



Robust Sea Urchin Shell Ornaments

David Lutrick

First modification

The first modification is to inject aerosol foam insulation into the shells prior to beginning the construction. The foam insulation adds significant strength to the shells, but insignificant weight. I can now handle the shells during construction as if they were made of wood. I have even dropped several completed ornaments from bench-top height to the floor without damage.

The aerosol foam insulation is the type sold for filling voids in walls. Sold in home improvement stores, it is made by Dow, DAP, and Owens Corning, among others. Choose one that has good dimensional stability, because some of the foams are sensitive to changes in relative humidity and temperature. Make sure the can comes with an extension tube or straw. Several cautions are worth noting. The foam is *extremely* sticky. Once dry, it can only be removed mechanically by picking or scraping off the residue. This applies to your hands as well as to the shells, so you might want to wear nitrile gloves. The foam is soluble in acetone before it cures, so keep a

The article by Bob Rosand in the Fall 2007 issue of *American Woodturner* (AW vol 22 no 3) introduced turners to the exquisite beauty and detail of sea urchin shells. I have made over fifty such ornaments, and along the way I have figured out how to make them less fragile. The modifications strengthen the ornaments by adding internal rigid foam and eliminating the glue joints between the shell, icicle, and finial.

supply of acetone and a brush handy. After use, flush the straw and the top nozzle of the can with acetone before the foam solidifies.

If the top of the shell has an open hole, seal it by applying painter's tape on the outside of the hole or by placing a disk of tissue paper on the inside before injecting the foam into the bottom hole.

The foam expands slowly to about twice the wet volume before solidifying in approximately two hours. The correct amount of foam is difficult to control, because the amount released when pressing the aerosol can valve is somewhat unpredictable. Photo 1 shows that using too much foam to fill a shell will result in a plume of excess foam; however, the excess can easily be



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Excess foam can be removed by twisting it off or cutting it with a fine-toothed hobby saw.

removed by twisting it off or cutting it with a fine-toothed hobby saw after it is dry.

The expanding foam can split very fragile or thin shells, common for the purple and pink varieties, even if the foam can vent freely from the bottom hole in the shell. The splits will be along natural weak points in the shells, which may be hard to see.

Once the foam is dry and any excess is removed, proceed with the ornament construction.

Second modification

The second modification is to use a connecting center dowel between the icicle and the finial rather than gluing these pieces to the shell itself or making a close-fitting insert.

First, use a conical, spherical, or tapered grinding stone, about 1" in diameter, to form a smooth, beveled recess around the natural hole in the bottom of the shell (*Photos 2 and 3*). This recess will be used to accept a matching-beveled base on the icicle. Just press the rotating stone, mounted into a power hand drill, into the hole far enough so that any irregular edges or shell spikes are ground away. The foam will be removed as well, but it provides some strength to the shell during the grinding. I have experienced very little chipping while grinding the beveled hole. If the shell has a large hole in the top, as is common with the Sputnik variety, you may want to grind a recess for the finial base around that hole too.

The second step is to make the icicle. The icicle base needs to be turned to match the ground-out hole in the bottom of the shell. For some shell varieties, such as the Sputnik and pink sea urchin, you will probably need to turn a relatively large, beveled flange on the icicle base to cover the hole. On green and purple shells, a smaller, spherical base can be used.

Drill a hole for the connecting dowel in the icicle about 1/4" deep, just enough to get a good glue joint. You can do this step on the lathe or drill before mounting the wood on the lathe. You may use 1/4"- or 3/16"-diameter dowels, so drill your

hole accordingly. Photo 4 shows how the icicle, finial, and dowel are connected to the body of the sea urchin.

Construct the finial with a center hole to accept the dowel and design its base to match the top of the shell. On varieties that have a small top hole in a convex surface, undercut the base around the dowel hole. On varieties that have a larger hole, turn a beveled base to fit snugly into the top hole.

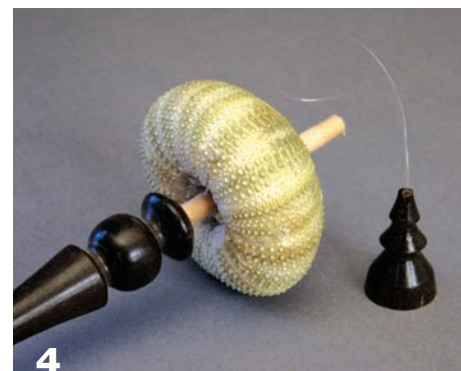
Complete the icicle and finial by sanding, polishing, and buffing, as desired.

Hanging the ornament

I use monofilament fishing line to hang the ornaments. This requires a third step, drilling a small-diameter hole through the finial in the axial direction. I do that on the lathe immediately after the dowel hole is drilled in the finial. The small-diameter drill bit tends to wander off the centerline, so take care or the hole will not be centered in the finial.

When the foam-filled shell, icicle, and finial are completed, glue a dowel in the icicle base that is long enough to go through the shell plus at least 1/2". To make a hole in the foam, use a rat-tail file. If the shell you are using does not have a hole in the top, you will need to file through the shell as well. Make the hole just big enough for the dowel. Insert the dowel, seating the icicle base in the beveled, bottom hole.

Carefully estimate the dowel length to ensure a snug fit between the shell and the finial. There should be enough dowel inserted into the finial hole for a good glue joint. If a beveled flange is



4 The icicle, finial, and dowel are connected to each other, through the body of the sea urchin.

also used for the top hole, both flanges should fit snugly inside their shell holes. If you will be using a monofilament hanger, make a loop of line and tie a small glass bead on the line before knotting it before gluing the assembly together. Place this on the inside of the finial. The bead and knot will jam in the finial hole and prevent the line from pulling out.

Dry fit the finial, with line inserted, on the dowel and adjust the length of the dowel if necessary. With the line loop in the finial and threaded through the top, glue the finial onto the dowel, pushing it down snugly on the shell.

With this construction, the weight of the ornament, icicle, and finial is borne primarily by the joined wooden components rather than the shell. The use of a grinding stone to bevel the holes, as well as turning a matching flange, eliminates the need to cut close-tolerance inserts and holes for glue joints.

To ship completed ornaments successfully, use a 3"-diameter cardboard mailing tube, cut to adequate length. Wrap the ornament in small-bubble, bubble wrap and place it in the mailing tube. The combination is light enough that even using postal letter rates is economical. ■

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