Two Things

First, I would like to update SSPC members on our recent Board meeting, held on May 29, in Chicago, IL. The Board welcomed two new members. The first is Mr. Ben Fultz from Bechtel Corporation, who was appointed by SSPC President Doni Riddle to replace the unexpired term of Brian Castler, who retired from the Connecticut DOT. Ben was subsequently elected to a four-year term beginning July 1. The second new member is Ms. Gail Warner, from NG Shipbuilding, who will also begin her first four-year term on July 1, replacing Mr. Danny McDowell. It was also announced at the meeting that Mr. Steve Hagman from Kleen Blast had been elected to his second, four-year term. Mr. Russ Brown, national sales manager—Temporary Humidity Control Services, Munters Corporation, was elected to the office of vice president for next year. A final note dealing with governance of the association is that Mr. Bruce Henley, vice president, Engineering Services, The Brock Group, assumed the role of SSPC president on July 1. Bruce replaces Mr. Doni Riddle, vice president of sales and marketing, Industrial & Marine Marketing, the Sherwin-Williams Company, who now becomes the immediate past president. The staff looks forward to Bruce's guidance and leadership during the next year and thanks Doni for his outstanding advice and support during his tenure as president.

The Board was briefed on the financial health of the organization. SSPC is a solid organization, but at this time of the year, our growth is a little slower than expected and budgeted. Training and certification programs continue to lead the way. The reserve fund is increasing and now shows a balance of $1.94M. Two big indicators of financial health are cash flow and the ratio of current assets to current liabilities. SSPC has had an increase of $158K in cash since December 31, 2007, and our current ratio is 4 to 1. The Board reviewed and approved the organization's independent audit and the auditor's management letter for FY 2007. Other briefings included those dealing with membership numbers; chapter activities, both domestically and internationally; training development; standards development; and the continued development of the joint document between SSPC and the American Institute of Steel Construction (AISC) dealing with our QP 3 and their Sophisticated Paint Endorsement (SPE) programs. A Task Group has developed a joint standard that is going through the approval process in each organization. In addition, both organizations are working on the administrative issues dealing with reciprocal audit programs. The Board spent a great deal of time discussing PACE and the future of that effort to develop a mega coatings show. More will be reported on that at a later date.

The second point of interest I would like to discuss is Bob Kogler's article "Managing the Infrastructure: The Role of Cost Knowledge" found on page 22 of this issue. SSPC plans to collect data from the field on the true costs of completing a painting job. Of course the respondents will remain anonymous and, as in the Kline/Appleman study, no specific contractor or owner will be mentioned. Only letters or numbers will identify them. We feel that this is important because, as Bob mentions, Life Cycle Cost Analysis (LCCA) for this industry does not exist, and in many forums, painting takes "hits" from other associations because of a presenter's general rather than specific statements on cost. We hope that the field data collected in this study will provide factual data to counter statements that the life cycle cost of painting far exceeds the life cycle cost of other corrosion protection methods. If you have any thoughts on this, we would like to hear from you.

Bill Shoup
Executive Director, SSPC

Floor Topping Is Icing on Bakery's Expansion Projects

When Hill Country Bakery of San Antonio, TX, purchased a nearby facility for the purpose of expanding its manufacturing capabilities, it selected a polyurethane-modified concrete flooring system to provide resistance to thermal cycling, impact, abrasion, and constant cleaning, says Steve O'Donnell, managing partner of the company. The company has used the flooring system in several projects, including this first expansion in 2005 and its second expansion, which was completed in 2007. Given his past experience with older epoxy flooring technology, which failed after a year in service in a similar project for another bakery, O'Donnell believes his choice of polyurethane-modified concrete is a good one. "I look at the long-term big picture. I don't want to put something down, get into

Continued

Polyurethane-modified concrete floor topping installed during the 2005 facility retrofit
Photo courtesy of Tnemec Company

Production area of the newest facility, with floor topping installed in 2007
Photo courtesy of T.W. Hicks, Inc.

Crew members install polyurethane-modified concrete floor topping during 2007 project.
Photo courtesy of T.W. Hicks, Inc.

production, and have the floor come up in a year or two," he says.

Facility Retrofit

Hill Country's first project comprised the retrofitting of a building to accommodate tunnel ovens, which increase productivity but which also subject the surrounding flooring to extreme temperature fluctuations. According to John Guidry, vice president of business development for the coating contractor, his company recommended the polyurethane-modified concrete floor topping because the thick-film system would offer better wearing, greater resistance to impact and thermal cycling, and longer service life than typical epoxy floor coatings.

The existing concrete was in generally good shape, says O'Donnell, but the areas that would support the tunnel ovens were removed and replaced to meet the weight demands of the equipment. In this project, the contractor prepared and resurfaced approximately 20,000 sq ft (1,858 sq m) of concrete and 1,600 lineal feet (488 m) of coving, says Guidry.

"Guidry recommended the floor topping because it would offer better wearing, greater resistance to impact and thermal cycling, and longer service life than typical epoxy floor coatings."

Although the contractor was not subjected to a tight timeline for the work, it operated as effectively and efficiently as it could, including working on weekends and holidays, to accommodate the other trades working on the retrofit, says Guidry. The crew members began the project by mechanically abrading the concrete with a self-contained electric shot blaster to clean the floor and provide proper roughness for sound adhesion of the new floor topping. Hand-held diamond grinders were used for perimeters and detail preparation, including "keying in" around drains to allow for proper drain flow, he says. The contractor then repaired large cracks and other surface imperfections in the concrete before applying the floor topping.

Once the preparation and pre-fill was completed, the applicators hand troweled two types of coving throughout the

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facility using a version of the polyurethane-modified concrete product formulated for vertical applications. The coving provides protection at the base of the walls from carts and two-wheeled traffic.

The polyurethane-modified concrete was then applied to the floor using gage rakes set at 3/16 in. thickness. At 70 to 75 F (21-24 C), the material cures in 8 to 12 hours; the contractor requested that the floor remain free of foot traffic for 24 hours and free of two-wheeled traffic for 72 hours.

New Concrete Coated in Second Project

The second project, comprising the application of the polyurethane-modified concrete to 40,000 sq ft (12,192 sq m) of concrete and 5,600 lineal ft (1,707 m) of coving, began in September 2007, with Hill Country's expansion to another building.

According to Guidry, the company retained the back section of the building, which included break room and warehouse areas, but completely renovated the production area. As in the first flooring project, the company had the concrete in the production area removed and replaced to accommodate the weight of the tunnel ovens.

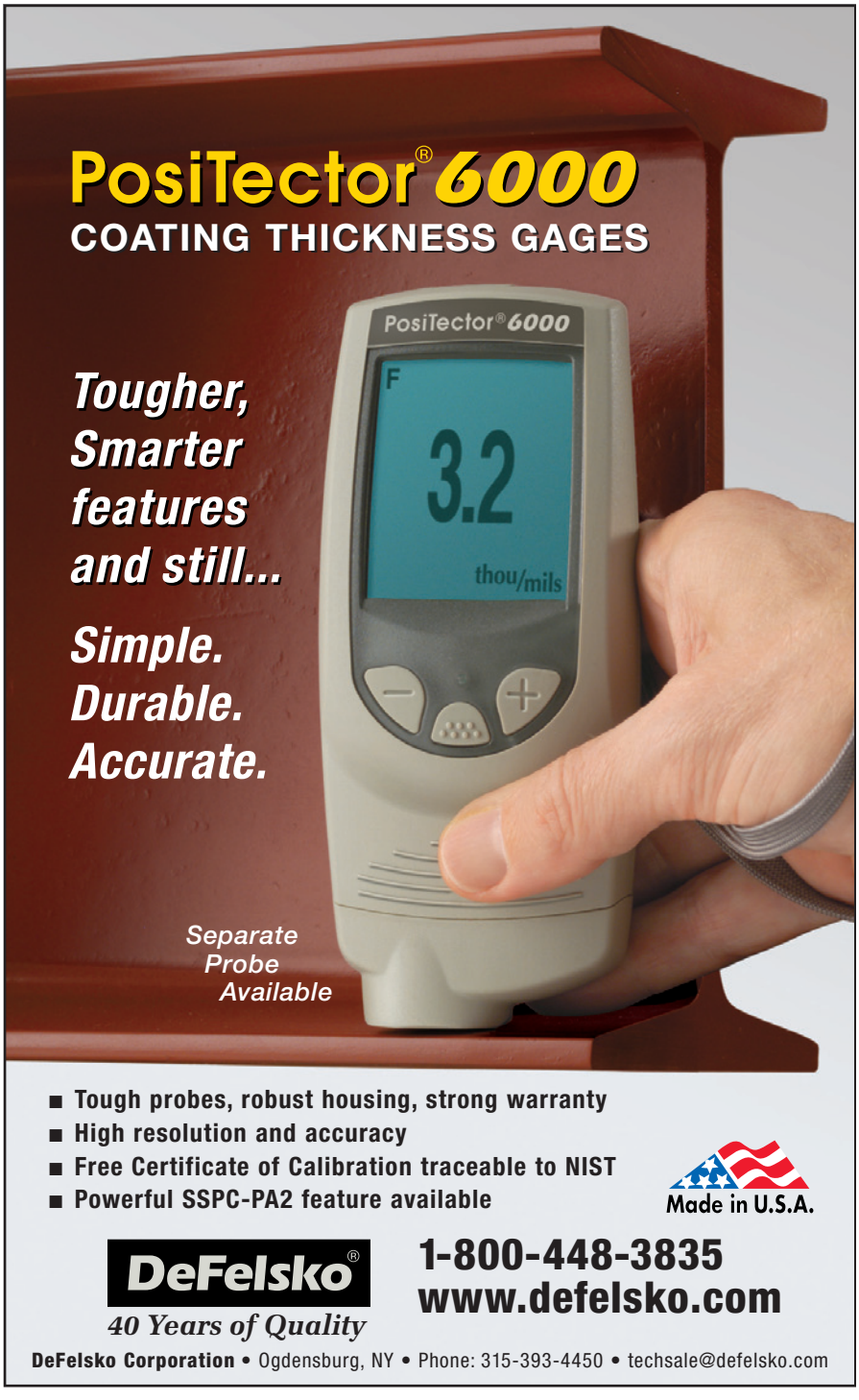
The contractor completed the second project in two phases to allow other trades access to the work area, says Guidry. Again, holiday and weekend work was necessary to accommodate other trades.

