

Completing the Promise of the Polished Concrete Floor

By Brad Sleeper

Exposed concrete floors have been oversold. The concrete polishing industry has been promising exposed concrete as a "low maintenance" floor for more than a decade, and as the rhetoric has gotten hotter, expectations have inflated. Owners who have been led to expect a glossy floor *forever* find themselves with a dull floor just a few years later.

My company, Lythic Solutions, believes there are really three causes of the problem: expectations, education, and materials. We've been working to fix the materials problem, using reactive colloidal silica to produce an innovative stain protector that significantly improves protection of the finish. We would also like to suggest a few simple steps that professionals can take to make expectations more realistic, and educate owners so they will enjoy the concrete floor benefits they're paying for.

Expectations

It's easy to understand where high expectations come from. A polished concrete floor has many aesthetic options via decorative coloring, exposing aggregate, etc. It is economically and environmentally appealing, too. It can be cleaned with simple, mild cleansers: as a replacement for vinyl tile, this eliminates harsh solvent strippers and waxes being washed down drains every night. Concrete does not offer an environment for mold or bacteria to grow, as does carpet. It's very durable: the finish theoretically lasts as long as the concrete, which could be hundreds of years, lowering materials consumption for replacing floor coverings.

The basic promise, however, has been difficult to keep. Many owners expect polished concrete be a "no-maintenance" floor. They may have been misled to believe no maintenance was necessary. The polisher or general contractor may have failed to explain the nature and necessity of maintenance.

The result is that the floor does not get the maintenance it needs, and the finish gets compromised. Stains, damage to color, and etched surfaces have marred the beauty of many floors. The retail sector – where polished concrete has really taken off – is particularly vulnerable because of frequent spills of acidic food substances. Owners who've experienced this problem may feel they've been sold a bill of goods.

Polishing professionals and design professionals alike need to be careful and thorough when selling the option of a concrete floor to an owner. Any discussion of the maintenance that's eliminated should also include an explanation of the maintenance that's truly needed.

Education

Owners and facilities managers need to be made aware of what an exposed concrete floor is, and the simple-but-crucial maintenance it needs.

- Concrete is a porous material, rather like a brittle sponge. Chemical densifiers partially close up pores in the surface, reducing the ability of liquids to penetrate, but leaving pores open enough to allow water vapor to escape. It is important that evaporating ground water below a slab on grade can find its way to freedom. Because concrete is not uniform, and some pores are bigger than others, densification is not perfect. Extremely porous slabs may need multiple densifier applications.
- Densifiers are part of polishing, or can also be used without polishing. They improve abrasion resistance and prevent dusting.
- A stain protector is normally applied as the last step (after polishing or other treatments such as burnishing). The stain protector deposits a thin, breathable polymer layer that augments liquid impermeability. It also deepens color and enhances gloss.
- Conventional stain protectors – most of them have either “Guard” or “Protector” in their brand name – are not true sealers. They are designed to slow down penetration of staining agents. They can’t prevent etching from acids and oils, and only allow a brief window of opportunity to clean up staining or etching agents, before damage begins. Some manufacturers suggest that they give an hour or two of protection after a spill, but truthfully, the window may be more in the range of minutes than hours.
- Stain protectors are considered a sacrificial layer. They need to be renewed periodically, according to traffic wear.

If owners and facilities managers are made aware of these facts, they will easily understand the need for regular maintenance. Without a regular maintenance program specific to densified polished concrete, the floor will rapidly lose its shine, and can degrade over time to become an eyesore requiring the expense of restoration.

Give them these simple instructions:

- The floor should be swept, wet-mopped or autoscrubbed daily. If not cleaned often enough, fine grit attaches to shoe soles and vehicle wheels, turning them into virtual sandpaper that can impair or remove the stain protector layer, and dull down the gloss of a polish.
- If staining and etching agents – acidic food spills like tomatoes or pickle juice, damp wood pallets, oil, etc. – are allowed to remain in contact with the floor, they can cut through a conventional stain protector and can damage the concrete surface texture and color. Spills need to be removed and cleaned quickly if any conventional stain protector has been applied.

