Creating Shell Ornaments by Kurt Hertzog

There are many ways to integrate shells into ornaments and other turnings. Seashells such as urchins in any size or shape, and natural shells from chickens, geese, or ducks, are available and easily used. While I don't profess that this method is the answer, I do know the technique works and it solves a lot of the pitfalls I've experienced working with shell materials over the years. I have heard of a technique using an expanding foam material to help improve the structural integrity of a shell. Apparently it works. I haven't tried it. It seems like a messy solution to only one of the problems I have experienced. What follows is the technique that I currently use. At this point in time, I'm happy with the results. It works well for me so you may wish to give it a try to see if it works for you. Obviously, shell bodies where you can see inside, such as pierced eggshells, require a different method for aesthetics.

The two biggest downfalls that I've seen people encounter when with working with shells are that the shell fails as a structural element and adhesion failure problems when bonding finials or other decorative elements directly to shell material.

The design and process explained here addresses both of those issues and a few others. This method also economizes on expensive, or not, wood used in the project. If you need to turn a larger diameter stock to fit into the openings in the shell, why waste all of that material by turning the rest of that wood into a slender finial.

I see the advantages of this method as: it removes the shell has a structural member; eliminates all adhesive bonding to the shell; economizes on the use of larger diameter materials; and allows for mix and match component selection for best aesthetics; and lends itself to a production style of work. The example used in this article is a Sputnik sea urchin shell but the multi-piece, assembled component ornament concept will work for most others.

Comments and suggestions are welcome. Contact me at kurt@kurthertzog.com.

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You can get Sputnik sea urchin and other urchin shells in different sizes. The Sputnik shells vary in color from white to cream with tints of purple. Other species are available in green, blue, pink, violet, and other colors.

Nearly all of then will have an erratic, non-circular opening at both ends. The opening can be made acceptably round by using the sanding disk on a rotary hand tool. It will be fine tuned later on in the process when the finial bases are made.

Close examination of the shells will often find hairline cracks that will fracture now or in the future. Also, the sound of the shell can indicate a flaw. Any shell with a dull “thunk” has some hidden flaw and is one you should avoid.

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The hairline marking barely visible in the previous picture above was indeed a crack in the shell. With virtually no enticement, the fractured area separated along the fracture line.

Depending on your threshold for perfection, you may want to closely examine the shell for damage before you invest a lot of time working on the rest of the ornament pieces.

It is rare to find a shell that doesn't have some kind of flaw. Here is a flaw that would be easy to overlook on the finished ornament, especially when viewed from a bit of a distance.

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Some more cosmetic blemishes that while a bit unsightly up close would probably be missed in casual viewing of the final product. If absolute perfection is desired, I'd skip this one as well.

With Blackwood currently costing over $10/lb, I hesitate to use larger diameters and cut away most of it. I make the finials as assemblies. Each of the respective pieces made from various sizes of stock to minimize wastage. I do try to match colors and grain.

Here is the bottom of the top finial "base", the piece that will fit into the opening of the shell. There is a shoulder to rest on the top of the shell as well as a bit of an inside "plug" to help block seeing any flaws in that opening of the shell.

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Rather than grind off a bunch of spikes haphazardly, I mark only those that will interfere with the seating of my top finial “base” and then grind the nubbin away only as much as is needed for proper seating.

The top finial base seating is a trial and error fit for diameter and spike clearance. Tuned until I’m happy with the fit and seating. There is a very small amount of clearance intentionally allowed between the shell and wood diameters.

I use a piece of bamboo kabob skewer to hold my many ornament component pieces together. Here is the drilling to pass the kabob skewer through. The diameter is drilled to be a slip fit to allow for gluing.

