

Pool & Spa Corner

Welcome to the second installment of the Pool & Spa Corner! As mentioned in the Spring issue of *Shotcrete*, the goal of this column is to reach out to those with a stake in the pool and spa industry so that our readers can benefit from our perspectives. So let's jump in!



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Cement-Based Products in the Landscape

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by Bill Goddard

While installing sprinklers, plants, and sod may be staples for many residential landscaping companies, higher-end clients now demand hardscapes that include water features, custom masonry, and decorative paving. Many of these hardscape features are produced using concrete and other cement-based products, so installers must have knowledge and training on proper concrete construction methods and techniques. Although this type of training may be foreign to many landscaping companies, specializing in these types of features can help a landscape design and construction company set itself apart from its competition. A good case in point is a large private estate landscaping project in Northern California that our company, Goddard Construction Services (GCS), recently completed.

Overview

Our company has won several international awards including a 2006 International Award of Excellence gold medal from the Association of Pool and Spa Professionals and a Masters of Design award in 2007 from *Pool & Spa News*. Numerous recent projects have enhanced large estates ranging in size from 4 to 80 acres (1.6 to 32.4 ha) and valued in the \$5 to \$25 million range, with landscaping

typically 40 to 50% of the overall value. So, at a size of 4.2 acres (1.7 ha), the site for this Northern California project was actually quite small for us, but it was also one of the most highly detailed. Rather than buying a vacation home overseas, the owners of this estate chose to build an outdoor vacation resort setting a few steps from their back door.

Working with a primary crew of eight, our landscaping portion of the project required about 32 months to complete. The initial site was a flat, blank canvas of bare land. This original landscape was sculpted and transformed with over 16,000 tons (14,500 tonnes) of soil brought to the site in about 655 truckloads to produce the dramatic final product shown in Fig. 1.

The quantities of cement-based materials required for the final landscaping design demonstrate the massive amount of detail that went into the project:

- Over 550 yd³ (420 m³) of ready mixed concrete;
- Over 150 yd³ (115 m³) of concrete mixed on site using a volumetric mixer;
- Over 11,000 ft² (1000 m²) of concrete pavers;
- Over 12,000 ft² (1100 m²) of integrally colored, stamped concrete with five different colored hardeners applied to simulate natural rock;

Pool & Spa Corner



Fig. 1: View of the finished estate looking over the pool to the waterfall in the background

- Over 3500 individual pieces of European-style cast stone including the column caps, wall caps, split stone, and pieces for the fountains. About half of the cast stone was manufactured on site using our own molds;
- A 6000 ft² (560 m²) pool (Fig. 2) that holds 330,000 gal. (1,250,000 L) of water and required almost 90 tons (82 tonnes) of bulk cement in the shotcrete used to construct the shell of the pool;
- Over 9500 ft² (880 m²) of real rock paving over a concrete base;
- Over three full truckloads of fabricated rock on the walls and pillars;
- Over 154 tons (140 tonnes) or 3278 bags of Type S mortar in the masonry; and
- Over five truckloads of concrete masonry units.

Specialized equipment is needed to perform on the scale required for such projects. We transport a portable volumetric batch plant and cement silo from project to project. This plant can produce as much as 20 yd³ (15 m³) of concrete per hour and is also used to feed our custom shotcrete equipment.

Part of the reason for owning this specialized equipment is our belief that quality and production

can be better controlled by self-performing the vast majority of the work. Typically, we use subcontractors only for the electrical portion of a project. Having this equipment in our inventory requires a significant investment of time and money to train our crews, but we view these as some of the most important investments we can make.

Pool Construction

On previous projects, we've constructed man-made lakes in the 3 to 7 acre (1.2 to 2.8 ha) range, but these lakes were effectively clay-lined basins. For this smaller estate, we had to do something quite different because the owner wanted a true swimming pool as the body of water below the waterfall.

After deciding to self-perform the shotcrete installation required to construct the 6000 ft² (560 m²) swimming pool, the next decision was determining what equipment would fill the needs of multiple projects. This led to the purchase of the dry-process shotcrete rig, the portable volumetric mixer to feed the shotcrete rig, the portable cement silo, and a 680 ft³/minute (19.2 m³/minute)

Pool & Spa Corner



Fig. 2: A 6000 ft² (560 m²) swimming pool at the base of the waterfall forms a focal point for the landscaping

trailer-mounted air compressor to meet the air requirements for the shotcrete nozzle.

The next decision was how to properly train the crews to operate the equipment. Multiple crews were sent to the equipment manufacturer where they learned the ins and outs of operating and maintaining the equipment. The best decision was to train the crews by bringing in an operating structural shotcrete company with expertise in mineshaft work. Wanting to do the highest quality shotcrete work on this pool, the decision was made to have a 1 in. (25 mm) air wand operator blow away all rebound and poorly adhered shotcrete and remove all rebound from the pool. This procedure, combined with proper nozzle operator technique, resulted in compressive strengths of nearly 4800 psi (33 MPa). The standard for comparable work in this area of the country is less than 3000 psi (21 MPa). The shotcrete portion of this project alone consumed over 300 tons (270 tonnes) of sand and almost 90 tons (82 tonnes) of Type II cement.

To finish the decorative look of the pool and complement the natural rock waterfall leading to it, plaster with a river rock exposed aggregate finish was used to coat the pool. This portion of the project was subcontracted to a pool plaster company with the expertise and capabilities to handle a job of this size. After the plaster was applied, it was acid washed to expose the integral multi-colored aggregate. As shown in Fig. 3, different integral aggregate colors were used in the plaster to provide a transition between the shallow and deeper portions of the pool.



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Pool & Spa Corner



Fig. 3: Various colors of river rock exposed aggregate were used in the plaster for the pool to create a visual transition between the shallow and deep ends of the pool