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The Voice of SSPC: The Society for Protective Coatings

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SSPC 2016 featuring GreenCOAT will be held January 18–21 at the Henry B. Gonzalez Convention Center in San Antonio, Texas. The SSPC 2016 Advance Program is published to help protective and marine coatings professionals begin planning their activities at the conference and exhibition. Details about awards, events, courses, the technical program, committee meetings, exhibitors and more are provided.



24 OSHA CONSTRUCTION STANDARD FOR CONFINED SPACE ENTRY: PLANNING AND MANAGING INDUSTRIAL PAINTING PROJECTS FOR COMPLIANCE

By Alison B. Kaelin, CQA, ABKaelin, LLC; and Stanford T. Liang, CIH/CSP, AM Health and Safety

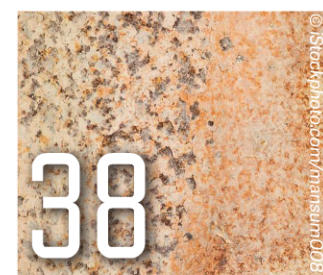
The authors will discuss the key details in OSHA's recently issued Standard for Confined Spaces and describe ways in which contractors and owners can assure compliance and safety when working in confined spaces.



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STAFF

Editorial:

Editor in Chief: Pamela Simmons / psimmons@paintsquare.com
Managing Editor: Charles Lange / clange@paintsquare.com
Technical Editor: Brian Goldie / bgoldie@jpcleurope.com
Directory Manager: Mark Davis / mdavis@paintsquare.com

Contributing Editors:

Warren Brand, Rob Francis, Gary Hall, Robert Ikenberry, Alison Kaelin, Alan Kehr, Robert Kogler, Vaughn O'Dea, E. Bud Senkowski, Lloyd M. Smith, PhD, Dwight Weldon

Production / Circulation:

Art Director: Peter F. Salvati / psalvati@paintsquare.com
Associate Art Director: Daniel Yauger / dyauger@paintsquare.com
Ad Trafficking Manager: Larinda Branch / lbranch@technologypub.com
Circulation Manager: JoAnn Binz / joann@qcs1989.com

Ad Sales Account Representatives:

Vice President, Group Publisher: Marian Welsh / mwelsh@paintsquare.com
Associate Publisher, Advertising Sales:
Bernadette Landon / blandon@paintsquare.com
Advertising Sales: Bill Dey / bdey@paintsquare.com
Classified and Service Directory Manager:
Lauren Skrainy / lskrainy@paintsquare.com

PaintSquare:

Vice President, Operations: Andy Folmer / afolmer@technologypub.com
Vice President, Technology: D'Juan Stevens / dstevens@technologypub.com
Vice President, Content: Pamela Simmons / psimmons@technologypub.com
Editor, PaintSquare News: Amy Woodall / awoodall@paintsquare.com
Digital Media Production Manager: Tricia Chicka / tchicka@technologypub.com

SSPC:

SSPC Individual Membership: Terry McNeill / mcneill@sspc.org
SSPC Organizational Membership: Ernie Szoke / szoke@sspc.org

Finance:

Accounting Manager: Michele Lackey / mlackey@technologypub.com
Accounting: Andrew Thomas / athomas@technologypub.com
CEO: Harold Hower / hower@technologypub.com
CFO: Peter Mitchel / pmitchel@technologypub.com

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EDITORIAL

Remember the Alamo — and SSPC 2016 in San Antonio!

Where has the year gone? As you read this editorial, you are probably finalizing plans for your Christmas and New Year's celebrations. Time has once again passed us by at a high rate of speed, as we scratch our heads wondering how we got to the end of the year this quickly. With the hectic schedules we all keep, it is little wonder that we once again failed to realize how quickly this year has passed.

For SSPC, it has been an especially busy year. From our leadership change in August, to our anticipated move into our new building in December, SSPC has been in perpetual motion. That continued motion picks up in earnest right after the start of the new year, as we begin finalizing our preparations for SSPC 2016 in San Antonio.

With a start date of January 18, the conference is right around the corner, and I would like to remind all of you to procrastinate no further. The date will sneak up on you as quickly as the end of this year has, so don't miss your opportunity to register. The SSPC conference is your once-a-year opportunity to interact with industry friends and colleagues at the premiere industrial coatings event in North America. This conference, as in previous years, will provide you and your colleagues an opportunity to participate in a variety of training programs, industry meetings, innovative technical sessions and hospitality events. There is no better opportunity for you to further your education and training in the field of industrial coatings, while enjoying a unique opportunity to network with other industry associates, than SSPC 2016. And you can experience all of this in one location.

In addition to the technical sessions and industry meetings, you will have an opportunity to visit approximately 250 exhibits highlighting new products and services from a variety of industry suppliers and manufacturers. If you have a need or challenge, the exhibit hall may have a solution for you. The student poster session, which has been expanded, offers a great opportunity for you to gain insight into some of the latest research being done at our universities, while providing you an opportunity to interact with some of our potential next-generation industry associates.

With this being my first conference, I am looking forward to the opportunity to meet all of you, and to personally thank you for your support of our organization. We continue to strive to provide you, our stakeholders, with the best products and services in the industry, and I look forward to receiving your feedback at the show as to how we can further satisfy your needs. Don't miss the opportunity to provide me with your comments.

In closing, I would like to wish you and your family a safe, relaxing holiday season, and a happy, healthy and prosperous New Year.

Bill Worms
Executive Director, SSPC

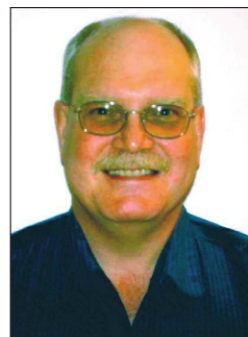
New Year Kicks Off with Live Webinar from SSPC 2016

Live from SSPC 2016 featuring GreenCOAT in San Antonio, Texas, the 2016 SSPC/JPLC Webinar Education Series will begin with a new, free online webinar.

"Evaluation of Slip and Fall Resistance of Flooring Systems," will be presented from the Henry B. Gonzalez Convention Center in San Antonio on Wednesday, January 20, from 11:00 a.m. to 12:00 noon, EST. This webinar will discuss various standards for evaluating slip resistance

to assist owners and specifiers who must specify required slip resistance for a floor surfacing (or coating) in a given service environment. It will review recommended maintenance protocols for hard flooring surfaces to increase slip resistance, and will present a sample form that can be used to investigate accidents and determine corrective actions. Explanations of terminology related to slip resistance, descriptions of standard methods and testing equipment for assessing slip resistance, and considerations when interpreting test results are also included.

Fred Goodwin, fellow scientist, product development for BASF Construction Chemicals, will present this webinar. Goodwin is a chemist with over 30 years of experience in the construction chemicals industry, including cement manufacture, research, development, and technical support of grouts, adhesives, coatings, shotcrete, stucco, flooring, and concrete repair materials. He has been with BASF and its predecessors for 24 years and is an active member of ICRI, ACI, ASTM, NACE, SDC, and SSPC. He is a fellow of ACI and ICRI, an Honorary Member of ASTM C1 and C9, and current chair of the ICRI Technical Activities Committee (TAC),



Fred Goodwin

ACI 515 Protective Systems, ASTM C09.41 Cement Based Grouts, SSPC 8.3 Commercial Floor Coatings, and a member of ACI TAC.

He is a guest lecturer for the Grouting Fundamentals short course at the Colorado School of Mines and was awarded the 2006, 2010, and 2012 Editor's Awards from JCPL, as well as

the ACI 2011 Delmar Bloem Award. He is a NACE Corrosion Technologist, holds four U.S. patents, was named as one of the Top 25 Thinkers by JCPL, and is a frequent speaker at ICRI, ACI, and SSPC national convention sessions.

This webinar is sponsored by BASF Building Solutions.

Registration, CEU Credits

This program is part of the SSPC/JPLC Webinar Education Series, which provides continuing education for SSPC re-certifications and technology updates on important topics. SSPC is an accredited training provider for the Florida Board of Professional Engineers (FBPE), and Professional Engineers in Florida may submit SSPC Webinar Continuing Education Units to the board. To do so, applicants must download the FBPE CEU form and pass the webinar exam, which costs \$25.

Register for this online presentation at paintsquare.com/webinars.

SSPC Moves Into New HQ Building Dec. 18

Since 1995, SSPC headquarters has been located in Pittsburgh's Strip District neighborhood, just outside of downtown Pittsburgh. On December 18, that will change.

This past September, the organization purchased a 26,000-square-foot building west of the city to house its new world headquarters.

As SSPC Executive Director Bill Worms mentioned in his October JCPL

editorial, the building more than doubles SSPC's current space and will provide the Society the room it needs to accommodate its rapid growth. The building is located in Green Tree, Pa., along the Pittsburgh International Airport corridor, and is in a highly visible place that provides the opportunity to create a greater awareness of SSPC and the coatings industry among the

Product News

PPG Tank Lining to Resist Chemicals

PPG Industries Protective and Marine Coatings has introduced Phenguard Pro, a tank coating system that the company says offers wide chemical resistance for shipyards and ship owners.

The two-coat phenolic epoxy system provides potential efficiency gains of more than 20 percent compared to traditional three-layer coating systems, according to PPG. It is designed for use on IMO II and III chemical/product tankers typically in the 30,000-to-60,000 dwt range.

According to the company, the product has been developed from the Phenguard phenolic epoxy product technology and offers maximum cargo flexibility with improved efficiency at installation. It is made for newbuilding and refurbishment projects. The product can be applied at 41 F (15 C) and provides a smooth finish that is easy to clean, PPG says.

For more information, visit www.ppgpmc.com.

Sherwin-Williams Coating Made for Concrete Refill

The Sherwin-Williams Company's Protective & Marine Coatings division has introduced an epoxy-modified cementitious resurfacer that the company says patches and refills voids and bug holes in concrete and masonry substrates.

Dura-Plate 2300 provides a hard, durable surface with good adhesion, according to the company. The new product

also minimizes pin-holing and outgassing problems sometimes associated with coating concrete.

The coating is suitable for resurfacing concrete prior to coating and lining applications for a range of environments, according to the company. Industrial applications include water and wastewater; oil and gas; pharmaceutical; bridge and highway; food and beverage; power generation; mining; sewer collection; atmospheric and immersion service; and secondary containment.

The company says the coating is abrasion-resistant and is part of a three-component kit that contains Portland cement, hydrophobic thixotropes, fiber reinforcement, graded silica sand and other aggregates. The kit consists of Part A Epoxy, Part B Hardener and Part C Mortar in a single package.

Sherwin-Williams says the product can be applied in a range of temperatures. When used at 75 F, the Dura-Plate 2300 can be dry to the touch within 3-to-4 hours. It can be applied at a minimum of 40 F, according to the company. The coating also has an unlimited recoat window because it can be re-agitated to reduce viscosity and improve workability time inside a 70-minute pot life, the company says.

The company says that Dura-Plate 2300 is available in a flat concrete gray, can be applied by a hand-trowel or spray, has a film build-up of up to 1/2-inch per lift, and can be top-coated within 8-to-24 hours depending on the type of topcoat.

For more information, visit www.sherwin-williams.com.



Rendering of signage on the new SSPC headquarters building, courtesy of SSPC.

Pittsburgh region's one million residents.

On December 18, the SSPC offices will close at 12:00 noon (EST) to begin the

move. Here is what you need to know.

- Starting at 12:00 noon, email, fax and the sspc.org website will be unavailable.

- SSPC2016.com and conference registration will still be open and functioning.
- Telephone calls to SSPC will be forwarded to voicemail and will be returned ASAP.
- If you must email SSPC during the move, please send your message to sspc.move@gmail.com.

SSPC expects to have email, web and fax running in a short amount of time; however, it is possible that the disruption will last for 48-to-72 hours. Phones will resume

normal function at the opening of business on Monday, December 21.

SSPC's new address will be: 800 Trumbull Drive, Pittsburgh, Pa. 15205.

Please note that only SSPC's physical mailing address is changing; payments will still be processed via the same payment address. SSPC phone numbers will remain the same, as well.

SSPC thanks you for your patience during this move.

THE BUZZ

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Photo courtesy of NASA.

NASA Sets Sights on Thermal Coating (Nov. 24)

When it comes to protecting its spacecraft — and the human occupants — from both heat loss and extremely high temperatures during space travel and re-entry into Earth's atmosphere, NASA is turning to coatings to control the heat.

The agency plans to use a silver, metallic-based thermal control coating as part of the thermal protection system on its Orion spacecraft, NASA announced on Nov. 19 when releasing conceptual renderings of the coated capsule. The Orion is meant to bring a new level of deep space exploration to the U.S. space program and is designed to be the safest, most advanced spacecraft ever built.

Upcoming missions will be able to take advantage of the silver, metallic-based thermal control coating that will be applied to the crew module's thermal protection system back shell tiles. Similar to the coating used on the main heat shield, the insulating coating is meant to help regulate interior temperature — reducing heat loss when Orion is pointed toward space (and experiencing cold temperatures as a result) and limiting the high temperatures the crew module would experience when the craft faces the sun. The reflective coating will help Orion's back side maintain an exterior temperature range of about -150 to 550 degrees F prior to entry and will also protect against electrical charges during reentry, NASA said.

During the test launch, the craft returned through the atmosphere at a speed of 20,000 mph (32,000 kph), where it experienced the hottest period of its return. The heat shield faced temperatures near 4,000 degrees F (2,200 degrees C). According to NASA, that's roughly 80 percent of the peak heating Orion would see during a return from lunar orbit, in which temperatures could reach 5,000 degrees F (2,800 degrees C).

PSN TOP 10

(as of Nov. 30)

1. Employee Skims from Paint Contractor
2. Why The Golden Gate Bridge Is Orange
3. Officials Shelve 'Bridge to Nowhere'
4. Coating to Insulate Hot, Cold Surfaces
5. Caltrans Blasts Old Bay Bridge Pier
6. Keystone XL: Analysis and Outlook
7. Two RPM Leaders Receive Promotions
8. Panels Show Tappan Zee Road Design
9. House Passes Long-Term Highway Bill
10. New York AG Investigates Exxon Mobil

WHAT'S GOT US TALKING

(PaintSquare News Weekly Poll, November 8-14)

Where do you think new funding for the most recent federal transportation bill should come from?

ANSWERS	VOTES
Congress needs to raise a specific tax, like the gas tax, or taxes in general to pay for transportation infrastructure.	44%
Congress needs to enact tax reform, either to cut corporate breaks or reorganize money already coming in.	16%
Congress needs to cut something else to fund infrastructure and not raise any taxes.	18%
Congress needs to find a way to spend within the budget from the current tax revenue, and cut projects as needed to fit that budget.	19%
Congress should not fund transportation infrastructure; let private companies pay for highways.	3%

Anna Jolly: "We are on the way to making ourselves a second-class country with this continual reduction of taxes and this pounding insistence that we can not afford to maintain our infrastructure. I am willing to pay my fair share, are you?"

Tim Ens: "In the end the money for all government spending comes from all of us who pay taxes. I myself am tired of the government spending my money on everything but infrastructure and other necessities."

Jim Johnson: "If a specific tax is generated, or a tax increase, it should expire when the work specified is completed."

On Specifying Abrasive Sieve Size

WHAT ARE THE PROS AND CONS OF SPECIFYING SIEVE SIZES FOR ABRASIVES?

Warren Brand
Chicago Coatings Group

From a consulting perspective, I can think of no reason to specify sieve size. However, from a contractor's perspective, it may be a good idea. If the sieve size is incorrect, it could seriously reduce production rates and/or may be too large or small to provide the appropriate profile in the specification.

M. Halliwell
Thurber Engineering Ltd.

Warren hit the nail on the head ... the pros are all about production and proper profile and might help a less experienced contractor. (It's all about getting the job done cheap, right?) Great if your spec writer has experience and knows what needs to be used. But if your spec writer is out to lunch, you're opening up the possibility of reducing productivity and making all manner of headaches for the project.

Robert Kogler
Rampart LLC

The only obvious reason to specify sieve sizes would be to achieve a specific profile or surface roughness, as abrasive size heavily influences resultant roughness. However, this issue can be overcome by specifying SSPC AB-1, which includes the classification of the abrasive by "Grade," which requires abrasive manufacturers to test blast with the given abrasive and report the profile that

results. This aspect of AB-1 is very useful and makes the SSPC spec more useful than MIL-A-22262.

Peter Bock
Advanced Polymerics, Inc.

The commonly held belief that coarse or medium-to-coarse abrasive does a better job of blasting off mill scale from steel to produce an SSPC-SP 6 or -SP 10 surface is not necessarily true. On a recent coating RFP, we were asked for a recommendation which would remove mill scale from sheet steel and provide a 1-mil anchor profile. I asked a very large, global distributor of garnet blasting abrasive and a manufacturer and lessor of vapor blasting equipment for their recommendations. The garnet guy recommended 200-mesh garnet. He said that this very fine abrasive actually did a better job of removing mill scale, because the fine abrasive particles broke the mill scale into smaller patches, allowing removal with less grit, less labor and less time required. The downside (normally) was that the 200-mesh garnet only produced a 1-mil anchor profile. The vapor blast equipment lessor said almost the same thing. He recommended 200-mesh or 120-mesh garnet in a vapor blast setup. The fine abrasive worked better at removing mill scale, required less time and effort and had an added benefit of less wear and tear on the vapor blast machinery, hoses and nozzles.

Again, only a 1-to-1.5-mil anchor profile would be the result. So if you need an -SP 6 or -SP 10 surface but not a 3-mil anchor profile, go with a 200-mesh abrasive and save yourself and your customer time and money.

Duane Hough
Champion Painting Specialty Services Corp.

Specify the desired surface profile. Specifying sieve size is unnecessary and falls into the means and methods territory. The various abrasives have different sieve sizes to achieve profile depending upon the hardness of the abrasive, and even the same type can vary (alluvial versus mined garnet, for example). Specify the proper surface profile for the coating system and let the contractor be responsible for meeting the specification.

Robert Ikenberry
California Engineering Contractors Inc.

Abrasive size selection is generally left up to the contractor as part of their "means and methods" of achieving the specified cleanliness and profile. Unless an unusual abrasive is required (for example, aluminum oxide) where contractors may be unfamiliar with the abrasive, specifying a particular size may just end up causing conflicts with other criteria, increasing costs, confusion and contentiousness.



The red topcoat on the Hell Gate Bridge experienced severe fading as result of insufficient clear coat application.

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What You See Isn't Always What You Get... The Problem with Aesthetics

Rick A. Huntley, PCS, KTA-Tator, Inc.

Richard A. Burgess, PCS, KTA-Tator, Inc., Series Editor

As a group, coating professionals who deal mainly with industrial coatings generally focus on coating performance — the majority of concern being focusing on a coating's ability to protect the substrate from the environment — and in the case of tank linings, to protect the tank contents from the substrate. Although these are certainly important considerations, another significant property of the coating is

its ability to provide an aesthetically pleasing surface, particularly when the coated surfaces are visible to employees and/or the general public. Many companies and agencies use color for brand identity, so color retention becomes vitally important as well.

For most of the population, the appearance of a coating is the most important consideration, since it is likely that the majority of the public is unaware of the consequences of the failure of a coating system to protect



Severe chalking and erosion of an epoxy coating caused by degradation of the resin in ultraviolet light. The degradation resulted in both aesthetic and performance problems. Courtesy of KTA-Tator, Inc.

in the inorganic pigments. Because of the superior tinting ability of the inorganic pigments, they are often used to make brighter more intense colors.

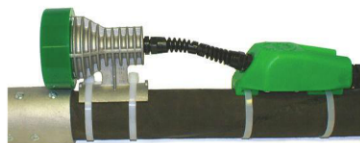
The perception of color is a visual phenomenon by which light strikes a material and different frequencies of

light are absorbed by that material. As a result, the light that is not absorbed is reflected and the combination of frequencies of light are perceived by the eye as a color. Although color is perceived with the eye, it is difficult to quantify color using only the

human eye. Fortunately, there are various ways of instrumentally measuring and quantifying color change. The color of a coating can be quantified by using a colorimeter. The colorimeter measures the spectral energy of light reflected from the coating over



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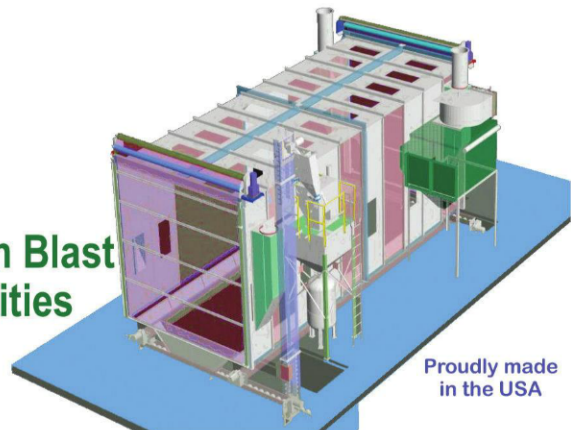


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*The aesthetics of a field touch-up can be compromised when the touch-up paint does not closely match the color of the weathered original coating.
Courtesy of KTA-Tator, Inc.*

the visible spectrum. The instrument then assigns the resultant measurement standard color coordinates on what is known as a color space. There are various different color spaces, each having different coordinates for a color, but one of the most common is the $L^*a^*b^*$ color space. In that space, L^* represents the darkness of the color on a scale of 0 to 100, with 0 representing the darkest black and 100 representing the brightest white. The a^* and the b^* coordinates represent the color and have numbers from -100 to 100, with positive a^* representing red shades, negative a^* representing green shades, positive b^* representing yellow shades and negative b^* representing blue shades. Color changes are quantified by measuring two colors and determining the difference between the colors in the color space using a common geometric equation to determine the distance between two points in space. It is held by many that a difference in color of 3 units (commonly known as $\Delta E^* 3$) or less is

imperceptible to the average human. It is not uncommon for a specification addressing requirements for maximum color change to limit the color difference to $\Delta E^* 3$ or $\Delta E^* 5$.

When intense colors such as bright red or blue are chosen for a topcoat, it is not uncommon for aesthetic problems to ensue. There are a number of environmental factors that may affect the color, but one of the most common is exposure to both moisture and solar radiation. Usually, the colors chosen for topcoats are made by combining various tinting pigments. If one or more of the pigments fade upon exposure, the color of the coating can significantly change. With the example of fading under sunlight (UV) exposure, the fading becomes more noticeable because different areas of the coated surface fade at different rates based on the amount of UV light exposure. As a result, there are often significantly faded areas that are directly adjacent to areas of little or no fading, and the difference in color can

be quite noticeable and aesthetically displeasing.

A classic case of color fading is the Hell Gate Bridge, a steel-through-arch railroad bridge located between Astoria in Queens, Randall's and Ward's Islands, and the Bronx. In the early 1990s, the bridge was completely recoated. The color selected for the

topcoat was known as "Hell Gate Red," a deep natural red. A four-coat system was employed consisting of two coats of epoxy, a pigmented polyurethane coat and a clear topcoat designed to preserve the red color of the bridge. The clear coat was designed to protect the underlying pigmented coat from the effects of sunlight

but unfortunately, the bridge began to change color even before the repainting was completed. According to references, the paint supplier allegedly changed pigment suppliers prior to manufacturing the paint for the bridge. The contractor used the same paint to recoat the faded areas of the bridge in 1996. However, by 1999, the new paint had faded again. It appeared that the problems with color fading on the Hell Gate Bridge were caused by the use of a pigment that was not able to resist degradation by solar radiation over time. Further, the clear urethane topcoat was reportedly not formulated properly to protect the pigmented urethane undercoat.

Similar color fading problems were encountered several years ago on multiple pedestrian bridges and associated railing structures coated with a royal blue waterborne acrylic finish coat or a polyurethane finish coat. The use of a clear coat over the acrylic polyurethane, a fluorourethane, and the use of a polysiloxane finish coat (in place of the traditional acrylic polyurethane) were given consideration. Ultimately a polysiloxane finish coat was selected. While polysiloxane and fluorourethane coatings are traditionally more costly than waterborne acrylic and polyurethane coatings, the savings in labor and material associated with a fourth (clear coat) application offset the higher cost finish coat.

