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learn to rivet and ripple this dynamic pendant
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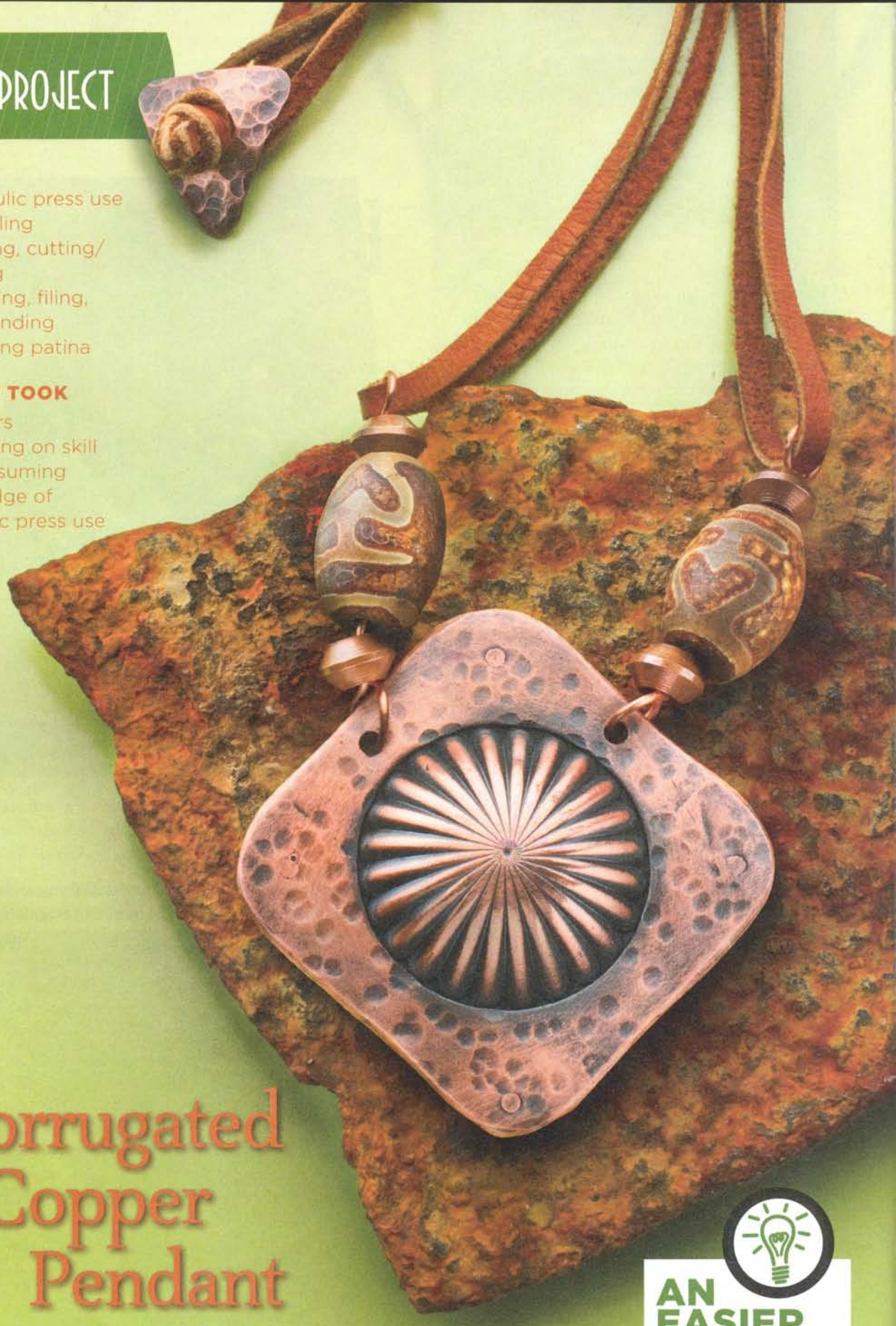
SKILLS

- Hydraulic press use
- Annealing
- Riveting, cutting/sawing
- Texturing, filing, and sanding
- Applying patina

TIME IT TOOK

2-3 hours depending on skill level, assuming knowledge of hydraulic press use



Corrugated Copper Pendant

Learn precision die forming with a special new system for the hydraulic press

BY RAMINTA JAUTOKAS

AN EASIER WAY

see page 26 for a simpler pendant and earrings

I LOVE TO ADD DIMENSION to my jewelry designs, which is why the hyraulic press is one of my favorite tools. I was thrilled to discover a new tool for the press from Bonny Doon™ called the Precision Non-Conforming Die Containment System, which is used with a Bonny Doon™ Precision Non-Conforming Die. This pendant design is a result of some my exploration with this new system.