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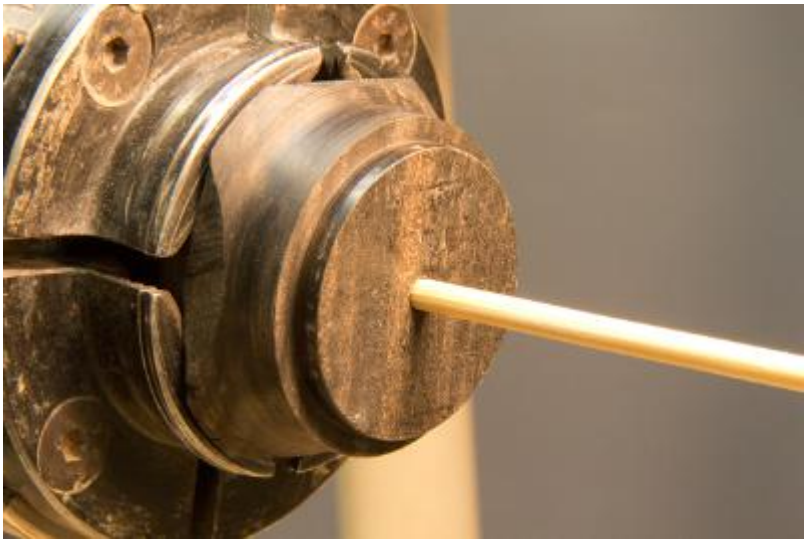
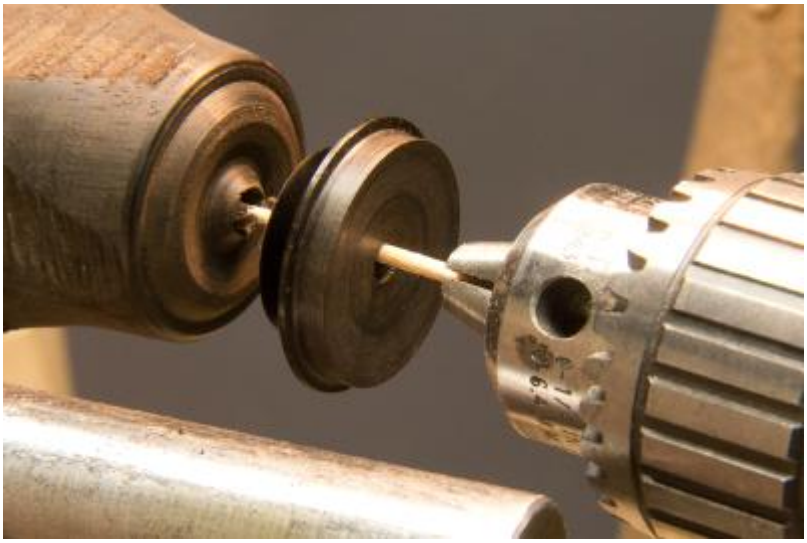
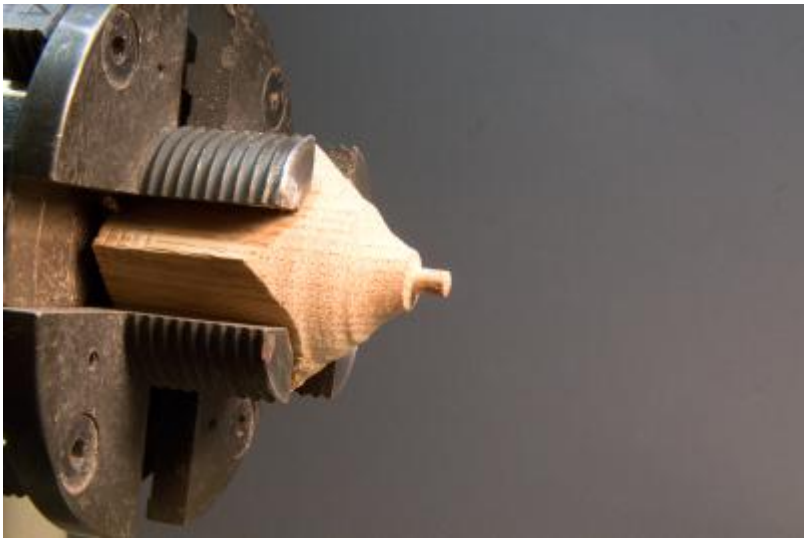


Even though it isn't a critical dimension or fit, it takes little time and effort to test fit the actual kabob skewer that is intended for use. If there isn't sufficient clearance for loose slip fit, drill larger. Too much clearance? Change kabob skewers for one in the bag with a larger diameter.



