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# CASE HISTORY

## Grandeur and Durability

**Market Segment:** Architecture

**Composite Application:** Replicate wooden pole

**Resin:** Vicast® A556  
Unsaturated polyester

**Manufacturing Process:** Filament Winding Stack

**Height:** 6 feet (1.8 meters)

**Diameter:** (taper 6 to 8 inches)  
15.2 to 20.3 centimeters from the top

**Installed:** 2007

**Location:** Arlington, Virginia, USA

New stylistic light poles in front of the U.S. Pentagon are exact replicas of the redwood poles that stood there before – except for one important factor. The replacement poles are not wood.

Instead, the replicas are made of a novel material system that will outlast wood and add to Serra Designs' reputation for bringing fine art and polymer technology together. The primary ingredient that gives the new poles a warm, wood-like "feel" is a Vicast flexible unsaturated polyester resin from AOC.

The poles are the latest manifestation of the lifelong pursuit of art by Serra Designs' owner and President José Serra. His talent for artistic drawing was already emerging when, as a six-year-old boy, Serra came with his family from Cuba to the United States. Over the years, Serra branched out to other media, such as woodcarving skills that were employed by Karges Furniture, The Karges experience laid the foundation for Serra Designs, Inc., a manufacturer of specialty and custom



*Two different views of the replica poles installed.*



## Grandeur and Durability, continued

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cast polymer products. Serra's reputation for exceptional woodcarving reached contracting giant Hensel Phelps Construction Co. Hensel Phelps is responsible for part of the long-term project that is restoring the Pentagon, a National Historical Landmark, to its initial architectural grandeur. The restoration included unique wooden light poles.

The profile of the narrow poles tapers toward a fluted crown with intricately carved design details. Atop each crown is a dish-like bobèche that holds a frosted glass globe light. The poles line the outer wall of the Pentagon's Mall Terrace Entrance where time and weather led to aesthetic decline.

### Carving Consumes Time

Hensel Phelps first asked Serra to personally carve 12 new poles out of wood. Serra said, "I told them it would take me two years to complete the job in wood. The demands of my business gave me little time for the extensive, detailed carving that was needed. I suggested that we make polymer replicas that would look exactly like the originals, right down to the wood grain on the surface. They didn't believe that was possible but after some urging agreed to send one of the old poles to see what we could do."

The half-century-old pole served as the master pattern for a mold that would produce an identical likeness. The original pole had deteriorated to the point where areas of rotted wood had to be cleaned away and filled in so Serra could artistically carve the initial detail back in. The original pole's finish was also removed so the mold could pick up the grain of the wood.

The prepared master was encased in silicone to form the mold that would produce a cast polymer replica. The new wood-looking pole was made with Serra Designs' proprietary "recipe" for products that look and feel like wood or leather. In addition to picking up wood grain and other details, the special material is designed to accept commercial, oil-based stains. After a dark stain was applied to the sample pole, an automotive grade clear coat was applied to provide protection against ultraviolet degradation.

"When the contractor's people examined the sample we made, they were amazed it was not wood," said Serra. "They changed their minds about wanting wood replicas and ordered cast polymer creations. The new

poles were made more quickly and cost-effectively. They perfectly match wood's appearance but will last indefinitely. And our process allowed a metal conduit to be integrally cast inside the length of the pole to serve as a wire chase." When the job is complete, Serra Designs will have produced 53 replica poles.

### Warm touch with Vicast®

The Serra Designs' base material for wood and leather replication is a blend that is three parts Vicast polyester to one part of a rigid resin. "Because of its flexibility, the Vicast resin in this cast polymer formulation is what makes our artificial wood and leather products warm to the touch," Serra stated.

The resin blend is filled with an application-specific mixture of alumina trihydrate flame retardant, glass beads, calcium carbonate and processed pecan shells. All materials except the nut shells are supplied through distributor Composites One. Serra said Composites One Sales Representative Ron Presley and AOC Technical Service Specialist Mark Campbell, CCT-I, CP, provide great support.

According to Serra, his special resin formulation was discovered through many iterations of trial and error. In addition to its warm feel, the resin combination results in a faster gel time. "The blend provides the timing we like and are comfortable with," he said. "The poles are just one of many products we make, and we have to keep production moving."

Good productivity contributes to timely delivery, one of the Serra Designs attributes praised in a letter of commendation from Neely Spraberry, Hensel Phelps Construction Co., Pentagon Renovation Team Wedges 2-5. Spraberry wrote:

"The light poles made of a polymer material and complete with a spun bronze bobèche bring the ceremonial Mall Terrace Entrance of the Pentagon to its original glory. The Pentagon Renovation Team would recommend Serra Designs to anyone looking for a great working relationship, quality work and timeliness."

### About Hensel Phelps

With corporate offices in Greeley, Colorado, Hensel Phelps Construction Co. operates from district offices strategically located throughout the United States

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to provide a comprehensive range of construction services. For more information, contact the Corporate Office by phoning (970) 352-6565, faxing 970.352.9311, or going to [www.henselhelps.com](http://www.henselhelps.com) to find the district office serving your location.

### About Serra Designs

Serra Designs Inc., Henderson, Kentucky, is a distinctive manufacturer of cast resin polymer products with an emphasis on custom work. Capabilities include specialized funeral urns, wood-like trim for caskets, asteroid reproductions and other space exploration collectibles, artistic reproduction, and architectural restoration and fabrication. For more information, e-mail [info@SerraDesignsInc.com](mailto:info@SerraDesignsInc.com), phone (866) 627-1636 toll free, fax (270) 826-8776, or go to [www.SerraDesignsInc.com](http://www.SerraDesignsInc.com).

### About AOC

Headquartered in Collierville, Tennessee, AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic material systems for composites and cast polymers. AOC develops technology, lives quality and delivers service better than any other resin supplier. For more information, e-mail [sales@hoc-resins.com](mailto:sales@hoc-resins.com), phone (901) 854-2800 or go [www.AOC-RESINS.com](http://www.AOC-RESINS.com).

