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### Concrete 101

Jon Namba  
October 13, 2005

#### ARTICLE TOOLS

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Photo 2



Photo 1

With all of the talk about moisture systems over a concrete substrate, the steps to make sure that the products are installed properly are critical to the success and warranty of the products. One area that is oftentimes overlooked is the condition of the concrete substrate prior to moisture coatings or sealers. Manufacturers state that the concrete surface shall be free of oil, grease, dust, paint, waxes, sealers, curing compounds, and any contaminants.



Photo 3

With today's fast track building it is the practice of cement finishers to utilize products that are quick and easy to use. The preferred method for finishers is the use of spray-on products to assist with the curing process versus using a wet cure method. Although spray-on products work well for the cement finisher, it can be a headache for the flooring contractor as this is considered a curing compound and most manufacturers require that there be no curing compound or sealer on the concrete surface prior to using their products. The removal of curing products can be done by scarifying or grinding, which is time consuming and not always the best method although it is less cost for the installer as a buffer and a scarifying disc are basically all that are needed. Unfortunately, this type of surface preparation does not meet the specified requirements of most moisture control manufacturers, yet this type of preparation is used more often than not.



Photo 4

Photo 1 shows what NOT to do: no mask, no dust containment, and the concrete surface is only being lightly scraped, which is fine for the removal of adhesives but not for giving the concrete surface a "profile," which we'll discuss further into the article. There are heavy-duty grinders and scarifiers that are more aggressive that flatten and remove coatings that can create more profile (Photo 2).



Photo 5

Shot blasting is a method that does an excellent job. Shot blasting uses steel shot, or small BB's that are blasted onto the concrete surface hence, shot blasting. The shot comes in different sizes and depending on how much product needs to be removed and the type of profile needed on the concrete surface, will determine the size of the shot. Once the shot has been blasted onto the concrete surface the machine has a vacuum system that picks up and separates the reusable shot and surface debris.



Photo 6

Any stray shot can be picked up with a magnetic broom. Shot blasting has a proven record and is recommended by most all manufacturers of moisture control systems. Here are a few different types of shot blasting equipment from a small 120-volt unit (Photo 3) to a larger 230-volt unit. An edge grinder is used at areas that cannot be shot blasted (Photo 4). Ride-on type systems are utilized for large jobs (Photo 5).



Photo 7

With technology always on the move, there is also a system that is being used to prepare concrete without the use of shot. This system utilizes water under extreme pressure; we used this type of system on our renovation at the WFCM (Photo 6), and the psi setting for the concrete on our project with a sealer was 30,000 psi (pounds per square inch) for a profile of CSP 4.



Photo 8

The psi can be adjusted for more or less profiling of the concrete surface (Photo 7). We timed the surface removal of a six-by-forty-foot corridor, and from start to finish it was a blazing four minutes (Photo 8).



Photo 9

All the sealer and contaminants were removed, and the concrete was ready for a topping without the need to pick up any

shot or sweep period, for that matter. Photo 9 shows the before photo and Photo 10 is the after. The vacuum pick up system uses up to 1350 CFM for removal of all water and residual matter and is sent to a containment system, see (Photo 11 truck bed).



Photo 10

What about the use of water on the concrete and adding moisture into the concrete you say? Calcium chloride testing and moisture meter testing were conducted prior to surface removal and after removal. What we found was no gain in moisture from the use of water, the reason, the temperature of the water at approximately 180 degrees, along with the small amount used under extreme pressure and the vacuum system virtually removed the water as fast as it was being shot at the surface. Now this particular unit that was used at our facility is not usually recommended for small residential jobs as the unit is quite large as you can see in Photo 9, but on large commercial installations, areas that need to stay operational, or food preparation areas, this system works great as it does not create any dust and there are no residues left on the concrete surface.



Photo 11

There are other methods that are used such as detergent scrubbing, acid etching, scabbling, flame blasting, etc. but these systems are not generally recommended where a moisture control system with an adhered product are going to be installed.



Photo 12

So how do you know which surface preparation methods to use? First of all you need to know the condition of the substrate prior to bidding. What amount of surface needs to be removed and what is on the surface is important. If there is an epoxy coating, you will need aggressive equipment, more time, and more money for removal versus a concrete surface with just a curing compound. Is there rental equipment available or are you going to need to contract out the surface preparation? Surface preparation equipment is an investment and it's not uncommon to spend thousands of dollars. If you don't want to invest in all the surface preparation equipment, get to know the reputable surface preparation companies in your local area and work with them as they can save you both time and money. Make sure you consider safe disposal especially if Asbestos is involved, this is where a reputable company with abatement qualifications can be a big plus. Power, is there available power source or will you need to use a self-powered propane system and will doorways accommodate the equipment. Make sure you have adequate ventilation and discuss with the end user or general contractor, whether or not it will need to be a dust free removal, and if it will be day or night work.



Photo 13

Get the manufacturer of the moisture control product involved. A good manufacturer will have field representatives to assist you. Many manufacturers require a surface profile of ICRI CSP 3-4 well; these numbers don't mean much to flooring installers as we are into installing floors and not specializing in floor preparation to the degree where we have shot blasting equipment or extreme pressure systems. Photo 12 is a surface profile of CSP 4 that was required for the moisture control system used at the WFCa facility. ICRI, is the International Concrete Repair Institute and CSP, is Concrete Surface Profiles.

The ICRI utilizes a set of nine distinct profiles that replicate different degrees of concrete surface roughness. CSP 3, Photo 13, is considered a light shot blast and CSP 4 Photo 14, is light scarification. The higher the number the rougher the surface. Grinding is considered a CSP 2.



Photo 14

Finally, know what your costs will be and make a profit, moisture control systems are not inexpensive and could possibly cost you a lot more if it fails especially when manufacturers have specific guidelines and will only consider the warranty if the product is applied properly. Thanks to Blastrac and Extreme Pressure Services for the photos.



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