Chalking

Exposure to ultraviolet light and moisture can also degrade the exposed resin on the surface of the coating, creating another type of aesthetic problem generally referred to as chalking. This is due to a property of light by which the light bends when it enters a material. Different materials bend the light at different rates. The refractive index of the material determines how much of the light is bent. This property is the reason why table salt appears



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to be white. If you look at an individual granule of salt under a microscope, it is transparent, not white. When light enters a pile of salt and it hits the first granule, it bends slightly and then bends again when it exits the granule back into the air space between the granules. It continues on into another granule and bends again. This process continues through multiple transparent granules of salt. Because the granules are aligned in different configurations, the bending of the light at the various angles causes the light to scatter, preventing the light from passing through the pile of salt. The eye sees all the different scattered light wavelengths and perceives the pile salt as white, not transparent.

Essentially, the same phenomenon happens on the surface of a coating when a transparent resin degrades. Particles of the resin remain on the coated surface and scatter the light. The scattering of the light gives the coating a lighter (more white) appearance. Fading of pigments and deterioration of the resin on the surface of the coating give the coating a similar lighter appearance. It is often possible to distinguish between the two phenomena by rubbing oil on the surface. Oil will have a refractive index somewhat similar to the coating resin and greatly lessen the scattering of the light. If the oil causes the coating to darken significantly, the fading was a result of chalking. If not it was likely caused by pigment fading.

Gloss

Another common aesthetic problem is visible variations in gloss. Gloss is an optical property that determines how well a surface reflects light in a mirror-like fashion. Light is reflected from a perfect mirror in an equal and opposite angle of the incoming light and variations in sheen include flat, eggshell, satin, semi-gloss and gloss. Gloss is measured using a gloss meter



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which shines light on the surface at a predetermined angle of incidence (for example 20, 60 or 85 degrees) and then measures the amount of light that is reflected in the equal and opposite direction.

On a microscopic level, gloss is usually determined by the relative amount of pigment that is protruding through the resin on the surface of the coating, as well as the grind of the pigment. Coatings with higher pigment content or a coarser grind of pigment generally have lower gloss. Yet other factors can affect gloss such as deterioration of the resin on the surface caused by exposure to the environment. This deterioration creates microscopic unevenness on the surface that causes the light to scatter. Similar to color, one of the biggest aesthetic

problems with gloss is a variation in gloss across a coated surface.

The most common aesthetic challenge in industrial coatings is matching both color- and gloss-intensive areas. This is most evident when a coating that has aged for several years is touched up. The aging process affects both the gloss and the color of the coating. If the original coating color is used during the touch-up, the touch-up paint is often a different color than the original because the original gloss and color have changed. If an attempt is made to match the color and gloss of the aged paint, it is not uncommon for the newly applied paint to then lose gloss and fade at a different rate than the original coating, making the touch-up paint visible after a few years of weathering.

Higher gloss coatings also tend to reveal application deficiencies, spray patterns and other visual defects more so than do lower gloss coatings. For example, touch-up areas on bridge and water tanks where the containment structure was attached are more difficult to blend when high-gloss finish coats are used. Ironically, the coating application may be satisfactory, but the perception is poor workmanship. Some agencies and municipalities have selected semi-gloss and even satin finishes to help avoid these types of aesthetic issues.

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OSHA CONSTRUCTION STANDARD FOR CONFINED SPACE

PLANNING AND MANAGING INDUSTRIAL PAINTING PROJECTS FOR COMPLIANCE



BY ALISON B. KAEIN, CQA, ABKAEIN, LLC
AND STANFORD T. LIANG, CIH/CSP,
AM HEALTH AND SAFETY

After seven years, the final OSHA Confined Space in Construction Standard was published on May 5, 2015, and the new rule went into effect on August 3, 2015, with enforcement delayed until October 2, 2015.

While similar to the pre-existing General Industry Permit Required Confined Spaces Standard (29 CFR 1910.146), the Confined Spaces in Construction Standard (29 CFR 1926 – Subpart AA) includes some differences tailored to address conditions unique to the construction workplace.

WHAT'S SIMILAR TO THE GENERAL INDUSTRY STANDARD

The new rule adopted the following requirements, which are similar to the general industry standard related to permit-required confined spaces (PRCS):

- Written confined space program;
- Permit system;
- Controlled access;
- Communication system;
- Emergency and rescue plan including attendants and emergency rescue;
- Training for workers making entries and designated rescuers (unless an outside rescue service is used); and
- Annual review of confined space entry permits to identify and address program deficiencies.

WHAT'S DIFFERENT

Construction sites are continually evolving, with the characteristics of confined spaces changing as work progresses. For example, during the course of an industrial painting project work may progress from one confined space to the next with each having unique physical characteristics such as size, internal configuration and the

number and size of entry ways. When coating application occurs, additional hazards are introduced with the potential to create a hazardous atmosphere. Such hazards may differ during the application of each coat. Also, the construction workforce is transitory, or temporary, where the composition of contractors and the workforce onsite is changing as the project progresses. This makes careful evaluation of, and planning for, confined space hazards even more critical as construction employees are not as likely to be familiar with work area hazards.

WHICH STANDARD APPLIES TO THE PROJECT?

One of the first steps is determining whether the project falls under the General Industry or Construction Industry confined space standard.

Painting is typically classified by OSHA under the Construction Standard as construction work. However, painting projects could be classified as General Industry work sites (such as in facilities governed by General Industry Standards) if the work is considered a routine maintenance activity. Either way, it is important for all contractors to determine which standard is applicable and to take the required actions to comply. OSHA

stated that where the definition of a Construction Industry versus a General Industry confined space is unclear, compliance with the Construction Industry confined space standard will also be considered to be compliance with the General Industry confined space standard.

EVALUATION OF CONFINED SPACES BY A COMPETENT PERSON

A Competent Person (CP) must evaluate the confined spaces to be entered. The CP must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, as well as who has the authority to take prompt corrective measures to eliminate them. The CP need not be an employee of any particular employer, and the various contractors on a site may use a single individual to perform the duties required of a CP. The CP must determine if the space meets the definition of a confined space, and if so, are any of the spaces permit-required confined spaces (PRCS)?

The CP will need to evaluate the coatings removal process and the coatings being applied to determine if any of the applicable conditions will be met. Next, the CP will focus on eliminating and reducing hazards.

ELIMINATING HAZARDS THAT CAUSE PRCS

Whenever possible, the project should be designed so that hazards that could cause a confined space to be classified as a PRCS are eliminated or reduced. Examples of ways to eliminate or reduce PRCS hazards include:

- The use of water-based instead of organic solvent-based coating systems;
- Coating application to structural components prior to assembly to minimize the amount of painting in the confined space;
- Spot repair of the existing coating systems as opposed to complete replacement;
- Using application methods such as HVLP that minimize vapor and aerosol generation and to reduce solvent losses;
- Replacement versus repair; and
- For new construction, ensuring that future access for maintenance purposes such as painting, are not PRCS.

HAZARDOUS ATMOSPHERES AND VENTILATION

Confined spaces containing atmospheric hazards cannot be reclassified as a non-permit space if the atmospheric hazard in a permit space must be controlled by forced air ventilation. In this case, the employer may be able to use simplified procedures instead of those for a

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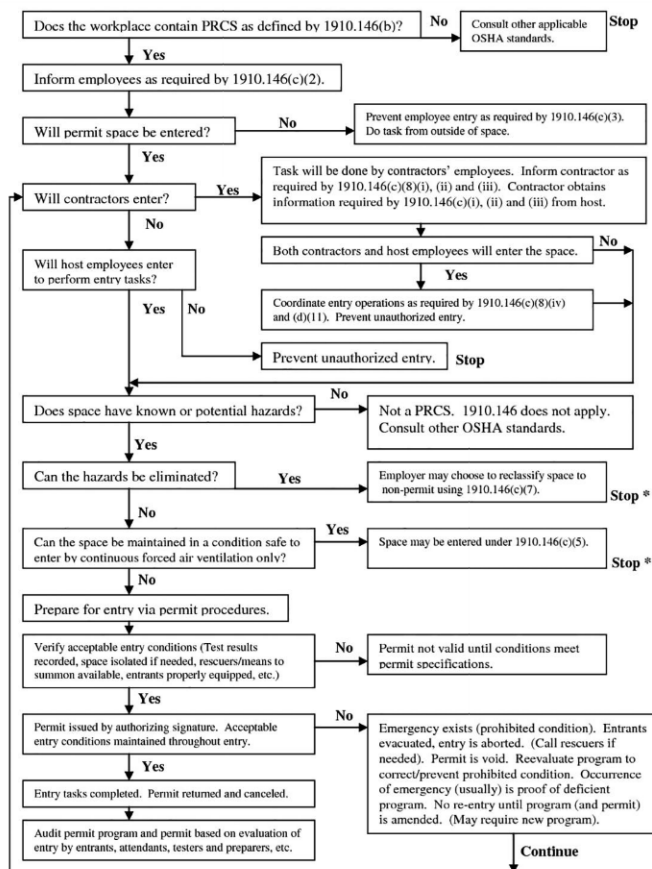


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Permit-Required Confined Space Decision Flow Chart (from OSHA General Environmental Controls 1910.146, but the same process applies). Spaces may have to be evacuated and re-evaluated if hazards arise during entry. Source: OSHA.

must certify and sign the basis for determining that all hazards in the permit space have been eliminated, and include the date and location of the space. The certification must be made available to each worker entering the space.

If any hazards arise within a reclassified non-permit space, each worker in the space must immediately exit the space. The entry employer must then re-evaluate the space and determine how to proceed. The employer must implement measures to protect workers from the hazard before any subsequent entry takes place. If the new hazard cannot be eliminated, it must be treated as a PRCS.

On an industrial painting project, it must be noted that evaluation of confined space hazards may be ongoing for the duration of the project. Not only may different confined spaces be entered as the project progresses, from box beams to interior cells of towers on a large suspension span bridge, but the classification of a given confined space may change as work progresses from one phase to the next. A confined space may not be require a permit during surface preparation but may have to be reclassified as a PRCS during coating application.

If the CP determined a PRCS is present, the following must be implemented.

CONTINUOUS MONITORING

The atmosphere within the space must be continuously monitored. The monitoring equipment must have an alarm that will notify all entrants if a specified atmospheric threshold is achieved. An employee must check the monitor with sufficient frequency to ensure that entrants have adequate time to escape in the event of an issue. At a minimum, monitoring for flammable gases and oxygen levels of 19.5 percent to 23.5 percent for oxygen and 10 percent of the lower explosive limit for flammable gases is required. Additional monitoring for toxic gases based on the OSHA Permissible Exposure Limits and respiratory protection is also required. Finally, if there is a potential for an immediately dangerous to life and health (IDLH) concentration of a toxic gas, the IDLH must be determined.

CONTINUOUS VENTILATION

If ventilation is required to control atmospheric hazards, air monitoring must ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Ventilation must be suited to the type of hazards it is controlling. If flammable atmospheres are anticipated, the ventilation equipment must be approved for the control of the type of flammable or combustible atmosphere anticipated, such as solvent vapors and combustible dusts. Duct work that is not properly grounded, for example, can generate static electricity and increase the risk of fire or explosion if flammable gases or vapors are present.

CONTINUOUS MONITORING OF ENGULFMENT HAZARDS

The CP must consider whether any liquid or flowable solid (such as sand) could enter the space. An example would be a pipe in an operating water or sewer system which is subject to flooding hazards. The employer's PRCS program must use an early-warning system placed sufficiently far upstream of the work area to

provide crews with enough notice of a surge in order to enable entrants to exit the space safely.

EQUIPMENT FOR SAFE ENTRY

In addition to personal protective equipment (PPE), other equipment that must be provided includes the following.

- Communication equipment enabling continuous communication with the attendant. Where high noise levels are present, radios that use headphones with noise-cancellation technology may be needed. Where radios cannot be used, hand or tending line signal systems may need to be used.

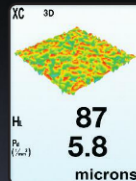
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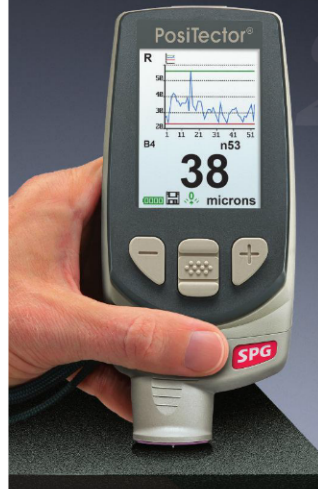
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- Lighting equipment must meet 29 CFR 1926.56 (Illumination). The minimum illumination requirement for general construction and underground work sites is five (5) foot candles.
- Barriers and shields to protect entrants from external hazards, such as motor vehicles and objects or pedestrians falling into open manholes.

- Ladders or other equipment that can provide safe access to the work area as well as control fall hazards. For example, the use of personal fall-arrest equipment should be considered when using ladders over 6 feet in height.
- Where the presence of flammable atmospheres is anticipated, electrical and electronic equipment must be approved

for use in flammable atmospheres by the manufacturer.

ATTENDANT

An attendant is required to remain outside the permit space throughout the duration of permit entry operations and continuously monitor and maintain communication with the entrants. The attendant must

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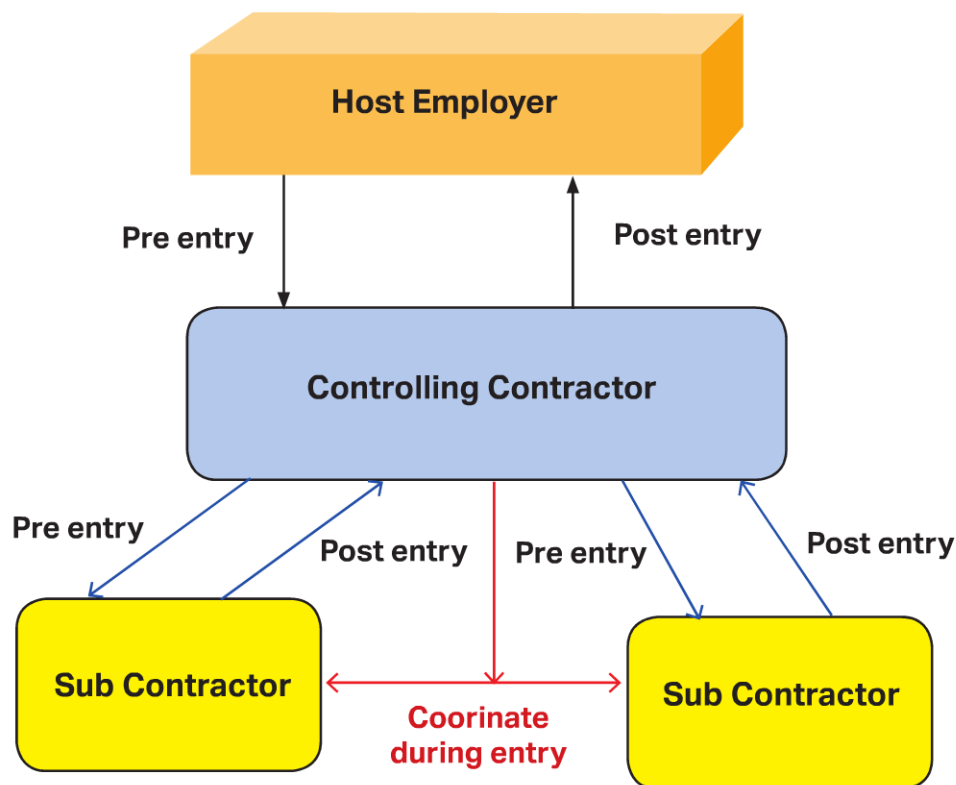
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Communication must occur between all three entities: the host employer, the controlling contractor and the subcontractor. Source: OSHA.

not perform any other collateral duties that might interfere with his or her responsibilities there. More than one attendant may be needed for multiple confined spaces.

The attendant must be able to summon emergency and rescue services

and/or activate the emergency response plan. If the attendant is to perform an emergency entry to rescue or provide first aid to entrants, he or she must be trained and properly equipped for rescue and must be relieved by another

attendant before entering the confined space in an emergency.

EMERGENCIES AND RESCUE

Effective emergency response planning is vital to ensure that any entrant



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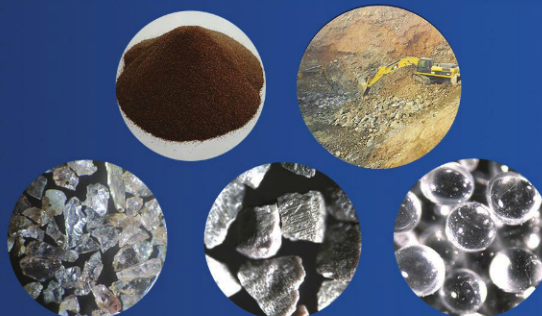
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who becomes sick or is injured in a permit space can be given medical attention and evacuated quickly and safely.

Rescue equipment must be provided for non-entry retrieval of entrants, such as a retrieval hoist for vertical entries greater than 5 feet in depth. Entrants must wear a chest or full-body harness connected to a lifeline attached to a fixed point or retrieval device outside the PRCS. Rescue equipment must be designed by the manufacturer for emergency rescue of personnel.

Where non-entry retrieval is not possible, the employer may do the following.

- Designate outside rescue and emergency services such as a fire department or rescue service. Employers must evaluate the rescuer's ability to respond and arrange for responders to give advance notice if they will be unable to respond (for example, because they are responding to another emergency). Many employers mistakenly assume that municipal fire departments will provide a confined space rescue team. This should be verified.
- Provide a rescue team trained and equipped by the employer. Rescue service personnel must be furnished with PPE and rescue equipment, and be trained in how to perform rescue duties. Training must include first aid and CPR.
- Timely response is defined in an OSHA letter of interpretation as a three-to-four-minute standard for the provision of emergency care. The means of contacting rescue services must be determined and tested at the start of the project. Do not assume that two-way radios or cell phones will work in an emergency.
- Consider whether access to the confined space can be provided that will allow for timely response. Specialized rescue winches and stretchers to lower incapacitated entrants from elevated work areas may be needed. Where the available entry ways do not permit emergency response, they may have to be provided by adding new access points or enlarging existing ones.

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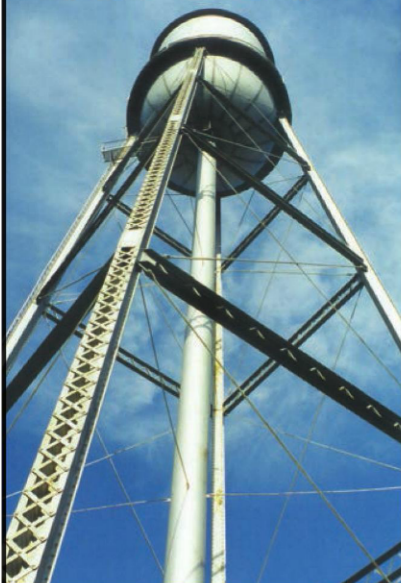
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- Employers must ensure that the rescue team practices or performs rescue exercises at least yearly and that rescue services are provided access to permit spaces so they can practice rescue operations. Rescuers must also be informed about any hazards of the permit space before they enter that space. The employer must provide the service with access to the permit space so that it can develop an appropriate rescue plan and practice rescue as necessary.

SUSPENSION OF PERMIT

OSHA allows for the suspension of a permit instead of the mandatory permit cancellation and reissuance. For example, if a condition inside or outside a permit space requires an evacuation, but the permit space soon returns to the same acceptable conditions specified under the permit, the permit would not necessarily need to be cancelled and reissued. It could simply be suspended until conditions are once again safe.

MULTI-EMPLOYER COORDINATION

The new rule requires identification of roles and coordination among the host employer, controlling contractors and entry employers.

ROLES

Host Employer

The host employer owns or manages the property where the construction work is taking place. There can be only one host employer. If the owner of the property on which the construction activity occurs has contracted with another employer to manage the property and provided any relevant information it has about permit spaces on the property to the managing entity, the managing entity is the host employer. Without such a contract and exchange of information, the owner of the property is the host employer.

Controlling Contractor

The controlling contractor is the employer with overall responsibility for

construction at the work site. If the controlling contractor owns the property, then he or she is both a controlling employer and the host employer. The controlling contractor is responsible for coordinating entry operations when there is more than one entry employer and when other activities on the site could foreseeably result in a hazard in the permit space. The controlling contractor must provide any information he or she has about any PRCS hazards and precautions previously used in the space.

Entry Employer

The entry employer is any employer who decides that an employee he or she directs will enter a permit space. There can be multiple entry employers if the employees of multiple employers must enter the space. Each entry employer is responsible for complying with all provisions of the standard except those specifically imposed on the controlling contractor and host employer.

Communication must occur between all three entities. As with the hazard evaluation and confined space classification process, implementing a process that complies with OSHA's multi-employer coordination requirements will also be an ongoing process as different contractors may be involved during various phases of a project.

CONCLUSIONS

As this article has demonstrated, protecting workers from confined space hazards and compliance with the new OSHA standard is a complex and ongoing process rather than a one-time event.

It is even more complex on a multi-employers work site. All employers with potential exposure to PRCS must understand and comply with these new standards.

ABOUT THE AUTHORS



Alison B. Kaelin, CQA, has more than 25 years of public health, environmental, transportation and construction management experi-

ence in the coatings industry. She is the owner of ABKaelin, LLC, a provider of OSHA training; quality assurance, auditing, consulting, and related services to the protective coatings, construction, fabrication, and nuclear industries. Kaelin is a certified quality auditor and a NACE-certified Coating Inspector. She was a co-recipient of the inaugural SSPC 2014 Women in Coatings Award, a 2012 JPCL Top Thinker, a 2012 JPCL Editor's Award Winner and an SSPC Technical Achievement Award winner in 2005. Kaelin is also a JPCL contributing editor.



Stanford Liang is currently director of industrial hygiene and safety services for AM Health and Safety, Inc. in Pittsburgh, Pennsylvania. He is a Certified

Safety Professional, Certified Industrial Hygienist and Certified Environmental Trainer with over 25 years of environmental, safety and industrial hygiene experience including over 15 years in the industrial painting industry. Liang has Bachelor of Science degree in safety from the University of Southern California. JPCL

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THE NEGATIVE INFLUENCE OF Fe_2P PIGMENTS ON THE ANTI-CORROSION PROPERTIES OF ZINC DUST PRIMERS

PASCAL VERBIEST, DR. SC.,
UMICORE ZINC CHEMICALS



All figures courtesy of the author.

inc primers are recognized as the most effective anti-corrosion paint systems to date and are considered to be nearly the only type of paint able to provide cathodic protection. For decades, zinc

primers have been abundantly used in marine and protective applications such as offshore, bridges, windmills and shipbuilding.

In recent decades, the production of zinc dust for this application has gone through a lot of changes. A ferro-phosphorus alloy pigment (FPA) consisting primarily of Fe_2P with traces of FeP and SiO_2 is said to be electrically and thermally conductive as well as chemically inert under normal conditions. Its particles are comparable in size and distribution with paint grade zinc-dust particles.

It has been documented that this FPA can replace 40 percent of the weight of the zinc dust in a zinc-dust primer without reducing its corrosion resistance¹⁻⁶. A program was conducted to evaluate the influence of this pigment on the performance of zinc-rich primers. Zinc metal dust anti-corrosive primers were prepared using semisolid epoxy resin. Zinc metal dust with a typical average particle size of 4.5 microns was used as the standard material.

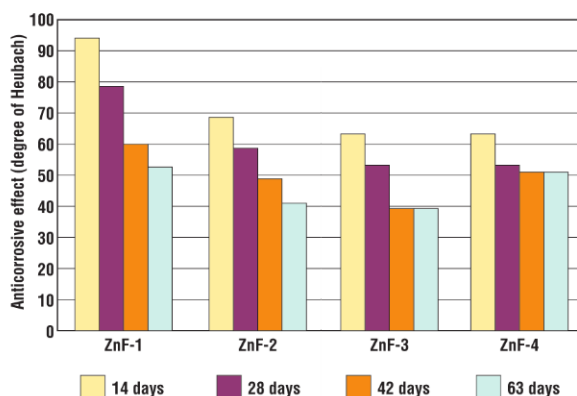


Fig. 1: Salt-spray test results show the anti-corrosive effect of primers based on a combination of zinc dust and FPA.