Top and bottom finial "bases" are turned as much as possible when mounted in the chuck. Then are parted off and reverse mounted in the chuck for completion on that side. The small inner diameter on each can be marred in work holding as they are internal. Here a toothpick is used to capture the bottom plug on separation.



Custom turning mandrels as needed is a worthwhile skill to develop. Here a scrap piece of oak is used to make a mandrel for the finish turning of the upper finial. The finial was already drilled for the kabob diameter and that hole is used for the mounting on the mandrel.

Unless the walls of your finial are thin or weak, you can cut the mandrel shaft size to be snug press fit. If you are too loose, re-cut another piece or wet the mandrel before putting on the finial.

Regardless of how you get there, the mandrel should securely hold the finial to be finish cut, sanded, and finished appropriately. Care in creating the mandrel, including a shoulder to seat on for accuracy, allows the work run true.

Turned, sanded, and finished. When running on a stub of a mandrel like this, sharp tools and light touch are the keys. These are good skills to develop regardless of your turning interests. At this point, time for a quick center drill and then drilling for hanging line.

For my bottom finial, I always turn with only a headstock mount. No tailstock. That allows it to run true and have no incentive to flex because of tailstock compressive forces. Traditional spindle cutting with that much unsupported length usually doesn't work very well.

Not only does the work flex away and chatter, you usually will wind up with spirals to go along with your design. As you get closer to the headstock, it is less of a problem. BTW – the other end of the finial has already been drilled with the kabob diameter hole.

A more effective way to cut delicate spindles, mounted only from one end or between centers, is to support the cut with your own "spindle steady". If you "squeeze" the work between the cutting edge and your spindle steady, there is no reason for it to flex. It only rotates between the two equal and opposing forces.

Work from the tailstock end towards the headstock, turning, sanding, and finishing in small sections as you go. Leave as much strength as you can for as long as you can. This is a one-way trip. Get everything just the way you want it before moving on to the next section.

Work in small sections and work to completion while progressing towards the headstock. Also notice the paper towel. No cloth in my shop for safety reasons. The paper towel is used to clean the turning between each progressive grit of sandpaper.

While you can free form your creation of finials, I find that having a plan in mind or on paper helps. The overall length, taper, features, and finished upper diameter where it meets the bottom are all things to think about and plan for.

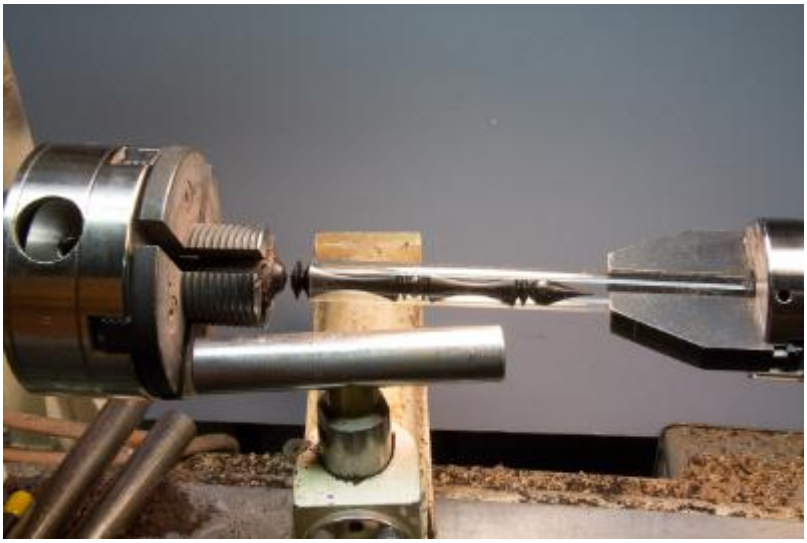
Ready for parting off. Remember, prior to this mounting, the blank was rounded to run true, mounted, faced, and the kabob hole was drilled to a planned depth. I already know where the end of the finial must be to be properly assembled.

