Specifying Quality Pool Plaster

by onBalance – Que Hales, Doug Latta and Kim Skinner

In the realm of design, bid, and contract, it is not unusual for a designer or a bid solicitor to specify certain elements of a project. Specifications may range from time constraints to approved materials to contractor qualifications to workmanship practices. Specifications are a method of ensuring that a final project will fit the concept of the designer and the needs of the consumer.

It is common to leave unspecified those portions of a project covered by either existing standards or where common practice is the optimal practice. Specifications are most common where the unusual is expected – from environmental challenges to variance from common practice to novel expectations on the part of the consumer.

When specifying plaster surfaces in watershapes, most standard practices are acceptable. However, as pointed out in a previous Watershapes article ("A Light on White" September 2008), in some areas common practices have been resulting in substandard results. The purpose of this article is to review some of these issues to determine if the practice of specification could solve some of these issues.

The Problem of Durability

As mentioned in the referenced article, "…the basic [white plaster] formula underwent a number of important changes" since the good old days of durable white plaster. Mr. Alan Smith mentioned that a major component of these changes was a switch to less durable, or acid-soluble aggregate. Fair enough – but the problem is that the cited deficiencies are not related to aggregate, but the even less-durable cement paste. When specifying quality plaster, calling for an exposed aggregate surface will decrease the surface area composed of paste, and the stronger the aggregate the more durable that portion of the surface will be.

There are more standard ways of ensuring durable concrete products, however. Included in the literature[1] are:

- Proper preparation of substrates
- Proper scheduling of placing and finishing
- Good finishing practice
- Proper curing
- Since calcium chloride is a primary cause of discoloration, calling for as little (or no) calcium chloride set-accelerant as possible
- Employ less hard finishing
- Calling for as little water in the water:cement ratio as is practicable
- Forbidding practices that skew the *surface* water-to-cement ratio (such as wetting the finish or the finishing tools during final trowel)

Some of these practices are common in the industry, but so also are violations of some of these good practices.

The Problem of Discoloration (White Plaster)

Calcium chloride, for example, is very common in the pool plaster industry even though it has become much less so in other, non-pool concrete applications. The move away from chloride accelerators has occurred in part because of its problematic relationship

with rebar in reinforced concrete, but also because it discolors finishes and generates a micro-porosity that allows greater water penetration into the hardened surface than if increasingly popular and available non-chloride accelerators are employed.

Some of the specific problems cited by Mr. Smith in his article as issues with white plaster, such as discoloration and so-called spot etching, have been shown by research laboratories to be a direct result of calcium chloride abuse (i.e., excessive amounts of chloride). Since this practice is known to predispose the surface to breakdown and/or discoloration, it might be an area ripe for specification by the exacting professional.

The Problem of Discoloration (Colored Plaster)

It has become common for some in the plastering industry to routinely apply water to a hardened surface during final hard troweling. This skews the surface water-to-cement ratio, which has specifically been shown in the research to promote surface discoloration and weakness – even in white and grey plaster or cement. However, this practice is specifically prohibited by major color additive manufacturers supplying the pool industry because of its whitening effect on the end product.

It is also common for calcium chloride to be added even to colored plaster applications. This in spite of the fact that it is commonly, specifically prohibited by color manufacturers, to the point of it being included on package directions.

These two practices combine to produce a whitened mottle to otherwise beautiful colored plaster applications. The practices are so commonplace that it has become axiomatic that colored plaster mottles… which is a shame since it is such a useful addition to the watershaping palette, and since non-chloride accelerators are readily available.

The specifier who calls for no calcium chloride and no wet finishing for colored plaster promotes more beautiful watershapes and helps train the plastering industry at the same time.

Influence of Water Chemistry

Finally, a word about water chemistry. As Mr. Smith mentioned, poor water chemistry is hard on a plaster finish. This is something that has been known virtually since the inception of the swimming pool industry. However, to ignore the elephant in the living room by unfairly blaming water chemistry even when it isn't a factor in a particular surface failure is disingenuous at best.

It is a fact that pouring undiluted acid directly into swimming pools was a common practice in Mr. Smith's golden age of white plaster. This practice is much more detrimental than his perceived issue with sanitizers.

Standards

The plastering industry's current attempt to micro-specify acceptable water chemical parameters by tightening the acceptable ranges to unrealistic extremes is a blatant attempt to ensure that most pools will be out of balance when problems occur – even if those problems are not related to the water maintenance to begin with. On the other hand, the plastering industry has steadfastly refused to accept reasonable, scientific standards when it comes to plaster mix and application. This mindset, in our opinion, is a major cause for the "conflicts among plasters, the builders they work for and service providers" cited by Smith, the current leader of the NPC.

In addition, the plastering industry has refused to engage determinations by some of the nation's leading cement failure analysis experts who have found certain plastering practices to be the culprit when some plaster fails.

Conclusion

Mr. Smith in his article suggested repeatedly that white plaster is inherently weak, and that water chemistry has become more aggressive since the 1960s. We disagree. Creating quality white plaster was understood a half-century ago, during the outset of the modern pool era. Those craftsmen understood their product and made it the mainstay it became. And the modern chemical industry has improved water maintenance through education, research and scientifically-based standards.

It is our hope that similar standards can be invoked for quality plaster. If the plastering industry cannot come to grips with the needed changes, perhaps informed specification can help them along the path.