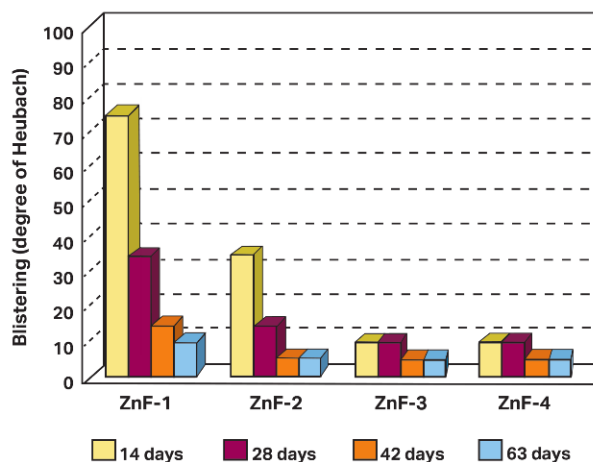


Fig. 2: Salt-spray test results show the blistering of panels based on a combination of zinc dust and FPA.

TABLE 1. CHARACTERISTICS OF ZINC ANTI-CORROSIVE PRIMERS BASED ON COMBINATION OF ZINC DUST AND FPA

Primer	PVC (%)	Zinc Dust: FPA	Zinc Dust: FPA
ZnF-1	69,55	Zinc Dust	Zinc Dust Only
ZnF-2	69,73	89 : 11	90% Zinc Dust/10% FPA
ZnF-3	69,90	79 : 21	80% Zinc Dust/20% FPA
ZnF-4	70,08	68 : 32	70% Zinc Dust/30% FPA

TABLE 2: FORMULATIONS OF 2-COMPONENT EPOXY PRIMER USING A COMBINATION OF ZINC DUST AND FPA

Formulation	ZnF - 1	ZnF - 2	ZnF - 3	ZnF - 4
Part A				
Zinc metal dust	831.60	748.44	665.28	582.12
FPA	-	83.16	166.32	249.48
Epikote 1001-X-75	60.20	60.20	60.20	60.20
Syloid 244	8.70	8.70	8.70	8.70
Methyl isobutyl ketone	8.90	8.90	8.90	8.90
Ethyl amyl ketone	6.10	6.10	6.10	6.10
Xylene	33.60	33.60	33.60	33.60
Methyl proxitol	27.10	27.10	27.10	27.10
Total	976.20	976.20	976.20	976.20
Part B				
Epi-cure 3115-X-70	21.00	21.00	21.00	21.00
n-butanol	2.80	2.80	2.80	2.80
Total (part by weight)	1000.00	1000.00	1000.00	1000.00
PVC (%)	69.55	69.73	69.90	70.08
Solid content – part A (% by weight.)	90.70	90.70	90.70	90.70
Solid content – total (% by weight w.)	90.02	90.02	90.02	90.02

The following solvent mixture was added for spray application (weight %):

Methyl proxitol	30.29
Methyl isobutyl ketone	9.97
Xylene	52.87
Ethyl amyl ketone	6.87

TABLE 3: FILM HARDNESS OF ZINC DUST PRIMERS WITH FPA BY PERSOZ PENDULUM

Primer	Film Hardness – Persoz Pendulum (%)				Thickness of Film (µm)	Appearance of Film
	1 days	7 days	14 days	28 days		
ZnF-1	41,2	41,4	42,2	42,9	50	Matt, smooth
ZnF-2	36,2	36,9	39,5	40,6	50	Matt, smooth
ZnF-3	40,1	40,7	41,0	41,5	50	Matt, smooth
ZnF-4	40,0	40,5	40,9	41,4	50	Matt, smooth

TABLE 4: PHYSICAL-MECHANICAL PROPERTIES OF ZINC DUST ANTI-CORROSIVE PRIMERS WITH FPA

Primer	Impact resistance reverse / direct (cm)		Bending test (mm)		Cupping test (mm)		Cross-cut test (degree)		Thickness of films (µm)
	7 days	28 days	7 days	28 days	7 days	28 days	7 days	28 days	
ZnF-1	<5/35	5/40	15	15	0,6	0,6	1-2	1-2	50±5
ZnF-2	<5/35	<5/35	15	15	0,5	0,5	1-2	2	50±5
ZnF-3	<5/35	<5/30	15	15	0,6	0,6	2	2	50±5
ZnF-4	<5/35	<5/35	15	15	0,7	0,7	2	2	50±5



Fig. 3: Virtually no red rust with formulation containing only zinc dust (ZnF-1).



Fig. 4: High level of red rust with formulation containing 10-percent FPA (ZnF-2).



Fig. 5: High level of red rust with formulation containing 20-percent FPA (ZnF-3).



Fig. 6: High level of rust with formulation containing 30-percent FPA (ZnF-4).

ZINC DUST PRIMERS

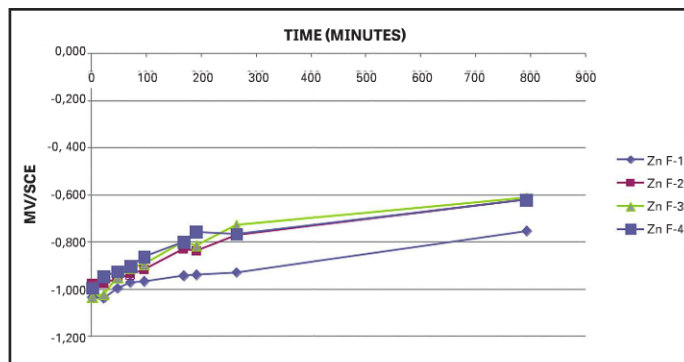


Fig. 7: Corrosion potentials of steel panels coated with a pure zinc-rich primer (ZnF-1) and with zinc dust replaced by iron-phosphorus alloy pigment (ZnF 2-4).

The zinc-rich primer with only zinc metal dust was formulated with a pigment volume concentration (PVC) of 69.55 percent. The other anti-corrosive primers were formulated using a combination of zinc metal dust and FPA, the characteristics of which are shown in Tables 1 and 1 (pp. 38 and 39).

RESULTS

Mechanical and Chemical Properties

All paints were spray-applied onto steel panels to a dry-film thickness of 50 ± 5 microns (2 mils). The panels were stored for four weeks under standard conditions (temperature of 23 ± 2 C (73 F) and relative humidity of 50 ± 5

TABLE 5 : MEK TEST OF ZINC DUST ANTI-CORROSION PRIMERS WITH FERRO-ALLOY-PIGMENT

Primer	MEK test (single rub) 28 days	MEK test (double rubs) 28 days	Thickness of film (µm)
ZnF-1	39	75	50 ± 5
ZnF-2	25	62	50 ± 5
ZnF-3	30	66	50 ± 5
ZnF-4	34	93	50 ± 5

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percent), after which their mechanical, chemical and anti-corrosion properties were evaluated.

No significant differences were observed in the mechanical properties of the different paint formulations. Film hardness, impact resistance, cross-cut results, bending and cupping resistance were all found to be equal (Tables 3 and 4, p. 39). Chemical resistance testing yielded slightly different results measured using the MEK test, and were observed for ZnF-2 and ZnF-3 (10-percent weight and 20-percent weight FPA, respectively) as compared to the pure zinc-dust primer Table 5 (p. 40).

Anti-Corrosion Properties

Anti-corrosion properties of the paints tested showed largely different results. All panels were exposed in a

salt-spray chamber as per EN ISO 9227, "Corrosion tests in artificial atmospheres — Salt-spray tests" and evaluated after 14, 28, 42 and 63 days. The results of the salt-spray tests are shown in Figures 1 and 2 (p. 38).

The anti-corrosive properties of the coatings were evaluated according to: EN ISO 4628, "Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting and Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect." Corrosion protection was also evaluated using ASTM D1654, "Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive

Environments," ASTM D610, "Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces" and ASTM D714, "Standard Test Method for Evaluating Degree of Blistering of Paints." A rating system was used to evaluate the total anti-corrosive effect. $AE = [A + B + C]/4$. AE equals the overall anti-corrosive effect, where a value of 100 represents the best performance and a value of 0 the worst. "A" corresponds to the degree of blistering. "B" represents the average measurement of failure at the scribe and "C" corresponds to the degree of rusting.

The graphs clearly demonstrate much better corrosion resistance for the zinc primer which only contains zinc metal dust and no FPA (ZnF-1). Higher values in the table indicate better resistance to blistering and red rust.

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The better corrosion resistance of the "pure" zinc dust primer was even more clearly demonstrated when the paint layer was removed from the steel panels after the salt-spray test using a mixture of acetone, chloroform and acetic acid. Figures 3 through 6 (p. 39) show the heavy, red corrosion which occurs when zinc dust is partly replaced by FPA (formulations ZnF-2, ZnF-3 and ZnF-4).

CATHODIC PROTECTION

The ability of zinc to protect steel by way of cathodic protection is a central feature of zinc-rich primers. Tests were carried out to evaluate how the replacement of the zinc dust with FPA influenced the corrosion potential of the coated steel panels (Fig. 7, p. 40). The corrosion potential of the panels was measured in relation

to immersion time in a sodium chloride (NaCl) 0.5 M solution. The reference electrode was a standard calomel electrode (SCE). Measurements were carried out in triplicate (3 panels for each type of paint). Cathodic protection is lost when the corrosion potential is greater than -0.850 mV/SCE. Table 3 (p. 39) shows the much quicker loss of cathodic protection if part of the zinc dust is replaced by FPA.

SUMMARY

Zinc-rich primers have been formulated where part of the zinc metal dust was replaced by a conductive FPA. The results of a test program conducted showed that the mechanical and chemical properties of the zinc-dust paints tested were unaffected by addition of this pigment. However, significant reduction in anti-corrosion performance

and cathodic protection was observed when zinc dust is replaced by an FPA

It is the author's belief that attempts to replace portions of zinc dust with an FPA threatens the long-term anti-corrosion performance of zinc primer.

ABOUT THE AUTHOR

Pascal Verbiest obtained a Ph.D. in inorganic chemistry focused on re-



actions of organotin-halides in 1991. His career began at the steel company ArcelorMittal as a researcher in the field of enameling steels.

In 1994 he joined the Business Unit, Industrial Products at Umicore Belgium as a research manager and then joined Umicore Research in 1997 as senior

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project manager. Since 2000, Verbiest has been part of the Business Unit, Zinc Chemicals, concentrating on development projects related to zinc oxide and zinc powder in a variety of applications such as paints, rubber and cosmetics. In 2009 he became head product development at the Business Unit, Zinc Chemicals. Since 2013 Verbiest has been working on both product and process development projects related to zinc metal powder and zinc oxide in Europe, Asia and the U.S.

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THE IMPORTANCE OF PATTERN RECOGNITION IN FAILURE ANALYSIS

BY DWIGHT G. WELDON,
WELDON LABORATORIES, INC.

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There are many reasons why a paint or coating can fail prematurely, even something quite simple such as painting over dirt, or something quite complicated such as poor chemical resistance or paint not being applied at the proper mix ratio. Many laboratory techniques can aid in determining the cause of a coating failure, such as optical microscopy, infrared spectroscopy, scanning electron microscopy energy dispersive X-ray spectroscopy (SEM-EDS), gas chromatography-mass spectroscopy (GCMS) and differential scanning calorimetry (DSC). Regardless of which laboratory techniques might be used, it is important to determine whether or not there is a pattern to the failure. Recognition of a pattern can aid in finding the cause of a failure and also sometimes lower the cost of the analysis by helping the investigator choose the most appropriate laboratory tests.

Pattern recognition is in itself a science. Indeed, there are scientific journals and technical societies devoted exclusively to this concept. Encyclopedia Britannica defines pattern recognition in computer science as "the imposition of identity on input data, such as speech, images, or a stream of text, by the recognition of and delineation of patterns it contains and their relationships."

Google uses pattern recognition algorithms to identify the faces of human beings in digital images captured by their street view cameras so that the faces of these people can be blurred to protect their privacy. But in the context of this article, pattern recognition means identifying and correlating events with locations, and subsequently correlating chemical or physical properties with those locations. This depends more on curiosity and making good observations (or asking the right questions if the investigator has not been onsite) than on algorithms.

Not all coating failures have patterns (and this in itself is an important observation). For instance, if a painted structure is essentially failing everywhere, this suggests that either the paint itself is defective, or that the wrong generic type of paint was specified. However, in those cases where there is a clear pattern to the failure, being aware of this pattern can often assist in determining its cause. In this article, several coating failures will be discussed where pattern recognition played an important role in their solution.

Case No. 1

The first case involved the failure of pre-painted galvanized roofing panels on an office building. The system involved the coil coat application of a primer and a topcoat. Although the panels were furnished with a 15-year warranty, after only four years sporadic failure of some of the panels was noticed, involving peeling of the paint down to the bare galvanized steel. An initial report by the paint manufacturer stated that the problem was due to mechanical damage by foot traffic and that it was therefore not covered by the warranty.

While the site visit did indeed show areas where there was failure due to mechanical damage (such as scratches), there were numerous areas of failure not associated with mechanical damage and certainly not

associated with foot traffic. A walk around the building from ground level showed that there was somewhat more failure on the south and east sides of the building compared to the north and west sides. This suggested that sunlight exposure might have had something to do with the failure and discounted the effects of mechanical damage and/or foot traffic. Why would these effects be worse on one side of the building versus another?

Closer scrutiny of the building revealed an even more distinct pattern to the failure. While not noticed initially, once recognized, it seemed incredibly obvious: there was much more failure near windows. Indeed, it did not matter what side of the building one looked at; there was always more failure adjacent to windows (Figs. 1 and 2).

A consideration of the window-related failures suggested two possible explanations: the failure was due to the inability of the coating system to resist window-cleaning chemicals, or the failure was due to the inability of the coating system to resist the additional heat and ultraviolet light exposure caused by sunlight reflection off of



Fig. 1 (top): Panels adjacent to brick, showing no failure. Fig. 2 (bottom): Panels adjacent to a window a few feet away from the panels shown in Figure 1. Note the extensive paint failure.

the windows and onto the adjacent painted panels.

Failure as a result of window cleaning seemed unlikely for two reasons: the windows were cleaned very infrequently and there was no failure near one set of windows which were adjacent to, and hence sheltered by, a brick stairwell that jutted out from the building. These windows would have been cleaned like any of the other windows, but would have been mostly in the shade.

Based on these observations, the laboratory was able to focus its attention on factors related to coating degradation. Indeed, infrared spectroscopic analysis showed degradation of the acrylic portion of the failing topcoat relative to the non-failing topcoat. The degradation of the topcoat would have made it more permeable to moisture, which over time would affect the adhesion of the thin primer coat to the substrate.

Case No. 2

A second example of the use of pattern recognition in failure analysis involved water permeation through the exterior painted block walls of a furniture store. The exterior walls of this building were made of two types of block: smooth-faced light-weight block and split-faced block. The smooth-faced block had been primed with a latex block filler and topcoated with an acrylic elastomeric coating. The block filler was to be applied at 6-to-8 mils dry film thickness (DFT) and the elastomeric topcoat had a recommended DFT of 8-to-10 mils. The split-faced block was primed with a different block filler (a heavy-duty block filler specified at 10-to-15 mils DFT) and topcoated with the same elastomeric coating. A month or so after the painting was completed, heavy rains hit the area and water was noticed on the inside walls of the building. The moisture on the interior of the block walls would dry up after a few days, but would reappear after subsequent heavy rains.

The site visit to the building was made on a sunny day, two days after a heavy



Fig. 3: Pattern of moisture on the interior of the block walls.

rainstorm. Fortunately, because of the recent rain, the inside walls of the building were still damp. By far and away, the greatest amount of moisture was on the east side of the building. The wet areas were usually present as strips, either vertical or horizontal, and would usually span several adjacent blocks (Fig. 3). Usually the water was present on entire blocks. However, there were some instances where only a few inches of each block was wet. When this occurred, it was usually in a vertical pattern, about 6-to-7 inches in width and up to four or five blocks high. There was little-to-no water present above roughly 18 feet and no wet areas were observed near the ceiling.

The examination then turned to the exterior of the building and an obvious pattern was immediately noted. On the east wall of the building, which had the greatest amount of water penetration, there was a change in the type of block at about the 18-foot level. Smooth-faced block had been used below this level, and split-faced block had been used above it. Thus, the change in type of block corresponded to the wetness on the inside of the building. However, if the problem was simply that the smooth-faced block was more porous than the split-faced block, or because the split-faced block was primed with a thicker coat of a heavy-duty block filler, why wasn't there more water all over the interior of the east wall, wherever smooth-faced block was used?

Sometimes paint failures are solved because of thorough background information, good sample taking, solid laboratory



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PATTERN RECOGNITION

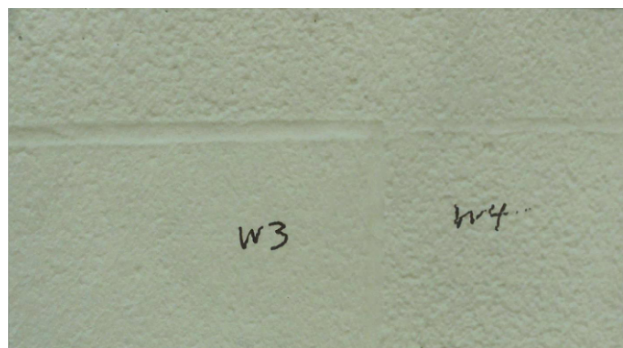


Fig. 4: Both smooth (location W3) and rough (location W4) paint on the exterior wall. Rough areas corresponded to areas on the inside of the building that were wet after a heavy rain.

work, an understanding of coating chemistry, or stubbornness. Sometimes, however, it helps to be lucky. As the author was leaning against the east wall of the building and casually gazing along its length, the oblique lighting from the noon sun revealed a pattern. There were texture differences in the paint on the smooth-faced block. While most of the paint was relatively smooth, there were some areas where the surface of the paint was much rougher (Fig. 4). This would not have been so apparent if the wall had been in the shade or if one was looking straight on instead of at an oblique angle.

A closer look showed that the pattern of rough texture was similar to the pattern of water present on the interior of the wall. The rough texture was generally present on an entire block or several adjacent blocks, either vertical or horizontal, much like the pattern of moisture that had been observed inside the building. Furthermore, like some wet areas on the inside of the wall, there were even instances where the rough texture took up only a few inches, in a vertical swath, of a few adjacent individual blocks.

A few areas of rough texture were sketched out on a notepad and marked as to where they were on the wall. Going back inside the building, it was found that these areas corresponded closely to the wet areas on the interior side of the wall. The pattern of rough-textured paint on the exterior of the wall corresponded to the pattern of water on the interior of the wall. The failure was due to the roughness of the paint, or to whatever was responsible for the roughness of the paint.

Now that one knew where to look and what to look for, a closer examination was made on the exterior of the wall. Stripping small areas of paint showed that the texture differences were mostly due to differences in the texture or roughness of the block face itself. However, a few areas could be found where the roughness was due to poor paint application. These areas were usually only 6 or 7 inches wide and often encompassed five or six vertically adjacent blocks. Closer observation with a field magnifier showed that this was the result of applying the paint in a dry fashion, or going over it with a roller when it was nearly dry. The semi-dry paint



Fig. 5: Paint failure near the base of a light pole. The failure was essentially confined to only one side of the pole, from ground level to about 7 feet.

was essentially pulled off the surface and formed little "hooks" or sags which could not flow back into a smooth coat. This would greatly increase the porosity of the coating.

When samples were subsequently examined in the laboratory, it was found that

the block filler was usually much thinner (and below the recommended DFT) in the failing, rough areas than in the non-failing smooth areas. It is apparent that a coating applied at only half its recommended thickness will be less resistant to wind driven rain than if it had been applied at its full thickness. It is likely that the coating was thinner on the rough-textured block because this block would have had more surface area per square foot (a seemingly odd statement at first glance). If the contractor was applying the block filler at the same spreading rate over both smooth and rough block, the rough block would require more coating to cover the cavities, crevices and peaks, thus resulting in a lower dry-film thickness.

Case No. 3

A third example of the importance of pattern recognition involved the failure of

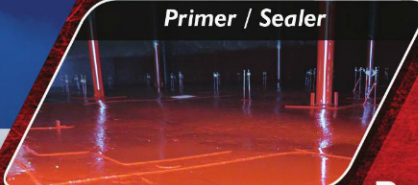
coated steel light poles in a small city in the upper Midwest. The light poles were about 35 feet high and were precoated with a polyester powder coating, specified to be 4-to-6 mils thick. They were installed in the summer along various streets in town. Within a year or two of installation, problems with rusting and peeling of the coating were noted.

The first pole examined had dozens of areas of up to an inch or so in diameter where the coating was lifted or blistered. Where the coating had broken open, the underlying steel was beginning to rust. There was, as the reader might expect, a pattern to the failure. It occurred from the base of the pole up to about 6 or 7 feet high (Fig. 5). There was very little coating failure above 7 feet, and virtually none above about 10 feet. Furthermore, there was only failure on one half of the pole (one "hemisphere"). Coating

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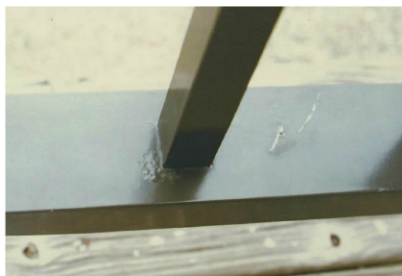


Fig. 6: Lifting and blistering of the coating from the bottom rail of a balcony railing. Almost all of the failures occurred on the top surface of the bottom rail, where the vertical picket went through the square opening in the rail.

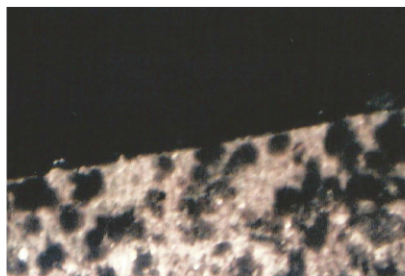


Fig. 7: The roughly 1/16-inch-wide perimeter of the square opening in the bottom rail showed isolated "globs" of paint on otherwise bare aluminum.

adhesion in non-failing areas was generally fair to good and the coating had good solvent resistance, as is expected of a baked powder coating.

After several poles were examined on both sides of the street, another pattern

became apparent: only the side of the poles facing oncoming traffic were failing. The failures had nothing to do with east, west, north, or south — only the direction of oncoming traffic, and height.

What could account for such a pattern of failure? What could differ in the local

environment below 10 feet, and in the direction of oncoming traffic? Could it perhaps have something to do with snow removal? The town was in a northern state and therefore subject to harsh winters. Impact damage could certainly be caused by snow plows throwing up gravel or other debris, which would correspond to the failing locations on the poles.

Field and laboratory testing indicated that the steel had been properly cleaned, that the coating was indeed a polyester as shown by infrared spectroscopy, and that it had been properly applied and cured as indicated by both solvent resistance and DSC testing. What the laboratory testing also showed, however, was that large chips of failing coating were relatively flexible at room temperature, but became very brittle after three hours in a freezer at 20 F. Indeed, the frozen chips could be easily snapped in half.

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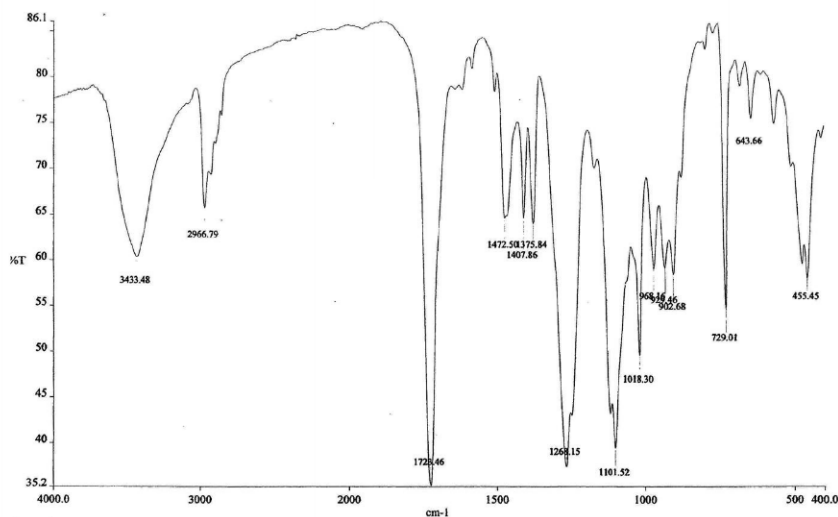


Fig. 8: Infrared spectrum of the blistered brown paint from the balcony railing, confirming that it is a polyester.