The concrete floor was approximately six months old when the flooring project began, says Guidry. Once again, the contractor carried out the same preparation of the concrete floor as in the first project. Two types of coving were installed throughout this facility, as well.

Once the preparation and coving installation were completed, the contractor applied the polyurethane-modified concrete floor topping to the substrate in sections, says Guidry.

According to O'Donnell, the polyurethane-modified concrete floor topping is performing well in the retrofitted facility, and he looks forward to a 15-year or greater service life. Hill Country is planning to have the polyurethane-modified concrete flooring system installed at its original facility once the newest facility is put into service, says O'Donnell.

T.W. Hicks, Inc. (Corinth, TX) performed the surface preparation and flooring installation for both projects. Tnemec Company Incorporated (Kansas City, MO) manufactures the polyurethane-modified concrete flooring topping.



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Improving Your Fall Protection Program with the New ANSI/ASSE Standard

By Joseph Feldstein, Manager, Technical Services, MSA

Fall hazards continue to be a leading cause of injury and death in the painting and applied coatings industry. What can you do to reduce fall hazards in your business? A newly published standard can help.

ANSI/ASSE Z359.2-2007, "Minimum Requirements for a Managed Fall Protection Program," is a voluntary national consensus standard. Although written for general industry, the basic provisions of the standard are universally applicable. In fact, the ANSI A10.32 Committee for Fall Protection in the Construction Industry has already indicated that they will adopt requirements from Z359.2 and other parts of the new ANSI/ASSE Z359-2007 Fall Protection Code. While OSHA representatives participated in the Z359 Committee during development of the new standard, the agency currently has no plans to incorporate these new requirements in US Federal OSHA rules.

A ladder safety system for use in confined spaces

Confined space entry and retrieval system in use for training. Photos courtesy of MSA

A fall protection system connected to an overhead beam

The new fall protection program standard takes a systematic approach to reducing hazards from accidental falls. This approach can be tailored to fit the needs of industrial coating crews for any jobsite, whether it be a steel building, bridge, ship, tower, confined space or other industrial structure.

Here are the key provisions of the new standards, with recommendations on how the managed fall protection program can serve your business.

The purpose of the standard is to assist employers in comprehensively dealing with fall hazards as they

- identify, evaluate, and eliminate (or control) fall hazards through planning;
- ensure proper training of personnel exposed to fall hazards;

Continued

Fall protection training is available from public and private sources. Courtesy of MSA

• ensure proper installation and use of fall protection and rescue systems; and
• implement safe fall protection and rescue procedures.

Program Participants and Their Duties

Begin creating a fall protection program by establishing the roles and responsibilities of the participants, as detailed in Table 1.

Training Your Employees

Training for fall protection and rescue at heights should follow the ANSI /ASSE Z490.1 "Criteria for Accepted Practices in Safety, Health and Environmental Training" guidelines. Quality plays a huge role in the success of the program, so the Z359.2 document describes the training in precise detail for each person with a defined role. Training includes lecture, demonstration, and hands-on use of equipment.

Currently, most coating contractor firms do not have a level of training sufficient to meet the criteria of the new standard. However, those who wish to get started in improving their employee training levels can take advantage of available resources: local universities, state health and safety agencies, commercial training organizations specializing in FP, and your FP manufacturer. When in doubt, contact your FP manufacturer and ask about training resources in your area.

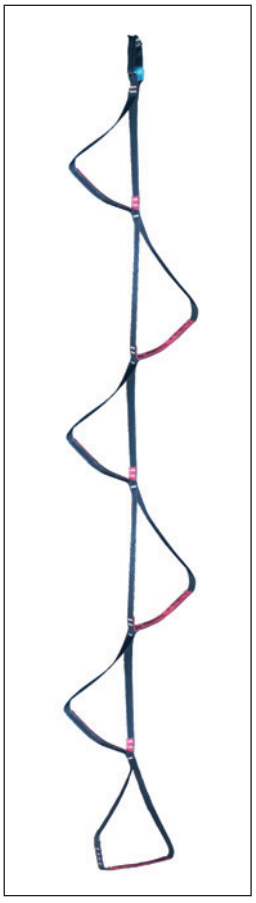
Table 1: Roles and Responsibilities for Participants in a Fall Protection Program

Role	Participant(s)	Responsibility
Employer	"The Boss" or Management	Must provide the adequate and timely resources needed to support your managed fall protection (FP) program
Program Administrator	Top safety professional in your organization or appointee	Responsible for developing, implementing, monitoring, and evaluating the program
Qualified Person	Usually an engineer with specialized FP training (may be a staff engineer or engineering consultant)	Supports the program, including FP system design, structural analysis, calculating forces and clearances, equipment selection, and compliance with regulations
Competent Person	A supervisor, lead hand, manager, or foreman who is experienced in FP as it relates to work	Responsible for the immediate supervision, implementation, and monitoring of the program; most companies have more than one trained Competent Person
Authorized Person	Line employees who receive training for work at heights	Has a working understanding of and follows the employer's policy and procedures and the instructions of the Competent Person regarding the use of FP and rescue systems
Competent Rescuer	Local emergency services, in-house professionals, or contract services	Anticipates the foreseeable need for planned rescue and develops rescue procedures and methods accordingly
Authorized Rescuer	Tradesperson with additional training to be on in-house rescue team or dedicated rescue professional	Responsible for performing or assisting in workplace rescues
Qualified Trainer	Extensively knowledgeable and experienced in FP and rescue, who demonstrates competency as an instructor (this may be a staff member or 3rd party contractor)	Responsible for conducting the training of other participants; must have a level of competency equal to or greater than the level to which they train

Conducting a Fall Hazard Survey

The first step in reducing fall hazards on the job is the "fall hazard survey," a complete walk-through of the work areas, either literally or virtually (using plans and drawings). The objective of the survey is to identify each fall hazard to which a worker may be exposed. Prepared by a Qualified Person, or Competent Person acting under the supervision of a Qualified Person, the survey is documented in a report, which includes hazard identification and ranking according to risk factors.

In general, Fall Hazard Survey Reports should be revised or rewritten whenever changes (to a task, process, structure, equipment, or legislation) render the previous survey obsolete.



An example of rescue webbing for use in delaying the onset of suspension trauma. Courtesy of MSA

Common Hazards

The following are some fall hazards and associated hazards to include in your Fall Hazard Survey Report.

- Hot objects, sparks, flames and heat-producing operations
- Chemicals hazardous to the authorized person or to the FP system
- Electrical hazards
- Environmental contaminants
- Sharp objects and abrasive surfaces
- Moving equipment and materials
- Unstable and slippery walking/working surfaces
- Climatic and weather factors
- Other materials or circumstances that could adversely affect the FP system
- Foreseeable changes in these conditions

Common Risk Factors

Some risk factors to include in your Fall Hazard Survey Report include the following.

- Reason for the exposure
- Severity of the fall
- Frequency of the task
- Duration of the task
- Occurrence of the task
- Obstructions in the path of a potential fall
- Existing fall protection systems or equipment

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- Access to the task or structure
- Environmental conditions
- Other workers or contractors in the immediate area
- Proximity to the fall hazard
- Other safety hazards
- History of accidents or incidents related to the task or structure

ANSI test torso rigged for demonstration drop in fall protection training. Courtesy of MSA

Hazard Abatement and the Hierarchy of Controls

After you complete your Fall Hazard Survey Report, you should begin to eliminate or control the identified fall hazards. Within the Z359.2-2007 standard is a Fall Protection Hierarchy to aid safety professionals in choosing the most effective methods for reducing fall hazards. The hierarchy is detailed below, starting with the most preferred, most effective method.

• Elimination or Substitution—Remove the hazard or hazardous work practices. Eliminating a fall hazard might include lowering the work surface to ground level. Substituting for a fall hazard might include changing a painting or coating process, sequence, or procedure so that authorized persons (e.g., employees trained in fall protection) do not approach the fall hazard.

• Passive Fall Protection—Isolate or separate the hazard or hazardous work practice from employees or others. Isolating the hazard might include installing guardrails or covering a floor opening.

• Fall Restraint—Secure the worker to an anchorage using a lanyard short enough to prevent the worker from reaching the fall hazard. This is generally interpreted to mean that the person's center of gravity is behind the exposed edge. To be conservative, restrain the worker so that no part of the person's body reaches the fall hazard.

• Fall Arrest—Stop a person after a fall has begun. A fall arrest system prevents the authorized worker from striking the ground or objects in the path of a fall. Fall arrest must also limit the maximum forces on the body to 1,800 pounds or less, as stated in U.S. OSHA regulations (Title 29 of the Code of Federal Regulations, Part 1926.502).

• Administrative Controls—Use work practices or procedures that signal or warn authorized persons that they are approaching a fall hazard. Examples are warning signs, lights or sounds, training, and other methods that warn a person to avoid the fall hazard.

Table 2: ANSI/ASSE Z359.2-2007 Anchorage Strength Requirements

	Non-Certified Anchorage	Certified Anchorage
Anchorage for Fall Arrest	5,000 pounds	2 times the maximum fall arrest force (up to 1,800 lbf per person attached to the system)
Anchorage for Work Positioning	3,000 pounds	2 times the maximum foreseeable load
Anchorage for Restraint and Travel Restraint	1,000 pounds	2 times the maximum foreseeable force
Anchorages for Horizontal Lifelines	not to be used	certified and designed by a Qualified Person, capable of sustaining 2 times the maximum tension developed in the lifeline during fall arrest in the direction applied by the lifeline forces
Anchorage for Rescue	3,000 pounds	5 times the applied load

Creating Fall Protection Procedures

After assessing the fall hazards and deciding which abatement strategies you will use to eliminate or control the hazard, you are now ready to write a set of job-specific fall protection procedures.