Putting a protective shield around the turning allows for parting off without worrying about reaching over the lathe or having it damaged by falling. This tube, far too big, is better than nothing.

A more appropriate sized “catchers mitt” and a smaller chuck to hold it in place. There is no contact between the finial and clear tube so there is no need for the tailstock to rotate. The tube is only there to catch the finial to prevent damage when parted off.

With your “catchers mitt” in place, you can now focus on finishing up the details at the interface end of the finial. You can also support your tool properly having both hands available to control the tool and make the separation.

Voila, the finial is separated with a nice clean cut. The finial is unscathed in the plastic tube.



This is a pretty simple yet very powerful concept. A simple plastic tube, cup or any vessel that can be held, placed so it surrounds the work as it is parted off frees your hands and your mind. Using this and the toothpick (or anything else) in a drill chuck to catch any piece with a hole when parting off has many applications in turning.

Here are all of the parts of my ornament assembly. Top finial, top finial base, shell (of any kind), bottom finial base, and bottom finial. All of the pieces that will be held together with a piece of bamboo kabob skewer. No wasted wood by turning little finials out of much larger diameter stock.

Here are the only two glue joints that carry any load other than their own weight. The top finial to the kabob skewer glue joint carries the load of the entire ornament. The bottom finial base glue joint to skewer carries only its own weight and the weight of the shell.

Can you see how you can make component parts to mix and match until you are content? Don't like the look of a piece? Make another. Before committing to glue, you can change anything you wish. Make a bag full of each of the various pieces and create ornaments on demand in a production style mode.

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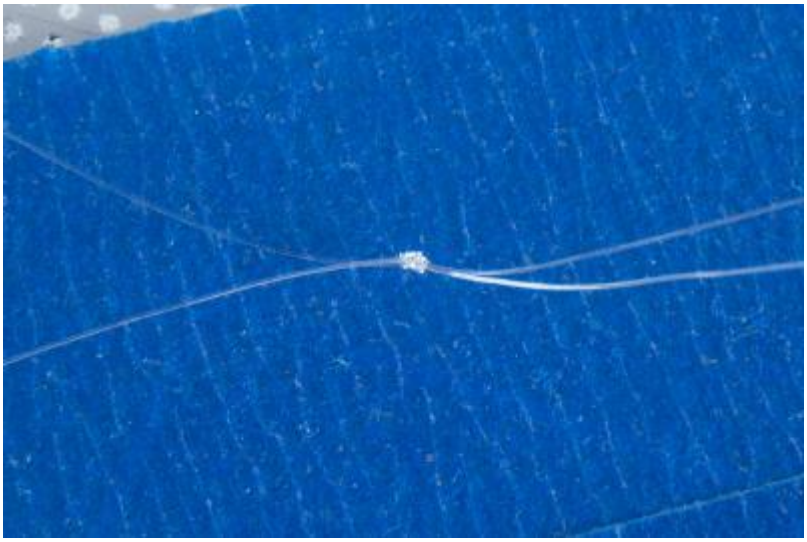
While many use threaded in eyelets as part of their hanging system, I find them visually distracting and clunky looking. I use fish line for my entire hanger system. Depending on the mass of your ornament, you can pick the fish line size appropriately. I use clear 2# test whenever I can.

If you need something stronger, use it. You can see the difference in size and clarity between 4# and 2# test. My goal is to have the hanging mechanism as invisible as possible. I'd like the fish line to disappear into the background if at all possible so the ornament appears to float in space.