Based on all of the above information, the cause of the coating failure was the brittleness of the coating at low temperatures. The lack of flexibility and concomitant poor impact resistance made the

coating susceptible to mechanical damage, likely from debris thrown up by snow plowing operations in the wintertime. The failure would have then been exacerbated by exposure to moisture and deicing salts.

Although the laboratory work was important, the key to solving this failure clearly was the observation of the distinct pattern of the failure.

Case No. 4

The final example of the use of pattern recognition in failure analysis involved the blistering of a brown polyester powder coating applied to aluminum balcony railings on a condominium high rise on the Gulf coast. Numerous railings were involved in the failure, which started to show up about two years after the railings were installed. Very little information was supplied concerning the type of coating, the type of surface preparation or the manufacturing process.

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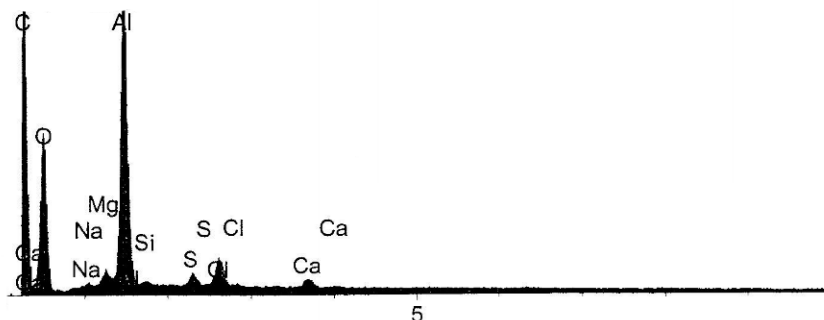


Fig. 9: X-ray spectrum of the white powder underneath the blistered paint, obtained by SEM-EDS. Note the large amounts of aluminum and oxygen, typical of aluminum oxide corrosion product, along with chlorine (chloride) from the coastal salt water environment.

However, a section of one of the failing railings was submitted to the laboratory, along with several photographs of the problem taken by the client.

An examination of the photographs, along with the section of railing submitted to the laboratory, immediately showed a pattern to the failure. Almost all of the blistering and lifting, which was rather severe, was occurring on the top surface of the bottom horizontal rail, adjacent to where the vertical pickets went

through corresponding square openings in the bottom rail (Fig. 6, p. 51). There was little-to-no failure on the top rail or on the vertical pickets themselves, except occasionally where they joined the bottom rail and very little failure even on the bottom rail not immediately adjacent to the pickets.

These vertical pickets were square and about 3/4-inch on each side and were spot-welded in place on the underside of the bottom rail. Because there was brown

paint on the welds themselves, the railings were apparently assembled and welded together prior to application of the powder coating. This suggested the possibility that the pickets and the bottom rail had no paint on them where they were in contact with one another. This was confirmed when portions of the railing were cut and one of the pickets was removed which showed that there was a narrow, essentially unpainted band around the picket, about 1/16-inch in width, corresponding to where it had been in contact with the opening in the bottom rail. Additionally, the corresponding edge

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of the square opening in the rail had also not been painted (Fig. 7, p. 51).

The blistered brown paint could be easily flaked away to reveal large amounts of a white powder on the underlying aluminum and lesser quantities of it on the back side of the blistered coating. Infrared spectroscopy confirmed that the paint was a polyester (Fig. 8, p. 52). The powder had the visual appearance of an aluminum corrosion product (aluminum oxide) which was subsequently confirmed by SEM-EDS analysis. In addition to aluminum and oxygen and some elements commonly associated with paint, the SEM-EDS analysis also revealed substantial amounts of chlorine, likely as chloride, clearly indicating the presence of salt from the coastal environment (Fig. 9).

Based on the distinct pattern of the failure and the laboratory findings, it was apparent that there was nothing wrong with

the paint itself, or even its application and curing. The cause of the failure was a design flaw in the construction of the railings themselves, which made it impossible to coat the portions of the aluminum pickets that were in contact with the openings in the bottom rail. Likewise, the perimeter of the openings themselves could not be coated. This essentially left small areas, or crevices, of bare aluminum exposed to salt water and salt-laden air from the coastal environment. Corrosion of the aluminum occurred, which undercut the adjacent coating, resulting in the observed blistering.

As the above examples illustrate, identifying a pattern to a coating failure can greatly aid in determining its cause. It also illustrates the importance of asking such questions of the client, since not every failure investigation involves a trip to the jobsite.

About the Author

Dwight Weldon is the president of Weldon Laboratories, Inc., a company specializing in both routine testing and failure analysis of paints and coatings. He has a Bachelor of Science degree in chemistry from the University of Michigan and a Master of Science in analytical chemistry from Michigan Technological University. Weldon



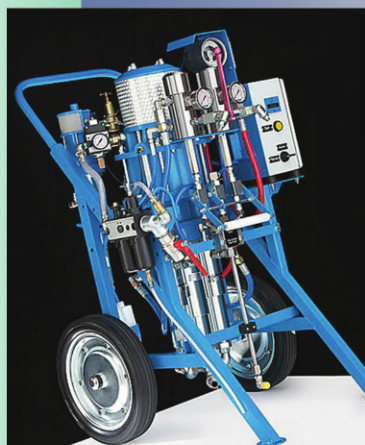
has over 30 years of experience in the coatings industry, has performed thousands of paint failure investigations and is the author of the book

Failure Analysis of Paints and Coatings, published by John Wiley & Sons. He has presented numerous lectures and workshops on failure analysis and is a member of ASTM, SSPC, the American Chemical Society and the Pittsburgh Society for Coatings Technology. **JPCL**



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AWARDS AND SPECIAL EVENTS

Attendees and guests at SSPC 2016 featuring GreenCOAT can enjoy a variety of special events during the conference, including SSPC's Annual Business Meeting and Awards Luncheon, opening and closing celebrations, guest events and more. For further information, visit www.sspc2016.com.

ANNUAL BUSINESS MEETING AND AWARDS LUNCHEON

**MONDAY, JAN. 18,
11:30 A.M. TO 1:00 P.M.**

Join SSPC President Skip Vernon, Executive Director Bill Worms, the Board of Governors and your peers to hear SSPC's annual report and to honor the 2015 award recipients. The awards to be presented this year include the SSPC Honorary Life Member, the John D. Keane Award of Merit, the SSPC Coatings Education Award, the SSPC Technical Achievement Award, the Women in Coatings Impact Award, the President's Lecture Series Awards, the SSPC Outstanding Publication Award, the *JPCL* Editors' Awards, the SSPC Outstanding Chapter Awards, and the 10th annual SSPC Structure Awards.

SSPC HONORARY LIFE MEMBER

This honor is presented to an individual by the Board of Governors for extraordinary contribution and longterm activity on behalf of SSPC. To become an honorary life member, an individual must be nominated by a Board member and approved by two-thirds of the Board. Only one honorary life membership is awarded each year.

JOHN D. KEANE AWARD OF MERIT

Named for SSPC's executive director from 1957 to 1984, this award acknowledges outstanding leadership and significant contribution to the development of the protective coatings industry and to SSPC.



Photo courtesy of SSPC.

SSPC COATINGS EDUCATION AWARD

This award is given for significant development and dissemination of education material and technical information relating to protective coatings and their application.

SSPC TECHNICAL ACHIEVEMENT AWARD

This award recognizes outstanding service, leadership and contribution to the SSPC technical committees.

WOMEN IN COATINGS IMPACT AWARD

SSPC's newest award was established at SSPC 2014 to recognize women in the coatings industry whose contributions have created a positive impact on the culture of the industry.

PRESIDENT'S LECTURE SERIES AWARD

This award honors a technical presentation that is handpicked by the SSPC president and chosen for its reflection of the coatings industry and profession. The presentation

will be highlighted in the SSPC 2016 Onsite Guide, and the winner will be recognized at the Awards Luncheon.

SSPC OUTSTANDING PUBLICATION AWARD

This award is given annually to the author(s) of the best technical paper or presentation from the SSPC International Conference and Exhibition or from *JPCL* that scores the highest in the following categories: clarity of expression and organization; originality of content or presentation; importance to the protective coatings industry; and effectiveness of figures or tables. SSPC selects a panel of judges from SSPC and *JPCL* to vote on the award.

JPCL EDITORS' AWARDS

The same panel of judges selects the recipients of the *JPCL* Editors' Awards, which also recognize excellence in technical writing. Winners are selected from a field of more than 100 eligible papers from SSPC 2015 and from *JPCL* articles published between May 2014 and July 2015. Awards are also based on clarity, originality, significance to the industry and effective use of illustrations.

SSPC OUTSTANDING CHAPTER AWARDS

Each year, SSPC presents awards to the Outstanding North America Chapter and the Outstanding International Chapter. Chapters are evaluated on their overall operation and the creativity and quality of the events held each year.

SSPC STRUCTURE AWARDS

The 10th annual SSPC Structure Awards will honor teams of contractors, designers, end users and other personnel for excellence and expertise demonstrated on industrial and commercial coatings project.



Photo courtesy of SSPC.

Awards to be presented are:

- The William Johnson Award for outstanding achievement demonstrating aesthetic merit in industrial coatings work;
- The E. Crone Knoy Award, recognizing outstanding achievement in commercial coatings work;
- The Charles G. Munger Award for an industrial or commercial project demonstrating longevity of the original coating;
- The George Campbell Award, recognizing the completion of a difficult or complex industrial coatings project; and
- The Military Coatings Award of Excellence for exceptional coatings work performed on U.S. military ships, structures or facilities.

JPCL will feature the Structure Awards recipients in a photo essay next spring.

OPENING CELEBRATIONS

WELCOME RECEPTION IN THE SPEAKEASY

MONDAY, JAN. 18, 5:30 TO 7:30 P.M.

Sponsored by Carboline Company

Back when the bathtub gin was cold and the nights were hot, people really knew how to party. Join your friends, colleagues and peers at our Speakeasy. Just remember to knock three times and whisper the password!

EXHIBIT HALL RECEPTION

TUESDAY, JAN. 19, 5:00 TO 8:00 P.M.

Sponsored by The Sherwin-Williams Company

Don't miss the ribbon cutting at 5:00 and the chance to roam the newly opened exhibit hall. Food, beverages and all of the suppliers you need to see await you.

MEETINGS AND OTHER EVENTS

YOUNG PROFESSIONALS MEETING

MONDAY, JAN. 18, 4:30 TO 5:30 P.M.

Young industry professionals are invited to gather before the Welcome Reception for an opportunity to discuss how the next generation can impact the industry, learn what career paths are available and seek a leadership role to shape the future.

FACILITY OWNERS

BREAKFAST AND PEER FORUM

TUESDAY, JAN. 19,

7:30 TO 10:00 A.M.

Facility owners are invited to join the QP-certified contractors at a complimentary breakfast to thank them for their commitment to quality coating projects. During the breakfast, a panel of peers will present thought-provoking questions to initiate discussion. Facility owners only, please. An RSVP is appreciated.

MEGA RUST MID-YEAR FOLLOW UP

WEDNESDAY, JAN. 20,

8:00 A.M. TO 12:00 NOON

The mid-year follow up to the Mega Rust 2015 Conference is scheduled as part of SSPC 2016 and is designed to continue the discussions on key corrosion issues concerning Navy enterprises, generate questions and talking points for potential presenters at Mega Rust 2016, discuss the meeting theme and draft the conference agenda. If you are interested in participating in Mega Rust 2016, please email ASNE at MegaRust@navalengineers.org or contact Mega Rust Chairman Dave Zilber, dzilber@mmm.com.

LUNCH WITH EXHIBITORS

WEDNESDAY, JAN. 20,

11:30 A.M. TO 1:00 P.M.

Sponsored by Mega Rust

THURSDAY, JAN. 21,

11:30 A.M. TO 1:00 P.M.

Sponsored by CoatingsPro

SSPC and sponsors invite you to complimentary lunches in the Exhibit Hall. Tickets will be in your registration packet. You've got to eat, right?

PROTECTIVE COATINGS

SPECIALISTS BREAKFAST

THURSDAY, JAN. 21,

7:30 TO 9:30 A.M.

The Protective Coatings Specialist (PCS) certification program identifies and awards recognition to individuals who have in-depth knowledge in the principles and practices of industrial coatings technology. Certification attests to the professional credibility of the coatings practitioner and raises the standards of the protective coatings profession. All PCS certified individuals are invited to this complimentary breakfast. An RSVP is appreciated.

RSVP for any of these special events by contacting Jim Kunkle at kunkle@sspc.org or 412-281-2331 ext. 2210.

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CLOSING CELEBRATIONS

EXHIBIT HALL CLOSING BLAST

**THURSDAY, JAN. 21,
1:30 TO 3:00 P.M.**

One final opportunity for interaction with the exhibitors before the hall closes at 3:00 p.m. Grab a beverage and dessert and get that last bit of vendor information to complete your conference.

CLOSING PARTY

**THURSDAY, JAN. 21,
7:00 TO 9:00 P.M.**

A low-key chance to say goodbye to friends new and old, and prepare for the return to work, full of information, industry news and contacts made during the week.

SPOUSE AND GUEST EVENTS

Two optional events are available for SSPC 2016 attendees' spouses and guests. The costs of these events are not included in the conference registration. Register online at www.sspc2016.com. It is not necessary to register for the conference to participate in these guest events.

"RELEASE YOUR INNER ARTIST"

TUESDAY, JAN. 19, 1:00 TO 4:00 P.M.

Marriott Rivercenter

Let your artistic side shine! Pinot's Palette comes to you for a one-of-a-kind, fun and friendly painting class! It has been said that, "Every child is an artist." The folks at Pinot's Palette have found a way to bring that child out in adults — with their relaxed, fun environment and expert guidance from local artists. Not an artist? No big deal! Talented

instructors will guide you step-by-step to create your masterpiece. Enjoy snacks and wine as you work and take your canvas with you at the end of class. Your canvas will be sized to travel!

WINERY UNIVERSITY

**WEDNESDAY, JAN. 20,
1:00 TO 4:00 P.M.**

Dry Comal Creek Vineyards

Visit Dry Comal Creek Vineyards and Winery and learn what all the fancy words and odd codes on wine labels mean. Tour wine labels from Texas to Tasmania and learn enough to be dangerous at your neighborhood winery! Each participant will receive printed materials and taste wines from winemaker Franklin Houser. Located in New Braunfels, the Housers have been producing wine since 1998, the same year their tasting room opened.



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TRAINING AND CERTIFICATION

All SSPC 2016 training and certification courses will be held at the Henry B. Gonzalez Convention Center and the Marriott Riverwalk Hotel. Registration for the courses must be done separately from the SSPC 2016 conference registration. Some courses have prerequisites, which can be found online at www.sspc.org/training.

To register, email or fax a completed training registration form to Nicole Lourette at lourette@sspc.org, or 412-281-9993. The deadline to register is December 18, 2015.

NAVIGATING NAVSEA STANDARD ITEM 009-32 (00932)

JAN. 14

This course provides attendees with a better understanding of the painting requirements outlined for U.S. Navy surface ships, submarines and aircraft carriers in Standard Item 009-32. It covers the cleanliness, surface preparation, coating application requirements and system application instructions for various Navy vessels. Requirements of referenced standards are also reviewed.

FUNDAMENTALS OF PROTECTIVE COATINGS (C1)

JAN. 14-18

The C1 course provides an overview for those who are new to the protective coatings industry. It is also an ideal refresher for reviewing the fundamentals of corrosion and the use of coatings as a protective mechanism against corrosion and deterioration of industrial structures.

LEAD PAINT REMOVAL (C3)

JAN. 15-18

The C3 course includes background information on the hazards of lead and other toxic metals, as well as the current legal and regulatory environment. The course



Photo courtesy of visitsanantonio.com

contains specific discussions on protecting workers, compliance with environmental regulations, proper management of waste streams and operations that result in potential exposure to lead and associated control technology. The course also addresses reading specifications and developing programs to effectively control risk to workers, the public, and the environment. It concludes with a discussion of insurance and bonding issues and an introduction to other safety and health issues.

NAVSEA BASIC PAINT INSPECTOR (NBPI)

JAN. 15-19

NBPI is an inspection course developed by Naval Sea Systems Command (NAVSEA) to train coatings inspectors to inspect critical coated areas as defined by U.S. Navy policy documents. These areas include (but are not limited to): cofferdams, decks for aviation and UNREP, chain lockers, underwater hull, bilges, tanks, voids, well deck over-heads and others. This course is especially valuable, as it also provides the technical and practical fundamentals for coating inspection work for any steel structure projects other than ships.

COATING APPLICATION SPECIALIST REFRESHER (CAS REF)

JAN. 16

The CAS Refresher is an overview of surface preparation and application covered in the Body of Knowledge of SSPC-ACS 1/NACE

No. 13 Applicator Certification Standard No. 1, Industrial Coating and Lining Application Specialist Qualification and Certification. It covers topics in surface preparation and coating application and is especially designed for employees that are new to the coatings industry.

FLOOR COATING BASICS (C10)

JAN. 16-17

This course is designed to meet the practical training requirements of SSPC-QP 8 Section 4.4, which requires that each job crew chief and each QC manager complete a minimum two-day overview of concrete components, coating and surfacing types, and surface preparation and substrate repair techniques based on SSPC consensus standard TU 10, "Procedures for Applying Thick Film Coatings and Surfacing Over Concrete Floors." C10 can be taken in place of the first two days of CCI.

PLANNING & SPECIFYING INDUSTRIAL PAINTING PROJECTS (C2)

JAN. 16-20

C2 is designed to provide those who understand coating fundamentals with an overview of the principles of planning, awarding and monitoring the quality of new construction or maintenance painting projects. Students will become familiar with tools to develop effective coating projects and play a more active role in managing painting projects to successful completion.

BRIDGE COATING INSPECTOR PROGRAM (BCI)

JAN. 16-20 (LEVEL 1);

JAN. 16-21 (LEVEL 2)

The BCI program covers the fundamentals of how to inspect surface preparation and application of protective coatings on bridge steel. The course covers situations that affect inspection in the field (e.g. containment, field safety hazards, changing weather conditions), as well as the skills required to inspect new bridge steel painted in the shop, in the field or maintenance systems applied in the field.

CONCRETE COATING INSPECTOR PROGRAM (CCI)

JAN. 16-17 (CCB);

JAN. 16-20 (TECH. LEVEL);

JAN. 16-21 (CERT. LEVEL)

The CCI program provides several different paths to certification, depending on the attendee's current level of experience; these can be found on SSPC's website. Concrete Coating Basics (CCB) provides basic training and is a prerequisite for individuals seeking CCI certification. The objective of the CCI program is to thoroughly train individuals in the inspection of surface preparation and the installation of protective coatings on industrial concrete structures and facilities.

PROTECTIVE COATINGS INSPECTOR PROGRAM (PCI)

JAN. 16-20 (LEVEL 1); JAN. 16-21 (LEVEL 2), JAN. 22 (LEVEL 3 EXAM)

The objective of this program is to thoroughly train individuals in the proper methods of inspecting surface preparation and installation of industrial and marine protective coatings and lining systems on an array of industrial structures and facilities. Candidates should be prepared for an intense and fast-paced week of training with evening homework and study.

PCI Level 1 has no prerequisites, but it is not an entry-level course. C1 is strongly recommended as a prerequisite for the PCI program. Students who pass the Level 1 exam and meet the prerequisites for Level 2 can take the written and hands-on Level 2 certification exams on day six. A passing grade on both exams is required to become a Level 2-certified inspector. PCI Level 3 identifies and awards recognition to individuals who have in-depth knowledge in the inspection of industrial coatings. Those who pass the Level 2 exam and meet the prerequisites for Level 3 can take the Level 3 exam on day seven.

BASICS OF ESTIMATING INDUSTRIAL COATINGS PROJECTS (EST)

JAN. 17

This course covers the fundamentals of estimating industrial painting job costs including surface area calculations, labor and production rates, and equipment and material requirements.

COATING APPLICATION SPECIALIST (CAS)

JAN. 17 (LEVEL 1);

JAN. 17-18 (LEVEL 2)

The CAS Certification Program is designed to certify individual craft workers who have experience and training in all aspects of hands-on surface preparation and coating application of complex industrial and marine structures. This program consists of written exams only; no formal training is offered during this program.

EVALUATING COMMON COATING CONTRACT CLAUSES (CONTRACT)

JAN. 18

This course will provide a basic overview of the clauses most common to coatings contracts. It follows the outline of a standard construction contract while also teaching students to identify the key provisions that may be missing from contracts they receive.

INSPECTING CONTAINMENT

JAN. 18

This course covers how to determine what type of containment is necessary from the specification of work and the supplied drawings at the job site. It will discuss the role the inspector plays when inspecting the removal of toxic coatings within these structures.

LEAD PAINT REMOVAL REFRESHER (C5)

JAN. 18

This one-day course provides refresher training for supervisors and competent persons who are responsible for industrial de-leading operations. It includes a review of basic information about lead and its human health hazards; a review and update

of relevant EPA regulations and progresses through discussions of 29 CFR 1926.62 and changes in the Respiratory Protection Standard (29 CFR 1910.134); and discussions about emissions control as presented in SSPC Guide 6.

SELECTION OF COATINGS

JAN. 18

This course covers the skills required to specify and select a coating for a specific structure or environment. It defines the primary function of a coating, the types of substrates that are painted and the challenges of matching a coating to a service environment to properly protect the structure from corrosion.

DEVELOPING AN EFFECTIVE COATING SPECIFICATION (DEV CTG SPEC)

JAN 18-20

This course is designed to provide facility owners, coating managers and specification designers with practical guidance and tools to be used in creating competent industrial coatings specifications that better ensure contractor conformance with job requirements. It reviews the concerns that can affect project success, presents a checklist for developing coating specifications and focuses on the technical requirements to consider when preparing specifications for coating work, with an emphasis on steel and concrete industrial and marine structures.

PROTECTIVE COATINGS INSPECTOR (PCI) WORKSHOP

JAN. 19

This one-day workshop trains individuals in the proper methods and equipment for inspecting surface preparation and installation of industrial and marine protective coatings and lining systems on an array of industrial structures and facilities. It was designed as a supplement to students who have completed the PCI online program.

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**USING SSPC-PA 2
EFFECTIVELY (PA 2)**

JAN. 19

This half-day workshop explains the key highlights of SSPC-PA 2: Measurement of Dry Coating Thickness with Magnetic Gauges. Students will learn to verify the accuracy of a DFT magnetic gauge; measure the DFT of a coating with Type 1 or Type 2 gauge; and describe and implement the procedure to determine if the film thickness in a given area conforms to the maximum and minimum levels specified.

**APPLICATOR TRAIN-THE-TRAINER
(ATT)**

JAN. 19-20

This course is designed to train owners, supervisors, and other representatives of industrial painting contracting companies

on the delivery of two levels of the SSPC Applicator Training Program for surface preparation and coating application. It provides a standardized curriculum for applicator training to present at the shop or job site. This course is only available to contractors and facility owners.

**BRIDGE MAINTENANCE:
CONDUCTING COATINGS
ASSESSMENTS (BRIDGE)**

JAN. 19-20

This course covers the fundamental inspection skills required to conduct a coating condition assessment of an in-service steel bridge. It provides a wide range of concerns that can affect the condition of the coating and presents a reporting and rating system, enabling the owner to make an educated decision on how to repair the damaged and deteriorated coating. The course also covers

the basics of corrosion and coating types and characteristics related to steel bridges.

**INSPECTION PLANNING AND
DOCUMENTATION (INSPC PLAN)**

JAN. 19-20

This course will teach coating inspectors how to plan inspections effectively before the work begins and document results of tests and inspections conducted. The training will emphasize carefully reviewing plans and specifications in order to develop a comprehensive inspection plan, as well as using forms to accurately and legibly document project-specific inspection and test results, non-conforming work, and rework. This course is designed for practicing coating inspectors already familiar with commonly used coating inspection instruments and standards of practice.