The Z359.2-2007 Managed Fall Protection Program standard provides excellent guidelines for writing procedures that specify how to reduce the hazard, using your analysis of your workplace fall hazards and the Hierarchy of Controls. The FP procedures you write will be used as training aids and daily reference materials for authorized persons before they start work. Logical, well written, easy-to-understand procedures can be very effective in training and motivating workers to follow safe work practices while working at heights. Of course, as job circumstances change, you need to update procedures accordingly.

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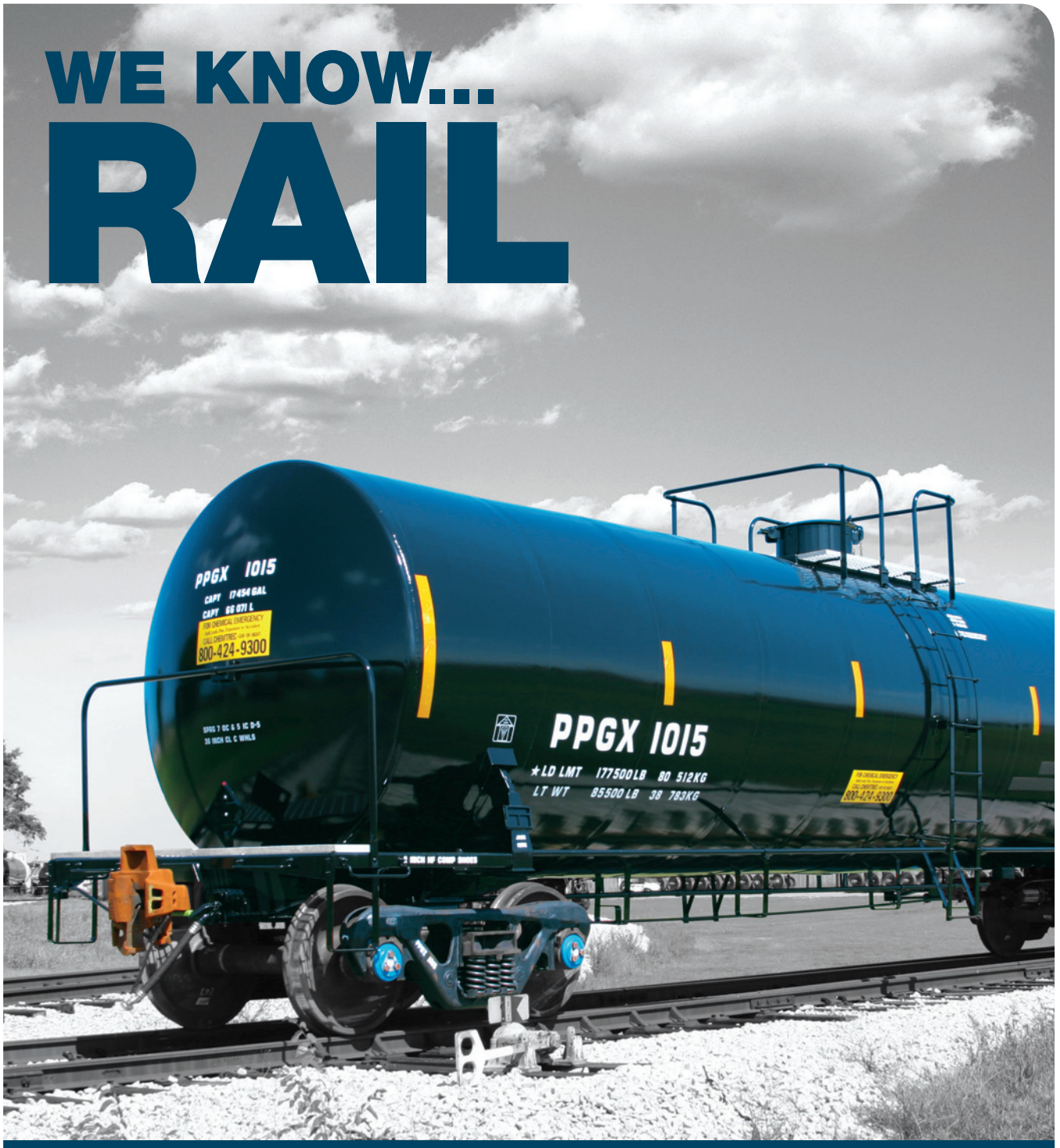

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Strength of Anchorages for Fall Protection and Rescue

The standard lays out clear guidelines for establishing anchorage strength for each of the work tasks described in the document. Certified anchorages have been individually evaluated by a Qualified Person for a specific fall protection system. Non-Certified Anchorages can be judged by a Competent Person to be capable of supporting the predetermined anchorage forces.

Table 2 summarizes anchorage strength requirements in ANSI/ASSE Z359.2-2007.

Some fall hazards can be eliminated by bringing the work down to the ground. Courtesy of the author

Rope Access

The ANSI/ASSE Z359.2 -2007 standard provides guidelines for the safe use of rope access equipment and methods. Rope Access is a work system that uses a two-line rope configuration to position a worker on a vertical surface while suspended from an anchor overhead. This method of gaining access to very-difficult-to-reach spaces makes rope access an important tool for work on bridge trestles, towers, and dams.

Post-Fall Rescue

Did you know that if a worker is unconscious or incapacitated after a fall, rescue must be accomplished in a matter of minutes rather than hours?

Workers suspended in a fall arrest harness are at risk of further injury from a condition known as suspension trauma (aka orthostatic intolerance). A comprehensive fall protection program addresses the critical need for prompt rescue. The standard directs employers to provide means for delaying the onset of suspension trauma, such as a webbing step. If a worker remains conscious after a fall, he or she can exercise the large muscles of the legs using the webbing step to prevent blood from pooling in the extremities.

Employers should have a rescue plan and the means to implement it in an emergency. The standard suggests that contact should be made with the fallen worker in fewer than 6 minutes after a fall.

The standard concludes with guidance on planned rescue of workers incapacitated after an accidental fall. Rescue considerations are frequently overlooked when workers are equipped with fall arrest systems.

Conclusion

The new ANSI/ASSE Z359-2007 Fall Protection Code contains a wealth of information that can enhance your company's fall protection program. To obtain a copy of this standard, contact the American Society of Safety Engineers, Des Plaines, IL, online at www.asse.org.

Joseph Feldstein is manager of technical services for Mine Safety Appliances (MSA) Company in Pittsburgh, PA. Mr. Feldstein, who has 18 years of experience in fall protection product design and standards

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development, is a member of the American Society of Safety Engineers' Engineering Practice Specialty; the Executive Committee, ANSI Z359 Accredited Standards Committee for Fall Protection in General Industry; and the ANSI A10.32 Accredited Standards Committee for Fall Protection in Construction Industry. He chairs the International Safety Equipment Association, Fall Protection Group; the U.S. Technical Advisory Group to the International Standards Organization, ISO TC94/SC4 for Fall Protection; and the Scaffold Industry Association, Fall Protection Safety Council. He is also a member of the Board of Directors, International Society for Fall Protection, and vice-chair of the Canadian Standards Association, CSA Technical Advisory Committee for Fall Protection. He has published and presented widely, and also holds a patent for a full-body harness for fall arrest. This year he received the ASSE Charles V. Culbertson Award for Outstanding Volunteer Service in 2007-2008 for his work on the ANSI Z359-2007 Fall Protection Code; and the ASSE Thomas F. Bresnahan Award for International Standards Development for his work since 1999 as chairman of the U.S. Technical Advisory Group to ISO TC94/SC4.

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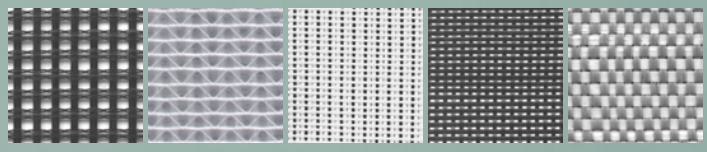

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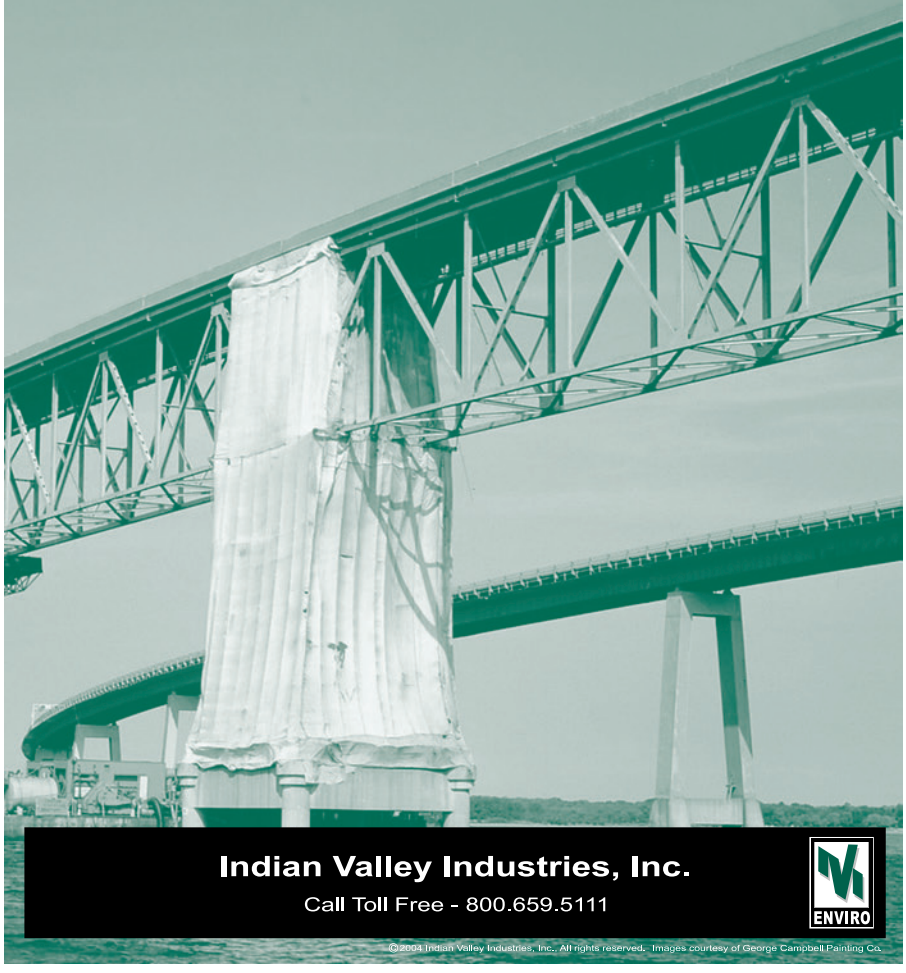