Not only does this system add dimension to your work, but amazing detail as well, even in thicker metal. This is possible because the cylindrical container and pusher are a very tight fit: when the urethane is compressed, it has nowhere to go but into the die. The brass dies are individually hand machined at Bonny Doon's studio with a rose engine from the 1880s. Most notably, rose engines were used to create the renowned Fabergé eggs. To me, the dies by themselves are pieces of artwork. The design possibilities with this system are endless. For this project, I chose to create a simple copper pendant by riveting the die-formed piece between two sheets of metal.

Be sure you understand hydraulic press use and safety before starting this project — and always wear safety glasses when using a hydraulic press.

Photo 1 The system comes with a cylinder, pusher, and three urethanes of different durometers and shapes.

Photo 2 Cut a 1 ¾" diameter disk from a 2" x 2" sheet of 24 gauge copper, using hand shears, a jeweler's saw, or a large disk cutter. I prefer to use a large disc cutter designed for use in the hydraulic press; it is precise and a huge time-saver.

OPENING PHOTO: JIM LAWSON; PROJECT PHOTOS: RAMINTA JAUTOKAS

MATERIALS

24 gauge copper sheet, 2" x 2" or 1¾" disk and two 1.5" x 1.5" discs

22 gauge copper sheet, ¾" x ¾"

18 and 20 gauge copper wire

48" deerskin lace

Two Tibetan etched agate beads (optional)

Four copper beads (optional)

Liver of sulfur, Nikolas lacquer, or method of choice to preserve patina

Jeweler's cement with hypo tip

TOOLS

HYDRAULIC PRESS: 20 ton hydraulic press, Bonny Doon™ Precision Non-Conforming Die Containment System, Bonny Doon™ Precision Non-Conforming Die #3

HAND: Jeweler's saw (#4/0 blades) or disk cutters, hand shears (my preference is Joyce Chen scissors), ruler, circle template, permanent marker, center punch, #60 and #45 drill bits, flex shaft or drill press, riveting hammer, steel bench block, flush cutters, round nose pliers, masking tape

ANNEALING: Torch, annealing pan, copper tongs, water for quenching, pickle, brass brush

FINISHING: Hand files, sandpaper, green Scrubbie, polishing cloth

OPTIONAL: Bench shears to cut out metal squares, large disk cutter for 1 ¾ disk, small disk cutter (1" and 5/16"), brass hammer, texturing hammer, dapping block and dap

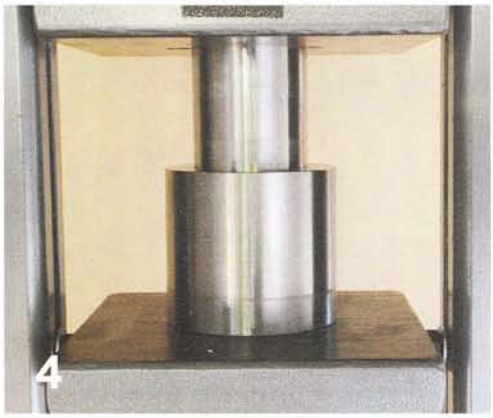
SOURCES

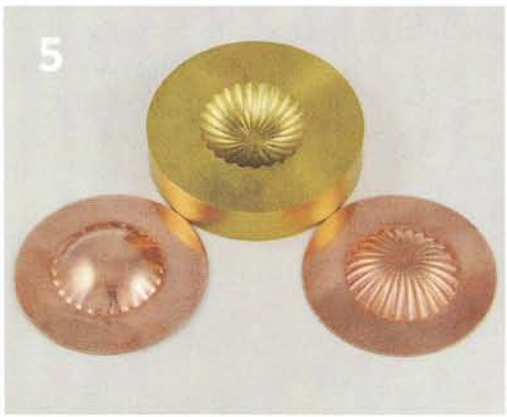
Most of the tools and materials for this project will be available from well stocked jewelry supply vendors, many of whom can be found in our Advertisers' Index, page 121. Both the Bonny Doon™ Precision Non-Conforming Die Containment System and Precision Non-Conforming Dies are available exclusively through riogrande.com. The dies are sold separately. Nikolas lacquer is available at wholelot-tawhimsy.com. Joyce Chen scissors are best found by doing a search on the Internet.