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**PROJECT MANAGEMENT FOR
THE INDUSTRIAL PAINTING
CONTRACTOR (PRO MGMT)**

JAN. 19-20

This course offers an introduction to project management concepts used on industrial painting projects. Attendees will learn about generating new business, reviewing contracts, navigating employee relations, and building safety into the job. The second day of this course involves an exam in which participants resolve real-world project management scenarios.

SPRAY APPLICATION BASICS (C12)

JAN. 19-20

C12 is designed to train and certify marine and industrial applicators to operate airless spray equipment. The course also assesses the skills of applicators who have at least 800 hours applying protective coatings with airless spray.

ABRASIVE BLASTING (C7)

JAN. 21-22

C7 is designed for contractor personnel who wish to obtain certification or others who wish to learn about dry abrasive blast cleaning of steel. It covers principles of surface preparation, surface cleanliness, surface profile, dust and debris control and abrasives. Students who do not want to receive the C7 certification can receive a certificate of attendance by attending the lecture portion of the training and observing the blaster demonstration.

**PROTECTIVE COATINGS
SPECIALIST (PCS)**

JAN. 21

The PCS certification program identifies and awards recognition to individuals who have in-depth knowledge of industrial coatings technology. The PCS is SSPC's highest level of certification and demonstrates mastery in assessment of coatings systems, development of coatings specifications, surface preparation and coatings applications, economics of coatings, contract planning and management, coating failure analysis and inspection.



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QUALITY CONTROL SUPERVISOR (QCS)

JAN. 21-22

The QCS program provides training in quality management for SSPC-certified contractor personnel, Technical Quality Managers (TQM) and inspectors employed by SSPC-QP 5 inspection firms. It gives an overview of the quality management aspects of surface preparation, paint, coatings and inspection operations that a QCS needs to know. It is highly recommended that persons attending the QCS course have recent inspection training or equivalent formal training and some quality control experience.

CCI SUPPLEMENT: DETERMINING THE LEVEL OF MOISTURE IN CONCRETE (CCI SUPP)

JAN. 22

This certification course covers the skills required to conduct moisture testing of concrete substrates prior to coating application. It defines and explains the steps for measuring moisture in accordance with ASTM Standard Test Methods. Candidates must have taken and passed the Certification Level of the SSPC's Concrete Coating Inspector (CCI) Program.

NATURAL AND ACCELERATED WEATHERING OF COATINGS (WEATHER)

JAN. 22

This course covers the different mechanisms of natural weathering, how and why coatings deteriorate, what methods

have been developed that allow deterioration to be duplicated at an accelerated rate, and determining the overall coating performance.

DOD FUNDING FOR SSPC 2016 COURSES

Under the DoD Corrosion Prevention and Control Program, funding for some of the courses offered at SSPC 2016 featuring GreenCOAT has been provided to train DoD, Army, Navy, Air Force, Marine Corps, NASA and Coast Guard personnel. Funding is on a first-come, first-served basis, and only the cost of the course and exam are funded under the contract. Other costs, such as labor, travel and per diem are to be covered by the participant.

For more information, contact Jennifer Merck at 877-281-7772, ext. 2221; or merck@sspc.org.

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TECHNICAL PROGRAM

The following is a list of the workshops and technical presentations that will make up SSPC 2016's technical program. This year's conference will also feature the second-ever Poster Session, which will be composed of research presentations given mostly by students or young professionals.

Questions about the workshops or the technical program can be directed to Sara Badami at badami@sspc.org; or 412-281-2331, ext. 2208.

MONDAY, JAN. 19

AFTERNOON — 1:30 TO 4:30 P.M.

SESSION 1: WORKING IN THE COATINGS INDUSTRY — WHAT YOU NEED TO KNOW!

"SSPC PROGRAMS: LEARN ABOUT WHAT SSPC HAS TO OFFER,"

by Jennifer Merck, Terry Sowers, Aimee Beggs, Jim Kunkle and Michael Kline, SSPC; 1:30 to 2:30 p.m.

Start off the week with the SSPC staff! Various SSPC staff members will present the ins and outs of SSPC's QP programs, individual certification and training, corporate and individual membership programs and technical committees involvement. All of your questions are welcome.

"COATINGS INDUSTRY STANDARDS: ARE YOU CURRENT?"

by William D. Corbett, PCS, KTA-Tator, Inc.; 2:30 to 3:00 p.m.

Whether you prepare coating specifications, perform or inspect surface preparation and coating application, or instruct others, it is important yet challenging to remain current. This presentation will highlight some of the changes to existing standards and new standards recently published by SSPC, ASTM and NACE that directly impact the protective coatings industry, and ways in which you can remain current.



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"DEVELOPING AN EFFECTIVE COATING SPECIFICATION,"

by Breck A. Vernon, P.E., Coating & Lining Technologies Inc.; 3:00 to 3:30 p.m.

This presentation will describe best practices for preparing a quality specification for applying protective coatings and linings to industrial structures, focusing on developing appropriate requirements for applying coatings and linings to obtain maximum system performance, service life, and protection of substrates in the prevailing service environment.

"CORROSION CONTROL TRAINING FOR GROUND COMBAT AND TACTICAL EQUIPMENT,"

by James Ellor, P.E., Elzly Technology Corp.; 3:30 to 4:00 p.m.

The Office of the Secretary of Defense has funded the development of a corrosion control training course designed to promote awareness of corrosion of military ground combat and tactical equipment. This presentation outlines this course, which is aimed at engaging operators/maintainers or equipment owners in understanding, preventing and correcting vehicle corrosion at various maintenance levels.

"SURFACE PREPARATION AND PAINT APPLICATION TRAINING FOR SHIPBOARD ORGANIZATIONAL LEVEL CORROSION CONTROL,"

by Michael Damiano, PCS, SSPC; 4:00 to 4:30 p.m.

The Office of the Secretary of Defense has funded the development of a surface preparation and paint application training course for shipboard organizational level corrosion control personnel. This presentation will outline the course, which was developed to demonstrate to sailors with limited corrosion control background how they can accomplish surface preparation and coating application work that is usually done by specialized personnel.

SESSION 2: WORKSHOP

"COATING FAILURE INVESTIGATIONS IN ACTION,"

by Cynthia O'Malley, PCS, and Chrissy Stewart, PCS, KTA-Tator, Inc.; 1:30 to 4:30 p.m.

This workshop consists of a set of interactive scenarios following a consultant and laboratory analyst on their journey and deciding what the investigators should do at crucial points in the investigative process.

The case studies, delivered using an interactive platform, mimic real-world information that comes in a variety of sources.

SESSION 3: ENVIRONMENTAL, HEALTH AND SAFETY REGULATIONS

"REGULATORY UPDATE: CONFINED SPACE IN CONSTRUCTION AND MORE,"

by Alison B. Kaelin, CQA, ABKaelin, LLC;
 1:30 to 2:30 p.m.

This annual presentation summarizes environmental, health and safety issues that may impact SSPC members and the coatings industry. It will discuss current and expected EPA and OSHA regulatory rulemaking, emphasis programs, enforcement initiatives or similar topics, as well as OSHA's final rule on confined space in construction issued in May 2015 and expected regulations on silica.

"THE PRINCIPLES OF WORKING AT HEIGHTS,"

by Mino Muhanad Alkhawam, Tractel; 2:30 to 3:00 p.m.

This presentation will discuss the principles of working at height and how fall protection dynamics work. It will cover the basics that should be considered and the challenges of any fall protection program, its administrators, finding a proper anchor point and how to connect to it, and figuring out the best choice of fall protection equipment.

"GREEN COATINGS FROM A GLOBAL PERSPECTIVE,"

by Don Futch, Jotun Paints, Inc.;
 3:00 to 3:30 p.m.

The purpose of this presentation is to examine the various governmental standards currently regulating VOC calculations of coatings and to analyze these disparities. Geographical differences, along with organizational and governmental bodies, all influence different shades of greenness. By looking at the commonly used methods and organizational standards, the goal is to educate the listener and hopefully find common ground while pointing out flaws and errors in existing methodology.

"29 CFR 1926.1200 — THE NEW OSHA CONFINED SPACES IN CONSTRUCTION STANDARD: WHAT'S DIFFERENT,"

by Charles Brown, PCS, Greenman-Pedersen, Inc.

This presentation will discuss the changes that have been made to the general industry confined space standard compared to the new construction confined space standard and how these changes will affect contractors.

SESSION 4: WORKSHOP

"OVERVIEW OF HEALTH, SAFETY, AND STEWARDSHIP PROGRAMS FOR POLYURETHANE COATINGS,"

by Scott Ecoff, Lisa Marie Nespoli and Ahren Olson, Covestro LLC; 1:30 to 4:30 p.m.

This presentation offers a new approach to incorporating concepts of product safety and stewardship along with sustainable thinking into the business development process when evaluating new products and applications globally. Recent developments in health and safety regulations (including OSHA's Isocyanate National Emphasis Program) will be discussed along with recommended controls when applying coatings containing isocyanate.

TUESDAY, JAN. 19

MORNING — 8:30 TO 10:30 A.M.

SESSION 1: ADHESION

"IMPROVING PERFORMANCE — INCREASING ADHESION OF SOLVENT-BORNE AND WATERBORNE EPOXY PRIMERS,"

by Ronald Brashear, BYK Additives Inc.; 8:30 to 9:00 a.m.

Epoxy-based coating systems are predominately used in applications like marine and protective coatings due to their high anti-corrosive and mechanical performance. New additive technologies for use in conventional and waterborne epoxy primers and the performance characteristics on various metallic substrates of typical epoxy primer formulations will be outlined in this presentation.

"IT'S ALL ABOUT ADHESION,"

by Guerman Vainblat, P.E., and Timur Kolchinskiy, E.I.T., Greenman-Pedersen, Inc.;
 9:00 to 10:00 a.m.

Adhesion is one of the most important properties defining the quality of a coating and its performance, and many different factors can affect it. During work on the Brooklyn Bridge Contract 6, such deficiencies had to be addressed, requiring careful evaluation, investigation, assessment, testing, analysis and proper correction. Adhesion tests were a big part of these processes, as this presentation will highlight.

SESSION 2: COMMERCIAL PAINTING PROGRAMS — CHALLENGES, SOLUTIONS AND OPPORTUNITIES, PART 1

"CASE STUDY: DECORATIVE YET FUNCTIONAL FLOOR COATING AT THE ENERGY INNOVATION CENTER,"

by Steven Reinstadtler, Covestro LLC;
 8:30 to 9:00 a.m.

This case study of a 70-year-old concrete floor restoration at a LEED-certified building will outline the challenges of working with an aged substrate and the requirements and specifications related to concrete remediation and LEED aspirations. It will cover the project details such as surface prep and repairs, conditioning the space, the waterborne polyurethane coating technology and application, and the final result.

"BEATING THE ODDS FOR SUCCESSFUL FLOORING INSTALLATIONS,"

by Fred Goodwin, BASF Construction Chemicals; 9:00 to 9:30 a.m.

Failure of flooring materials is usually a combination of factors that lead to below-expectation performance rather than a single, simple cause. This presentation will describe these factors and how to determine when the odds are not in your favor.

"USING LEAD ABATEMENT CONTRACTORS FOR SURFACE PREPARATION ON COMMERCIAL PROPERTIES — THE CONSEQUENCES OF SACRIFICING QUALITY FOR SAFETY,"

by Raymond S. Tombaugh, KTA-Tator, Inc.; 9:30 to 10:00 a.m.

This presentation will discuss the regulations that govern lead paint removal, provide insight into the reasons that painting contractors use lead abatement contractors for surface preparation work, and highlight the potential consequences of these partnerships. It will also discuss various surface

"PULL-OFF ADHESION STRENGTH TESTING OF LINING SYSTEMS ON CONCRETE: A REVIEW OF THE VARIOUS DIRECT TENSILE TEST METHODS USED FOR SEVERE SERVICE EXPOSURES,"

by Vaughn O'Dea, PCS, and Cory Brown, Themec Company, Inc.; 9:00 to 9:30 a.m.

The use of concrete resurfacers and repair mortars under high-performance protective linings is a best practice to achieve a monolithic system for severe service exposures. There have been numerous investigations leading to the development of different devices and test methods used to assess

and moisture vapor emission rate requirements founded on laboratory testing rather than field experience. This presentation will discuss the repeatability problems and margin of error intrinsic to the most widely specified moisture-related test standards, and describe case histories that demonstrate the inaccuracy and unsubstantiated reliance on these commonly used test methods.

**SESSION 4: COATING TYPES
 "20-YEAR COLOR LIFETIMES OF PROTECTIVE COATINGS — THEORY AND REALITY,"**

by Charles Weidner, Arkema Inc.; 8:30 to 9:00 a.m.

Attendees of this presentation will learn how PVDF (polyvinylidene fluoride)-based coatings have changed in order to meet market needs. It will include a discussion of different highly weatherable pigments that can be used to create coatings in various color spaces; solvent and water-based PVDF-based coatings; and field-applied 1k and 2k PVDF-based coatings

"SECRETS TO SUCCESS — EXAMINING THE HISTORY AND CHEMISTRY BEHIND THE PERFORMANCE OF VINYL RESIN COATINGS,"

by David Tordonato, Ph.D., PCS, U.S. Bureau of Reclamation; 9:00 to 9:30 a.m.

This presentation provides an overview of vinyl resin coating formulation, bonding theory and several case studies of use on hydraulic equipment. Corrosion performance and material properties will be examined using modern laboratory techniques to provide a benchmark for the development or evaluation of next generation polymer coatings which may someday provide a green alternative to the legacy vinyl systems.

"SELECTING THE PROPER COATING OVER HOT-DIP GALVANIZED STEEL USING SSPC-GUIDE 19,"

by Kevin Irving, AZZ Galvanizing Services; 9:30 to 10:00 a.m.

This presentation will explain why the zinc on a hot-dip galvanized coating is in a constant state of change until it ages; why



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preparation methods that can be employed, as well as practices and controls that can be implemented.

SESSION 3: WASTEWATER COATING CHALLENGES AND SOLUTIONS

"STANDARDS, TRAINING, AND CERTIFICATION IN THE WASTEWATER INDUSTRY," by Robert Murphy, PCS, The Sherwin-Williams Company; 8:30 to 9:00 a.m.

This presentation will provide information on current training and certification programs related to standards and practical aspects of selecting, specifying and using coatings safely, effectively and economically to protect structures in harsh wastewater environments.

"APPLYING COMMON SENSE TO MOISTURE VAPOR EMISSIONS AND MOISTURE CONTENT REQUIREMENTS WHEN COATING CONCRETE SUBSTRATES IN WASTEWATER APPLICATIONS,"

by Randy Nixon, Corrosion Probe, Inc.; 9:30 to 10:00 a.m.

When establishing the minimum conditions suitable for coating concrete in wastewater applications, coating manufacturers, specifying engineers and contractors generally rely on unrealistic moisture content

proper preparation of hot-dip galvanizing before painting depends on its age; the different ways to prepare the steel; and how to use SSPC-Guide 19 for determining the proper paint to be used over hot-dip galvanized steel.

**MID MORNING —
 10:30 A.M. TO 12:30 P.M.**

SESSION 1: WORKSHOP

"SSPC 2016 COATING INSPECTORS' FORUM,"

by Earl Bowry, PCS; and J. Peter Ault, P.E., PCS, Elzly Technology Corp.; 10:30 a.m. to 12:30 p.m.

This year, the Coating Inspectors' Forum will engage the audience in a conversation about issues impacting inspectors. The interactive format will pose a series of situations for discussion and allow the audience to debate the appropriate response of an inspector. The situations will encompass ethical issues, inspector etiquette, obligations and responsibilities of inspectors, and emerging technology issues.

SESSION 2: COMMERCIAL PAINTING PROGRAMS — CHALLENGES, SOLUTIONS AND OPPORTUNITIES, PART 2

"CASE STUDY: SETTING UP A COMMERCIAL COATINGS INSPECTION PROGRAM,"

by Davis Kyle, Master Painters Institute; and Richard Bright, Bright Concepts, Inc.; 10:30 to 11:30 a.m.

Commercial coatings inspections will soon be mandated in several national specification standards. This case study will review the necessary steps taken to develop a successful commercial coatings inspection program. An overview of the educational requirements, the methodology of commercial inspections and insight into identifying potential partners and customers will be provided.



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"COMMERCIAL BUILDING CLEANING, PAINTING AND QC REQUIREMENTS — DIFFERENCES BETWEEN 'HIGH PERFORMANCE' AND 'CONVENTIONAL' COMMERCIAL COATINGS,"

by Jeff Theo, PCS, and Doug Pigue, Vulcan Painters; 11:30 a.m. to 12:00 noon

This session will present case histories on various commercial projects that incorporated industrial surface preparation, application, and quality control standards and procedures into the work plans to achieve successful results. Highlights of SSPC audits for QP-8 and QP-9 recertification on two of the projects will be discussed.

SESSION 3: OIL & GAS, PART 1

"STANDARDS, TRAINING AND CERTIFICATION IN THE OIL & GAS INDUSTRY,"

by Ernst Toussaint, E.I.T., PCS, TransCanada; 10:30 to 11:00 a.m.

This presentation will provide information on current fundamental training and certification programs that cover industry standards and practical aspects of selecting, specifying and using coatings safely, effectively and economically to protect structures in harsh oil and gas environments.

"PIPING'S KRYPTONITE: UNDERSTANDING REPAIR OPTIONS FOR PIPING WITH SECTION LOSS,"

by David Hunter, PCS, Neptune Research Inc.; 11:00 to 11:30 a.m.

The sheer volume of piping systems, both insulated and non-insulated, is daunting. By the time surfaces and systems are inspected, they often exhibit wall loss or pitting corrosion on surfaces. This presentation will discuss the ASME B31.2 piping requirement for tmin considerations, and the ASME PCC-2 Standard for repairs, which includes a composite coating system as an allowable method for strengthening piping.

"TRENDS IN TANK LINING TEST METHODOLOGY FOR OIL AND GAS SERVICE,"

by Michael Harrison, Hempel A/S; 11:30 a.m. to 12:00 noon

This presentation is intended to review the new test methodology that has been developed/modified to demonstrate the performance of the new generation of versatile linings designed to meet the increasing demands of the oil and gas market.

"TUNGSTEN POWDER THERMAL SPRAYING IN THE OIL & GAS INDUSTRY,"

by Lee Schmerling, OneSubsea; 12:00 to 12:30 p.m.

This presentation will explore the variables that affect tungsten carbide powder spraying on oil and gas components such as the gates of valves and on pistons that drive the shear rams on the large blow-out preventers. Among the issues that will be addressed are the grades of tungsten carbide powders that are used and the qualification procedure to ensure the proper application of the process.

"USE OF INDUCTION HEATING FOR THE PRE-HEATING AND POST-CURING OF LIQUID EPOXY COATINGS ON GAS PIPELINES,"

by Bruce Wiskel, Pacific Gas & Electric; and J. Peter Ault, P.E., PCS, Elzly Technology Corp.; 12:30 to 1:00 p.m.

During the winter of 2013-2014, Northern California experienced unusually cold temperatures. Low temperatures delayed Pacific Gas & Electric's (PG&E) painting operations on new and old pipelines. This presentation will show how heat induction proved to be the most efficient and controlled way to heat substrates prior to application and to cure the coating after application.

SESSION 4: CONCRETE PROTECTION SOLUTIONS

"UPDATE TO SSPC-PA 9 PAINT APPLICATION SPECIFICATION,"

by David Beamish, DeFelsko Corporation; 10:30 to 11:00 a.m.

This presentation will discuss the revision of SSPC-PA 9, "Measurement of Dry Coating Thickness Using Ultrasonic Gages," which describes procedures to measure the thickness of dry, homogeneous coatings applied to concrete, wood, wallboard, plastic, fiber and composite material using commercially available ultrasonic coating thickness gages.

"MOISTURE TESTING AND INSPECTING FOR CONCRETE FLOORS TO RECEIVE COATINGS,"

by Brian O'Farrell, PCS, MCI, DP Coatings Ltd.; 11:00 to 11:30 a.m.

This presentation will be a quick refresher on basic moisture tests (ASTM) and their application, with a main focus on site surveys, building conditions, maintenance practices and facility production procedures that can affect the moisture in concrete floors.

"LEAK MITIGATION OF DYNAMIC CRACKS IN CONCRETE,"

by Charlie Lerman, Avanti International; 11:30 to 12:00 noon

Flexible polyurethane grouts can be used to mitigate water intrusion in concrete. This will extend the life of the structure, and

is a crucial step in surface preparation for most coatings. This paper will discuss applications and repair methods for dynamic nonstructural cracks in concrete, as well as types of chemical grouts for these applications, safety, and the equipment required.

"APPLICATION CONCERNS AND PRACTICES FOR APPLYING CONDUCTIVE AND STATIC DISSIPATIVE COATING TO CONCRETE," by Steve Schroeder, Dex-O-Tex (division of Crossfield Products Corp.); 12:00 to 12:30 p.m.

This presentation examines the basic concerns and practices when applying conductive and static dissipative flooring or



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coatings to concrete. With this basic knowledge, a contractor will be cognizant of the common concerns and requirements when installing one of these specialty flooring or coatings systems.

AFTERNOON — 1:30 TO 4:30 P.M.
SESSION 1: BRIDGE PAINTING
AND PROTECTION

"SHOP PAINTING VS. FIELD PAINTING OF STEEL BRIDGES: PROS AND CONS,"

by Charles Brown, PCS, Greenman-Pedersen, Inc.; 1:30 to 2:30 p.m.

This presentation will look at the recent trend of applying all three coats of paint in the shop versus painting just the primer in the shop and applying the other two coats in the field. It will review the pros and cons of shop versus field painting and touch on costs, underlying issues, quality control and repairs. It will also go over a recent job done in the shop and the problems that arose.

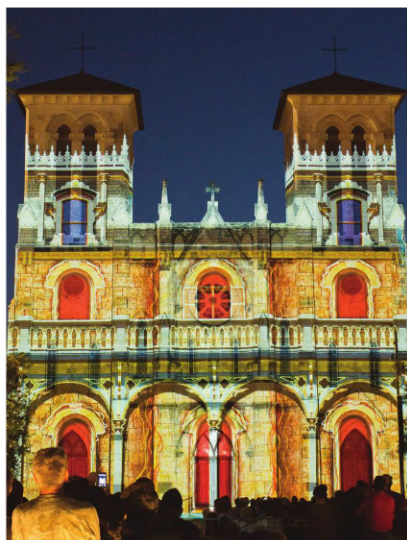


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"THE USE OF A DUPLEX PROTECTIVE COATING SYSTEM FOR A KYTC RAPID RECONSTRUCTION BRIDGE PROJECT,"

by Bobby Meade, Greenman-Pedersen, Inc.; and Sudhir Palle, Kentucky Transportation Cabinet; 2:30 to 3:00 p.m.

The Kentucky Transportation Cabinet constructed two new bridges in 2014 using hot dipped galvanizing (HDG) as corrosion protection of steel reinforcement bars in one bridge deck and as part of a duplex protective coating system for the steel superstructure of both bridges. The project team learned a number of important lessons, which will be discussed in this presentation.



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"TWO-COAT POLYASPARTIC URETHANE COATINGS PROTECT VIRGINIA STEEL BRIDGE STRUCTURES FOR OVER A DECADE," by Ahren Olson, Covestro LLC; Mark Hudson, The Sherwin-Williams Company; 3:00 to 3:30 p.m.

Two-coat polyaspartic urethane coatings have been used to protect steel bridges from corrosion for well over a decade now. Over the past decade, more than 100 steel bridges in the state of Virginia have been repainted with this technology. This paper will discuss several topics including the advantages and disadvantages of using two-coat polyaspartic coatings for the field repainting of steel bridges.

"NEW DEVELOPMENTS IN FLUOROURETHANE COATINGS FOR BRIDGES," by Robert Parker, AGC Chemicals Americas, Inc.; 3:30 to 4:00 p.m.

Fluorourethane coatings based on FEVE (fluoroethylene vinyl ether) chemistry, have been used globally for over 30 years. Recently, the bridge market has taken notice of this high performance, especially in harsh marine environments. This paper will present the latest performance data on fluorourethane-based coating systems, comparing fluorourethane systems and both traditional polyurethane systems as well as polysiloxane systems.