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Developments in Waterborne Breathable Flooring Systems

by Thomas J. Murphy, VP Marketing LLC

Urethane cement breathable system in a food plant
All photos courtesy of the author

Resinous flooring and floor coatings have been used for over half a century. Throughout this period, materials have evolved, allowing for more robust and thicker systems, easier application, lower volatile organic compound (VOC) content, and faster installation.[1,2] Currently, the most widely utilized material for seamless flooring is high-solids epoxy, frequently referred to as 100% solids epoxy. The demand for faster installations, reduced post-installation issues, and more environmentally friendly products has driven the development of waterborne technology. These systems provide many of the same performance and aesthetic advantages as high-solids epoxy systems. In addition, the waterborne systems are breathable, minimizing issues with moisture vapor transmission (MVT) after installation. Manufactured by several companies, the new systems provide value throughout the supply chain. They are safer to manufacture, more environmentally friendly, easier and/or faster to install, and they reduce installation problems.

Why Coat Concrete?

Concrete is the most commonly utilized construction material in the world. Most commercial and industrial floors are based on a concrete slab. Concrete provides a supportive surface that can be finished to a slip-resistant or polished surface to meet the needs of the intended use and environment. Although, in many applications, concrete may not need to be coated, in high traffic environments and in most industrial applications, the concrete floor can be protected and last longer if it is coated.

Concrete is a relatively weak and porous substrate. Aggressive traffic will wear the surface, causing dusting or spalling. The low tensile strength of concrete results in chipping and cracking in situations where impact or vibrations frequently occur. The high porosity of concrete allows liquids to enter a concrete slab, potentially weakening the con-

crete. Concrete exposed to acids will deteriorate. Concrete is highly alkaline and will react with acidic food stuffs, beverages, or chemical acids.[3,4]

In some cases, concrete is coated to provide additional performance or aesthetic properties. Conductive coatings provide static charge dissipation to protect people and property from unwanted static discharge. Clean rooms require an environment with little or no dust. A coated floor is easier to clean and will not be a source of airborne particulates. Coatings with both colored and photoluminescent materials can also improve the facility's light reflectivity or directional indicators. Finally, although the porosity of concrete provides a relatively slip-resistant surface, coating the concrete and broadcasting aggregate into it will create texture and further improve slip resistance.

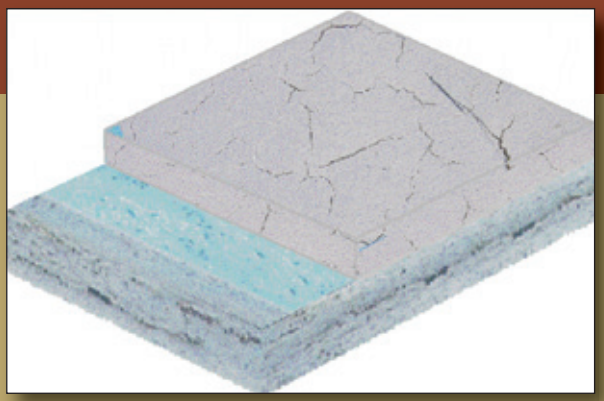

Fig. 1: Water-based polyamine adduct epoxy shrinkage cracking

Seamless Flooring Options

Depending upon the desired performance, the condition of the substrate, and the budget, concrete can be coated with a variety of different flooring systems. *Concrete stains and sealers* penetrate the concrete, sealing some of the pores and providing improved aesthetics and performance. *Penetrating coatings* provide no film build and are generally used in light traffic and decorative applications. *Thin-mil coatings* provide a film build on top of the concrete substrate and generally do not include aggregate other than that used for slip-resistant textures. *Resin-rich systems*, commonly used in aggressive environments, incorporate a blend of aggregates applied as slurry, self-leveling, or broadcast processes. Resin-rich, high-solids epoxies systems are not breathable and can be adversely affected by the movement of moisture from the concrete slab. The highest build systems incorporate more aggregate with the resin and are applied with a trowel. These mortar systems are used to resurface damaged substrates, address sloped and vertical surfaces, and can include larger aggregate, such as marble in thin-set terrazzo.

Urethane cement breathable system finished with paint chip decorative coating at a pharmaceutical company
Courtesy of the author

History of Material Selection

Solvent-containing polymers such as epoxy, polyurethane, and polyesters were utilized over 50 years ago to improve and protect concrete. The material selected was driven by cost, ease of use, and performance. The application thickness was limited by the solvent and the shrinkage of the floor during the curing process. These limitations led to the development of higher solids materials. Epoxy provided the most cost-effective alternative and did not have the high odor of styrene-based polyester and vinyl ester systems. To date, high-solids epoxy remains the predominant resin used in the high-build seamless flooring industry. The physical properties of these epoxy systems have proven to

yield outstanding surfaces that can be utilized in aggressive environments but can also be designed with a decorative finish. Because there is little or no solvent (~100% solids) in these systems, they meet LEED (Leadership in Energy and Environmental Design) contribution requirements, allow for thick application, and have no odor issues during installation.

In the 1980s, a waterborne polyurethane cement system was introduced to the market. This waterborne system involves a complicated multi-reaction chemical cure. Most of the water is utilized in the hydration of the cement; thus, there is little or no shrinkage of the system. This urethane cement system provides excellent chemical resistance and has been universally adopted by the food and beverage processing industry.

Over the last few years, waterborne epoxy systems have been introduced. Some of these systems contain cement, reflecting the design of the urethane cement systems. Other novel systems contain no cement, with equal or better performance properties.

Evolution of Waterborne Epoxies

The initial waterborne epoxy products developed were based upon polyamide chemistry.[5] Due to the high viscosity of these materials, nonionic surfactants were added to provide workability. These materials had a short pot life, high color content, and slow cure. Applications of these products were limited to primers or thin-mil applications. Waterborne polyamine adducts were introduced to improve the performance, workability, and aesthetics of the coatings (Fig. 1). They had lower color, higher solids, and a faster cure. These early waterborne products required the addition of cement for thick applications. Attempting to apply these chemistries as a self-leveling system without the use of cement resulted in entrapped moisture, causing low gloss, soft cure, shrinking, and mud cracking. New waterborne technology has solved these issues.

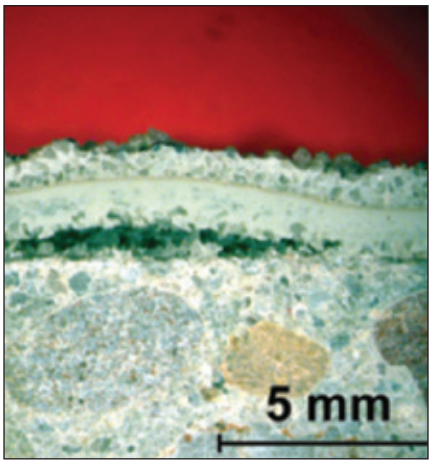

Fig. 2: Impermeable epoxy flooring with blister

Limitations of Conventional Systems

The early waterborne epoxies were limited to thin applications and were slow to cure, depending upon temperature and humidity to drive evaporation. Solvent-containing chemistries are also limited by thickness of application, and their high VOC content restricts their use. Solvent-free chemistries, especially 100% solids epoxy systems, are subject to free amine reaction with water and carbon dioxide, resulting in carbamation and surface blush. The most highly visible and most expensive issue with these systems is blistering and delamination. These issues are frequently not experienced until several months or years after installation.

Blister Formation

There are a number of theories regarding the cause of blisters in seamless floors (Fig. 2). One commonality to all hypotheses is that blisters occur when there is movement of water in the concrete slab. Minimizing the movement of moisture is accomplished by proper exterior grading, utilizing low permeance moisture retarders below the slab, pouring low-water-to-cement-ratio concrete, proper curing, and installation of the flooring systems in the same environmental conditions in which they will be placed in service. After an impermeable flooring system has been installed on a concrete slab, the movement of moisture within the concrete is driven by the difference in vapor pressure at the bond line and within the slab. Vapor pressure is a function of temperature and relative humidity. When the slab is "capped" with a seamless flooring system, only the temperature differential will affect the vapor pressure differential. Proper concrete mix design and curing can decrease the permeability of the slab and will reduce the potential channels for moisture movement in liquid and vapor form.[6]

One theory of blister formation, presented in the late 1990s, was termed *osmotic blistering*.[7] But this theory has been disputed. Osmosis is the transport of a fluid (in this case, water) through a semi-permeable membrane, from low concentrations to high concentrations. It had been argued that the concrete slab itself was the semi-permeable membrane, although there is no common agreement on this.

