cover the set-up of the rigs and the actual coring process. It will also discuss power, speed, coring on small lathes, and complex bowl shape.

CENTER SAVING TUTORIAL- INSTALLMENT #3

This is the final installment of the center saving tutorial. This section will discuss the set-up of the rigs and the actual coring process. It will also cover lathe power, lathe speed, coring on small lathes, and complex bowl shapes.

Step #4 – set up the rig to selected parameters

In order to get the best use from your center saving system, it goes without saying that you should read the manufacturer's instructions for your particular center saving system. If you get the Oneway or Woodcut systems, watch the videos. They help clarify the use of the tools.

To begin the coring process, you have to set up the tool. In a nutshell, the trick is to position the gate or tool rest such that the knife is oriented to enter the blank at the desired location and at the desired entry angle. For each of these tools, they will cut best and bind the least if the cutter tip is at the centerline of the spindle. Since the kerf is essentially vertical at the centerline, the knives have the most clearance in this position.

Before beginning your cut, make sure that your cutting tip is sharp. The best method for any of these tools is to use a diamond hone on the front bevel of the tip. It is rare that you will need to go to a grinding wheel. This is especially true with McNaughton cutters because the tool steel is a thin layer on the tip of the blade. Sharpening across the top of the cutter could prematurely wear out your cutter tip. In all cases, follow the manufacturer's recommendations.

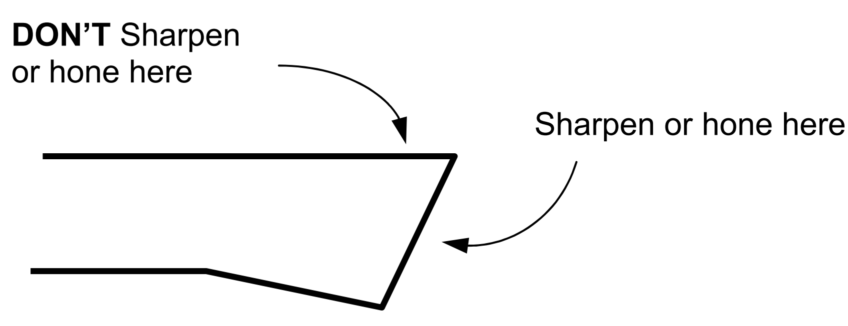
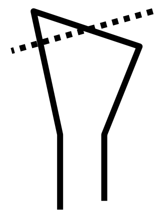


Figure 15 – Honing the bevel.

In the past, McNaughton has shipped most of their knives with a beveled tooth configuration like a table saw blade. They are now starting to ship with a point in the center. This recommendation, I believe, came from Mike Mahoney. In any case, if you have the old style tip, I recommend that you regrind the tip as shown in Figure 16 by the dotted line. The angle is not critical. Oneway's tip already comes with a point. The Woodcut tip is ground straight across. Because of my lack of experience with the Woodcut system, I cannot recommend regrinding their cutting tips.



Grind the corner off the McNaughton blades if not already ground to a point.

Figure 16 – McNaughton's old and new cutting tip profiles.

Another suggestion for McNaughton users is to round off the sharp edges on the tops of the knives with a hone or a grinder. This is useful because it reduces the tendency of these edges to scrape on the inside surface of the bowl blank as it turns across this edge.

Next, you must position the gate assembly to obtain the desired cut. For all the tools, set the gate such that the cutting tip is at the centerline of the spindle.

Helpful Hint: Here are three useful hints for your gate assemblies:

- Since the McNaughton and Woodcut systems use the banjo from the user's lathe, the height setting, once set, will not change from knife to knife. Once you determine the correct gate height for your system, cut a piece of heavy PVC pipe to act as a spacer on the tool post so that you can easily reset the gate height. Oneway has adjustment screws built into the pivot base and the supporting arm base.
- Rubbing WD-40 or paste wax over the surfaces of the gates where the blades slide will help the blades pass smoothly through the gates.
- Consider buffing and waxing the blades to help reduce friction between the blades and the blank.

Please note that if you are a heavy user of the McNaughton blades, it is possible that you will bend them down over time. If this happens, the cutting tip will drop below the spindle center as the blade is advanced through the gate. If this happens, you can compensate during the cut, by raising the gate to offset the bend. You can also just buy a new replacement blade. For practical consideration, however, the only time I have ever seen this is when watching Mike Mahoney.

During your blade selection process, you also had the opportunity to determine the entry point of the blade and the angle of the blade upon entry into the cut. Now you need to position the gate assembly to replicate these to coring parameters. Remember that you do not have to cut a hemisphere. You can also set all three systems (Oneway, McNaughton and Woodcut) to cut a tall, deep core and a shallow, broad core. The McNaughton system, because it is not tied to a pivot point, is the most flexible in this regard. You can position the knife's starting point and starting angle anywhere you can move the banjo. Oneway has the next most flexibility by sliding the support bases to the desired locations. The length of the slots on the base assemblies limits the range. Woodcut offers a small amount of lateral adjustment. Because it uses the tailstock for support, the gate assembly can be moved a couple of inches from left to right.