With the previously drilled finial hole sized large enough for my 2# test line knot, I cut off a length of line. After determining the desired loop size, I tie a knot to help secure it in the hole when glued.

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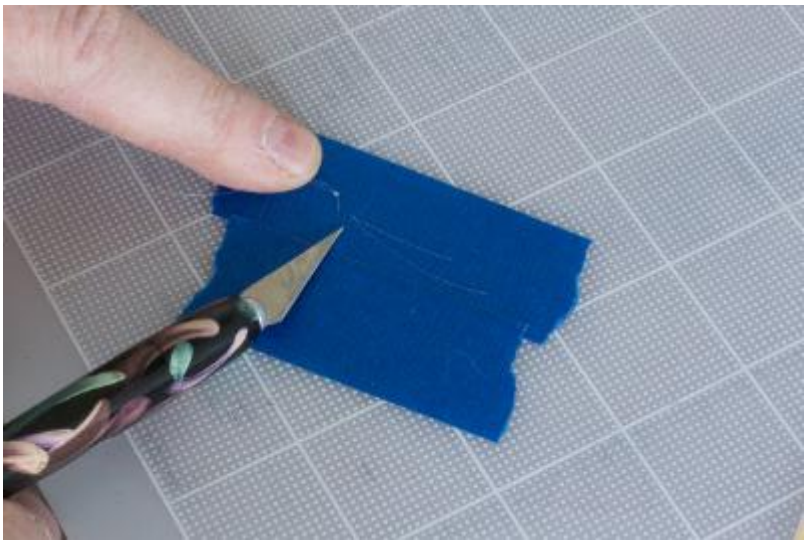
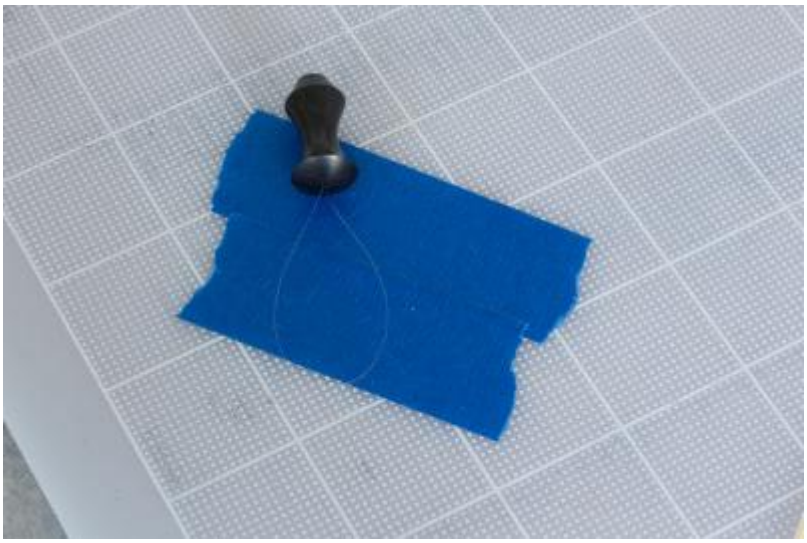
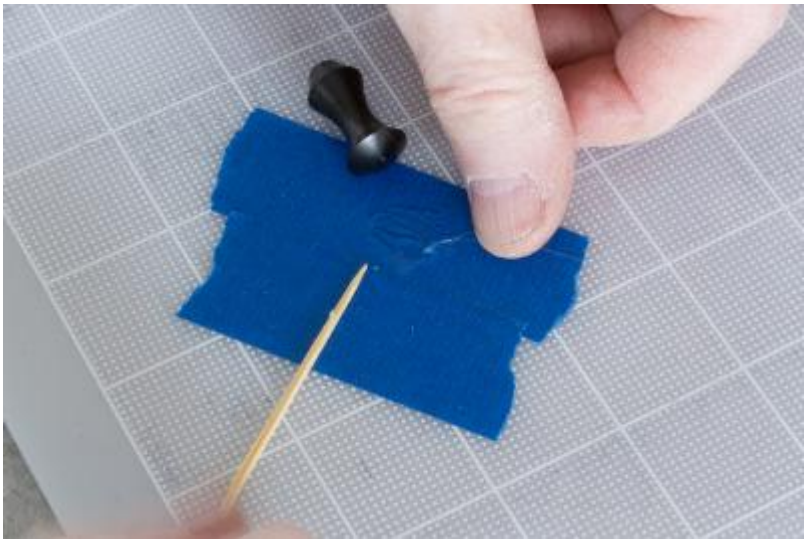


