

A Concrete Contractor's Experience with Self-Consolidating Concrete
By Harry Moats, President
Precision Concrete Construction, Inc., Alpharetta, GA

As a proactive and industry-savvy concrete contractor, we are always exploring new ideas and ways to better our business, improve the quality of our finished product and at the same time remain competitive in a very competitive marketplace.

A couple of years ago, we were asked to participate with our local ready-mix supplier (LaFarge) to experiment with and evaluate a new concrete material, now commonly known as SCC (self-consolidating concrete). As usual, we were more than happy to participate being that we had no real experience with the product or its use. During the days and weeks of testing and evaluation, we became more and more convinced of the product and its uses. We truly believed that this material would change the way we place concrete in the future because of its unique characteristics.

Not long after going through this evaluation process, we had an opportunity to bid and were awarded a project where all the walls and columns were exposed architectural concrete and, also to add complexity, were all structural support for the entire building.

To add yet another layer of opportunity to the project-the High Museum of Art at Atlanta's Woodruff College-it was one of the highest profile projects in Atlanta at the time.

The first step was to identify, understand and replicate the desires of the Architect and Owner through a series of full size mock-ups where expectations were defined, design mixes reviewed and adjusted and construction techniques evaluated for best results and a quality product. Mixes were adjusted, several times; several form materials were evaluated such as HDO, MDO, Fin Form, and BB plyform for best surface texture. This process was extremely important and invaluable as we prepared to start walls and columns that ranged from 12" to 18" thick and from 8' to over 30 feet tall.

Due to the nature of the work and the importance of the finished product, little material was able to be reused except for small filler pieces. Because the work required the use of MDO plywood, we had to be very selective in the matching of surface color and texture of the form materials to make sure that the finished product was as uniform as humanly possible. One of the values of SCC is that it will replicate detail better than any conventional concrete on the market today. You are able to achieve crisp clean lines at reveals and other decorative features that may be attached to the formwork. This means that all the embedded items to provide these features have to be exact and uniform.

Other opportunities that presented themselves were issues like full liquid head, small holes in the formwork and tight butt joints in the forms both at corners and straight runs. SCC is so fluid and flowable it will find any holes or cracks to migrate from the forms. Extra care has to be taken to make sure the formwork is almost watertight. Not overly difficult to do; you just have to know what to expect and plan for it. The same holds true for the liquid head issue. Because no pour lies or cold joints were allowed in the walls and columns, we had to make all pours full height, at least to the nearest reveal strip, which meant that our formwork had to be braced differently from what we usually do with conventional concrete. We used heavier lumber and spaced braces closer together. We had no blowout nor did we have any form movement during the entire project.

Something that was new for us was the submittal of all formwork shop drawings for stick built walls. We have never had to provide shop drawings for a stick built system prior to this project. Even though we thought this unnecessary, we learned that it probably helped our field personnel do a better job with less hassle.

"Bugholes" were a big issue with the architect. Nothing larger than a dime was acceptable nor was any concentration of 'bugholes' acceptable. This was somewhat easier to deal with using the SCC mix, and inconsistent vibration was not a consideration since none was required. The density of the form surface did

add a little challenge since the MDO does not absorb the air as well as less dense material such as BB plyform. We had to be very careful with the application of the form release material-not too much and not too to little-which helped control the "bughole."

The end result was that we provided the client with a quality product that he was willing to pay for. We achieved a precast quality product in a cast- in-place environment thanks to the use of SCC. If you have a plan, know what to expect and with reasonable execution, SCC will provide a quality product in very harsh and difficult situations. We believe this to be a very important tool for the concrete contractor as we continue to experience and embrace technology now and in the future.