AN EASIER WAY

Eliminate the riveting and layering to simplify this design. Just press and go!

- Make a simple pendant. Cut around the die-formed piece and leave a tab. Fold the tab over to create a bail.
- Cut out the die-formed piece and attach a bail. Create lightweight earrings by cutting out the die-formed piece, drilling a hole and attaching ear wires.





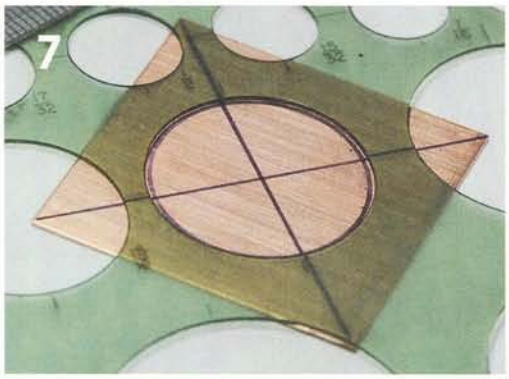


Photo 3 Preform the copper disk by assembling the containment system as follows: the die in the bottom of the container, the copper (annealed and lubricated), the 60 durometer urethane, and finally the pusher. This preforming step ensures that the metal moves evenly into the die and, as a result, reduces outer edge thinning of the metal that may lead to tearing. Use small pieces of masking tape to ensure the metal stays centered.

Photo 4 Center the assembled cylinder on the lower platen of the press. Press to 3,000 psi. Remove pusher, urethane, and the metal. Anneal, quench, pickle, clean with a brass brush, and thoroughly dry the copper.

Photo 5 The preformed piece, the die, and the finished piece.

Photo 6 Once the metal is preformed, assemble the system again: the die, the preformed copper (annealed and lubricated), the domed 95 durometer urethane with the domed side facing the metal, and finally the pusher. Center the assembled cylinder. To press in the detail, press to 8,000 psi.

Check the detail in the metal. The subsequent presses are to 10,000 psi. Usually, you will need to press to 10,000 psi more than once. How many times you press depends on the gauge and type of the metal, as well as the details in the die. Anneal and clean the copper between the presses. The die I used has very fine lines in the center. I know I have reached maximum detail when the lines show up in the metal. I pressed to 10,000 psi two times.

Photo 7 Make the top and bottom squares that will sandwich the die-formed piece by cutting two 1.5" x 1.5" copper squares using bench or hand shears. Draw lines from one corner to the other to create an X. Using these lines and a circle template as a guide, draw a 1" circle in the center. Cut out the circle with a jeweler's saw (#4/0 blade) or a 1" disk cutter.

Photo 8 On the top square, mark the positions for the four rivets about $5/16$" down from each corner and center-punch them.

