Repairing Ornamental Plaster

BY RON AND WILLIAM BISSON

I've been a plasterer for about 40 years. Along with my son, William, I run our business, Bisson Plastering, out of Craftsbury, Vt. We do new and restorative plaster work for both residential and commercial properties around New England and have had the great fortune of working on dozens of buildings on the National Register of Historic Places. Our work varies from large jobs, which entail making large decorative moldings (such as ceiling medallions and cornices), to repairing plaster ceilings and walls for small, rural farmhouses. In this story, we'll offer a glimpse into our fairly specialized niche of repairing historic plaster.

Last spring, we began plaster restoration work at the Fairbanks Mansion in St. Johnsbury, Vt. The mansion is part of the St. Johnsbury Academy (a private high school) and it serves as function space on the main floor and student housing on the upper floors. Built in 1884, the structure—the crown jewel of the academy's campus—has been under extensive renovations for the last couple of years. Most of the plaster cracking throughout the building was a result of normal wear and tear, but extensive foundation and structural repairs contributed to more-pronounced plaster damage localized to the first-floor rooms.

In terms of complexity, the ornamental plaster ceiling in the building's main entry hall **(1, 2)** was the project's most challenging restoration work for us. The ceiling's thin decorative patterns were done in what we refer to as flat reliefs. It had suffered from water damage and extensive cracking. Complicating matters, it had a rustic sponge finish. Though this rough, stippled finish looked like it had been added in intervening years, it was original and added a degree of difficulty to our work.

MAKING AN IMPRESSION

On our initial walkthrough, we verified that the entry hall's walls were a mix between gypsum- and lime-base-coat walls. We tested the walls by pushing a putty knife into them (if the knife goes through to the lath, it's lime base coat; if it doesn't, it's gypsum base coat—gypsum is much harder than lime). A few of the home's original lime-base-coat walls remained, while most had been redone with gypsum (lime walls typically last about a hundred years). The walls were on the thick side, 7/8 inch thick (conventional plaster typically finishes off at 3/4 inch). Inspecting the ceiling,

Master plasterer Ron Bisson inspects his replacement plaster flatwork **(1)**, which will be used to repair the main entry hall ceiling of the Fairbanks Mansion in Vermont **(2)**. Prior to making a mold, his son, William, brushes on one of seven coats of flex wax over an intact motif **(3)**. Then the wax impression is removed from the ceiling and prepped for mold making **(4)**.

Photos by Tim Healey

we discovered it was lime base by chipping on some of the cracks and noticing its softness. We also found that the ceiling was on the thin side, about 1/4 inch thick, which was a little unexpected given the robust nature of the mansion's overall construction.

Starting out, we needed to make replacement pieces for some of the damaged decorative motifs. We chose intact candidates on the ceiling, masked them off with painter's tape, and applied petroleum jelly to the existing painted plaster surface to help release our impression molds. Then we applied flex wax in seven coats to a minimum thickness of 3/32 inch **(3)** to the shapes we needed. Once hardened, we removed them from the ceiling and prepped them for making molds **(4)**—we removed the painter's tape and trimmed the wax "negative" mold **(5)**.

Of all the molds we use, wax molds are the easiest to make. There isn't a lot of handwork or complex ingredients involved, but they have short lifespans. For this ceiling, we needed to replicate only three decorative shapes (a sun motif and two floral patterns), creating a few of each, so we were able to get by using wax molds rather than the standard rubber ones we usually make.

MOLD MAKING

Next, we mixed fast-drying, highly refined gypsum, or gauging, to make what would be the flat bottoms, or saddles, of our molds **(6)**. Gauging is an ingredient used to make plaster, which hardens it (the more gauging added, the harder the plaster). We sprayed the bottom of the wax with cooking oil, then poured the gauging over the wax **(7)** and flattened the saddles out with putty knives **(8)**. After 20 minutes, the molds were ready to flip over.