Another school of thought regarding the mechanism of blister formation is based upon the argument that some silica is susceptible to alkali silica reaction (ASR). In the presence of highly alkaline conditions, as seen in floor blisters, some reactive silica will convert to an expansive gel. The gel will create pressure, causing delamination and even concrete cracking. This process is not dissimilar to the corrosive effects of rust, where iron is degraded under the proper conditions and expands as the iron is oxidized. In

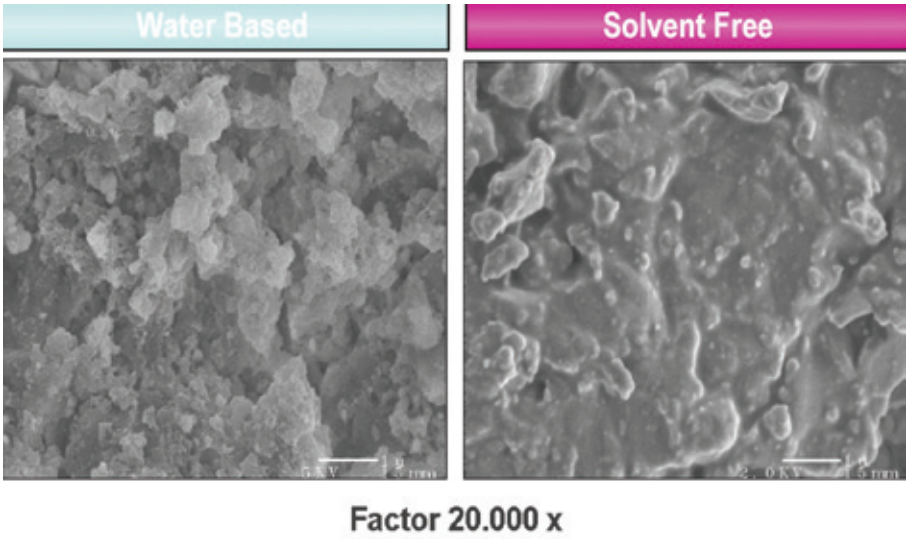

Fig. 3: Electron Micrograph of New Water-based Epoxy vs. High Solids Epoxy Systems

theory, as moisture moves through the concrete and condenses or consolidates at the bond line, the highly alkaline conditions may react with the fine sand (silica) that is at the surface of the concrete. The subsequent ASR "unlocks" the mechanical bond and forces the flooring system to blister.[8]

Yet another theory recently presented suggests that the formulation of the resin primer and the flooring system itself may play a role in the formation of blisters.[9] Briefly, the authors present experimental evidence showing that epoxy formulations containing nonreactive diluents, such as benzyl alcohol, can actually create discontinuities in the polymer structure, leading to pressure points. The capillary pore pressure within a concrete slab has been measured to be as high as 2.9 bar (42 psi). If this force is focused on a fine pinhole, the pressure would exceed 2,500 pounds per square millimeter. In addition, the formulations containing benzyl alcohol become soft when exposed to highly alkaline conditions.

Regardless of which of these theories is correct or which combination of causes results in blister formations in impermeable flooring systems, the common element is the movement of water and the accumulation of highly alkaline liquid at the bond line. The blistering problem would not present itself if either one of these factors were eliminated.

Waterborne Breathable Technologies

Several flooring systems on the market today are based upon waterborne chemistry, which yields a "breathable" flooring system. As discussed previously, polyurethane cement systems have proven to be successful for nearly 20 years. Waterborne epoxies with cement offer the same advantages as polyurethanes and may be more cost effective. Over the past five years, waterborne epoxy technology has also

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been formulated for thick-film and troweled systems that contain no cement.[5] In addition, novel waterborne polyurethane coating systems are now available as neat (without aggregate) coating systems or topcoats for breathable systems.[10]

The newly developed waterborne epoxy systems that do not contain cement have solved the issue of shrinking and cure within a one- to two-day period, depending upon environmental conditions. The fact that these systems do not shrink as the water leaves the system is a clue to why they breathe and thus minimize issues related to moisture vapor emissions. Reference 10 shows that this open architecture system shows 1.3–1.5% shrinkage, compared to the theoretical calculation, which anticipates 30% shrinkage. When mixed with a graded aggregate, the waterborne epoxy coats the aggregate, the water evaporates, and a three-dimensional structure remains. Figure 3 compares the structure of a typical high-solids epoxy and a newer waterborne epoxy. The "solid" structure of the high-solids system will not allow for the passage of moisture, while the open "microporous" structure of the cured waterborne system will be breathable. To put this picture in perspective, a molecule of water is 2.8 angstroms in size, which is 1/35,0000 of one millimeter. A pin head is about 2 mm wide.

Measuring Permeability

Manufacturers are beginning to report either the permeance or the permeability of their products and systems. Typically, permeance is measured using ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.[11] The ASTM E96 values are not necessarily comparable between products and systems because the test method describes two separate techniques to measure the permeance of a material. One method (Wet Cup Method) uses a water-containing cup covered by the test specimen and measures the loss of water in the cup. The second method (Dry Cup Method) uses a desiccant within the cup and measures the gain in weight as moisture passes through the specimen into the cup. Water vapor permeance is the time rate of water vapor transmission through a unit area of flat material or construction induced by unit vapor pressure difference between two specific surfaces, under specific temperature and humidity conditions. The terms, "permeability" and "permeance" are often misused. Permeability is the arithmetic product of permeance and thickness. The samples themselves may vary in thickness and composition. Ideally, the flooring system itself is measured for permeance (grains /Pascals-seconds-m^2 or g/Pa-s-m) or Perm (inch-pound). Although the test method controls the temperature and humidity during the test, the value derived under these conditions may or may not reflect those under which the system will be used.

Concrete has been reported to have a permeance between 20 and 30 Perm.[5] In the insulation industry, products are considered to be breathable if their Perm rating is greater than 1. In the flooring industry, however, a floor coating is considered to be breathable if the Perm rating is 3 or higher.[12] The issue is rate. When bonding a "breathable" coating to a concrete surface, the coating system must handle the rate of moisture vapor transmission from the concrete. Picture a fire hose connected to a garden hose. If water is allowed to trickle through the fire hose and through the garden hose, there is not an issue. Both hose systems can handle the moisture flow. If, on the other hand, the water pressure is maximized through the fire hose, the garden hose will be blown off (or disbond from) the coupling. A coating on concrete will behave in the same manner.

All coatings are permeable, but at what rate? In tank lining applications, the permeability of the coating is reduced through the use of glass or mica flake to avoid blister formation caused by vapor migrating through the coating and condensing at the bond line, creating blisters (cold wall effect). The permeance of these tank linings compared with a typical high-solids epoxy flooring system results in Perm ratings near zero, as shown in Table 1. (It should be noted that permeability is relative. For example, the permeance ratings of 100% solids coatings are so low that the coatings are considered impermeable. A product can "work" as a floor coating as long as its permeance rating can handle the vapor transmission rate.) What matters in Table 1 are the relative differences among the values.

Polyurethane cement systems obtained values of 6 to 7 Perm when

Table 1: ASTM E96 Perm Ratings for Impermeable Coating Systems

		Glass Flake Filled Novolac (Published)	Mica Filled Polyester (Published)	100% Solids Cycloaliphatic Epoxy System
Water Vapor Transmission	*g/(m^2·s)*	2.09E-07	2.18E-05	6.00E-06
Permeance	*PERMS*	0	0	0
Water Vapor Permeance	*g/(m^2·s·Pa)*	9.15E-11	9.54E-09	5.00E-09

Table 2: ASTM E96 Perm Ratings for Polyurethane Cement Systems on a Paver

		Paver	Urethane Cement (sealed)	Urethane Cement
Water Vapor Transmission	*g/(m²·s)*	1.44E-03	8.49E-04	8.02E-04
Permeance	*PERMS*	11	6	6
Water Vapor Permeance	*g/(m²·s·Pa)*	6.29E-07	3.71E-07	3.51E-07
L (sample thickness)	*cm*	3.84	4.4	4.2
Permeability	*perm-cm*	2.41E-06	1.63E-06	1.47E-06

Table 3: ASTM E96 Perm Ratings for New Waterborne Epoxy Flooring Systems

		Paver	Waterborne Epoxy System (Published)	Waterborne Epoxy (broadcast/sealed)	Waterborne Epoxy	Waterborne Epoxy Broadcast
Water Vapor Transmission	*g/(m²·s)*	1.44E-03	9.75E-04	1.00E-03	9.47E-04	5.37E-04
Permeance	*PERMS*	11	12	7.6	7.2	4
Water Vapor Permeance	*g/(m²·s·Pa)*	6.29E-07	6.67E-07	4.39E-07	4.14E-07	2.35E-07
L (sample thickness)	*cm*	3.84		4.07	4.04	3.98
Permeability	*perm-cm*	2.41E-06	1.44E-07	1.79E-06	1.67E-06	9.35E-07

tested on top of a concrete paver with a Perm rating of 11.[13] With over 20 years of experience, the industry know that this value works when placed on a variety of different concrete slabs. These systems have even proven to be successfully installed, with no subsequent moisture issues, over green concrete that had only cured for 3 to 7 days. Interestingly, the "sealed" urethane cement system that was coated with a 100% solids epoxy performed as well as the uncoated sample (Table 2).

The new waterborne epoxy system was tested within three different system designs (Table 3). The first system was simply a self-leveling slurry application. The second system utilized a slurry application, followed by a full sand broadcast and sealing with 100% solids epoxy. The last system was a double broadcast that used an application of waterborne epoxy with a decorative quartz broadcast, followed by a reapplication of the coating and broadcast quartz. This system was sealed with the same breathable waterborne epoxy. The two slurry-containing systems produced comparable Perm ratings of 7 to 8, higher than the polyurethane cement systems. The double-broadcast system, however, did not have as high a permeance. One possible explanation for the lower permeance is that a graded aggregate was not used, and the aggregate was placed in the system after it was applied to the floor. Thus, system design, not just resin composition, is critical to the permeability properties of the system.

The fact that the "sealed" systems, both polyurethane cement and new waterborne epoxy systems, had high permeance values indicates that to avoid moisture issues, the systems can be applied before installing impermeable flooring systems. These breathable systems will work as a remediation system for a concrete slab that measures too high a moisture vapor transmission level before installation of a seamless flooring. The breathable systems remove the stress from the bond line, preventing crystallization and serving as reservoirs for moisture movement. One such example would be the use of these systems under thin-set epoxy terrazzo. Most epoxy terrazzo applications incorporate 100% solids epoxy. They are not considered to be breathable and frequently present problems with moisture vapor transmission.