A short length of line is left below the knot. I want the loose ends to bottom out in the hole while the knot, a short way up from the bottom of the hole, is securely fastened in the column of glue. The knot acts as a mechanical obstruction to pulling out of the glue bond in the hole.



It never hurts to test fit things. Make sure they fit as you wish before there is glue on things. Sufficient loop? Knot deep enough in the hole? When you are content, it is time to make things permanent. The disadvantage to this method is the inability to change loop size or hanging material like you can with a brass eye.



I use epoxy for all of my fastening needs on ornaments. I like the open time, the ability to fill gaps, and the long-term flexibility of the material. The hole has been wetted with glue and here the knot is coated with glue as well.

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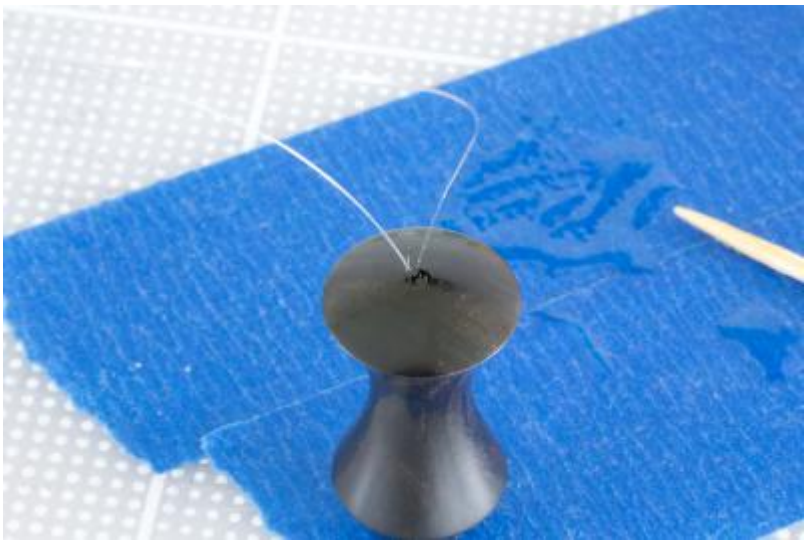

I try to get sufficient glue in the hole so that it fills. I'd like to see it at or close to the top of the hole. Not so much for strength but for appearances. Any open depth showing at the top of the hole is visually distracting if someone examines things up close.

Bamboo kabob skewers are nearly impossible to cut cleanly so I use this to my advantage. The raggedness can help gap fill as well as provide more face grain surface for adhesion.

I intentionally crush both ends for the reasons above. Originally, I used the parent finial material turned to a tenon and glued into the top. That developed into assembly with a dowel, and then a thinner dowel to now kabob skewers. The kabob skewers, or something similar, are cheaper, smaller, and lighter. Certainly strong enough for those turning beasty ornaments but works well in all sizes of work.