The replacement flat-work pieces were made with straight Hydrocal white gypsum cement by USG (no lime added). Hydrocal is a super-hard, highly-refined molding plaster, which we use for making thin, ornamental work that needs to be strong. We sprayed the wax molds with cooking spray and poured the Hydrocal into the top of the molds. After five minutes or so, the mold was ready to be disassembled—first the saddle **(9)**, then the finish replacement piece **(10)**.

APPLYING THE PATCH

First, we carefully removed the damaged decorative molding and some of the adjacent plaster down to wooden lath. We scored the existing plaster with a putty knife, cutting slowly through the finish and base coats. While removing the plaster, we pressed on the edge of the remaining plaster at the same time, so we didn't hurt the ceiling **(11)**. We cleaned out all the gaps in the lath, allowing us to key our new plaster into the lath. We precisely lined up the replacement pattern

Ron trims the wax negative **(5)**, while William and apprentice Derek Dawson mix fast-drying gauging (gypsum) to make the bottom, or saddle, of the mold **(6)**. After the wax has been sprayed with oil, the gauging plaster is poured over the wax **(7)**, flattened **(8)**, then later flipped over (Hydrocal is used to make the new pieces). First, the mold's saddle is removed **(9)**, then the paper-thin, Hydrocal replacement piece **(10)**.


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After the damaged piece has been removed **(11)**, Ron applies a bonding agent over the old, dusty lath **(12)**, then spreads a thin coat of plaster (heavy on the gauging, light on the lime) to the repair area **(13)**. Squeeze-out from the replacement piece is tooled around the edge **(14)**. Finally, touch-up lime putty is feathered to the existing painted surface, with the excess wiped **(15)** and tooled **(16)** off the existing paint.

to its desired location, then scribed and trimmed our replacement piece to the opening. With our new piece dry-fit to our liking, we wet down the existing wood lath using a pump sprayer and applied a bonding agent **(12)**. We use USG's Plaster Bonder to help adhere new plaster to old, dusty lath. The bonder takes about an hour to become dry and tacky.

With the bonding agent ready, we prepared the plaster that would hold our replacement piece in place. We mixed the plaster with a lot of gauging and just a small amount of lime in order for it to set quickly and adhere the decorative piece to the ceiling. We applied it to both the bonding agent **(13)** and the back of the replacement piece (at this stage, you have to work fairly fast and know precisely where the new piece is located). Also, to add to the degree of difficulty, you have to apply the right amount of plaster fill to flush up the new piece with the existing ceiling—this takes a lot of practice.

While the replacement piece was being held in place, we pushed excess plaster squeeze-out into any voids and tooled the edges **(14)**.

FEATHERING NEW TO OLD

For the finish touch-up work, we mixed some lime putty. We typically use autoclaved lime, which we soak for a few days (a process known as slacking the lime). Slacked lime is more pliable and it blends into itself better. We store the wet lime in buckets and use it as needed. Working in small batches, we made small rings of lime and added a retarder in a little bit of water to the ring. Also made by USG, gypsum plaster retarder is used to control how long you want a batch to last (or as we refer to it, timing the batch). Once the retarder was mixed in the water, we added gauging to the lime—if a retarder weren't added to the mix, the gauging would cause the lime putty to set up almost immediately after mixing it.

Because the existing ceiling was painted and lime putty cannot adhere to paint, we had to feather our new touch-up work right up to the edge of the painted surface. While texturing to match the existing ceiling, we wiped the plaster off the paint while we worked **(15)**, using a rodding spatula to help texture the ceiling and scrape back the new plaster **(16)**. Perfectly feathering in a new replacement piece with lime putty is a quick process that happens in a matter of minutes; a lot must be done before the finish sets up. After the lime putty dried, we applied parging (spackle) over the hairline seam between the new plaster and the existing painted surface and sanded it smooth to cover the seam.

Ron and William Bisson own and operate Bisson Plastering, in Craftsbury, Vt.