

Building a Water Feature Using Shotcrete Placement

By Monte Vandeventer

Water features have become a staple in modern landscaping, offering a tranquil ambiance and a uniquely aesthetic appeal. Whether it's a serene pond, a cascading waterfall, or a dynamic fountain, the addition of water to your garden or backyard transforms the space into an inviting, peaceful retreat, and one of the best methods for constructing durable, customizable water features is with shotcrete placement — a versatile and efficient form of concrete application. In this guide, we will explore the process of building a water feature using shotcrete placement, from planning and site preparation to the final finishing touches and maintenance.

WHAT IS SHOTCRETE?

Shotcrete placement is a method of applying concrete to a surface sprayed at high velocity using specialized equipment. It is often used in situations where traditional pouring methods would be difficult or impractical, such as in creating curved or irregular shapes for water features. There are two primary shotcrete processes: wet-mix or dry-mix. In wet-mix shotcrete, the materials are pre-mixed with water before spraying, while dry-mix injects water at the nozzle during application. With proper materials, equipment and application techniques, both methods offer strong, durable, watertight results. Some water feature contractors prefer wet-mix for higher production rates.

The main benefits of shotcrete placement for water features include its flexibility in design, rapid application, and the ability to create intricate forms and shapes that traditional concrete may not accommodate.



Sketched out concept



Excavations

PLANNING YOUR WATER FEATURE

Before shotcrete placement, it is essential to plan your water feature carefully to ensure it fits seamlessly into your landscape and meets your functional and aesthetic needs.

DESIGNING THE FEATURE

Think about the style and size of the feature. Will it be a small pond, a tranquil waterfall, or a large, dynamic fountain? Consider elements such as water flow, height, and shape. You may want to create a natural, rock-like appearance, or opt for smooth, modern lines. You can sketch out your design or consult with a landscape designer to help visualize the concept.

CHOOSING THE RIGHT LOCATION

Selecting the right location for your water feature is crucial. Choose a spot where the water flow can be easily controlled and ensure that the area has adequate drainage. Consider access to water supply and electricity, as you will need a reliable water source and power for pumps and lighting.

PREPARING THE SITE

Once your design is finalized, it is time to prepare the site for the shotcrete application. This involves excavation, reinforcement, and formwork.

EXCAVATION

Depending on the size and depth of your water feature, you will need to excavate the site accordingly. For a pond, you will need to dig deep enough to accommodate the desired water depth, while ensuring the base is level. If you are creating a waterfall, ensure the slope is designed to guide the water flow smoothly.

REINFORCEMENT

To provide the shotcrete structure with the necessary strength, install a steel reinforcing bar cage or steel mesh in the excavated area. This reinforcement will help reinforce the shotcrete and prevent cracking over time. You should also plan for the placement of plumbing and electrical systems that will be used for water circulation, lighting, and pumps.

FORMWORK

If your design calls for specific shapes or ledges, such as for a waterfall or rock formations, you may need to build temporary formwork. This will guide the shotcrete into the desired shape as it is placed.

ADDING THE WATER FEATURE COMPONENTS

PLUMBING AND PUMPS:

Install the necessary plumbing and water circulation system, including a pump, filtration system, and any piping for water flow. The pump will need to be powerful enough to move water

through the feature, and the filtration system will ensure the water remains clean and clear.

LIGHTING AND ELECTRICAL

Consider adding lighting to enhance the visual impact of your water feature, especially for evening use. Submersible LED lights work well in water features and can create dramatic effects when placed strategically.

SHOTCRETE PLACEMENT

With the site properly prepared, you can now move on to shotcrete placement. This is a critical stage, as the quality of the final structure will determine the final appearance and durability of the water feature.

SHOTCRETE PLACEMENT

Shotcrete placement typically uses a specialized spray nozzle connected to a delivery hose, which is fed by an air compressor. Wet-mix or dry-mix is sprayed onto the prepared surface in layers, with each layer fully bonding to the previous one as it builds up. The shotcreter will need to carefully direct the shotcrete to create the desired contours and textures while achieving full consolidation of the concrete and encasement of the reinforcing. Use of ACI-certified Shotcreters is highly recommended to help ensure a quality placement.

LAYERING AND BUILDING UP

The shotcrete placement is often done in layers, allowing each layer to set before the next is added. This layering method, with proper surface preparation, ensures a monolithic, strong concrete structure. Shotcrete placement is typically completed in sections, starting from the base and moving upward or outward. The result is a solid, durable structure with the exact shape and features you designed.

FINISHING TECHNIQUES

After shotcrete placement has taken place, the concrete can be smoothed, textured, or carved to create realistic rock faces, smooth pond surfaces, or other desired effects. You can use tools like trowels, sponges, and brushes to add finishing details. Curing the concrete properly is also important to ensure it hardens correctly, reaches its full strength and minimizes cracking.



Reinforcement



Formwork



Finishing techniques



Final product

CONCLUSION

Building a water feature using shotcrete placement offers both beauty and practicality. This method provides a durable, customizable, and cost-effective way to bring your landscaping vision to life, allowing for unique designs that other materials may not accommodate. With careful planning, site preparation, and attention to detail, your shotcreted water feature will be a stunning addition to your outdoor space for years to come.



Monte Vandeventer began his career in 1996 in the drilling industry, working out of a Local 320 Laborers union in Portland, Oregon for Tigard Sand and Gravel. He worked drilling with air-track drills, drilling holes and helping the explosive techs load the shots with explosives to break the rock apart so it could be crushed and sold for various applications. In 1998, he

began working on the geotechnical side of the industry that focused on the building of Deep Foundation Shoring Systems consisting of a variety of different drilling techniques with engineered shoring solutions — such as soldier piles, lagging, soil nails, shotcrete, micro-piles and tiebacks — to retain earth around deep excavations, especially in urban or confined sites.

Throughout his 29-year career, Monte has found himself with a love of the industry and the joy each day brings as he gets to be a mentor and train so many young contractors coming up in the industry. Over the years he has had the opportunity to be a part of the construction of some beautiful architecture, carved shotcrete walls, and water features like those displayed in this article. He currently serves as the Director of Field Operations at Thorcon Shotcrete and Shoring LLC.