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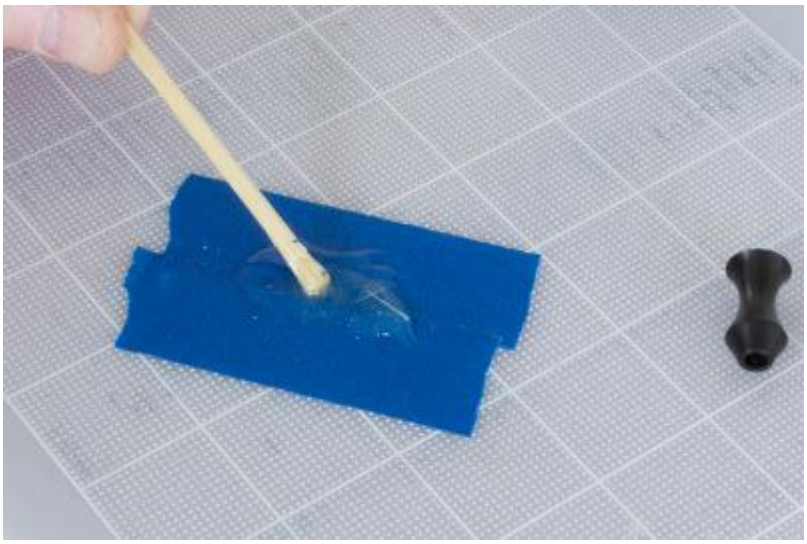
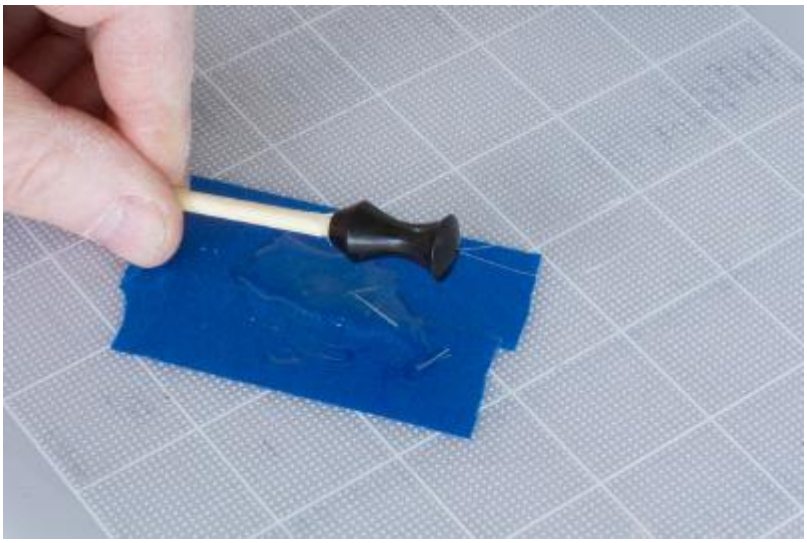


With the ends crushed, why not use the kabob skewer as my mixing stick? Saves getting something else dirty and helps work the adhesive into all of the fibers on the crushed end of the skewer.



The kabob skewer is bottomed out in the top finial, twisted around to spread the glue, and set aside to cure. Care is taken to keep the area on the bottom surface of the finial clean. This will be a mating surface to the upper finial base. Good clean mating surfaces will help the visual appearance.

A high tech curing fixture. The weight of the finial keeps it seated while it cures. Also by standing it straight up, there is little tendency for the kabob skewer to not remain centered should the hole be a touch large. The flared out fibers also help keep things centered.

Once the top finial is cured, it is time to add the top finial base. Because the interface between the top finial and the top finial base is a visual interface, all adhesive is applied on the inside bottom. There is no load on this joint so it only needs to be held in place.

This interface is a surface to surface mate. Both surfaces should be clean and flat so the seam is not noticed. A small bit of pressure on the joint while it is setting up isn't a bad idea to keep them in intimate contact.

Even though my frugalness has made me use two different pieces of wood to create this finial, it never hurts to line up the grain as much as possible while gluing things up. Attention to detail does make a difference.

The top finial is just resting in place for this photo. Even though it is not properly seating or sitting flush, you still should be able to note that the finial is intended to follow the same curve as the shell. I want it to appear to be part of the shell.