The feature of the Woodcut and Oneway systems is that, once the gate positions are determined, the blade trajectory is also set. With the McNaughton system, the gate head pivots freely, so you need to set the gate position in conjunction with the knife trajectory. It really helps to have the entry point marked on the surface of the blank so that, if the gate head pivots, you can re-establish the knife entry point.

A suggestion by Oneway that is explained very well in their video is to prepare a spacer block that positions the gate mounting base a fixed distance from the headstock. This technique will help make repeated set-ups fast and easy for a given core shape.

Step #5 – coring the bowls

At this point, you are ready to begin coring. If you follow my process, you will:

1. Core the biggest bowl.
2. Temporarily bag the core until ready to remount it.
3. Finish-turn the largest bowl if dry.
4. Perform sanding on the lathe for the largest bowl if dry.
5. Remove and set aside for bottom/reverse turning at a later time. Otherwise, set the bowl aside for bagging and drying with whatever drying method works well in your location. Dry the nest together in one bag and stack.
6. Mount the large core between centers, add a tenon for chucking.
7. Remount for coring.
8. Repeat Items 1 through 7 until the smallest bowl is cored.
9. Reverse turn all the feet on the bowls.

Except for Item #1 in this list, all of these steps are simply the method that you turn a bowl. Coring, however, needs a bit more explanation.

With all of these tools, you do not want to feed the tool into the wood too aggressively. Given the horsepower of your lathe, you will find an appropriate speed with which to feed the knives. Because of the grind on the McNaughton blades, you may find that they will actually self-feed into the core. If this happens, the tool will likely stall the lathe or cause the blank to be wrenched from the mounting. Therefore, proceed easily.

As the tool advances, listen to the sounds. You cannot see the bottom of the kerf except for the straight blades. If the outer bowl is getting thin, you will hear that in the wood. As you approach the center, the sound will change too. If you are getting thin, stop cutting and adjust the gate. You cannot cause the blade to change directions inside the kerf. You need to move the gate assembly outward a small amount and start the blade into the existing kerf. This change will cause the knife to veer into the central core and away from the outer bowl.

You may also consider using a laser arm to indicate the location of the tool tip. It works the same as the hollowing lasers, but the mounting would be different depending on your coring system.

When using the Stewart Slicer, the leverage on you is the same as when turning with any tool. The wood pushes the tip down and you use your body's mass to overcome this leverage by pressing down on the handle end of the tool. The Oneway and Woodcut tools require no user leverage to control the tool. The gate assemblies completely support the cutting blade as it plunges into the wood.

The McNaughton tools, including the straight blades, are used with the McNaughton gate. This tool is not as intuitive as the others. Unlike most tools where you press the handle down to control the tool, for the McNaughton, you need to ***LIFT*** the handle against the gate when advancing the blade into the kerf. Until you get used to using the McNaughton system you will need to fight the impulse to press down on the handle. ***KEEP THE HANDLE LIFTED SO THE BLADE STAYS IN CONTACT WITH THE CROSS-ARM OF THE GATE.*** If you forget to keep the handle lifted against the cross bar in the gate, the blade will grab and snap against the gate. The experience can be a bit frightening, so be careful.

Clear the chips frequently. Some woods will break into small chips and self clear nicely. Some woods will generate stringier wood waste and will need to be cleared on occasion. If you pull the knife out while the bowl is turning, you will discover that this action will clear a lot of chips. Also, if you bend up a wire coat hanger to make a small hook on the end of a straight piece, you can insert it into the kerf to pull out jammed chips. Only do this with the lathe stopped, or when turning the bowl by hand.

Also, Mike Mahoney suggests that you relieve the corners of the kerf a bit to give the chips a place to go. In other words, think of putting a chamfer on the inside edge of the big bowl and the outside edge of the adjoining core. Don't do this, however, with natural edge bowls or you might damage the edge.

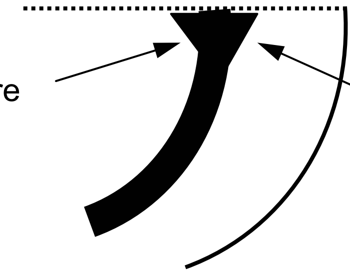


Figure 17 – Chamfering the corners of the kerf to make chip-clearing easier.

Finally, you can widen the kerf by restarting the blade a fraction of an inch in or out from the center. If you do this, however, you are reducing your chances for more pieces.