learn more

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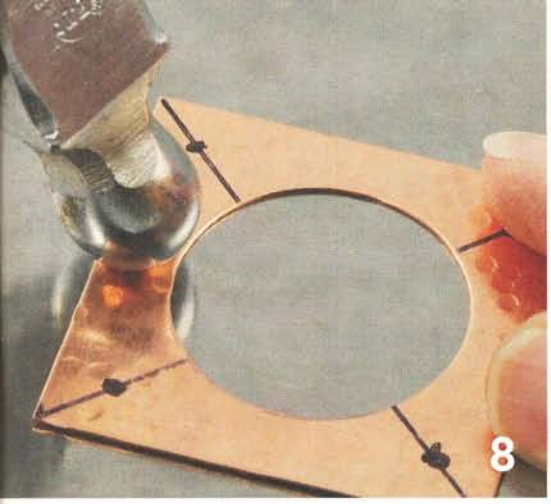
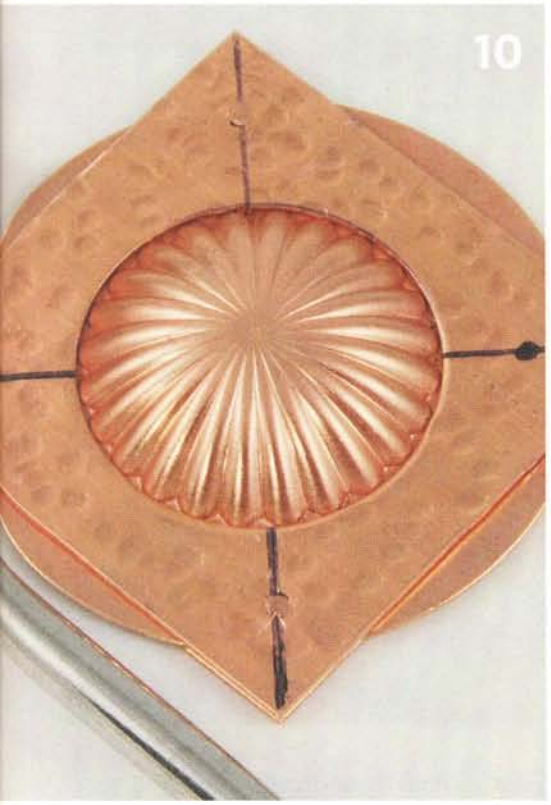
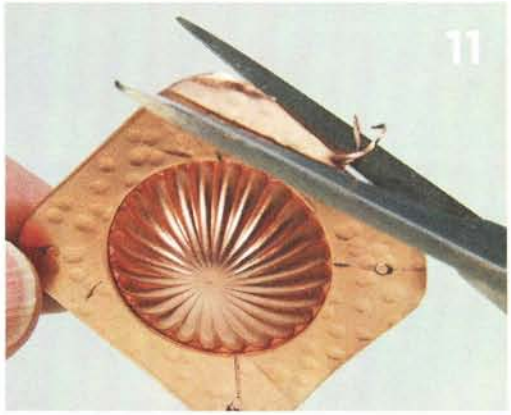
corrugation techniques in Cool Tools & Hip Tips







Texture the top piece. Don't wait to texture after the piece is assembled, because you risk hitting the die-formed piece. I used the ball peen side of my chasing hammer.

Photo 9 Assemble the pendant by sandwiching the die-formed piece between the two copper squares. You don't have to fit everything together perfectly since you will be trimming the edges. Just make sure the hole in the back plate is centered over the back of the die-formed piece. Tape the three layers tightly together with masking tape. I also tape the assembly to a piece of wood to make sure that it does not move while drilling. Drill through the three layers using a #60 drill bit.

Photo 10 Flush-rivet one corner, using 18ga wire. Drill and rivet the opposite corner. Once the two rivets are done, you can drill the other two holes at the same time and rivet the entire piece.

Photo 11 Round the edges of the square and trim off the parts of the die-formed piece that are sticking out with a jeweler's saw or hand shears. I added free-form contours to the sides for a more organic look. My favorite hand shears are Joyce Chen kitchen shears. They work great on metal, and because they have narrow blades, they are easy to maneuver around corners. Use hand files to round off the edges and then sand until smooth. You can use your flex shaft if you prefer. I also like to round off the edge of the top and bottom plate so I get a nice smooth look and feel.

Photo 12 Select the rivet that will be the top of the pendant. Drill a hanging hole ½" from the rivet with a #45 drill bit. Do the same for the other hanging hole on the other side of the rivet.

tips for successful pressing

- **gauge.** 20-24 gauge metal works best, although you can use 18 gauge.
- **anneal first.** Annealing the metal before pressing provides the finest detail available from the precision dies. Always make sure the metal is clean and dry before pressing.
- **lubricate first.** Always lubricate the metal before pressing to help the metal move evenly into the die and reduce the chance of it ripping. Lubricants such as Liquid Bur Life®, lard, or liquid lanolin work well.
- **center tools.** Make sure tools are always *centered* on the steel platens of the press before pressing. This step is critical for the Precision Non-Conforming Die Containment System because of the 10,000 psi required to form the die details in the metal.
- **remove plates.** The assembled cylinder is pressed directly with the steel platens. If you have acrylic or Kevlar® plates attached to the platens, remove them because they may shatter. The pusher and container do not have any sharp edges and will not damage the steel platens.
- **seat properly.** Always check to make sure the pusher is seated flat and plumb within the container.

