product watch

Concrete Floors are here to Stay and Stay and Stay and Stay and Stay...

By Dianne Carey

Problems

From the beginning of the industrial revolution in 1760, a variety of building construction materials have been used to create long lasting, durable floors in manufacturing, warehouse and distribution center facilities. Materials have included dirt, wood blocks, brick, stone and concrete, just to mention a few. Concrete floor construction has emerged as the material of choice in today's modern industrial plants, sprawling warehouses and gigantic distribution centers.

Just as concrete continues to evolve, so have the challenges to its structural longevity and durability. High foot and heavy vehicular traffic abrasion are primary causes for floor deterioration. The lack of resistance to an ever increasing number of chemicals and petroleum-based products are all taking their costly tolls. Finally, housekeeping is a monumental and expensive task, especially when it comes to concrete dusting. The dust from floors adheres to vehicle tires and employees shoes. It moves easily from one area to another, when disturbed by minimal activity or motion. As a result, it clings readily to personnel and products.

Solving these problems can be costly and disruptive. However, new and existing concrete floors can be treated with a liquid hardening and dust proofing treatment, which results in floors that can last the life of a building.

ACI Specification

The American Concrete Institute, ACI 302.1R-04, Specification for Concrete Floor and Slab Construction, Section 5.8, refers to these products as liquid surface treatments. ACI 302, Section 5.8, recommends liquid surface treatments to extend the life of concrete that has been improperly constructed, causing the substrate to be relatively pervious and soft that will wear and dust rapidly. Per ACI 302, Section 5.8, treatment with liquid surface treatments will reduce dusting of the floor and create a denser, harder surface.

Dusting

Chalking or powdering at the surface of a concrete slab is called dusting. Dusting is evident when the surface powders or dusts under any kind of traffic movement. The surface may also be easily scratched with a nail or, at times, even by sweeping. When a concrete floor dusts with foot or vehicular traffic, it is a sign that the wearing surface is weak. The following are possible causes for a weakened concrete surface.

- Finishing while the bleed water is still on the surface.
- Inadequate protection of the freshly placed concrete from rain, snow or drying winds.
- Insufficient or no curing.
- Troweling of condensation moisture from warm humid air on cold concrete. (In cold weather, the concrete sets slowly. If the humidity is high, water will condense on the freshly placed concrete, which, if troweled into the surface, will cause dusting.)
- Inadequate ventilation from heaters will cause carbonation, which will greatly weaken the top surface of the concrete.

To minimize or eliminate dusting, a liquid surface treatment in the form of a chemical concrete floor densifier and hardener should be applied. Depending on conditions, application techniques, etc., the chemical reaction between the treatment and the concrete can continue for up to 12 months. A properly applied liquid surface treatment should keep the concrete floor surface dustproof and hardened for the life of the slab.

Application

For typical liquid surface treatments, the following application methods are advised.

On newly placed (fresh) concrete, the treatment can be applied just as a cure would be applied, after final troweling. No further application steps are required for fresh concrete.

On existing concrete, the surface should be clean and structurally sound. All residues, curing compounds, oils, sealers, contaminants and laitance must be removed. Fill and repair all holes, cracks and deteriorated areas to sound concrete. For existing concrete, the surface should be saturated with the treatment at approximately 200 sq. ft./gal. (this may vary for different treatment brands, and the porosity of the surface) using a low-pressure sprayer or by spreading evenly with a squeegee or soft-bristled broom.

Keep the surface wet with the treatment for a minimum of 30 minutes. (A range of 30-60 minutes may be required depending on temperature and conditions.) Pay particular attention to porous and/or dry areas. These areas must be kept wet at all times. Once the surface begins to gel and become slippery, immediately spray the surface with a light water mist. Scrub the surface with a broom or mechanical scrubber to increase the penetration of the surface treatment. Continue to work the treatment into the surface for another 5-10 minutes or until the treatment becomes gelled and slippery for a second time. At this time, thoroughly flush the surface with water. During the flushing process, agitate the surface with a broom to aid in removal of the excess product. Remove all excess material with a mop or squeegee. Allow the surface to dry. If there are slippery patches, this is an indication that there is still excess product present. These areas should be re-flushed and the product removed with a squeegee once again until the entire surface is dry. (Extremely porous surfaces may require a second application).

Failure to thoroughly wash and remove all excess material from floor surfaces may result in unsightly white stains. Immediately wash off over-spray from glass, aluminum, or highly polished surfaces with water to avoid etching of surfaces.

The recommended drying time is two to four hours. Drying times may be extended on existing (old) concrete due to surface conditions. Restrict foot traffic for at least four hours. Twelve hours is preferable. Again, these procedures may be different for the various brands of liquid surface treatments.

The application procedures mentioned in this article are recommended for use with W. R. Meadows LIQUI-HARD®. Other product application procedures may vary. Manufacturer recommendations must be followed depending on the product, but these application techniques are "typical."

Conclusions

Liquid surface treatments in new construction are most popular in warehouses and big retail box stores. The benefit of this type of treatment is the one-time application. The product continues to improve the concrete surface as more wear is put on the floor. The floor won't dust and is easily maintained. Other applications include storage silos, sewage plants, chemical processing facilities, refineries, civic centers, sports arenas, stadiums, hospitals, airports and museums.

When a quality liquid surface treatment is properly applied to a concrete floor, long-life and durability can be expected. Now, concrete floors will last as long as the lifetime of the building. Concrete floors are here to stay, and stay, and stay…▪

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