Other Performance Properties of Waterborne Systems

Seamless floors are frequently used in wet conditions, in areas that require seam cleaning, or in process areas where temperatures will fluctuate or thermal shock conditions exist. The waterborne epoxy systems provide a natural form of thermal buffer or insulation due to the open architecture following cure. The formulation contains no plasticizers; thus, unlike most 100% solids epoxies, the waterborne systems will not become soft when exposed to

high heat. The polyurethane- and epoxy cement-containing systems also perform well in these environments. Because these systems have thermal coefficients of expansion similar to that of concrete, there is little or no bond line stress when the temperature changes rapidly.

High-solids epoxy systems are generally brittle. Upon heavy impact, these systems can deform and frequently crack. The waterborne epoxy systems, with their microporous structure, will tend to dent, rather than crack, when presented with an impact event. The energy of impact is absorbed. The cement-containing systems transfer the energy of impact because their physical properties are similar to the underlying substrate.

Traditional high-solids epoxy systems have served the industry well but are relatively slow to install and can have issues with moisture movement in concrete.

Urethane cement systems have addressed both of these weaknesses; they can be installed quickly and have no issues with moisture vapor transmission. The epoxy cement systems also perform like urethane cements, but the system may be slower to cure, allowing for a more decorative finish. The new waterborne system without cement has better chemical resistance than the cement-containing products and performs comparably. Finally, the waterborne polyurethane coating can be used as a breathable system to a degree and provides all of the advantages of a typical topcoat or coating system.

Limitations of the Waterborne Technologies

Because these technologies contain water, they can freeze. In some cases, if the formulation is not self-emulsifying, the emulsions can break, and the product will not cure correctly. The microporous nature of the new waterborne epoxy systems limits compressive strength. These systems will dent when placed under high point loads. The cost of the new technologies may be higher than the other products currently being used.

Conclusion

Waterborne breathable flooring systems provide value to all parties associated with the flooring installation. In addition to the strong performance and aesthetics of the concrete surface, these technologies eliminate post-installation moisture issues. They are VOC compliant and environmentally friendly. They can be easy and fast to install. There is low or no odor during installation, especially if the tools can be cleaned with soap and water. Waterborne technology is also safer and "cleaner" to manufacture.

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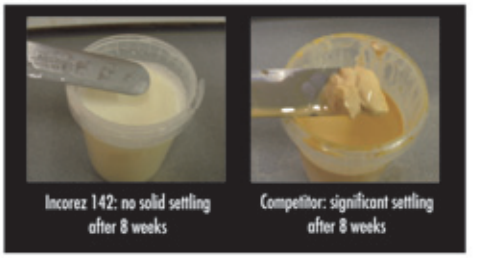

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References

1. Hare, Clive H., *Protective Coatings: Fundamentals of Chemistry and Composition* (Pittsburgh, PA: Technology Publishing Company, 1994).
2. Smith PhD., Lloyd M., *Generic Coating Types: An Introduction to Industrial Maintenance Coating Materials* (Pittsburgh, PA: Technology Publishing Company, 1996).
3. Nixon, Randy and Richard Drisko, *The Fundamentals of Cleaning and Coating Concrete* (Pittsburgh, PA: SSPC: The Society for Protective Coatings, 2001).
4. Murphy, Tom and John Durig, "Selecting a Flooring System," *Plant Services* (June 1998).
5. Klippstein, Achim H., Matthias Lohe, and Mike Cool, "3-Dimensional epoxy binder structures for water damp permeable and breathable coating and flooring systems", Quelle: 5. Internationales Kolloquium Industrieböden 03. 21.-23. January 2003, Ostfildern
6. Hall, Charles and Scott O'Connor, "How Water Transmission Affects Slab-on-Grade Flooring Systems," *JPCL* (February 1997), pp. 86-102.
7. Pfaff, F.A. and F.S. Gelfant, "Osmotic Blistering of Epoxy Coatings on Concrete," *Expanding Coatings Knowledge Worldwide, Proceedings of the SSPC Conference*, San Diego, November 1997 (Pittsburgh, PA: SSPC, 1997).
8. Farny, James A. and Steven H. Ksmatka, "Diagnosis and Control of Alkali-Aggregate Reactions in Concrete," *Concrete Information: Portland Cement Association* (Portland Cement Association, 1997).
9. Wolff, Lars, Michael Raupach, Dr. rer. nat Kidist Hailu, "Blistering of Reactive Resin Coatings on Concrete: Causes and Prevention," *JPCL* (December 2007), pp. 30-45.
10. Wuehrer, Karl H. and Kathy Allen, "Chemical-Resistant Waterborne Polyurethane Topcoats for Flooring," *JPCL* (February 2007), pp. 59-66.
11. ASTM E96/E 96M –05, "Standard Test Method for Water Vapor Transmission of Materials," ASTM International, 2005.
12. Hall, Gary R. and Scott A. O'Connor, "Effects of Moisture Vapor Transmission on Delamination of Coatings for Concrete," *JPCL* (May 1998), pp. 6-12.
13. Third-party tests conducted under private contract; results not published.

Thomas J. Murphy has been involved with the seamless flooring industry for over 13 years, holding sales, marketing, and technical service positions with General Polymers (acquired by Sherwin-Williams in 2000). He is active in several industry committees, including SSPC-CU 10, Thick Film Coatings; National Terrazzo and Mosaic Association—Co-Chairman Promotion Committee; ASTM F-13 Slip Resistance of Pedestrian Walkways; ASTM E54 Homeland Security, and USGBC – LEED Development Committee. Tom received the SSPC Coatings Education Award in 2007 for spearheading the development and introduction of SSPC C10: Coatings & Surfacing Concrete for Contractor Supervisory Personnel. He is now a consultant to the construction industry through VP Marketing LLC. Contact him at Tmurphy14@cinci.rr.com

Polyurea Elastomer Helps Bring Rail Line up to Olympic Speed

A high-speed rail line linking Beijing to the Chinese coastal city of Tianjin will help transport Olympic guests to and from venues in Beijing in August 2008. The rail line, which was completed in a fast-track project to allow adequate time for testing the trains before putting them into operation, features metal rails that sit atop a foundation consisting of poured-in-place and precast concrete panels. With each of the panels over 18 ft (5.5 m) wide and 81 ft (25 m) long, they required waterproofing to prevent premature degradation of the concrete from moisture intrusion, corrosion, and abrasion.

Given the large amount of coatings required for the project over 600,000 gallons (2,271,247 L), the Chinese government let three contracts for the supply of coatings. A joint venture partner of United Coatings (Spokane Valley, WA) manufactured a high-build polyurea elastomer for a portion of the 71-mile (114-kilometer) rail line.

To produce the concrete sections, several concrete yards were temporarily set up in the field. Once the sections were produced, they were transported to their positions on support pillars, where two coatings contractors from China applied a two-component sealer to penetrate and seal the elevated deck sections. The coatings contractors then applied the polyurea elastomer to a thickness of 80 mils (2 mm) using plural-component spray equipment. The material was applied in three separate passes to prevent pinholes and ensure even coverage.

The painting crews worked long hours, up to 20 per day when the weather permitted, to ensure that the project was completed on time.

A waterproofed deck section

The application of the polyurea elastomer to the elevated concrete deck sections
Photos courtesy of Bill Mann, United Coatings.

The rail line

Associations

NPCA Honors Rawlins, 6 Others

The National Paint and Coatings Association (NPCA) and the Vincentz Network have presented Dr. James W. Rawlins with the first-ever American Coatings Award for his collaborative paper entitled, "Letting Mother Nature Tackle the Dirty Work: The Future of Coatings Additives."

Dr. James W. Rawlins

The association also presented Charles E. Bunch, chairman and CEO of PPG Industries, with the George Baugh Heckel Award and honored five other industry executives.

Rawlins is an assistant professor of polymer science and engineering at the School of Polymers and High Performance Materials at the University of Southern Mississippi. His co-authors were Michael D. Blanton and Pirro B. Cipi of the University of Southern Mississippi; and C. Steven McDaniel, Melinda E. Wales, and Juan Carlo Carvajal of Reactive Surfaces Ltd.

The paper was selected from 72 finalists out of 170 submissions. The prestigious award is endowed with $2,500 and an attractive sculpture.

The award-winning paper explored how biological molecules such as enzymes and peptides have traditionally been viewed as functionally restricted to very narrow environmental conditions, but how increased levels of understanding have led to the development of innovative, bio-engineered 'smart' additives for paints and coatings.

Bunch became NPCA's Chairman of the Board in October 2006. His tenure included the beginnings of the NPCA merger with the Federation of Societies for Coatings Technology, as well as a more active dialogue and participation in the Paint Product Stewardship Institute effort, a major association focus for a nationally coordinated system for the management of leftover consumer paint.

(L-R) James Weil, incoming chairman of NPCA; Charles E. Bunch, winner of Heckel Award; and Andy Doyle, president of NPCA

NPCA's Industry Statesmen Awards honor individuals for long and devoted service to the paint and coatings industry. The 2008 Industry Statesman Award recipients are

• Kent Child, retired CEO of Comex Group-North America;

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• Jerry Jones, retired chairman and CEO of Jones-Blair Co.;
• H.H. (Larry) Larison, retired president and CEO of Columbia Paint & Coatings;
• Stephen Lustig, who retired this year from Cook Composites and Polymers after 45 years in the industry ; and
• George Patterson, who will retire from DuPont Performance Coatings this year after 40 years with the company.

NPCA is a voluntary, nonprofit trade association representing paint and coatings manufacturers, raw materials suppliers, and distributors, especially as an ally and advocate on legislative, regulatory, and judicial issues.

European Polyurea, Chemical Entities Form Working Group

The Polyurea Development Association (PDA) Europe and Deutsche Bauchemie e.V (German Association of Construction Chemicals Manufacturers) have joined forces and set up a working group "Polyurea in der Bauwirtschaft." The working group will collaborate with the major producers of polyurea raw materials and formulators of specialty products for the construction industry to issue a status report describing the many uses of polyurea and its effects on the environment.

