Using Aluminum Castings For Restoration

When ordering custom castings for restoration projects, different quality levels are available.


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Custom castings are often requested during renovation and restoration projects. Often, new castings must be reproduced from old pieces taken from the job site, or even a drawing, old photo, or faded newspaper clippings. On a small scale these projects can be a homeowner needing 2-3 fence panels to repair a fence, or on a large scale the project can be a government agency restoring a turn-of-the-century post office.

Because of the age of the castings being reproduced, almost all of the designs are originals made in cast iron. The aluminum replacements are easily accepted by the fabricator and architects. Aluminum is more forgiving than cast iron. It is easily drilled and fabricated, lighter in weight, rust free, and simple to weld. If the project involves attaching aluminum castings to a steel frame, a steel clip, bolt, or stud can be placed in the aluminum casting during forming. This steel insert can then be welded to the steel framing.

There are some quality constraints with a restoration project. If the job calls for only a few new castings, the tooling charges may easily outweigh the cost of the individual pieces. On a small project, for example, our foundry can reproduce directly from the older casting sample by forming the mold around the “loose” sample. In this case the detail in the new piece will be no better than the detail in the old casting, and in many cases worse. By producing the new casting loose there is no toling to hold the sample rigid in the production equipment. This lack of rigidity causes floating, which sometimes reduces the quality. There is also a loss of crispness in the detail and an accumulation of defects. Think of this method as using a photocopier, where you must make a copy of a copy. Each time a “copy of a copy” is made, the defects accumulate. As details become blurry and blotches occur, some of these defects can be eliminated by using an old sample to make new tooling or by re detailing to create an epoxy look-a-like.

The reproduced castings will also be 2 percent smaller than the original. When the 2 percent shrinkage is a problem, the issue can be circumvented by lengthening the sample casting or by adding epoxy where needed.

A typical renovation project, where no samples were available, is shown in Figures 1 and 2. The figures
are of a window cresting for the renovation of a 1920s house in Miami, Fla. All ironwork on the house had been removed and destroyed by a succession of owners. But the new owner had a faded 1920s newspaper article and photo that depicted the house when new. This photo was used to make the full scale drawing in Figure 1, and reproduced as three new woodcarvings. The resulting castings are shown in Figure 2. It is a remarkable reproduction.

Figure 3 shows two cast iron panels from a Pennsylvania bridge renovation project where samples were available. The sample panels were cleaned up, epoxy was added to lengthen the required 2 percent, and new match plate tooling was fabricated. A 100 units of each design were required. Figure 4 is an example of the original bridge railing.

The first casting on the left in Figure 7 shows an 8 inch cast iron stove leg with a hollow back. The other three castings are aluminum legs that have been cast loose, without the benefit of permanent tooling. Only one leg was required. But because reproducing in this manner sometimes gives questionable quality, we cast three legs and picked the best one to ship. Around the edges of the two right most castings, the rough edges can be seen. The selected casting, second from left, also looked this way, but it was extensively cleaned with chipping hammers, grinders, and files.

The two cast iron finials in Figure 8 were cast in Ohio during the late 1800s for a mansion in Passacoula, Miss. A current source for matching finials could not be found. Alloy Casting was sent a sample of each finial. An epoxy mold was made, and the resulting finial was detailed and mounted to a pattern board. To provide a compatible welding point between the aluminum finials and the steel frame, we provided a 2 inch long, 3/8 inch diameter smooth steel rod that was cast into the aluminum. The rod protruded out 1 inch. The fabricator’s job entailed redoing old broken fence sections and a driveway expansion. Over
1,000 finials were required.

Over the years Alloy Casting has done many restoration projects. Each project was unique. We once did aluminum pieces for a large scrolled iron chandelier with missing sections. It was fortunate that the lamp was not welded as it allowed the iron and aluminum replacement pieces to be interlaced and bolted together. The chandelier (no photos available) now sits in a restored mansion in Ohio with few people knowing its blend of old and new technology.

In 1992 the Hill Country Courthouse in Texas was gutted by fire. Two years later we were requested by a local Waco, Texas, fabricator to reproduce the window walk roof cresting for the courthouse. The source material for the product included old photos, old drawings, and a partial piece of heavily burned cast iron. There were five pieces to the project that entailed a combination of four wooden pattern boards and one aluminum match plate. The exterior of the building was the first phase in the renovating project, and the new aluminum roof crestings were visually equal to the old cast iron pieces.

The diversity of projects that fall under the renovation and restoration category is endless. Every project from home owner’s fencing to bridges, to building facings to theater stairs, to roof cresting, has been completed with aluminum castings. We have even had inquiries to do aluminum castings for antique cars. Anything is possible.

The key items to consider for reproduction are the quality of the sample item submitted as a pattern and the trade off between the number of casting required and the amount of tooling investment needed to maintain quality.

FIGURE 7: The stove leg casting on the left is cast iron with a hollow back. Although only one duplicate was needed, three were poured to allow for some selection. The one chosen for shipping is the part second from left, shown after cleanup.

FIGURE 8: These two iron finials were originally cast in Ohio during the late 1800’s. To reproduce these, an epoxy mold was made, and the resulting finial was re detailed.

Alloy Casting has been a NOMMA member since 1974. This article is the fifth in an ongoing series on custom castings. For a complete collection, call Alloy Casting at 800-527-1318.