Not only does this system add dimension to your work, but amazing detail as well, even in thicker metal.

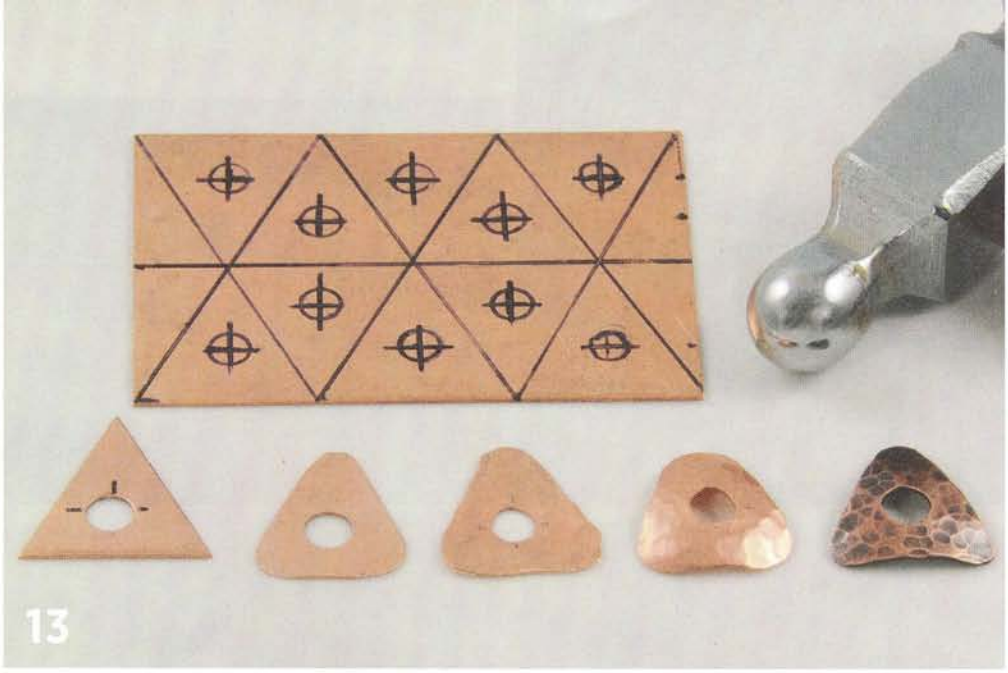


Photo 13 Cut a triangular shape from a ¾" x ¾" sheet of 22ga copper for the toggle. Saw or use a disk cutter to punch out a 3/16" size hole in the center of the triangle. Round off the sharp corners with hand shears, sand, texture, and dome the toggle.

I like to make more than one toggle at a time. I start with a 2.5" x 1.25" sheet and draw out 10 toggles and mark their holes. Then I cut out the holes and toggles and trim them as desired.

Photo 14 I used liver of sulfur to patina the finished piece and the toggle. For the final finish, I used a green Scrubbie on the flat part and polishing cloth on the domed part. The final finish is really up to you. To preserve the patina and prevent the copper from tarnishing, I use Nikolas lacquer, which is traditionally used to prevent tarnish on brass instruments, but also works well on jewelry. Just make sure you have good ventilation and do not apply it when it's too cold or you will get a cloudy finish.

Photo 15 I chose deerskin lace to hang the pendant because it is very soft and supple, and the soft brown color looks great with the copper. For visual interest, I wire-wrapped Tibetan etched agate and copper beads onto the pendant and made a wire loop on the other end. The lace is threaded through this loop. I used 4.5" of 20ga copper wire and 24" of deerskin lace for each side. Thread the deerskin lace through the toggle and tie knots on both sides of the toggle. Make a loop on the other side. I also apply jeweler's cement with a hypo tip to the interior of the knots to make sure they do not untie.

RAMINTA JAUTOKAS is a studio artist/metalsmith in Los Angeles, California. She can be contacted at raminta@raminta.com.

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uses of corrugation in jewelry design in Trends