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To learn more, visit www.astm.org.

PRA, Safinah Start Consultancy Partnership

Two UK organizations, the Paint Research Association (PRA) and Safinah Ltd., have formed a new partnership to provide an expanded global consultancy for the marine and protective coatings industry.

For many years, PRA has provided independent technical investigation and inspection services for marine and protective coatings, although sometimes limited in geographic reach. As part of its mission to support innovation and growth of its member companies, PRA can now provide a global response to marine and protective coatings technical problems and disputes.

Safinah specializes in providing independent advice and training on the whole chain of activities that links ships, structures, coatings, and the environment. With a strong track record in marine consultancy, Safinah complements PRA's emphasis on protective coatings and independent laboratory investigations. Together the two entities will be able to quickly identify the best consultant to respond to client's issues.

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Companies

Hempel A/S To Stop Making Paint in Denmark

Hempel has announced that paint production at its factory in Lundtofte, Kgs. Lyngby, Denmark, will continue until May 31, 2010. After that date, a new factory in Poland will take over production. Hempel's remaining departments in Lundtofte, Kgs. Lyngby, Denmark, will not be affected by the move, the company says.

The decision is the result of developments in the global market. Growing competition in the paint industry means that it is no longer possible to produce paint in Denmark at competitive prices, the company reports.

Ecospeed's Hull Technology Wins Energy Globe Awards

According to Subsea Industries, Mr. Boud Van Rompay, executive director and CEO of Ecospeed, Subsea Industries' non-toxic, ship hull coating technology, accepted two awards from the Energy Globe organization at ceremonies held in the Plenary Hall of the EU Parliament in Brussels, Belgium, May 25 and 26.

The World Energy Globe awards for sustainability were launched by Austrian Wolfgang Neumann in 1999 and are considered today's most prominent and prestigious environmental prizes. From over 800 submitted projects from 109 countries, the best five environmental projects that conserve and protect the world's resources or that employ renewable energy are chosen in the five categories: Water, Earth, Fire, Air, and Youth.

Subsea Industries's Ecospeed was the National winner for Belgium and one of three finalists nominated for the International award in the Water category. The National Award was presented by Ms. Maneka Gandhi, Indian Member of Parliament and former Environment Minister. The International award was presented by Mr. Kofi Annan, former UN Secretary General.

Mr. Boud van Rompay and Ms. Maneka Gandhi

BASF To Distribute CONICA Line in North America

The Building Systems business of BASF Construction Chemicals (Shakopee, MN) has announced that it will now distribute the CONICA® line of sports surfaces in North America. CONICA, whose products are also distributed by the Performance Flooring business of BASF Construction Systems Europe, has been developing, producing, and supplying products for synthetic sports surfaces in all climatic conditions for 30 years.

CONICA's product portfolio includes two-component polyurethane coatings, primers, adhesives, and pore sealers for indoor and outdoor running tracks, multipurpose facilities, sports halls, and playgrounds.

BASF Construction Chemicals—Building Systems manufactures chemicals and building products for the construction industry.

BASF Corporation, headquartered in Florham Park, NJ, is the North American affiliate of BASF SE, Ludwigshafen, Germany.

Rohm and Haas To Build Plant in Vietnam

Rohm and Haas Company has said that it intends to build an acrylic emulsion facility in Nhon Trach city, within the Dong Nai province of Vietnam, in order to meet the fast-growing needs for the region's paints and coatings market. The company will spend approximately US $10 million for this facility, which will be completed by the middle of 2009 and will join a network of 12 plants across the Asia-Pacific region, part of a system of 34 plants worldwide.

According to Bruce Hoechner, VP and Asia-Pacific regional director for Rohm and Haas's Paint and Coatings Materials business, Rohm and Haas has been importing products into the Vietnamese market for more than 12 years.

Technical support will continue to be provided from the technical service lab in Singapore and the state-of-the-art R&D center in Shanghai, China, Rohm and Haas says.

PPG Marine Coatings Approved under IMO Standard

PPG Industries' protective and marine coatings (PMC) business has announced that *SigmaPrime*™ 700 and *SigmaPrime* 700 LT coatings by PPG will be applied to a vessel that will be the first built in full compliance with the International Maritime Organization (IMO) ballast tank coatings regulation titled *Performance Standard for Protective Coatings* (PSPC). The vessel is being built in Korea for Chandris Hellas.

SigmaPrime 700 and *SigmaPrime* 700 LT coatings have received Lloyd's Register type approval certificates in accordance with the IMO PSPC. The standard calls for shipyards, coatings manufacturers, ship owners, and classification societies to ensure that protective coating systems in dedicated sea water ballast tanks are specified, qualified, applied, and inspected throughout the ship's construction.

PPG's protective and marine coatings products are applied on projects in markets such as energy, infrastructure, and marine. PPG (Pittsburgh, PA) is a global supplier of paints, coatings, chemicals, optical products, specialty materials, glass, and fiberglass.

AkzoNobel To Move from Former ICI Headquarters

AkzoNobel has agreed to a transfer of the lease on its London base in the UK. The Manchester Square property—formerly ICI's head office—will be taken over by The Boston Consulting Group. The company will be moving into new office space a few miles away in Portland House. The deal has been agreed to just a few months after AkzoNobel's acquisition of ICI.

AkzoNobel has taken over the 26th floor of Portland House, which is near Victoria Station. Around 75 employees will move to the new location and are due to be in place by the end of June. The Manchester Square deal will officially be finalized in August, the company reports.

A multinational company headquartered in Amsterdam, The Netherlands, AkzoNobel manufactures decorative paints, performance coatings, and specialty chemicals.

Courses

Online Course on Concrete Treatments Offered

W.R. Meadows Inc. announced the development of a new AIA-approved continuing education presentation, "Concrete Curing Compounds and Sealers Examined, and the New Era of Polished Concrete," hosted on the AEC Daily website (aecdaily.com). The company says the course provides an overview of the differences in concrete curing compounds, cure, and seals and sealers. It also reviews the proper curing techniques for concrete and diamond grinding and polishing as an alternative treatment for concrete.

AEC Daily is an online learning center website where users can take continuing education courses on architecture and engineering in the construction

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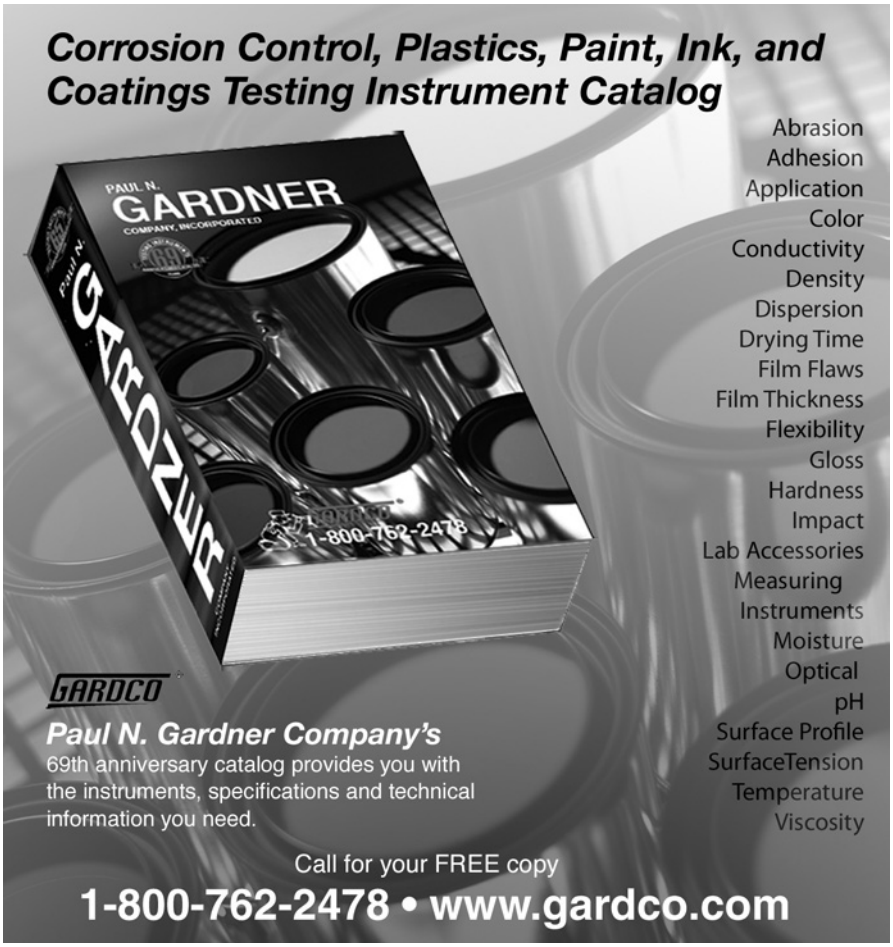

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AkzoNobel To Move from Former ICI Headquarters

AkzoNobel has agreed to a transfer of the lease on its London base in the UK. The Manchester Square property—formerly ICI's head office—will be taken over by The Boston Consulting Group. The company will be moving into new office space a few miles away in Portland House. The deal has been agreed to just a few months after AkzoNobel's acquisition of ICI.

AkzoNobel has taken over the 26th floor of Portland House, which is near Victoria Station. Around 75 employees will move to the new location and are due to be in place by the end of June. The Manchester Square deal will officially be finalized in August, the company reports.

A multinational company headquartered in Amsterdam, The Netherlands, AkzoNobel manufactures decorative paints, performance coatings, and specialty chemicals.

Courses

Online Course on Concrete Treatments Offered

W.R. Meadows Inc. announced the development of a new AIA-approved continuing education presentation, "Concrete Curing Compounds and Sealers Examined, and the New Era of Polished Concrete," hosted on the AEC Daily website (aecdaily.com). The company says the course provides an overview of the differences in concrete curing compounds, cure, and seals and sealers. It also reviews the proper curing techniques for concrete and diamond grinding and polishing as an alternative treatment for concrete.