"ASSESSMENT OF CBPC COATING IN WET EXPOSURE BY ELECTRO-CHEMICAL TESTING," by Md Ahsan Sabbir, Florida International University; 4:00 to 4:30 p.m.

Assessment of the performance and condition of coatings in aggressive environments provides bridge owners with information to determine appropriate maintenance for their structures. This presentation focuses on the performance evaluation of chemically bonded phosphate ceramic (CBPC) coatings in neutral pH solutions (with and without chloride) which provided an aggressive bridge environment analogous to coatings exposed to wet environments (e.g. pooled runoff water).

SESSION 2: COMMERCIAL PAINTING PROGRAMS — CHALLENGES, SOLUTIONS AND OPPORTUNITIES, PART 3

"CASE STUDY: COATING FAILURE OR BUILDING FAILURE,"

by Ken Trimber, PCS, KTA-Tator, Inc.; 1:30 to 2:30 p.m.

This presentation will outline the diagnostic work undertaken to determine the cause of failing coating and spalling block on the exterior of a commercial building. It will describe the field assessment methods used to diagnose the problems including non-destructive and destructive methods for determining moisture content in the masonry, infrared thermography, and visual assessments. It will also discuss modeling using WUFI as an aid in establishing the cause of the failures.

"ARE YOU READY TO PURSUE TODAY'S GREATEST MARKET OPPORTUNITY IN THE COATINGS INDUSTRY? MILLIONS OF SQUARE FEET OF COMMERCIAL WALLS NEED AIR BARRIERS. WHAT DO YOU NEED TO KNOW TO BE A PART OF THIS EMERGING MARKET?"

by Kevin Knight, Edifice Tutorial; and David de Sola, 3iVE; 2:30 to 4:00 p.m.

This presentation will address both existing and new air barrier technology. It will address the background and history of the air barrier industry over the last 40 years and the development of materials and assemblies as well as whole building air tightness requirements and will explain where coatings have found a unique niche within the market.

"TRAFFIC BEARING COATING SYSTEMS IN THE PARKING STRUCTURE MARKET,"

by Mosby W. Lawrence IV, NEOGARD Construction Coatings; 4:00 to 4:30 p.m.

The presenter will focus on aiding an engineer, contractor or decision maker in selecting the most appropriate type of traffic bearing coating system for a given application for parking structures.



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SESSION 3: DEFENDING AGAINST CORROSION IN THE MILITARY
"TRANSLATIONAL CORROSION SCIENCE IN ACTION,"

by Daniel Dunmire, Department of Defense/ LMI; 1:30 to 2:30 p.m.

This presentation will briefly review the translational corrosion science objectives, the process to achieve these objectives, and the temporal and economic benefits to the material sustainment industry. It will also describe the microbiologically influenced corrosion (MIC) research and development process and report results to date, as well as the interaction between the translational corrosion science development process and the MIC proof of concept project.

"DEPARTMENT OF NAVY CORROSION CONTROL AND PREVENTION EXECUTIVE (DON CCPE) OVERVIEW,"

by Matthew Koch, DON CCPE, ASN RD&A — DASN RDT&E; 2:30 to 3:00 p.m.

This presentation will provide an overview of the Navy's Corrosion Control and Prevention Executive (CCPE) office, ongoing efforts in corrosion policy, RDT&E, and program evaluations.

"THE GREATEST CHALLENGE IN CORROSION PREVENTION AND CONTROL IS APATHY,"

by Dr. Roger D. Hamerlinck, U.S. Army Office of the Army CCPE; 3:00 to 3:30 p.m.

The presenter will explain why apathy or the lack of interest or concern for corrosion prevention and control is the greatest enemy we face today in the war against corrosion inside the U.S. Army. He will discuss how apathy is both a conscious and an unconscious act, the role that culture and leadership emphasis play in motivating soldiers to want to make a difference and a change in how the Army views corrosion.

"IMPACT AND ABRASIVE RESISTANT COATINGS AND OVERLAYS FOR IMMERSION STRUCTURES IN SEVERE ENVIRONMENTS,"

by Jeffrey Ryan, U.S. Army Corps of Engineers; 3:30 to 4:00 pm.

This presentation outlines demonstrations and lab testing of two ceramic

composite coatings and an adhesively applied ultra-high molecular weight polyethylene (UHMWPE) sheet applied only at the water line of steel dam gates, which provide superior protection and increased life expectancy, thereby eliminating the need for regular repair of an extremely high-VOC coating.



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"INSTITUTIONALIZING CORROSION PREVENTION AND CONTROL IN THE USAF,"

by Jeffrey Nusser, U.S. Air Force;
 4:00 to 4:30 p.m.

This presentation will explain the Air Force CCPE office's strategic goals of 20-percent reduction in aerospace system corrosion costs by 2025; 20-percent reduction in corrosion maintenance costs, 20-percent reduction in non-available hours (NAH) due to corrosion repairs, and a 20-percent reduction in corrosion-related safety mishaps.

SESSION 4: CULTURAL ISSUES IN THE WORKPLACE

"CREATING A CULTURE OF LEADERSHIP; STRATEGIC PLANNING WORKSHOP BY WOMEN IN COATINGS,"

by Cynthia O'Malley, PCS, KTA-Tator, Inc.;
 1:30 to 3:30 p.m.

A cultural shift from the customs and traditions that supported a male-dominated network of industry professionals is occurring, which promotes an inclusive network where gender is not a limiting factor. This combination of transformational leadership and culture management is getting diverse and dispersed members of an organization to work together in a coherent and purposeful manner. This strategic planning workshop of industry professionals will define how we will make this vision a reality by capitalizing on the momentum of this cultural shift.

"RECRUITING YOUNG ADULTS INTO THE COATINGS BUSINESS,"

by Chris Hooter, PCS, Prairie Finishing Trades Institute (PFTI); 3:30 to 4:30 p.m.

How do we revitalize career interest in the know-how economy? How do we woo young adults into the skilled trades, and specifically industrial painting? Career expos, job postings, advertising the skills gap, construction forecast, infrastructure needs, demographic studies — all have a tactical place in our grander recruitment strategy for young adults. But our real horse in the race is training. This presentation will discuss these issues.

WEDNESDAY, JAN. 20

MORNING — 8:30 TO 9:30 A.M.

SESSION 1: MINI SESSION

"CO₂ AND THE PARTIAL PRESSURE BANDIT,"

by James McDonald, Hempel;
 8:30 to 9:30 a.m.

This presenter believes that there is a connection between the pressurized atlas cell testing pressure and the percentage of CO₂ (also described as partial pressure) and the failure of coatings by blistering. Often understood as "cold wall effect" blistering, it is the aim of this presentation to describe additional failure considerations when testing with CO₂.

SESSION 2: MINI SESSION

"THE MANUFACTURER'S STANDARD COATING SYSTEM — WHAT IT CAN MEAN TO THE STAKE-HOLDERS IN THE EQUIPMENT PURCHASING PROCESSES,"

by Kristin Leonard, Bechtel Corporation;
 8:30 to 9:30 a.m.

Often times, protective coatings for equipment and packages come as an afterthought, and a coatings specialist is not always included in early purchasing discussions. This presentation will discuss key questions to ask as well as various methods of getting coating details into early procurement documents to improve the efficiency and outcome of a project.

SESSION 3: MINI SESSION

"DESIGN, TEST AND MANUFACTURE OF RADAR ABSORBING MATERIALS FOR AUSTRALIAN DEFENSE PLATFORMS,"

by Dr. Andrew Amiet, Defense Science and Technology Organisation (Australia);
 8:30 to 9:00 a.m.

This presentation will outline the development of multi-layered Radar Absorbing Material (RAM) coatings for Australian Navy platforms and the key performance characteristic of the coatings.

"CHEMICAL AGENT RESISTANT COATING (CARC) SYSTEM FOR MILITARY VEHICLES,"

by Alex Piazza, Elzly Technology Corp.;
 9:00 to 9:30 a.m.

The U.S. Army and Marine Corps paint their vehicles with a chemical agent resistant coating (CARC) system, consisting of an epoxy primer and polyurethane topcoat similar to many other industrial paint systems, but with added functional requirements. In addition to reviewing the CARC coating system, this presentation will discuss some of the common issues that are experienced by depots, corrosion repair facilities and active units.

SESSION 4: MINI SESSION

"FORMULATORS IN THE FIELD: THE EFFECT OF OVERCURE OR UNDERCURE OF POLYCLAMINE CURED EPOXY LININGS,"

by Michael O'Donoghue, Ph.D., and Vijay Datta, M.S., International Paint LLC;
 8:30 to 9:30 a.m.

Advanced technology, high-performance tank linings are often applied by plural-component spray equipment, and occasionally one of the components could be off-ratio. This presentation will investigate the effects of undercure or overcure on the performance of the high-temperature tank linings by deliberately mis-mixing the two components.

SESSION 5: INTERNATIONAL SPOTLIGHT SESSION

"AN OVERVIEW AND COMPARISON OF SURFACE CLEANLINESS STANDARDS FOR THE PROTECTIVE COATINGS INDUSTRY,"

by Nico Frankhuizen, TQC B.V.;
 8:30 to 10:00 a.m.

As SSPC continues to grow, coatings professionals from around the world are discovering the value, knowledge and resources available from SSPC and its members. The rise and globalization of new test methods has caused an infusion of hybrid specifications in the industry, and applicators must adopt guidelines

from a global perspective. This presentation correlates the U.S. to International (ISO) standards, explaining where there is an overlap and where there is the need for clearer specifications. It will also address the methods and tests from an ISO perspective and compare them to the SSPC specifications.

MID-MORNING — 10:00 TO 12:00 NOON

SESSION 1: POWER

"COATING MODERN WIND TURBINES — HOW HARD CAN IT BE?" by Benedicte R. Sorensen, Jotun AS; 10:00 to 10:30 a.m.

Today, wind turbines are often placed offshore or in rugged terrain, making repairs extremely difficult and costly. There is a need for tremendous corrosion and erosion protection to achieve the required life expectancy. What makes a good

erosion-resistant coating, and how is this performance best tested? This will be discussed in this presentation.

"THE NUCLEAR RENAISSANCE, PAINTING VOGTLE 3 & 4,"

by Richard L. Smith, II, PCS, Williams Specialty Services, LLC; 10:30 to 11:00 a.m.

Located in Waynesboro, Ga., Vogtle Units 3 & 4 are the first two nuclear power plants to be built in the U.S. in 34 years. This presentation will outline the coating of these plants, discussing Level I, II, and III nuclear coatings and safety-related topics in nuclear coatings.

"UNIQUE APPLICATION OF EPOXY GEL TO ELIMINATE PENSTOCK CAVITATION AND POTENTIALLY IMPROVE TURBINE POWER GENERATION EFFICIENCY,"

by Norm Klapper, Process Equipment Corp.; 11:00 to 11:30 a.m.

A unique project was completed in mid-2014, the Unit 3 turbine refurbishment at the Grand Coulee Dam in Washington. The purpose of applying a thick epoxy gel coating to the 6,400 sq. ft. exit chamber of the penstock was to repair the surface primarily to correct cavitation. This presentation will outline this process and the results.

"BENEFITS EXHIBITED BY STYRENE FREE COATING TECHNOLOGY," by Mike Durbin and Razi Anwer, The Sherwin-Williams Company; 11:30 a.m. to 12:00 noon

Styrenated coatings often use wax in the topcoat to acquire a tack-free surface, but this presents a problem when trying to recoat. Styrene-free technology can resolve these concerns while maintaining similar performance. This presentation will outline a novel styrene-free coating technology that resolves the issues obtained



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SESSION 2: PANEL DISCUSSION — AGREE TO DISAGREE

"EXPLORING DIFFERING VIEWS ON CAUSES OF COATING FAILURES,"

moderated by Dwight Weldon, PCS, Weldon Laboratories, Inc.; with panelists Michael O'Brien, MARK 10 Resource Group, Inc.; Charles Harvilicz, PCS, Newport News Shipbuilding; and Dudley Primeaux, PCS, VersaFlex, Inc.; 10:00 a.m. to 12:00 noon

A panel of coating specialists with experience in analyzing the causes of premature coating failures will review the same photos and laboratory data about a specific case, and then, in turn, will explain their views on what happened and why. The catch? Each will represent a different party in the

dispute — owner, general contractor, painting contractor and paint manufacturer. The discussion will cover the differences in interpretation of the same facts.

SESSION 3: SURFACE PREPARATION — THE FOUNDATION OF EVERY COATING PROJECT

"MEASURING SODIUM CHLORIDE AND SOLUBLE CONTAMINANTS,"

by Nico Frankhuizen, TQC B.V.; 10:00 to 10:30 a.m.

This presentation will describe the commercially available analysis techniques for soluble, but often nonvisible, surface contaminants. Interpretation of data obtained from each technique and the difficulties encountered when making comparisons of data generated using different techniques will also be discussed.

"MYTH OR FACT? HIGHER SURFACE PROFILE INCREASES COATING

ADHESION," by Brad Gooden, Blast-One International; 10:30 to 11:00 a.m.

The presenter will discuss the relationship between surface profile and coating adhesion; identify the rules of thumb for coating DFT vs. profile height; explain the translation from mils to microns and its knock on effects globally; and discuss the most common way that the actual profile height can be misread or measured incorrectly.

"EFFECT OF SURFACE PREPARATION ON COATING PERFORMANCE,"

by Patrick Cassidy, Elzly Technology Corp.; 11:00 to 11:30 a.m.

The effect of profile height, profile type (type of tool used), extent of cleanliness and amount of chloride contamination on



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coating performance were all studied for this presentation. Statistical analysis software was used to determine the correlation between these factors in an attempt to identify the primary factor in coating failure due to improper surface preparation.

"IMPROVING SURFACE PREPARATION PRODUCTIVITY USING RECTANGULAR BLASTING NOZZLES,"

by Chang-Hun Lee, Hyundai Heavy Industries Co. Ltd.; 11:30 a.m. to 12:00 noon

This presentation focuses on rectangular nozzles, which increase surface preparation productivity by avoiding the concentration of abrasive material. Rectangular nozzles can spread the abrasive materials evenly due to the shape of the nozzle. Two kinds of nozzles will be compared in productivity and quality.

SESSION 4: WORKSHOP

"WATERBORNE COATINGS FOR COMMERCIAL ARCHITECTURE,"

by Dr. Leo Procopio and Laura Vielhauer, The Dow Chemical Company; 10:00 a.m. to 12:00 noon

This workshop will provide an overview of the major types of waterborne coating technologies available and describe where they can be utilized within the commercial architectural environment. The fundamental differences between waterborne coatings and solvent-borne coatings will be discussed, as an understanding of these differences is key to assuring the proper selection, successful application and ultimately the expected performance of waterborne systems.

AFTERNOON — 3:00 TO 5:00 P.M.
SESSION 1: PROTECTING SHIPS AND MARINE STRUCTURES, PART I
"STANDARDS, TRAINING, AND CERTIFICATION IN THE MARINE INDUSTRY,"

by Earl Bowry, PCS; 3:00 to 3:30 p.m.

This presentation will provide information on current training and certification programs related to industry standards and practical aspects of selecting, specifying

and using coatings safely, effectively and economically to protect structures in harsh marine environments.

"DEVELOPMENT OF MATERIALS AND PROCESS METRICS FOR HIGH-PERFORMANCE ABRASIVE BLAST SURFACE PREPARATION,"

by Robert Kogler, PCS, and Laura Erickson, Rampart, LLC; 3:30 to 4:00 p.m.

The Naval Research Laboratory is examining how to specify surface preparation details to achieve desired quality and consistency of performance demanded by current fleet coatings applications. This presentation will relate blasting parameters to the resultant surface preparation, characterized beyond current crude visual and one-dimensional profile standards to include parameters such as surface peak height density and profile height.

"SURFACE PREPARATION & COATINGS PANEL 2016 UPDATE,"

by Arcino Quiero, Jr., Newport News Shipbuilding; 4:00 to 4:30 p.m.

This presentation is an overview of the NSRP Surface Preparation and Coating (SP&C) Panel's mission to reduce the cost of construction, maintenance and repairs of U.S. Navy ships. This review summarizes the Panel's efforts and looks at some of its implementable works.

"USING THE LATEST DIGITAL INSPECTION TOOLS — NSRP PANEL PROJECT FINAL REPORT," by Joseph Walker, Elcometer; 4:30 to 5:00 p.m.

Navy Standard Item (NSI) 009-32 has a specific method and procedure for collecting and documenting dry-film thickness (DFT) readings. The purpose was to collect, document, record and analyze DFT data collected at three NSRP member shipyards using three methods of data collection, data recording, and data analysis. This presentation will compare and contrast these methods.

SESSION 2: WOMEN'S PROGRAM

"WOMEN'S PROGRAM: COCKTAILS AND CONVERSATION," 3:00 to 5:00 p.m.

This program will focus on women in the coatings industry. This is a great opportunity to hear practical advice and receive guidance from women in the industry. You will get the unique opportunity to ask questions and learn more about women in the workplace. SSPC welcomes your participation in this event.

SESSION 3: INSPECTION — ASSURING PERFORMANCE AND QUALITY

"CORROSION: DOMESTICATED AND IN THE WILD,"

by Carl Reed, CCC & L; 3:00 to 3:30 p.m.

This presentation examines the four predominant sources of corrosion that occur "in the wild" and compares them to observational results found in exposure to accelerated corrosion conditions. The presenters will also provide some suggested solutions using coatings for the improvement of corrosion resistance resulting from these sources of corrosion.

"SMALL EXPENSE, BIG REWARD — THE IMPACT AND VALUE OF QUALITY ASSURANCE TESTING OF COATINGS FOR STEEL STRUCTURES,"

by Brooke Divan, M.Sc., and Rebekah Wilson, Ph.D., USACE Paint Technology Center; 3:30 to 4:00 p.m.

This presentation will provide background information, QA testing procedures, reasons and importance of the testing and the impact it has on the field; examine testing procedures and the specs that they come from; and make the field more aware of the testing and how it can save money on coating failures.

"INSPECTING HOT-DIP GALVANIZED STEEL,"

by Bernardo Duran, AZZ Galvanizing Services; 4:00 to 5:00 p.m.

This presentation begins by examining how the surface preparation and galvanizing processes differ from other corrosion protection systems. The most commonly

used standards in the galvanizing industry will be discussed, and the audience will learn inspection criteria for galvanized coatings and will become familiar with inspection tools, techniques and methods used for inspecting galvanized steel.

SESSION 4: WORKSHOP

"AN IN-DEPTH LOOK AT STANDARDS FREQUENTLY ENCOUNTERED BY INDUSTRIAL PAINTERS,"

by L. Skip Vernon, PCS, MCI, Coating & Lining Technologies, Inc.; and Michael Damiano, PCS, SSPC; 3:00 to 5:00 p.m.

This workshop will explore several new and recently revised versions of SSPC standards used by industrial painters, including revisions to SSPC-PA 2 and SSPC-AB 2 and other new SSPC standards, focusing on the more obscure requirements and ambiguities of each. The workshop will address what constitutes an industry standard, the contractual implications of specifying using only a standard and the impact of secondary and tertiary references in standards.

THURSDAY, JAN. 21

MORNING — 8:30 TO 9:30 A.M.

SESSION 1: MINI SESSION

"NOVEL ACRYLIC EPOXY HYBRID COATINGS,"

by Zhenwen Fu, Ph.D., The Dow Chemical Company; 8:30 to 9:30 a.m.

This presentation compares two waterborne coating systems with a new waterborne acrylic epoxy hybrid dispersion technology designed to cure faster, be more stable to UV light exposure, resist loss of gloss and decreased yellowness.

SESSION 2: MINI SESSION

"CASE STUDY: TELECOM MEETS WATER TOWER,"

by Chris Wolfram and Dan Zienty, PCS, Short Elliott Hendrickson, Inc.; 8:30 to 9:30 a.m.

This case study explores a situation where a new water tower's handrail was brought to its maximum capacity by a carrier upgrade, and the solution considered by

the City's engineer in collaboration with the carrier's design engineer.

SESSION 3: MINI SESSION

"MODERN CORROSION TESTING,"

by Sean Fowler, Q-Lab Corp.; 8:30 to 9:30 a.m.

A century ago, auto companies developed the early laboratory salt spray

corrosion tests, which did not produce realistic exposures due to limitations in corrosion test chamber technology. Modern chambers offer improved correlation and reproducibility. This presentation will discuss the critical environmental parameters the new chambers control and how the automotive industry is exploiting these improved testing capabilities.

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SESSION 4: MINI SESSION

"THE IMPACT: TRAVELING FASTER THAN THE SPEED OF SOUND, PROTECTIVE COATINGS AT WORK,"

by Dudley J. Primeaux II, PCS, and Todd Gomez, PCS, VersaFlex Incorporated;
 8:30 to 9:30 a.m.

There is a whole world of alternate uses for protective coatings, including personal protection applications. This is a controversial subject as is any subject related to fire-arms, but coating systems such as polyurea are being used with excellent results. This presentation will discuss the history related to this subject and polyurea, as well as presenting the truth and facts: polyurea coating and lining systems are not bullet proof!

MID-MORNING — 10:00 TO 12:00 NOON

SESSION 1: PROTECTING SHIPS AND MARINE STRUCTURES, PART 2

"NEW ADVANCES IN EPOXY PROTECTIVE COATINGS,"

by James McCarthy, PPG Protective & Marine Coatings; 10:00 to 11:00 a.m.

This presentation will review the features and benefits of a new epoxy coating technology that allows for true epoxy-amine curing in a single-pack product. Performance versus traditional 2k epoxy products will be compared, and environmental and convenience benefits of single-pack versus 2k packaging will be discussed.

"IMPROVEMENT OF WEATHERABILITY FOR EPOXY COATINGS ON MARINE STRUCTURES,"

by Sang Moon Shin, Hyundai Heavy Industries Co. Ltd.; 11:00 to 11:30 a.m.

The effects of fatty acid adducted epoxy resin content on overall coating performance were evaluated as a means to develop epoxy coatings with a superior weathering resistance on ships.

"ACTIVATED ZINC TECHNOLOGY: MAKING ZINC-RICH EPOXIES WORK BETTER FOR THE APPLICATOR AND THE OWNER,"

by Pablo Bernad, Hempel A/S; and James McDonald, Hempel USA;
 11:30 a.m. to 12:00 noon

This presentation will discuss a new generation of zinc-rich epoxy coatings that overcome the limitations of the current technology. Core to the technology is the efficient activation of the zinc content within the film and robust application and film characteristics.

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SESSION 2: SPECIFICATION ISSUES

"INCONSISTENT COATINGS SPECIFICATION LANGUAGE BETWEEN DIVISIONS,"

by Laura Blechl, DECO Coatings;
10:00 to 11:00 a.m.

This presentation will discuss specification language between engineer, architect and manufacturer. Timely delivery requires defining responsibility for solving potential issues before they surface. Aligning engineer/architect specifications with manufacturer specifications can often expose gaping holes. Simple standard operating procedures can alleviate the crossfire.

"EQUIFINALITY: SPECIFYING PERFORMANCE,"

by Troy Fraebel, PCS, The Sherwin-Williams Company; 11:00 to 11:30 a.m.

This presentation looks toward the future of specifying coating projects starting with the traditional prescriptive, means-and-methods, coating formula-based specifications. The popular qualified product list (QPL) approach along with its drawbacks, and the design/build (DB) ideal and limitations of specifying only performance are presented.

"STANDARDS USED FOR 'PARTIAL' ABRASIVE BLASTING DURING MAINTENANCE PAINTING,"

by J. Peter Ault, P.E., PCS, Elzly Technology Corp.; 11:30 a.m. to 12:00 noon

Sometimes projects may be designed to an intermediate level where the intent is to reduce the surface preparation level of effort by allowing "good" coatings to remain. There are a number of standards that can be used to describe such work. This presentation will review these standards and discuss common issues associated with their use.

