Taking the Charge Out

An opening exists for electrostatic discharge concrete floors.

By Floyd Dimmick Sr.

To the untrained person, concrete floors look very similar. But in reality, while looks might suggest conformity, the floor's performance can vary when it comes to vapor transmission (VT) and static electricity (SE).

In today's fast-paced warehouse operations, problems associated with VT and SE have been increasing. Forklifts traveling on some treated concrete surfaces can become charged from their tires' contact with ungrounded coatings. With the increasing use of computer chip technology in many inventory systems, even a small unexpected charge can bring devastating results. Some manufacturing industry experts estimate product losses due to static electricity range from 8% to 33%, or into the billions of dollars annually.

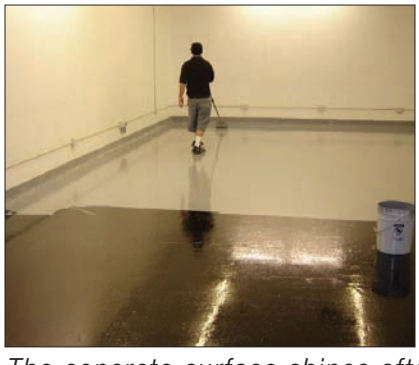
A concrete floor's resistance to VT and SE is directly correlated to factors like the floor's placed density, the original mix design, and the final water/cement ratio. Unfortunately for the surface treatment contractor who has been asked to solve a problem, these factors have already been set.

His only option is to provide a working surface that can be installed in a timely manner and provide a durable surface. Clearly, the opportunities exist for more contractors to become factory-trained installers of electrostatic conductive polymer floor overlays. That's why in the industrial and commercial polymer floor markets, many contractors have carved a solid niche providing solutions.

And considering the magnitude of the potential effect, it's important that contractors entering this high-tech market have a thorough knowledge of the manufacturers' products, and be properly trained on how to install and test electrostatic discharge (ESD) and conductive floors. One example follows.

Coating to prevent static electricity

Veritek Mfg.'s existing concrete



CROWN POLYMERS

The concrete surface shines after the high-gloss ESD topcoat is applied and completed.

floor was overlaid with a non-conductive epoxy coating. Static electricity is a major problem in this dry desert environment. Light forklift traffic routinely traversed the electronic manufacturing plant's 14,000-square-foot floor in Escondido, Calif.

The contractor, Austin Stephens, owner of Unlimited Protective Coatings (UPC) of Temecula, Calif., was asked to inspect an existing factory floor and make recommendations to convert the floor into an ESD system. He found a solid concrete floor with an epoxy coating of different thicknesses. The contraction joints were filled with a flexible epoxy joint sealant. The owner requested that the joint system be saved, if possible, because it was properly sealing the joints. There were no cracks or deep depressions in the floor, and the overall condition of the floor was good.

Surface preparation

The existing coating formula and brand name were unknown. Therefore, to ensure adhesion of the ESD system, the coating would need to be removed. Diamond grinders with vacuum attachments and dust collectors were used to remove the major portion of the coating.

The surface profile was rough because some of the coating remained on the concrete surface. The surface prep sub-contractor knew if they ground too deep, they would badly mar the concrete surface. Therefore, they would depend on their shotblasting equipment for the remainder of the coating removal.

The cleaning process required a dust-free, smooth surface upon completion. It was accomplished and the work was accepted.

Surprise

Yes, the cleaned concrete was dust-free and smooth. Nevertheless, the shotblasting opened the surface of the concrete, revealing a porosity issue. When water immediately disappeared into the concrete in a water bubble test, it was clear help was needed.

Jose Ibarra, owner of Crown West Inc., Stephens' polymer supplier, was called because of his experience. The floor was carefully inspected and it was agreed that it would need sealing before applying the ESD system.

Prime and seal the floor

The product selected for the prime coat was a 100% solids, low-odor epoxy, CrownPrime product by Crown Polymers. The epoxy was mixed and poured onto the concrete surface. It was immediately spread with squeegees and back-rolled to remove thicker epoxy areas caused by the squeegee.

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Care was taken to observe where more polymer was needed to fill those areas. If the epoxy film was lost on the surface, more material was applied. This process is considered a penetrating process and it builds a thin film on the surface. The primer was tack-free in six to seven hours.

Grounding work

During the surface preparation phase, Jeremy Apodaca, project foreman for UPC, and his crew cut the pathways between the concrete slabs. These conductive pathways are required because of the seismic environment in Southern California.

A special system designed by the polymer manufacturer transported the conductive charge of electrons uniformly across the surface of one slab to the adjacent slab and so on to a common grounding source where it was neutralized. After placing the conductive system, the pathway was leveled to the concrete surface with ESD primer to ensure waterproofing and electrical conductivity.

ESD prime coat

With phase one of grounding work completed, the ESD prime coat, a 100% solids, low odor, two-component product, was mixed and poured onto the sealed floor surface, spread with squeegees and back-rolled with spiked rollers. The application rate is 10 mils thick. The epoxy coating was cured overnight.

ESD topcoat

The topcoat is a low odor, 100% solids durable epoxy that is nearly self-leveling with a high gloss. It was mixed, poured on the floor, and spread with squeegees and back-rolled with ⅜-inch-thick nap roller covers. Each layer of the polymer system, the primer, ESD primer, and topcoat will chemically bond together and become a monolithic part of the concrete.

Even with the added sealing work, the project was completed on schedule with the assigned five-man crew in five days. The customer moved in on schedule.

Because of the equipment cost for manufacturing and the potential loss to productivity and profits, the owner hired an independent testing laboratory to test the electrical conduciveness of the ESD system. The cured ESD coating values complied with ANSI standards and the work was accepted. **CS**

Floyd Dimmick Sr. is co-founder and technical director of Crown Polymers, of Huntley, Ill., an international polymer manufacturer of concrete repair products and floor systems. Active in the design and application of polymer products for more than 40 years, he has developed patented new polymer technologies. He teaches polymer classes for contractors and has published numerous papers.

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