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GOVERNMENT FACILITIES

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Carrier Johnson, San Diego

How to Evaluate Emerging Materials

New San Diego campus for the Thomas Jefferson School of Law

It's arguable that architects are creatures of habit. When it comes to specifying materials, our tendencies have been to stay with what has always worked in previous projects. It's never been easy to place faith in the promises made by vendors of newer materials because, when it comes down to it, you really don't know if the material will perform as advertised. That said, a sea change, fueled by sustainable architecture, is underway, and there is an ever-growing demand for sustainable structures driving greater interest in newer construction materials. Simply put: 21st century customers want LEED certification and similar designations, and that expectation can radically change the way architects specify their materials.

Because many architects, for years, stuck to specifying materials they were familiar and comfortable with, emerging material makers were at an obvious disadvantage. Today, however, architects are paying more attention to these new materials in the hopes that they can help meet sustainability requirements. The more LEED points these products earn for a project, the more likely they are to gain consideration. Still, it's wise to proceed with caution when considering these products and set stringent criteria to which they must adhere.

One particularly good, and recent, example of this trend can literally be found in the underground parking levels of the Thomas Jefferson School of Law's (TJSL) new downtown San Diego campus. Specifically, the construction team examined the use of integral concrete-waterproofing methods as a way to streamline schedules while providing sustainability benefits. This approach can eliminate the need for external waterproofing membranes, which can sometimes contain toxins and other non-renewable materials that bond to concrete. Integral solutions can make the recycling process easier and, in some cases, contribute to LEED points. But when integral methods were introduced decades ago, the common knock was that—while simpler to apply—they weren't true waterproofing solutions, as they provided only a concrete additive.

Recent advancements in integral admixtures, though, have persuaded construction teams to give them another shot to help meet the needs of increasingly green-conscious clients. Keys to the newer solutions are higher-performance additives, coupled with service that ensures joints are properly sealed and the inevitable cracks in concrete are addressed. Perhaps just as critical, the stringent, long-term performance warranties that were included also served to offer a higher comfort factor in their vendor's commitment.

This example illustrates why it's important to set key criteria for selecting emerging materials: For many years, longevity was an important litmus test for evaluating whether a particular product was appropriate for a project. In other words, does the product have a long track record of success? Emerging materials normally don't have any kind of track record. To satisfy the longevity requirement, therefore, it's critical to carefully evaluate product warranties and technical aspects.

Specific to concrete waterproofing, the TJSL project team's criteria included ensuring the solution:

- Was truly waterproof (or hydrophobic) and not just integral;
- Included a service element that ensures the solution is properly installed and maintained throughout the construction schedule;
- Reduced foot traffic to improve overall safety;
- Met the minimum BSI-1881 122 standards; and
- Included a strong performance warranty with minimal exclusions, typically for 10 years.

For TJSL, the integral waterproofing needed to protect the below-grade structure—which sits about 40 ft. below grade into the water table—from brackish water and corrosive salts. The material ultimately used, an admixture provided by New Jersey-based Hycrete Inc., tested at less than 1% absorption under BSI-1881 122 to meet hydrophobic concrete performance standards. From a sustainability perspective, the key differentiator with this specific hydrophobic admixture was its water-based properties, which make it greener for the people and the environment, as opposed to ammonia-based alternatives.

All told, the project used Hycrete to waterproof approximately 2,300 cu. yds. of concrete and eliminate 25 tons of non-renewable materials, nine tons of polymers, and 36 tons of landfill debris. Along with these environmental benefits, the approach saved $187,000 in material costs—a 32% improvement over traditional waterproofing methods.

The TJSL project proves that, when done methodically, the use of emerging materials can provide both cost savings and the all-important sustainability benefits. The key is staying true to criteria:

As I evaluate newer materials and products, the internet serves as a powerful tool that allows me to search blogs, news and reviews that pertain to these products. Sometimes I can find specific project installations, and a simple call to the building architect is worth its weight in gold. As I researched the Hycrete product, I sent out many e-mails and phone calls to the local architectural community for feedback, and whether the feedback was positive or negative, it showed me that every architect has the same concerns with specifying newer materials. Can it work? Has it worked? Prove to me that it does work. Now with all of your research in hand, it's time to convince the building owner. ☐

Example of corrosion inhibition

Hycrete W1000 product in action