AEC Daily is an online learning center website where users can take continuing education courses on architecture and engineering in the construction

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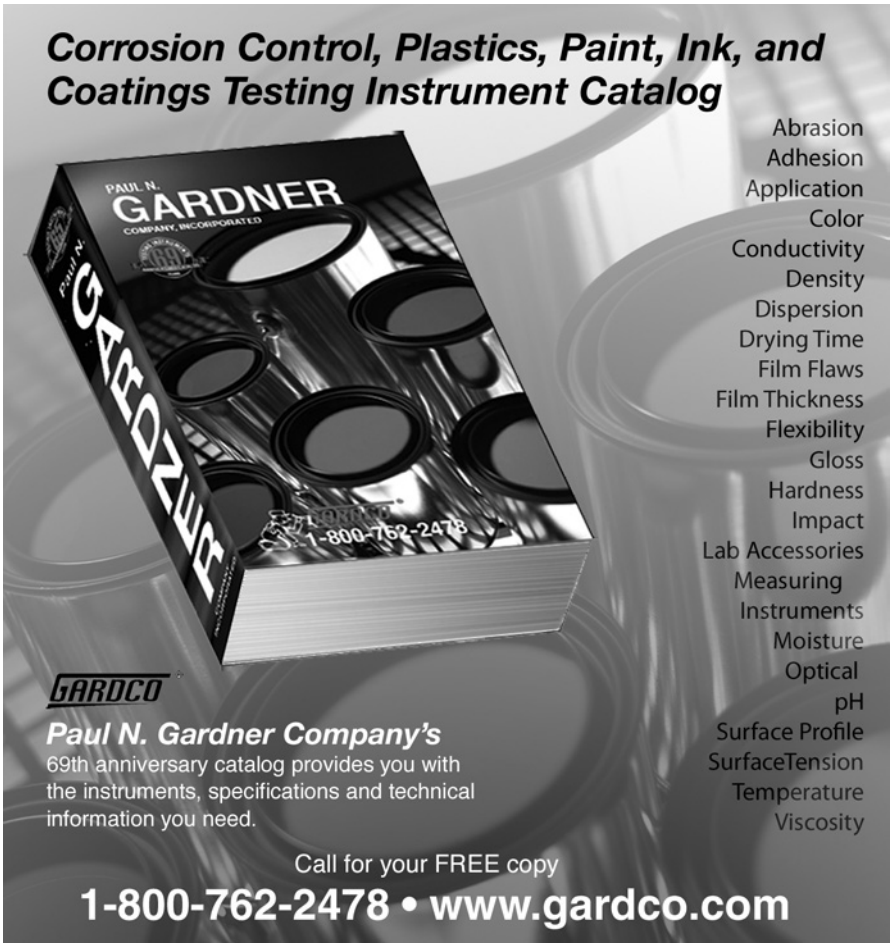

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industry. The courses are free and approved by the AIA, CSI, and other organizations. AEC Daily reports continuing education credits to AIA on the user's behalf.

In addition to the new presentation, W. R. Meadows currently hosts two other courses on the website: "Controlling Moisture Movement in Buildings: The Complete Air and Vapor Barrier Approach" and "Controlling Moisture Movement in Buildings: The Complete Approach—Below Slab Protection." The courses are designed to help educate users on the current science of thermal and moisture protection.

For more information: www.wrmeadows.com.

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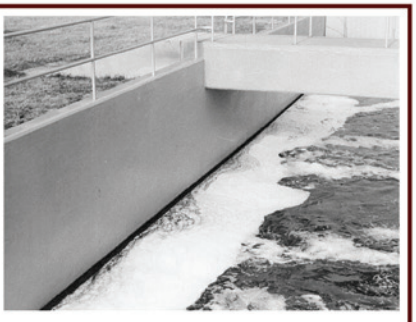

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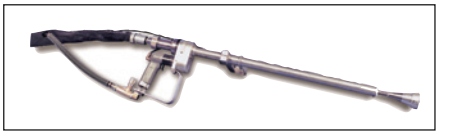
Products

Rotating UHP Lance Has Long-Life Seal



The new NCG8450A-3 rotating water jet lance from NLB Corp. (Wixom, WI) has a UHP seal that lasts an average of 40 hours—five times as long as the company's previous seals, NLB says. The field-repairable lance delivers UHP water (up to 40,000 psi) with a rotating action that is designed to widen the spray pattern and make product removal more productive.

The lance can be used with any of NLB's multi-orifice heads. Its rotation speed is variable up to 3,000 rpm, and is provided by an air-driven swivel. The ergonomic lance enhances operator protection in several ways, including dual-trigger operation and instant pressure dump, the company says. It comes with a 36-inch barrel; another model, the NCG8450LA-3, has a 48-inch barrel.

For more information, contact Jim Van Dam—tel: 248-624-5555; email: vandamja@nlbusa.com; website: www.nlbcorp.com.

Waterbornes Fight Carbonation

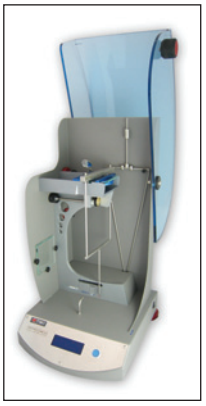
Eliokem (Villejust, Paris) has announced that its proprietary emulsified binding system (EBS) technology marketed under the trademark of Hydro Pliolite® allows the formulation of anti-carbonation exterior masonry paints. The EBS system is an acrylic copolymer emulsion, internally plasticized.

According to Eliokem, anti-carbonation paints formulated with Hydro Pliolite® offer good protection from the elements and provide long-term barrier protection against carbon dioxide, water, and oxygen while enhancing the exterior appearance of buildings. They exhibit good weatherability; good ageing

properties; and resistance to water and alkali, the company says.

For additional information, visit the Eliokem website: www.eliokem.com.

Hardness Tester Introduced



TQC (Zevenhuizen, The Netherlands) has announced that after a year of development, its Pendulum Hardness Tester is now available. According to TQC, the tester has several unique features that simplify the measurement of either the König or Persoz hardness as described in ISO 1522. Other features include an easy menu-driven single-button interface and an automated electronic counting mechanism that is not affected by reflections from the surrounding area, the company says.

For more information, contact TQC: info@tqc.eu; website: www.tqc.eu.

New Fluorescent Lights Are Linkable

Wolf Safety (Sheffield, UK) has introduced a new range of linkable ATEX Certified portable fluorescent luminaries. According to the company, the lamps are approved for use in Zone 1 (Cat 2) IIC T3/T4 Hazardous Areas for heavy-duty applications in demanding areas, such as the oil, gas, and petrochemical industries, as well as the utilities markets.

According to Wolf, the lights are available with twin or quad 18W, 36W, or 55W energy-efficient fluorescent lamp combinations in a wide range of voltages (24V–254V). Producing white light output, the luminaries can be linked in series (plug and play) or side-

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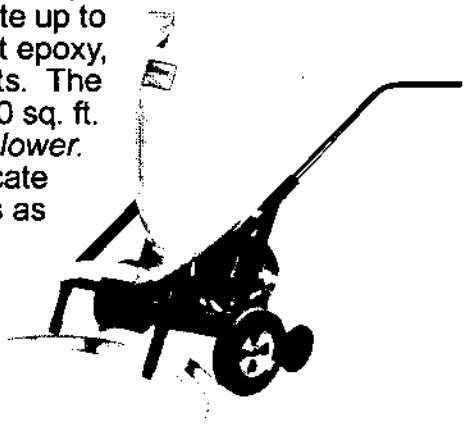

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by-side to provide temporary lighting solutions using ATEX plugs and sockets. The lights are quick and easy to relamp using standard compact fluorescent lamps readily available from electrical retailers, the company says.

For more information, contact Wolf—email: info@wolf-safety.co.uk; website: www.wolf-safety.co.uk.

Redesigned Gage Accommodates SSPC-PA 2

The redesigned PosiTector® *6000* Coating Thickness Gage from DeFelsko Corporation now offers an advanced SSPC-PA 2 feature set-in memory models. This new feature is designed to make it easier to determine if film thickness over an extended area conforms to user-specified minimum and maximum levels.

PA 2 recommends that a coated surface be sectioned into one or more large test areas. A minimum of 15 individual measurements is taken in 5 groups of 3 measurements each. Suggestions are made as to the acceptability of individual measurements, spot measurements (the average of each group), and the calculated average of the spot measurements.

In simple terms, PA 2 suggests the average of a series of average values be used to determine if a target thickness has been met.

The PosiTector *6000* PA2 Setup menu allows the user to specify a minimum thickness, maximum thickness (if applicable), number of readings in a

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spot, number of spots in a batch, and percent below/above the minimum and maximum values each "spot" is allowed to fall between.

Stored results can be viewed on the display, modified, or deleted. A formatted printout can be sent to the optional IR printer or results can be downloaded to a PC using the included PosiSoft software and USB cable.

For more information, contact the company—tel: 800-448-3835; website: www.defelsko.com.

Updates Published on Paint Industry

Information Research Ltd. (IRL; London, UK) has announced the publication of three new titles that report on the paint and coatings industry around the world.

A Profile of the Argentinean Paint Industry reports on the South American paint sector. According to the report, the prospects for the paint industry in Argentina appear good for almost all segments.

The *Profile* covers other topics, such as paint production, trade, and consumption; industry associations; and a directory of Argentinean paint companies.

The eighth edition of *A Profile of the Asia-Pacific Paint Industry* provides a four-year review of the Asian paint industry, including mergers, acquisitions, and investments; data on 10 economies; and a statistical summary covering all the key data from these markets.

IRL also has published a third edition of its industry report, *The Top 50 Paint Companies in Asia*. This volume provides a short numerical summary of the paint and coatings statistics for the region and a directory-style overview of the top 50 paint companies across the region.

Sections from the reports mentioned above will soon be available to purchase at IRL's website: www.informationresearch.co.uk.

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