

## **Self-Consolidating Concrete and Architectural Concrete**

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One man, wearing casual business attire, was on a walkway at the top of a 12 ft high form. He was holding the pump hose with one hand and a finger of the other hand was pointing straight up and making slow circles in the air indicating to the pump boom controller to slowly lift the boom and the pump hose. This was the first time I had been involved with the forming and casting of Self-Consolidating Concrete. In fact, it was the first time I had even heard the SCC name. I was in Anaheim California at Disneyland. The wall being placed was 18 feet long, twelve feet high with enlarged columns at each end with a considerable steel reinforcing. This was actually a mock-up pour to see if a new type of mix could be used to flow around the congested steel in the columns. I watched the fluid concrete creep from the deposit point, where the hose disappeared into the concrete mix, across the wall area of the form and into the column area, and the creamy liquid crawled around the bars with no one vibrating the concrete. One man placed the concrete, finished the top of the wall, and walked away. The next morning, after the forms were stripped away, I looked at a concrete surface where there were no bug holes or placing seams or defects of any kind. It enlightened me to the fact that I was experiencing the greatest improvement in architectural concrete since the introduction of superplasticizers and concrete placement using a pump. For over 35 years I had been looking for that "little magic pill" that I could drop into concrete, thereby eliminating bug holes and insuring a consistent presentation of the color and surface of concrete when used as an architectural material. A tremor went up my spine when I thought I had finally found the pill I had been searching for. On that day I couldn't help but think that with the use of SCC, architectural concrete might become a more easily produced material that would be embraced not only by the design professionals, but also by the construction segment of the industry as well.

Concrete in its final presentation is virtually manufactured at the project site at the beginning of the construction operation, when the roughest workmanship is usually accomplished. However, architectural concrete is all about the surface presentation of the material and requires planning and techniques not traditionally employed. Finding methods that make production easier in that environment can only be a benefit. In the total scheme of things, the use of SCC and the upgraded formwork it requires accomplishes a more fail-safe, economical way to achieve a quality architectural concrete surface presentation. SCC not only produces a surface that is the best architectural concrete I have ever seen, it is placed with extremely efficient and fast methods. After ten years I still wonder why the industry has not embraced SCC as a standard of producing and placing all concrete. I guess change is difficult and sticking with the devil you know is more comfortable than risking the angel you haven't met yet. I feel that when SCC becomes a traditional method of construction, the transition to producing architectural concrete will easily follow.

Since that day in Anaheim over ten years ago, I have been working to get SCC into the cast-in-place arena as a traditionally produced material to benefit architectural concrete. Since SCC is a new material, on many projects where I have prepared the architectural concrete specification, I have specified SCC and also regular concrete as alternative options, stating that SCC was preferred, but if all the parties developing the concrete work were not completely comfortable with SCC and were not willing to do the development testing, then a more conventional concrete should be used. Of course, architects have embraced the concept of SCC very readily as their interest is to achieve controllable construction of a quality surface presentation; however, It has been only in the last two or three years that contractors and owners have been willing to do the required development work and pay the added cost to get what I call "architectural concrete of the highest quality surface presentation possible."

Most have only heard about the disasters of the material caused by insufficient development and planning prior to casting and do not want to be the "experimental firm" in their area for a new material that they perceive may be a risk to schedule and predictable cost. Of course, the industry experienced the same scenarios of disasters when superplasticizers and pumping were introduced in the late 70s and early 80s and now both are in unquestioned use. I feel that SCC will take that same course and will relatively soon be routinely used. Many concrete contractors and suppliers throughout the country want to use it, but

construction managers and owners are the most reluctant to try SCC, not having the background to realize the potential nor the positive examples to mitigate their concerns.

New York is probably the last strong hold-out for the use of architectural concrete as well as SCC, especially in larger buildings. Ask almost any developer, construction manager, real estate, or hands-on construction person about quality surface presentation and the subject immediately turns to speed of construction and cost. The overwhelming definition of quality in New York seems to be "speed". It is obvious that when time of completion, in a town where building completion is crucial to investment, more traditional time-proven materials and methods are preferred. This is not the case in most of the rest of the United States and the world and it is what makes New York unique and separate from the rest of the world. I work all over and have a very direct and positive dialog with the construction industry about architectural concrete and SCC everywhere except in my own hometown.

It seems to me that the concrete organizations in the city need to offer more extensive educational programs on the benefits of SCC as a production enhancing product and not just the technical aspects of the material design. Concrete contractors, suppliers, form designers and especially developers and construction managers need to send staff to be educated in the placement, mix development and form design for using SCC. There needs to be a common knowledge base for determining the cost, schedule, and quality differential between SCC produced architectural concrete and traditionally produced structural concrete so a definite determination of its worth in a project can be evaluated. If we achieve that, maybe we can meet the Angel we have been looking for and can push the Devil that has been holding us back into the past.