

## Matching Equipment to Process: The Predampener

by David Jamieson

**A**s one who promotes choosing process before product, I believe that the success of any project also depends on matching the appropriate equipment to the process/product chosen. Specialty equipment offers several opportunities to achieve effective results. This article will discuss the predampener, a machine used in dry-mix shotcrete application.

In wet-mix shotcrete application, the water-cement ratio ( $w/c$ ) is controlled prior to discharge into the mixer-pump apparatus. High-velocity air pressure propels the mixture to the receiving surface. In a dry-mix shotcrete application, the  $w/c$  is controlled by the nozzleman. Because it is not desirable for the nozzleman to introduce all the water at the water ring, a predampener must be used to ensure proper hydration of the cement.

The predampener facilitates the process as follows: the bagged product, or “super sack” material, is dropped into the predampener’s front hopper and moved by an auger system through a fine mist of water that dampens the product prior to it being dropped into the shotcrete gun and propelled by compressed air up to the nozzle, where the appropriate amount of additional water is then added.

When shotcrete is delivered by a ready-mix concrete truck, the mixture is already predampened from the moisture in the sand. Avoid the use of

excessively aged ready-mix supplied dry-mix shotcrete, however, as prehydration can cause pellets to form, increasing rebound and reducing shotcrete quality. (Note: ACI 506R requires dry-mix shotcrete to be used within 45 min of batching.) With either ready-mix supply or predampening, the correct amount of water is indicated by the shotcrete material just staying in a loose ball when squeezed in the hand and then released. If the ball collapses, the mixture is too dry. If paste squeezes out between your fingers, the mixture is too wet.

It is unreasonable to put a dry-mix into a shotcrete gun and expect the nozzleman to have optimum control over the  $w/c$ . Reducing the variability of the  $w/c$  provides better performance in the structure. Control of the  $w/c$  is greatly enhanced with the use of a predampener. Predampeners are just one example of equipment innovation that makes shotcrete the process to match the challenges of the new millennium. Matching the proper equipment and process goes a long way toward a successful shotcrete project.



*Predampener used in dry-mix shotcrete application*



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