As the tip of the knife approaches the center, the wood is moving past the tip at a slower and slower speed. You should slow your advance accordingly. Also, as you approach within an inch or so of the center, you might want to slow the lathe a bit in case the joining stub of wood fractures and the core goes flying. At this point, you may consider bringing the tailstock up to the inner core for additional support and safety.

When you are within a ½" of the center, the tenon may break on its own. If it doesn't, you can usually stop the lathe and press on the core to snap it out. You make consider a pry bar too, but do not put too much pressure on the outer bowl or it will crack. This will only be true for side grain bowls. If you turn an end grain bowl, you will have to cut all the way through to the center.

Final Considerations and Suggestions:

With everything that I've stated to this point, you should be able to successfully core a set of bowls. I do have a few remaining comments to offer on lathe speed and lathe power; coring on a small lathe; and making irregular cuts.

Lathe power:

Many turners believe that a large motor is required to perform coring. This is not necessarily true. My first lathe was a used ½" hp motor on a 12" lathe. I was able to core several 3-piece nests where the outside bowl was 11" or smaller. With a smaller motor, however, you may need to reduce the feed rate of the knife into the blank. In other words, if you bog down the lathe, back off on the thrust applied to the knife. Also, make sure that you clear the chips often from the kerf.

Lathe speed:

I usually run my Stubby lathe around 300 to 400 rpm. I find that this speed range provides me the best coring success. For very large blanks, slow the lathe below 300 rpm. For smaller blanks, you may speed the lathe up. Consider setting the speed proportionally to the speed that you would use to turn a bowl of comparable size: the larger the blank, the slower the speed.

Coring on 12" lathes:

There are several, fine 12" lathes on the market that are neither particularly massive, nor do they have powerful motors or variable speed. They usually have a 1" x 8 tpi spindles. The question usually boils down to, "Can you core using the lowest speed on these lathes: around 550 to 600 rpm?" The answer is yes. Since the coring activity is on blanks around 11" in diameter less, coring at 600 rpm is doable. I recommend using a light touch as you feed the knife into the wood. As your confidence increases, you can increase your feed rate.

I do not recommend attempting to core on mini or midi lathes. They are not robust enough to withstand the forces that these coring system impart. For that matter, I'm not even sure you can buy a coring system for them.

Coring complex curves:

The final topic I want to address is the coring of complex shapes. Up to now, I have only referred to simple convex curves or cones for the outside of the bowl. What other shapes are possible with these coring systems? This is a trick question. The answer is that any shape that you can turn in a blank is possible for your inner bowl. Can you cut the complex shape with the knife itself? Maybe, but I would argue that it is a waste of time to try.

As I stated before, all of the blades in these systems are either straight or arcs from circles; therefore, these tools can only cut a straight line or a circular cut. There are those that claim they can produce shapes such as those shown in Figure 18.

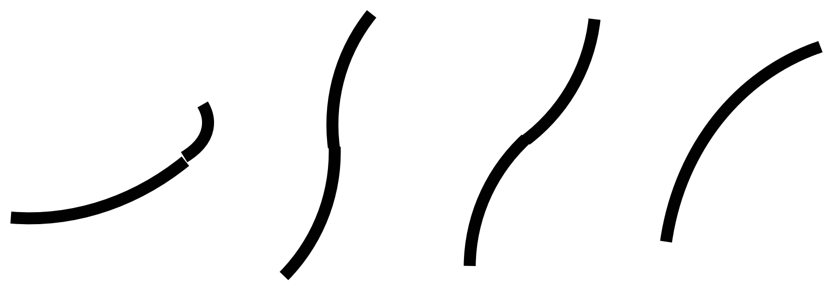


Figure 18 – Four potential complex bowl shapes: tight and broad convex curve; flared ogee; and inward ogee.

Any turner that is accomplishing these curves is doing so by increasing the width of the kerf through which a round blade can be inserted. If you open up a portion of the kerf near the rim, you might be able to insert a different blade into kerf to change the shape of the bowl. All of the shapes in Figure 18 can be completed and others too with this method, but to do so means that you trade off the size of the inner bowl. A combination of curves and straight blades can be utilized to approach the shapes shown. Even so, a lot of wood is wasted.

If you are willing to give up bowl size for complex shape, then I recommend a different alternative. Instead of using the coring tool to make complex shapes, make a simple cut with a minimal kerf, then, re-turn the bowl between centers a bowl gouge. By using a gouge to create the complex shape, you can see the cuts that you are making instead of blindly using the coring tool to accomplish the same thing.

Concluding Thoughts:

This tutorial is not intended to be a complete review of every coring process adopted by other turners. I have tried to explain a process that works along with helpful suggestions along the way. Each coring system has its own strengths and weaknesses, as well as its own peculiarities during operation. In general, however, these procedures should help any user of these coring systems obtain better performance from them.