Here is a look at the next step dry fit. Again, there is an interface to the bottom finial that must be kept clean so the gluing will be done on the shaft from the inside. By design, the shell does no load bearing and is held captive between the upper and lower finial bases. This finial base is cut so it follows the curve of the shell as well.

Another high tech assembly fixture. A cardboard core from a copier paper roll. I cut them down and use them for ornament shipping containers. Here is a short cutoff length with the spindle core in place. The shaft hole becomes a perfect positioning device for positioning the ornament for gluing and to let is rest until cured.

Positioned with the upper surface of the top finial base resting on the paper drum hub hole, the shell is positioned and readied for gluing the bottom finial base in place. Glue is placed on the shaft below the pen mark so that it is all tracked inward keeping the bottom interface surface clean. Since this glue joint only carries the weight of the shell, it doesn't need to have adhesive slathered all over. A good wetting on the shaft carried into the hole will work nicely.

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The bottom finial base is glued in place. Once cured, the lower finial is glued in place. This glue joint carries only the weight of the lower finial. Hopefully not much weight at all. Care is taken to put glue into the hole so that it is tracked deeper into the hole with none squeezing out and becoming apparent at the seam. I glue the two pieces of the bottom finial in two separate steps. You can do it simultaneously but I find I can better focus on the finial gluing when the lower finial base is permanently fixed. The hole in the finial is intentionally a bit deeper than the length of kabob skewer so it doesn't bottom out. When glued, the lower finial can be lightly pressed to create an unnoticed seam. If you have messed up in your planning and the skewer bottoms out, sand enough off the skewer before gluing on the finial.

When the lower finial has cured, you have the finished ornament. The grain orientation between the top and bottom finial bases was aligned when glued as was the bottom finial to bottom finial base. Attention to details does matter. No squeezing of the shell in this method. The urchin shell (or any other shell, big or small) just sits between the finial bases and is free to move as needed. The shell carries no load, has nothing glued to it, needs no strengthening or blown in foam, and is loose enough that any change in dimension in the wood doesn't stress it. Remember the grain orientation of the kabob skewer? Virtually no movement in that direction and there was a slight clearance intentionally cut into the two bases to allow for movement.

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Same concept of a “captured” shell works a host of shells of all different sizes. Here, one of the mini urchin shells, there is no skewer utilized. The lower finial has a shelf for the shell to sit on. The lower finial itself has a thin tenon turned on the shaft that extends through the shell body and is glued into a hole in the bottom of the top finial. The shell is only captured between these two finial shelves. The finial is a continuous piece of wood that happens to have a glue joint. There is no need to glue anything to the shell or worry about it breaking other than impact damage.

Closing Thoughts

Originally this article was created as a narrative for publication in a magazine. It may run one day but since it has been waiting in the queue for quite some time, I’ve adapted it to a pictorial using some more recent photos. The problem with pictorials is that you can’t convey all that you’d like, particularly the underlying reasons and thought process, in to the captions. You can put a lot of information in a narrative that doesn’t quite fit in the captions space. Regardless, I hope most of the key concepts are clear. To recap the entire article…

Advantages:
Totally removes the shell from any load bearing
Doesn’t require any “strengthening” stuff like foam or other material
Eliminates any adhesive bonding to the shell material
Allows for stress free use of dissimilar materials
Entire assembly is face grain to face grain gluing
Maximizes utilization of materials

Allows for mix and match of component pieces
Eliminates the unsightly screw eyes and wire/yarn/string loops
Concept works on a variety of “captive” components
Isn’t unduly stressed with moisture or temperature changes

Disadvantages:
Perhaps more time consuming, but very minor

Some additional nuggets:
Using a toothpick or similar in the tail stock to capture cutoffs pieces
Using the plastic tubing or some containing vessel to catch cutoff pieces
Tape stuck to bench as glue mixing area and peeled up when cured

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Revisions
12/23/11 Adapted to pictorial from narrative article
12/24/11 Spelling errors corrected
01/03/12 Layout changes, minor text corrections/additions