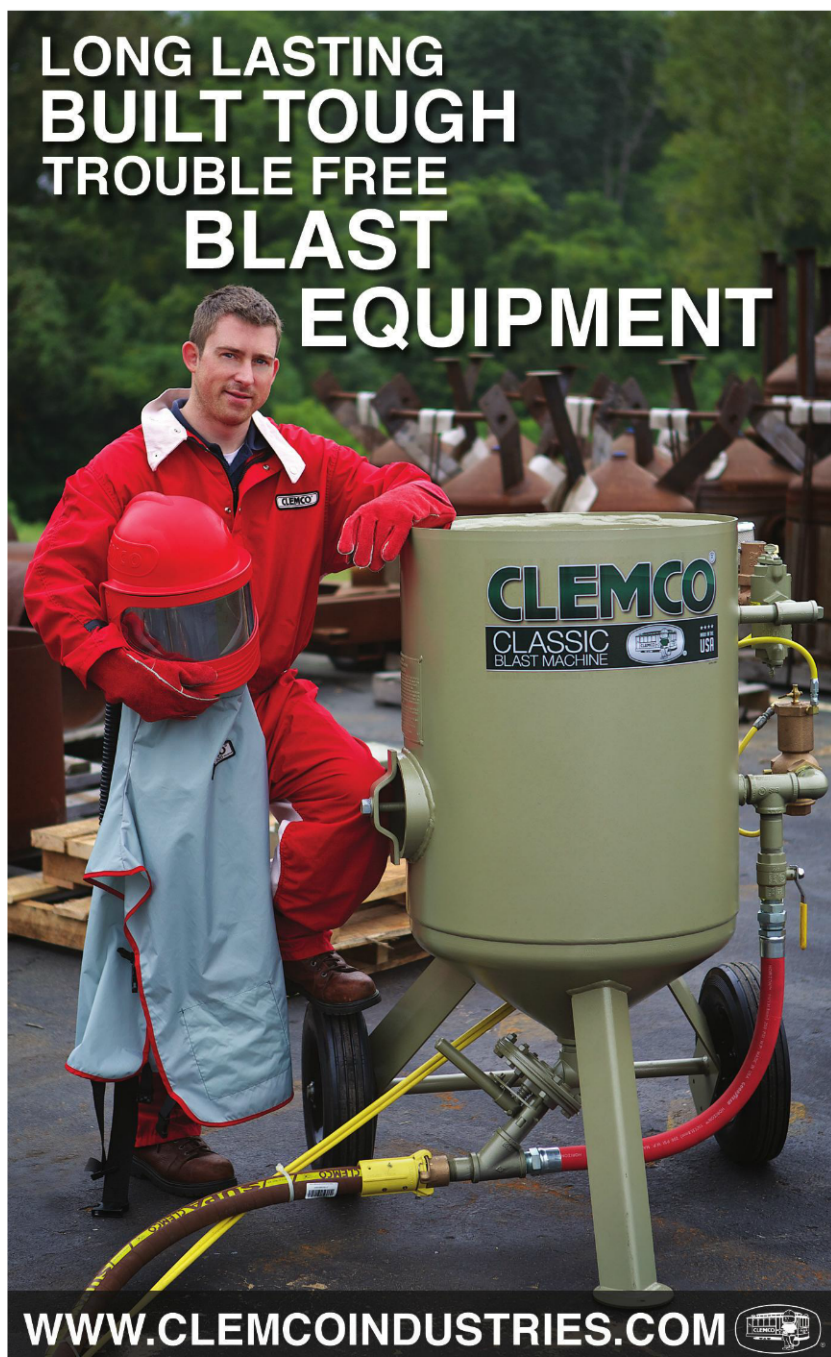
SESSION 3: GREEN EVOLUTION

"WATERBORNE FUNCTIONAL COATINGS: COMBATING NOISE, HEAT AND AIR POLLUTION,"

by Dr. Leo Procopio, The Dow Chemical Company; 10:00 a.m. to 10:30 a.m.

This paper will discuss coating technologies that are being asked to go beyond the

typical protective and aesthetic aspects of coatings, and offer other functions. Several types of waterborne functional coatings will be described, including technologies for combating noise, heat, and air pollutants.



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"GREEN SOLVENTS — REPLACING DIRTY & TOXIC WITH CLEAN & GREEN,"

by Dave A. Pasin, TBF Environmental Technology, Inc.; 10:30 to 11:00 a.m.

This presentation discusses effective aromatic and aliphatic green solvents that can be used in the formulation of paints and coatings, adhesives and inks to replace

currently used toxic materials. These solvents can be used in formulation and in cleaning and allow the user to meet and exceed current and proposed VOC and MIR regulations throughout the country.

"ULTRA-LOW VOC WATERBORNE ALKYD COATINGS WITH EXCEPTIONAL CORROSION RESISTANCE,"

by Erin Vogel, Ph.D., The Dow Chemical Company; 11:00 to 11:30 a.m.

This presentation outlines a new technology developed to disperse traditional high viscosity, short oil alkyds with minimal surfactant and no polymer modification. These attributes allow for the formulation of pigmented waterborne alkyd coatings with comparable dry times, adhesion, and hardness to those of conventional solvent-borne alkyd coatings.

"NOVEL 2K EPOXY-HARDENER SYSTEM WITH SUPERIOR PERFORMANCE AND MINIMUM IMPACT ON HEALTH AND ENVIRONMENT,"

by Ramon Sanchez-Morillo, Ph.D., Allnex USA Inc.; 11:30 a.m. to 12:00 noon

Novel waterborne and solvent-borne systems that increase productivity and reduce environmental impact and health hazards have been developed. These systems consist of a family of polyamine hardeners and epoxy resins that when combined, can be formulated to achieve flexible or hard coatings. An overview of these systems and the properties of formulated primers will be shown in this presentation.

SESSION 4: OIL & GAS, PART 2

"COATINGS FOR THE PREVENTION OF CORROSION UNDER INSULATION,"

by Michael McLampy, PPG Industries; 10:00 a.m. to 11:00 a.m.

This presentation highlights the importance of coatings for use under insulation especially for cyclic service. The concept of a safety factor for coating materials in these very harsh environments will be provided along with related potential failures. The coating system selection tables for carbon and stainless steels will be reviewed and discussed.

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**"THE GOOD, THE BAD AND THE SMUGLY:
 THE IMPORTANCE OF MONITORING OEM
 COATING SELECTION AND APPLICATION
 BY SUB-TIER VENDORS,"**

by Richard A. Burgess, PCS, KTA-Tator, Inc.;
 11:00 a.m. to 12:00 noon

Fabricators, construction firms and equipment manufacturers often rely on sub-tier vendors to supply a vast array of components and equipment. The items are

normally prepared and coated prior to being delivered to the vendor with what are typically referred to as original equipment manufacturer or OEM coating systems. This presentation will reveal project experiences of the author, as well as the outcomes of interviews with buyers, vendors and sub-tier vendors regarding their experiences with OEM coating requirements.

AFTERNOON — 3:00 TO 5:00 P.M.
SESSION 1: BUSINESS

**"FIVE BUSINESS DEVELOPMENT
 MOVES TO MAKE NOW,"**

by Jon Goldman, Brand Launcher; 3:00 to 4:00 p.m.

In today's hyper-competitive business environment, "me too" strategies just don't cut it. This presentation will offer five proven business development strategies to attract new business and retain your current accounts. Learn real-world tools to begin using in your own firm immediately.

**"WORK PACKAGES:
 DEVELOPMENT AND USE,"**

by Doug Sawyer, PCS, CDS Custom, LLC;
 4:00 to 5:00 p.m.

This presentation will discuss the development of work packages for projects. Included will be how these packages should be used both by the project manager and the field staff.

SESSION 2: WORKSHOP

**"FAILURE ANALYSIS OF PAINTS
 AND COATINGS,"**

by Dwight G. Weldon, PCS, Weldon Laboratories, Inc.; 3:00 to 5:00 p.m.

With over 33 years of failure analysis experience, the instructor for this workshop will present the methodology involved in solving coating failures. Topics will include what to look for at the job site, sample taking and lab techniques. Practical information on the uses and limitations of several laboratory techniques will be covered, such as microscopy, infrared spectroscopy, SEM-EDS, gas chromatography and differential scanning calorimetry. Case histories will be presented covering several types of coatings and failures. Extensive interaction between the instructor and the attendees is encouraged.

SESSION 3: WORKSHOP

"THERMAL SPRAY APPLICATION,"

Grant Blohm, Structural Technologies;
 3:00 to 5:00 p.m.

This workshop will cover the fundamentals of applying thermal spray coatings to industrial substrates.

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SSPC COMMITTEE MEETINGS

Various SSPC committee meetings are scheduled to take place at SSPC 2016. The following list provides committee names, meeting dates and times. All information is current as of press time. Visit www.sspc2016.com or contact Aimée Beggs, beggs@sspc.org, for more details.

MONDAY, JAN. 18	
8:30 TO 10:30 A.M.	Standards Review Committee
1:30 TO 3:00 P.M.	C2 Steering Committee
TUESDAY, JAN. 19	
8:30 TO 10:00 A.M.	C.2.16 AB 3 Revision C.2.14 Dehumidification C.1.8 Fluoropolymer Coatings (AEB)
10:30 A.M. TO NOON	C.4.1 PA 5 Revision C.1.15 Guide 14 Revision
1:30 TO 3:00 P.M.	C.7.3 SP Concrete (SSPC) C.1.1 Zinc Rich C.1.5.F Coatings for Thermally Sensitive Surfaces
3:30 TO 5:00 P.M.	DOD Corrosion Prevention/Control TG C.1.1 (continued) C.5.3.D QP 2 Revision
WEDNESDAY, JAN. 20	
8:30 TO 10:00 A.M.	Polymer Flooring Advisory C.8.1 Commercial Cleaning and Painting C.8.4 Commercial Air Barrier Coatings



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THURSDAY, JAN. 21	
8:30 TO 10:00 A.M.	C.7.6 Revision of SSPC-PA 7 C.2.13 Location and Number of Soluble Salt Tests
10:30 A.M. TO NOON	C.2.3. Revision SSPC-SP 2 and SP 3 ASTM-SSPC Cooperation
12:30 TO 1:30 P.M.	Instructors
1:30 TO 3:00 P.M.	C.7.8 TR 5 Revision
2:00 TO 4:00 P.M.	Education/Instructors Committee
3:00 TO 4:30 P.M.	SRC Wrap-Up Meeting

10:30 A.M. TO NOON	Open PCCP Advisory C.1.13 Wastewater Coatings C.8.2 Commercial Coating Materials C.8.3 Commercial Floor Coatings
1:30 TO 3:00 P.M.	C.1.7 Powder Coatings TG 417 Surface Prep Concrete PCCP Advisory Business
3:30 TO 5:00 P.M.	C.1.4.C Waterborne Acrylic Coatings (Paint 23 rev.) C.7.5 Texture of Concrete Coatings C.8.5 Commercial Contractor Certification

More than 125 companies from the protective coatings industry are set to exhibit their products and services in the SSPC 2016 exhibit hall. The following is a list of exhibitor descriptions, with contact information and booth numbers known to JPCL at press time. For further information, contact Kate Jurik, jurik@sspc.org.

Abrasive Warehouse & Equipment.

Houston, Texas; 713-715-7100;
abrasivewarehouse.com. Booth 518.

Abrasives, Inc. manufactures Black Magic coal slag and Dakota Gold silica sand. Rail access allows the company to deliver abrasives in the U.S. and Canada. Glen Ullin, N.D.; 701-348-3610; abrasivesinc.com. Booth 607. *See our ad, p. 42.*

Advanced Marine Preservation LLC is an SSPC QP-1 marine coatings contractor that provides blasting and coating services for U.S. Navy and Coast Guard vessels. Norfolk, Va.; 757-962-9340; gotoamp.com. Booth 446. *See our ad, p. 110.*

Air Systems International provides customers with confined space ventilation, Grade D and E breathing air equipment and environmental products. The company can also customize or design products to safely solve customers' issues. Chesapeake, Va.; 757-424-3967; airsystems.com. Booth 631. *See our ad, p. 115.*

AirTech Spray Systems. Houston; 281-631-5576; airtechspray.com. Booth 102.

Ameraguard Protective Coatings provides spray-on bedliners and protective coatings, including specially formulated polyureas and polyurethanes used throughout the commercial, industrial, agricultural and military sectors. Ft. Worth, Texas; 866-366-7035; ameraguard.com. Booth 719.

APE Companies. Deer Park, Texas; 281-930-0808; apeblastandpaint.com. Booth 518.

EXHIBITOR DESCRIPTIONS



Photo courtesy of SSPC.

ARID-DRY mobile desiccant dehumidifiers are manufactured by Controlled Dehumidification for temporary humidity control and constructive drying. Features include special filtration, cooling and heating; units are available in 600 to 25,000 CFM supply volumes. Brighton, Mich.; 810-229-7900; cdims.com. Booth 336.

ARMEX Blast Media is a line of baking soda based abrasives from Church & Dwight, marketed by The ArmaKleen Company and sold through a network of independent distributors world wide. ARMEX abrasives can be used in industrial service applications in either dry or wet blast systems. Princeton, N.J.; 800-332-5424; armex.com. Booth 606.

ARS Recycling Systems, LLC manufactures abrasive grit blasting and recycling systems, as well as dust collection systems, for the bridge, marine and storage tank refinishing markets. ARS systems have an efficiency of 99.6 percent, providing a low operating cost while greatly reducing the amount of waste for disposal. Lowellville, Ohio; 330-536-8210; arsrecycling.com. Booth 349. *See our ad, p. 48.*

Atlantic Design, Inc. is a full service engineering and manufacturing business located with over 30 years of experience

providing innovative and efficient solutions to meet each individual customers needs. The company sells and rents both new and used equipment and can also retrofit, upgrade and troubleshoot any equipment you may already own. Baltimore, Md.; 410-335-1400; calladi.com. Booth 449. *See our ad, p. 68.*

The Aulson Company. Methuen, Mass.; 978-975-0987; aulson.com. Booth 743.

Axxiom Manufacturing, Inc. manufactures the Schmidt brand of engineered abrasive blast equipment and specialized systems that incorporate state-of-the-art metering and control systems with quality workmanship. The company's products include Schmidt air blast equipment and component parts, as well as vacuum systems, moisture separators, air dryers, after coolers and other storage and transfer systems. Fresno, Texas; 800-231-2085; schmidtabrasiveblasting.com. Booth 517. *See our ad, p. 26.*

Barton International supplies high-performance garnet abrasives for a wide variety of blasting applications. Its Mil-Spec- and CARB-approved blasting abrasives provide health and environmental safety and performance for all applications. Garnet abrasives

are harder, heavier and more durable than other blast abrasives, and Barton offers a variety of grades to match your project requirements. Glen Falls, N.Y.; 800-741-7756; barton.com. Booth 501. *See our ads, pp. 66 and 111.*

Bellemare Group specializes in the manufacture, distribution and sale of abrasive and mineral products for surface preparation and high pressure sandblasting. Trois-Rivières, Québec, Canada; 819-379-2535; groupebellemare.com. Booth 241.

Binks offers fluid handling and spray finishing equipment solutions for protective coatings applications, spray guns, pumps, 2-K, accessories, hose, clean air coalescers, filters and pressure tanks. Glendale Heights, Ill.; 630-237-5169; binks.com. Booth 443. *See our ad, p. 87.*

Blast-One. Columbus, Ohio; 614-476-3000; blast-one.com. Booth A508. *See our ad, p. 114.*

Blast Pro Manufacturing manufactures portable shot blasting equipment that is reasonably priced and supported by 24/7 customer service. Oklahoma City, Okla.; 405-491-6464; blastpromfg.com. Booth 132.

Blastrac vertical and horizontal steel shot blasting is a labor- and time-saving process that strips, cleans and profiles simultaneously. It leaves surfaces immediately ready for application of coatings or overlays, eliminating drying time and costly disposal associated with other surface preparation methods. Systems utilize continuous internal-recycling of abrasive that helps eliminate contamination. Oklahoma City, Okla.; 800-256-3440; blastrac.com. Booth 742. *See our ad, p. 111.*

Bon Tool Co. manufactures construction hand tools for the travel trades. Bon has a line of tools designed for concrete coatings including gauge rakes, rollers, mixing

barrels, mixers and more. Gibsonia, Pa.; 724-443-7080; bontool.com. Booth 736.

Bullard manufactures personal protective equipment that is marketed worldwide. Founded in 1898, its product lines include hard hats, face shields, respirators, air quality equipment, fire and rescue helmets, and thermal imagers. Durability, comfort, safety, quality and innovation are hallmarks of every Bullard product line. Cynthiana, Ky.; 859-234-6611; bullard.com. Booth 125. *See our ad, p. 77.*

Carboline Company offers a global line of high-performance coatings, linings and fireproofing products for steel and concrete protection. For over 60 years, Carboline has combined product development with technical knowledge. St. Louis, Mo.; 314-644-1000; carboline.com. Booth 201. *See our ad, inside front cover.*

CESCO Inc. supplies abrasive blasting, paint spray and safety equipment, as well as the Aqua Miser ultra-high-pressure water blaster. CESCO is well known as the one-stop corrosion shop in the industry capable of supplying any type of equipment or supplies necessary to make a surface preparation and coatings project successful. Charleston, S.C.; 843-760-3000; blastandpaint.com. Booth 309.

CHLOR*RID International Inc. provides soluble salt information, CHLOR*TEST field test kits, soluble salt removal products, the HOLD*BLAST surface passivator, and education for surface preparation. Chandler, Ariz.; 480-821-0039; chlor-rid.com. Booth 101. *See our ad, p. 84.*

Clemco Industries Corp. manufactures abrasive blast equipment and related products, including portable blast machines, specialty blast products, operator safety equipment, blast cabinets, recovery systems and blast rooms. Washington, Mo.; 636-239-0300; clemcoindustries.com. Booth 118. *See our ads, pp. 89 and 107.*

CoatingsPro Magazine offers an in-depth look at coatings based on case studies, successful business operation, new products, industry news and the safe use of coatings and equipment. San Diego, Calif.; 858-768-0825; coatingspromag.com. Booth 142.

Cortec Corporation is trusted globally to provide effective corrosion management solutions. Cortec manufactures environmentally friendly VPCI & MCI technologies that are ISO 9001-, ISO 17025- and ISO 14001:2004-certified. St. Paul, Minn.; 651-429-1100; cortecvci.com. Booth 709.

CSI Services, Inc. is a third-party, SSPC-QP 5-certified coating inspection firm that provides consulting, inspection and testing services to the coatings industry. Santa Clarita, Calif.; 877-274-2422; csiservices.biz. Booth 611.

Custom Abrasives LLC supplies and manufactures abrasive products. Houston, Texas; 281-286-7200; customabrasivesllc.com. Booth 214.

Dampney Company, Inc. manufactures industrial and heat-resistant coatings for the petrochemical, power generation and OEM markets. ThurmaloX products are designed to provide heat and color stability for a wide range of metals up to 1,600 F (871 C). ThurmaloX is a unique silicone resin technology that allows for ambient or hot applied applications in the industry's most challenging environments. Everett, Mass.; 617-389-2805; dampney.com. Booth 442.

DeFelsko Corporation manufactures PosiTector 6000, PosiTest and PosiPen coating thickness gauges and inspection instruments including surface profile gauges, adhesion testers, dew point meters and wall thickness gauges. Ogdensburg, N.Y.; 315-393-4450; defelsko.com. Booth 209. *See our ads, pp. 5, 31 and 112.*

Dehumidification Technologies, LP provides temporary humidity and temperature

control solutions to multiple industries in the U.S., Canada, Australia and Thailand. DH Tech has an experienced and highly trained technical staff, and owners Ken Armstrong and Brian Battle work closely with employees to deliver unparalleled customer service. Houston, Texas; 713-939-1166; rentdh.com. Booth 133. *See our ad, p. 76.*

Denso North America, a subsidiary of Winn & Coales International, manufactures anti-corrosion coatings, including Protal protective pipeline coatings that can be applied by hand or spray method. Denso offers a full range of fast-cure, high-build epoxies for a variety of above- and below-ground corrosion protection. Houston, Texas; 281-821-3355; densona.com. Booth 615. *See our ad, p. 50.*

Department of Defense, Office of Corrosion Policy and Oversight is responsible for the development and recommendation of policy and guidance on the prevention and mitigation of corrosion for the DoD. Arlington, Va.; 315-339-7009; corrddefense.org. Booth 345.

DESCO Manufacturing Co., Inc. manufactures dust-free surface preparation tools and critical filtration vacuums designed to remove and contain lead, asbestos, silica and beta hot spot decontamination with minimal secondary engineering controls. Rancho Santa Margarita, Calif.; 800-337-2648, descomfg.com. Booths 698 and 610.

Detail Masters. Boerne, Texas; 800-634-9275; detailmasters.com. Booth 744. *See our ad, p. 110.*

Detroit Tarp Inc. has manufactured tarps, covers and custom enclosures for 49 years. It will display materials used nationwide for containing lead from abatement projects, overspray, weather enclosures for construction projects and tarps for all needs. Romulus, Mich.; 800-457-5054; detroit tarp.com. Booth 338.

Dex-O-Tex by Crossfield Products Corp. develops polymeric and cementitious construction chemistries designed to repair, protect and beautify commercial, industrial and institutional decks, floors and walls. Rancho Dominguez, Calif.; 310-886-9100; dexotex.com. Booth 708.

Doosan Portable Power has over 100 years of manufacturing expertise and application experience. Construction equipment includes mobile generators, air compressors, lighting systems and light compaction equipment. Statesville, N.C.; 704-883-3500; doosanportablepower.com. Booth 149.

DryAir by Trask-Decrow Machinery (TDM) distributes compressed air solutions, industrial pump and portable equipment for virtually any application. Trask-Decrow also provides installation, overhaul and repair of your current and new systems. Scarborough, Maine; 800-287-1538; getdryair.com. Booth 143. *See our ad, p. 108.*

DRYCO provides industrial climate control for the blasting and coating industry, specializing in desiccant and ArcticDRY mechanical dehumidifiers, cooling, heating, and temporary power. Downers Grove, Ill.; 866-379-2600; drycogroup.com. Booth 415. *See our ads, pp. 51 and 113.*

Dumond Chemicals manufactures environmentally friendly but highly effective industrial and marine coating removers, graffiti removers and masonry cleaners. Malvern, Pa.; 609-655-7700; dumondchemicals.com. Booth 707.

Dustless Blasting (MMLJ, Inc.) is guaranteed faster and cheaper than sandblasting. MMLJ, Inc. is the original manufacturer of blast equipment, and still the only to offer a lifetime warranty on tank assemblies. Built in America with quality, first patent 1941. Houston, Texas; 713-869-2227; dustlessblasting.com. Booth 537.

Eagle Industries services the industrial painting industry with containment and

ventilation solutions. Eagle inventories containment tarps, shrink wrap, scaffold sheeting, paint screens, ventilation equipment, surface prep tools, dust collectors, industrial vacuums and more. The company has warehouses on the East, West and Gulf Coasts. New Orleans, La.; 504-733-3510; eagleind.com. Booth 419. *See our ad, p. 45.*

Elcometer Inc. will showcase and demonstrate its entire line of inspection equipment and software for protective coatings and NDT inspection. Products include corrosion gauges, flaw detectors, adhesion testers, coating thickness gauges, surface profile gauges and climate/humidity gauges. Rochester Hills, Mich.; 248-650-0500, elcometer.com. Booth 301. *See our ad, p. 3.*

EnTech Industries has been manufacturing high-quality, field-tested mobile and skid dust collectors for 20 years. The collectors are offered in diesel, electric and diesel/electric combination, and in capacities from 2,000 cfm through 60,000 cfm. East Grand Forks, Minn.; 218-773-6505; entechindustries.com. Booth 049. *See our ad, p. 82.*

Ervin Industries, Inc. is a leading producer of carbon steel and stainless steel metal abrasive sold under the brand names Amasteel and Amacast. It offers application assistance and onsite training. Ann Arbor, Mich.; 734-769-4600; ervinindustries.com. Booth 136. *See our ad, p. 40.*

Fischer Technology Inc. provides specific solutions for the precise measurement of corrosion protection coatings according to international standards IMO PSPC and SSPC-PA 2. Fischer Dual and Eddy current probes feature a patented conductivity compensation for measuring various aluminum alloys without the readings being affected by the conductivity. Windsor, Conn.; 860-683-0781; fischer-technology.com. Booth 106. *See our ad, p. 16.*

Forrester Environmental Services, Inc. (FESI) provides state-of-the-art, patented FESI-BOND heavy metals stabilization

technologies and remedial services in the United States and abroad. Meredith, N.H.; 603-279-3407; fesi-bond.com. Booth 643.