- If the stain protector is not renewed when it needs to be, it can fail to protect the surface adequately. It can also become dull-looking and spoil the glossy appearance of the floor. This could be as little as six months in a high-traffic location.

In our opinion, any contractor who finishes a floor and applies a stain protector ought to make it his business to educate the owner or facilities manager about how to care for the floor. A thoughtful architect could also perform this beneficial service when first discussing flooring options with a client, and by including manufacturer's maintenance data as part of operation and maintenance submittals.



Photo courtesy of Lythic Solutions

This polished concrete supermarket floor became dull and dirty-looking after about 3 years of use, as seen in the foreground. It was recoated with Lythic SPD Protector and burnished to a high gloss, seen in the background.

Materials

If we step back a moment and look at the situation honestly, we might notice that the weak link in the process has been the stain protectors. The truth is that conventional stain protectors are designed to provide only very temporary protection, *and that may not be enough in the real world.*

We decided that, as a company dedicated to improving concrete floors, Lythic Solutions should stop thinking about this exclusively as a *maintenance failure*, and stop finding ways to blame the customer. We started looking at it as a *materials failure*.

We sought to develop a material that's more suited to the way exposed concrete floors are actually used. If clean-ups simply do not happen soon enough to preserve the floor, then the protection time needs to be increased.

Lythic SPD Protector was developed to extend the protection period. SPD – Silica Polymer Dispersion – is chemically different from other stain protectors. It is a two-part, waterborne epoxy with reactive silica solids suspended in it. Reactive silica has the property of bonding to other silica, including to itself. It not only toughens the protection layer, but bonds to the concrete and the densifier application, and helping the SPD stay on the concrete. The material is warranted not to peel.

Unlike previous products (including our original Lythic Protector), SPD provides at least 24 hours of protection from spills. It was third-party laboratory tested against both motor oil and strong muriatic acid for 24 hours of exposure. In some samples, SPD showed slight discoloration, but this buffed out easily, and the underlying concrete was unchanged. With extended protection, even if a spill gets missed for hours, regular daily cleaning will still be enough to preserve the floor in most cases. We believe that's a more realistic scenario than current limitations.

SPD is a slightly thicker application than conventional stain protectors, but thin enough to maintain the look and feel of exposed concrete. As applied, it has a slightly matte finish, not as glossy as other stain protectors, but it can be buffed with a high speed burnisher to a very impressive gloss.

To help maintain and replenish the surface, we developed a daily cleanser containing colloidal silica, as well. Applying Lythic Cleaner adds silica to the floor as it cleans, improving the hardness of the SPD surface.



Photo courtesy of Lythic Solutions

This retail store used a self-leveling cementitious overlay to create a very smooth, fine-grained floor surface without diamond polishing. It was treated with SPD and burnished to produce a high gloss.

As of this writing, SPD has been used in projects ranging from high-end retail environments to the offices and work bays of an electrical power utility. No application of SPD has yet worn away enough to require renewal. Based on internal testing, and

comparisons to conventional products, we are estimating a two-year service life in moderate- to high-traffic environments, perhaps four times the service that could be expected from a conventional stain protector. We believe this is a significant step towards making concrete floors that deliver on expectations.

Conclusion

Improved materials such as SPD will help move us closer to keeping the "low-maintenance" promise. In this very active, expanding industry, improved materials are being developed at a fast pace. We expect to see the bar raised repeatedly, so design professionals who specify exposed concrete should keep a careful eye on the market. But materials alone will not solve the problem. They must be coupled with proper owner education, so that the true potential of concrete floors is realized and owners' legitimate expectations can be met.

AUTHOR: Brad Sleeper is Vice President of Sales and Marketing and co-founder of Lythic Solutions, Inc. (www.lythic.net), a concrete technology company dedicated to bringing to market advanced products for concrete polishing and other concrete finishing applications. He is also a professional concrete and stone polishing contractor, with over a decade of experience in the field.