FS Solutions. Elgin, Ill.; 847-622-7044; fssolutionsgroup.com. Booth A609.
 See our ad, p. 75.

GMA Garnet (USA) Corp. is a leading supplier of garnets for the surface preparation industry. Material is available through its global distribution network and warehouses. Houston, Texas; 832-243-9300; garnet-sales.com. Booth 626. See our ad, p. 79.

Grace Distributing distributes LifeGuard Active Rust Primer, a waterborne 2% VOC acrylic copolymer primer that goes directly over clean tight rust and tight paint; and is a full-service coatings contractor that uses a unique 7,000 psi hot water turbo pressure

washer to prepare rusted steel, avoiding the need for expensive abrasive blasting. Charlottesville, Va.; 434-825-1529; grace-distributing.com. Booth 103.

Graco Inc. manufactures dependable and accurate protective coatings equipment for spraying coatings and foam on the toughest materials, including plural-component proportioners, spray guns, transfer pumps and accessories. Minneapolis, Minn.; 612-623-6639; graco.com. Booth 601. See our ads, pp. 81 and 113.

Green Diamond Sand Products offers environmentally safe, moisture-free abrasives with no free silica. Durability and sharp edges provide faster cutting. Custom blends can be used in numerous applications. Riddle, Ore.; 541-874-3111; greendiamondsand.com. Booth 242.

Greener Blast Technologies Inc. supplies a surface preparation system that uses water and blasting materials to be as effective as the conventional methods while using only a fraction of the product. GBT's machine can blast at pressures ranging from 18 to 100 psi and is easy to use in all applications. Tyngsboro, Mass.; 978-857-0473; greenerblast.com. Booth 124.
 See our ad, p. 113.

Greenman-Pedersen, Inc., an engineering and construction services firm, specializes in protective coatings design, management, and inspection services for governmental and private clients. Affiliate companies include GPI Southeast, Underwater Engineering Services, and Corrosion Control Consultants & Laboratories. GPI and GPI Southeast are SSPC-QP 5-certified firms. Booth 414.



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Harsco Minerals has been recycling by-products to minimize landfilling since the 1930s, and producing The Original BLACK BEAUTY abrasives (coal slag) for nearly 80 years. Harsco also offers BLACK BEAUTY IRON (copper slag) and BLACK BEAUTY GLASS (crushed glass) abrasives. Harsco's high-quality, low-dusting abrasives are utilized in a wide range of applications. Mechanicsburg, Pa.; 888-733-3646; blackbeautyabrasives.com. Booth 216. *See our ad, p. 63.*

Hempel is a world-leading coatings supplier for the decorative, protective, marine, container and yacht markets. From wind turbines and bridges to hospitals, ships, power stations and homes, Hempel's coatings protect man-made structures from the corrosive forces of nature. Conroe, Texas; 936-523-6000; hempel.com. Booth A702.

HippWrap Containment specializes in shrink-wrap containment enclosures for protective coatings, asbestos and weather protection projects. The company offers creative solutions to containment problems. San Diego, Calif.; 800-362-4477; hippwrap.com. Booth 225. *See our ad, p. 43.*

HoldTight Solutions Inc. manufactures HoldTight 102 Salt Remover/Flash Rust Inhibitor. It is non-hazmat and biodegradable and can be dissolved in water to pressure wash any surface, prevent rust, and degrease. Houston, Texas; 713-266-9339; holdtight.com. Booth 407. *See our ads, pp. 15 and 107.*

HRV Conformance Verification Associates provides global, cost-effective quality assurance inspection services to both public and private entities. Specializing in the bridge and highway construction industry, HRV currently works with numerous DOTs and other authorities throughout the U.S. Other industries served include commercial buildings, water and wastewater, power, oil and gas, rail and transit facilities. Pittsburgh, Pa.; 412-788-2522; hrvinc.com. Booth 509.

Industrial Vacuum Equipment Corp. manufactures the Hurricane line of industrial vacuum loaders. It sells and rents vacuums and dust collectors from locations through North America, including Canada. Ixonia, Wis.; 920-261-1136; industrialvacuum.com. Booth 649. *See our ad, p. 21.*

International Marine & Industrial Applicators, LLC (IMIA) has extensive surface preparation and painting experience in the commercial shipbuilding industry. IMIA has the equipment, seasoned deckplate supervision and mechanics, as well as rigorous corporate safety and quality programs and financial strength, to comprehensively support its customers' preservation needs. Spanish Fort, Ala.; 251-626-3625; imiallc.com. Booth 224.

International Paint and Devoe High Performance Coatings are brands of AkzoNobel, a global manufacturer of corrosion-resistant coatings, linings and fire protection products. Along with its other products, Enviroline and Ceilcote, the company provides high-quality corrosion protection to industries and consumers worldwide. Houston, Texas; international-pc.com. Booth 321. *See our ad, p. 33.*

JAD Equipment Co. Inc. will be showcasing painting, sandblasting, safety, lighting, and other inventory used in the blasting and painting industry. The company will also have a few new products. Youngstown, Ohio; 330-746-6100; jadcousa.com. Booth 637. *See our ad, p. 55.*

JOLLYFLEX manufactures world class industrial rubber hoses including blast hoses, air hoses, cement hoses, and also rubber washers and gaskets. Kerala, India; +91-484-2655135; jollyflex.net. Booth 131.

Jotun Paints, Inc. protects property by providing solutions that not only enhance the appearance of the asset but also ensure durability. Jotun's products are inspired by

technology, designed to meet the latest industry standards and developed with sustainability in mind. Its specialties include premium decorative paints and coatings for corrosion protection of metal and passive fire protection of steel. Belle Chasse, La.; 504-394-3538; jotun.com. Booth A503. *See our ad, p. 59.*

Kennametal, Inc. is a North American company that provides high-production abrasive blasting nozzle solutions for most every blasting need. It offers a selection of conventional and specialty blast nozzle designs covering a variety of wear-resistant hard materials. Its XL Performance nozzle offers contractors increased productivity gains without additional capital investment. Traverse City, Mich.; 231-946-2100; kennametal.com. Booth 138.

KTA-Tator, Inc. (KTA) is a consulting engineering firm founded in 1949. KTA's specialties include coatings and corrosion engineering and inspection; steel and concrete fabrication inspection; field and laboratory coatings failure analysis; environmental, health and safety consulting; and contract administration for maintenance and construction activities. KTA helps commercial owners, facility managers and engineering partners properly engineer and oversee the protection and maintenance of building assets. KTA also distributes a complete line of inspection and monitoring equipment, and provides a number of specialized quality assurance/quality control and workplace safety training courses. Pittsburgh, Pa.; 412-788-1300; kta.com. Booth 200. *See our ad, p. 44.*

Luoyang HongFeng Refractories & Abrasives Co., Ltd. (HRAC) manufactures blasting media in China. Its products include aluminum oxide brown/white in macrogrits or microgrits, alumina-zirconia, general garnet material, waterjet garnet material, glass beads, glass sand, steel shot, steel grit and silicon carbide. Luoyang, China; hongfeng-abrasives.com. Booth 633. *See our ad, p. 34.*

Marco is a single-source solution for providing innovative and reliable products and services to the surface preparation industry, including abrasives; air-blasting equipment; engineered systems; painting, rental, and safety equipment; and service and repair. Davenport, Iowa; 563-324-2519; marco.us. Booth 217.

Midsun Specialty Products, Inc. manufactures self-fusing silicone tape for corrosion prevention, weatherproofing and insulation. Midsun also distributes and installs animal outage mitigation, silicone coatings for flashover protection and corrosion control within the power distribution industry and other commercial industrial markets. Berlin, Conn.; 860-378-0111; midsunspecialtyproducts.com. Booth 706.

Minerals Research & Recovery, Inc. (MRI) has produced blasting abrasives since 1980. MRI's Sharpshot is the only ambient-cooled copper slag sold in the United States today. In recent tests, Sharpshot HP has outperformed its competitors, cutting faster, producing less dust and using less material. Tucson, Ariz.; 520-748-9362; mrrinc.com. Booth 244.

Monarflex by Siplast offers Super T-Plus and Super T-Plus Flamesafe scaffold sheeting systems in several roll lengths that are easy to install, durable, and have a patented grommet system. Irving, Texas; 469-995-2227; monarflexusa.com. Booth 720. *See our ad, p. 112.*

MONTI Tools is the North American office of the MONTI organization, presenting its patented BRISTLE BLASTER industrial surface preparation technology, an easy-to-use, lightweight powered tool system capable of cleaning to a Near-White finish by blasting away corrosion, mill scale and coatings and generating a profiled finish of 3+ mils. Houston; 832-623-7970; monti-tools.com. Booth 137. *See our ad, p. 109.*

Montipower will showcase the MBX Bristle Blaster, a powered surface preparation tool that removes corrosion, scale, and coatings; imparts a 3-mil surface profile; and cleans to a near-white metal blast. The tool is designed for spot repairs and for jobs where abrasive blasting is prohibited. Manassas, Va.; 703-396-8777; mbxit.com. Booth 206. *See our ad, p. 18.*

NACE International, The Corrosion Society, focuses on corrosion control and provides standards, training, conferences, and publications that address corrosion issues. Houston, Texas; 281-492-0535; nace.org. Booth 144. *See our ad, p. 19.*

National Equipment Corp. will display its Neco Blast Couplings in addition to its complete product line. Brenham, Texas; 979-830-8030; hosecoupling.com. Booth 543.

NexTec Inc./Pre Tox markets PreTox 2000, a system for rendering lead waste non-hazardous during abatement. The system works with all standard removal methods including abrasive and mechanical. Dubuque, Iowa; 800-338-8296; pretox.com. Booth 347. *See our ad, p. 36.*

Novatek Corp. manufactures critical surface preparation equipment and portable air filtration systems for hazardous and non-hazardous environments. The company will feature its portable air filtration systems, dustless needle scalers, rotary peen prep tools, hand grinders and HEPA-filtered vacuums. Exton, Pa.; 610-363-7800; novatekco.com. Booth 227. *See our ad, p. 13.*

Novetas Solutions manufactures New Age Blast Media, a sandblasting media manufactured from 100-percent recycled bottle glass, which means it is non-toxic and completely inert and can be used near and around water. In addition to worker safety benefits, New Age Blast Media works for sandblasting thick or soft coatings. Holmes, Pa.; 866-775-6226; newageblastmedia.com. Booth 130.

NRI (Neptune Research Inc.) develops, designs and manufactures pre-impregnated and field-saturated composite strengthening systems that restore, protect and reinforce pipes, pipelines and civil structures. Riviera Beach, Fla.; neptuneresearch.com. Booth 100.

Nu Way Industrial Waste Management LLC provides responsible and effective waste management solutions to the industrial and commercial sectors, utilizing a network of EPA-permitted disposal facilities and licensed transporters throughout the U.S. North Lima, Ohio; nuwayindustrialwm.com. Booth 729.

Olimag Sand, Inc. is a large, eastern Canadian producer of non-toxic abrasive for abrasive blasting. Its synthetic olivine JETMAG is produced in a rotary kiln at 2,300 F. Thetford Mines, Québec, Canada; 418-338-3562; olimag.com. Booth 624.

Opta Minerals, Inc. has provided high-quality, non-silica abrasives and services to the abrasive blast cleaning industry for more than 130 years. Its 17 locations across North America can meet all blasting abrasive needs. Waterdown, Ontario, Canada; 905-689-7361; optaminerals.com. Booth 343. *See our ad, p. 90.*

Oxifree Metal Protection manufactures Oxifree TM198, a sprayable polymeric resin coating created to prevent metal corrosion. Its patented resin contains organic corrosion inhibitors; provides protection against all corrosive contaminants; and contains less than 0.5% VOCs, having no adverse ecological or environmental impact. Spring, Texas; 281-251-7171; oxifree.com. Booth 502.

P&L Metalcrafts LLC provides a full line of rigging supplies at wholesale pricing, specializing in designing and fabricating complete containment systems for any bridge or water tank. With a complete engineering staff qualified in every state, it can ship direct to your job-site with special rates.

Youngtown, Ohio; 330-793-2178. Booth 718.

Pacific Dust Collectors and Equipment, Inc. provides work on aged wood beams, brick, architectural concrete, barges, coating removal, Dunn Blasting, epoxy, fire damage, heavy duty coatings, heavy equipment, lead removal and pools. Damascus, Ore.; 503-318-3860. Booth 246.

Painters and Allied Trades LMCI focuses on industry programs that enhance the market share and work opportunities of industry partners, the IUPAT, and its signatory employers. It specializes in productive labor management relations. Hanover, Md.; 410-564-5860; lmcionline.org. Booth 730.

Polygon provides dehumidification, heating and cooling services and equipment for coating applications. North Andover, Mass.;

800-422-6379; polygongroup.com. Booth 220. See our ad, p. 29.

PPG Protective and Marine Coatings is a leader in protective and marine coatings, constantly striving to deliver innovative and fit-for-purpose products to its customers in the energy, infrastructure, and marine markets. PPG PMC's Amercoat, Amerlock, PSX, and Sigma Coatings lines are used to protect high-profile projects in harsh conditions. Pittsburgh, Pa.; 412-434-3275; ppg.com. Booth 401. See our ads, pp. 53 and 112.

PTQ Safety Goggles. Houston, Texas; 832-582-8716; ptqsafety.com. Booth A605.

Rapid Prep, LLC is a provider of steel surface preparation equipment. It rents and sells dry abrasive blast machines, grit blast and recycling machines, shot blasters, air

dryers, dehumidification and air conditioning equipment, dust collection to 80,000 cfm, vacuums and much more. N. Kingston, R.I.; 877-529-2124; rapidprep.com. Booth 749. See our ad, p. 108.

Raven Lining Systems has been providing innovative solutions for corrosion, erosion and I&I in water and wastewater infrastructures for more than 20 years. Its products are environmentally friendly, 100% solids, VOC-free and NSF-certified Broken Arrow, Okla.; 800-324-2810; ravenlining.com. Booth 411.

RBW Enterprises, Inc. manufactures centrifugal shot blast cleaning equipment, as well as portable systems that can be used both in plant and in the field. It also engineers and manufactures special blast cleaning systems for surface preparation of pipe, tanks, wind towers and steel plates.

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Newnan, Ga.; 770-251-8989; rbwe.com.
 Booth 235. *See our ad, p. 54.*

Ring Power Corp. supplies new and used air compressors, air tools, and air compressor parts and services throughout Florida. It also supplies Sullair, Atlas Copco, and Hurricane air compressors, tools, and parts throughout the U.S. St. Augustine, Fla.; 904-494-1274; ringpower.com. Booth 646.

Rust-Oleum, an RPM company, is a major producer of industrial protective coatings designed to protect steel and concrete from weathering, corrosion and chemical attack. 877-385-8155; rustoleum.com. Booth 735.

Rustibus, Inc. manufactures and distributes mechanical surface preparation equipment. Houston, Texas; 832-203-7170; rustibus.com. Booth 507.

SABRE Autonomous Solutions specializes in developing autonomous robotic solutions for harsh working environments. Its flagship product, the Autonomous Abrasive Blaster, is a revolutionary way of abrasive blasting. Revesby, Australia; +61-2-9792-2733; sabreaautonomous.com.au. Booth 731. *See our ad, p. 111.*

SAFE Systems Inc. provides manufacturing, engineering, sales, parts, technical support and service for its full line of U.S.-built portable equipment and fixed blast facilities. Standard or custom designed equipment for blasting, recovery, classification, and dust collection maximize flexibility and customers' return on investment. Kent, Wash.; 425-251-8662; safesys.com. Booth 514. *See our ad, p. 14.*

Safety Lamp of Houston is the North American distributor of Wolf Safety Lamp Co., specializing in portable pneumatic, LED and fluorescent lighting solutions for all wet and hazardous areas. Humble, Texas; 281-964-1019; safetylampofhouston.com. Booth 416. *See our ad, p. 114.*

Safway Services, LLC manufactures engineered suspended access systems for use on bridges, buildings, offshore platforms, and special structures. It also sells and rents to contractors. Scotia, N.Y.; 518-381-6000; safway.com. Booth 625. *See our ad, p. 41.*

Sand Express produces high-quality processed sands and aggregates. Its capabilities include raw sands, industrial sands and abrasives. The company services industrial and commercial customers throughout the Gulf coast region and the central U.S. Columbus, Texas; 800-460-8210; sand-express.com. Booth 642.

Sauereisen, Inc. is a third-generation manufacturer of a complete line of organic and inorganic corrosion-resistant construction materials for new and rehabilitation applications. Its global presence is maintained by a network of technical sales representatives and warehouse facilities located in the U.S., Europe, the Pacific Rim and Latin America provide worldwide product distribution. Pittsburgh, Pa.; 412-963-0303; sauereisen.com. Booth 111.

The Sherwin-Williams Company has manufactured a complete line of protective coatings and lining products for more than 150 years. It has an SSPC- and NACE-certified workforce trained in corrosion control, and a dedicated distribution network that ensures on-time delivery from 4,000 company-owned points worldwide. Cleveland, Ohio; 800-524-5979; sherwin-williams.com/protective. Booth 437. *See our ad, p. 93.*

Specialty Finishes. Atlanta, Ga.; 404-351-1062; specialtyfinishes.com. Booth 717.

Specialty Products Inc. Lakewood, Wash.; 253-588-7101; specialty-products.com. Booth 644.

Spider, founded in 1947, is a large manufacturer and distributor of access and safety solutions in North America. It also sells, rents, and services powered suspended access

platforms, material hoists, rigging and safety equipment, and it provides turnkey access solutions and OSHA Competent Person training. Seattle, Wash.; 877-774-3370; spiderstaging.com. Booth 619.

Sponge-Jet, Inc. manufactures composite abrasives by bonding conventional abrasives with polyurethane sponge to create dry, recyclable, low-dust and low-rebound Sponge Media abrasives that accelerate blasting and painting operations. High-production, composite-abrasive blasting and recovery systems also are offered. Newington, N.H.; 603-610-7950; spongejet.com. Booth 506.

Sulzer Mixpac USA, Inc. is a global manufacturer of innovative packaging, dispensing, mixing/spray systems for one- and two-component adhesives, sealants, and coatings; and industry-recognized Mixpac, Quadro, Mixcoat, Statomix, MK cartridges, mixers, dispense guns, and spray tips. Salem, N.H.; 603-893-2727; sulzer.com. Booth 602. *See our ad, p. 109.*

Sunbelt Rentals Inc. has more than 475 locations nationwide and offers all of the equipment you need for surface preparation and coating projects including air compressors, air monitoring systems, desiccant dehumidifiers, dust collectors, generators and more. Fort Mill, S.C.; 800-667-9328; sunbeltrentals.com. Booth 711. *See our ad, p. 101.*

Tarps Manufacturing, Inc. offers custom containment tarps, building wraps, and ground tarps in strong nylon and poly mesh. Many options are available in coated fabrics, FR, multi-layered tarps for sound reduction, and special printing. Meredosia, Ill.; 217-584-1900; tarpsmfg.com. Booth 714. *See our ad, p. 30.*

TDJ Group Inc. manufactures Blastox, an abrasive additive to stabilize lead-based paint, eliminating the generation of hazardous waste. Blastox has been tested by the EPA, Federal Highway Administration

and U.S. Army Corps of Engineers and is a one-step lead abatement approach. Cary, Ill., 800-252-7869; blastox.com. Booth 600. See our ad, p. 111.

TecnoFink specializes in industrial maintenance, including products for reform, reconstruction, flooring, corrosion protection, maintenance, insulation, retubagem and industrial cleaning, among others. Belo Horizonte, Brazil; +55-31-2112-4000; tecnofink.com. Booth 645.

Technology Publishing Company has published *JPCL* for over three decades and provides its audience with a daily eNewsletter (*PaintSquare News*) and a digital edition. Its other daily eNewsletter, *D+D News*, focuses on architectural coatings in the built environment. TPC also offers PaintBidTracker, the only project lead service dedicated to coatings work. Pittsburgh, Pa.; 800-837-8303; technologypub.com. Booth 337.

Tesla NanoCoatings, Inc., a nanotechnology company, manufactures the Teslan product line, a highly effective corrosion control coating for structural steel that uses carbon nanotube (CNT) technology to inhibit corrosion. North Canton, Ohio; 610-764-1232; teslanano.com. Booth 245.

Tioga Air Heaters, Inc. is a full-service temporary air heater company that manufactures a full line of indirect and direct-fired temporary air heaters that are available for rental, lease or purchase. Minneapolis, Minn.; 800-218-4642; tioga-inc.com. Booth 701.

Titan manufactures professional-grade sprayers for applying a variety of coatings and materials, including airless and air-powered sprayers, fine finishing sprayers, sport field and pavement marking sprayers, and sprayers for applying texture, roofing, corrosion control, and protective coatings. Plymouth, Minn.; 800-526-5362; titantool.com. Booth 725.

Tnemec Co., Inc. makes high-performance coatings for industrial and architectural applications on steel, concrete, masonry, and other substrates. Kansas City, Mo.; 816-483-3400; tnemec.com. Booth 315.

Tractel Inc.'s Griphoist Division offers a complete line of man-riding equipment products and fall protection equipment, including traction hoists, secondary brakes, manual hoists, modular platforms, suspension systems and more. Norwood, Mass.; 800-421-0246; tractel.com. Booth 210.

TruQC offers cloud-based, job-site documentation for the iPad. Developed specifically for compliance with SSPC-QP and -QS certifications and requirements, the program provides customizable solutions for secure job-site documentation, including documentation storage, and accounting, and time-tracking practices designed to meet OSHA documentation requirements. Kirkwood, Mo.; 314-457-3920; truqcapp.com. Booth 112.

U.S. Minerals manufactures coal slag abrasive products from six production facilities. In 2013, a new copper slag processing facility opened, serving customers throughout the U.S. and Canada. Dyer, Ind.; 219-864-0909; us-minerals.com. Booth 721. See our ad, p. 92.

Uni-Ram Corp. is a manufacturer of spray-gun cleaners and solvent recyclers. Markham, Ontario, Canada; 905-477-5911; uniram.com. Booth 710. See our ad, p. 112.

Van Air Systems designs and manufactures equipment that dries and purifies compressed air used for applying and removing coating systems. Lake City, Pa.; 814-774-2631; vanairsystems.com. Booth 508. See our ad, p. 35.

VersaFlex Inc. formulates, manufactures and supplies pure polyurea coatings, liners and sealants for a wide variety of industrial, commercial and maintenance environments. The company has offices in China,

Europe, India, Malaysia and the Middle East. Kansas City, Kan.; 913-321-9000; versaflex.com. Booth 511. See our ad, p. 49.

Vitro Minerals, Inc. manufactures recycled glass powders and sands. Conyers, Ga.; 678-729-9333; vitrominerals.com. Booth A603. See our ad, p. 114.

W Abrasives manufactures carbon steel shot and grit. Its lineup includes high carbon steel shot and grit, stainless steel shot, and an innovative line of premium products specific to your cleaning needs. Bedford, Va.; 281-480-2341; wabrasives.com. Booth 547.

The Warehouse Rentals and Supplies (TWRS) carries a large selection of abrasive blasting and painting supplies including the safest and most popular brands of equipment. Greensburg, Pa.; 724-836-0808; twrs.com. Booth 146. See our ad, p. 52.

Wasser Coatings manufactures and supplies anti-corrosion and protective coatings. Products include a variety of moisture-cure urethanes and polyurea membranes. Auburn, Wash.; 800-627-2968; wassercoatings.com. Booth 444. See our ad, p. 85.

Western Technology Inc. manufactures explosion-proof, portable low-voltage lighting, including The BRICK product line, and a complete line of deadman controls. Bremerton, Wash.; 800-654-5483; westerntechnologylights.com. Booth 107.

WIWA LP manufactures airless paint spraying equipment, including standard airless pumps, plural-component equipment, and other industrial systems. Alger, Ohio; 419-757-0141; wiwalp.com. Booth 230. See our ad, p. 11.

Zibo TAA Metal Technology Co., Ltd., founded in 1997, is the world's fifth largest supplier of metal abrasives, committed to steel shot, steel cut wire shot, stainless steel shot and other products. Zibo, China; taa.net.cn. Booth 545.