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A Brief History of SSPC Conferences

BY MICHAEL KLINE, DIRECTOR OF TECHNOLOGY AND COMMUNICATIONS, SSPC

As of this writing, Coatings+ 2020 in Long Beach, California, is just several weeks away. We're looking forward to our return to the Golden State, which last hosted an SSPC annual conference in 2008, when we were in Los Angeles for the joint PACE conference.

It's important to note that two of the most active SSPC chapters are located in California: the Southern California/Nevada chapter and the Northern California/Nevada chapter.

It is well-documented that the geography of SSPC's influence has expanded dramatically in recent years. Traditionally focused on North America (the U.S. in particular), we've found demand for SSPC standards, training and certification programs increasing around the world since the early 2000s.

A quick glance at the Chapters page of our website (sspc.org/chapters) shows extensive growth in Latin America, Asia Pacific and the Middle East in recent years. Change is certainly in the air. With this expansion and the ongoing merger discussions with NACE International, it might be interesting for members to know how the location is selected for the SSPC annual conference.

SSPC's annual conference occurs in the winter during January or February. The main reason for this time frame is that (at least in the U.S.) those months are solidly "out of season" for most of the country with regard to painting projects. For many years the conference was held in the fall, usually in the October/November time frame. This became problematic for our contractor members because the construction season was extending well into those months, making it difficult for them to attend the conference. So, beginning with the inaugural PACE show in 2005, SSPC switched to having the annual conference in the winter to allow contractors greater flexibility in attending.

Of course, having the show in the winter adds another variable to the location equation: it effectively eliminates northern U.S. venues from consideration.

The primary variables considered in the decision-making process include the following:

- Location: Ideally, SSPC seeks a first- or second-tier city with a warm climate, a large-capacity and conveniently located airport, and walkable areas with restaurants and entertainment within the vicinity. SSPC also takes into account the region of the country (east/central/west) and the timing of the most recent SSPC national conference held in the area.
- Meeting Space: Coatings+ requires lots of space. The exhibit hall needs a minimum of 100,000 square feet. In addition, we need at least 25 sizable breakout rooms for networking events, committee meetings, the technical program and training courses.
- Cost to Attendees: Convention center rental, hotel and food and beverage fees make up most of the cost of the event. SSPC's goal is to keep registration fees steady from year-to-year and maintain hotel room rates in the $200–$250-per-night range.
- Hotel Room Quantity: Coatings+ uses 1,000 rooms or more on the peak night of the conference. Thus, SSPC targets cities that have enough rooms within walking distance of the convention facility.
- Date Restrictions: There are several high-profile events that occur in the same winter time frame as Coatings+ that we try to avoid overlapping when possible—primarily the Super Bowl, World of Concrete show and the Sherwin-Williams national sales meeting. In addition, NACE's annual CORROSION conference occurs in early spring, so we try to keep our dates 6–8 weeks out from the NACE show.

Despite our international growth, SSPC membership is still heavily concentrated in the U.S. With that in mind, our goal is to move the conference around the country every few years so that the majority of our members and exhibitors have the opportunity to benefit from

closer proximity and shorter travel. With all of the variables mentioned, there is a tight window in which to fit our conference.

For 2020, there were 33 different cities that were initially considered for the meeting. The list was ultimately narrowed down to three, based on which city had the most interest in bidding on our show and the fact that we wanted to hold the conference in the western part of the country. Phoenix, Austin, Texas, and Long Beach made the cut, and after evaluating the bids, only Long Beach met the majority of our criteria.

The following list shows locations for the SSPC conference each year since 1987. Many SSPC chapters also hold significant events during the year, both locally and internationally. You can find upcoming chapter events at the SSPC Chapters webpage or at sspc.org/events/.

SSPC 1987	New Orleans
SSPC 1988	Baltimore
SSPC 1989	Houston
SSPC 1990	Nashville, Tennessee
SSPC 1991	Long Beach
SSPC 1992	Kansas City, Missouri
SSPC 1993	New Orleans
SSPC 1994	Atlanta
SSPC 1995	Dallas
SSPC 1996	Charlotte, North Carolina
SSPC 1997	San Diego
SSPC 1998	Orlando, Florida
SSPC 1999	Houston
SSPC 2000	Nashville, Tennessee
SSPC 2001	Atlanta
SSPC 2002	Tampa, Florida
SSPC 2003	New Orleans
SSPC 2004	Replaced by PACE 2005
PACE 2005	Las Vegas
PACE 2006	Tampa
PACE 2007	Dallas
PACE 2008	Las Angeles
PACE 2009	New Orleans
PACE 2010	Phoenix
SSPC 2011	Las Vegas
SSPC 2012	Tampa
SSPC 2013	San Antonio
SSPC 2014	Orlando
SSPC 2015	Las Vegas
SSPC 2016	San Antonio
SSPC 2017	Tampa
SSPC 2018	New Orleans
SSPC 2019	Orlando
SSPC 2020	Long Beach

SSPC is excited to bring our premiere annual event out to the west coast this coming February. Keeping in line with our mission of the advancement of learning and elevation of our members, we hope to continuously expand career networking opportunities and knowledge within the protective coatings industry with events like Coatings+. By going where our members are, staying up-to-date on the latest industry trends, and listening to feedback provided by our customers, we are able to provide the best resources possible. We look forward to seeing you in Long Beach!

Obituary:
David Beamish, DeFelsko President

David Beamish, President of DeFelsko Corporation, died in his home on Nov. 4 after a 32-month battle with cancer. He was 63 years old.

Born in Ottawa, Canada, Beamish studied civil engineering at Carleton University where he earned his bachelor's degree.

After marrying his wife, Linda, the two joined DeFelsko, which, at the time, was a small distributor of testing instrumentation that had fewer than 10 employees and was founded by Beamish's father-in-law.

Over his 31-year career with the company, Beamish became General Manager and eventually President, guiding not only the company, but members of the industry as well.

"We're stunned and saddened to learn of Dave's passing," said Mike Kline, Director of Technology and Communications, SSPC. "He was a true gentleman who was well-liked by our staff, SSPC members and his colleagues in the coatings industry. His support of SSPC over the years was valued across the board and his contributions to SSPC were numerous, especially on technical committees and education programs. He was passionate about his work, his company and his life, and we will miss him."

Beamish participated in the development of several ASTM, ISO and SSPC standards and served on several NACE and SSPC committees over the years; he was also the chair of SSPC's Profile Measurement Compliance Committee. Other sectors he was involved in include:

- C.1.12 Painting Galvanized Steel;
- C.1.7 Powder Coatings;
- C.2.0 Surface Preparation Steering;
- C.2.12 Location and Number of Soluble Salt Tests;
- C.2.15 Revision of SSPC-Guide 15 2019;
- C.2.3 Power Tool Cleaning;
- C.3.12 SSPC-PA 9 Revision;
- C.3.2 PA 2 Revision;
- C.7.5 Texture of Concrete Coatings;
- C.7.7 Revision of SSPC-SP 13/NACE No. 6;
- C.8.3 Commercial Flooring; and
- C.8.4 Commercial Air and Vapor Barrier Coatings.

With his active involvement in the industry, he was someone who others turned to for guidance.

"In my tenure as the Editor of JPCL and PaintSquare Press, I considered David Beamish to be a treasure of a resource—not only for his invaluable editorial contributions, but for his brilliant and engaging conversations, as well," said Pamela Simmons, VP of Content at Technology Publishing Co. "His passing leaves a void in the protective coatings industry that will be difficult to fill."

During his tenure at the helm of DeFelsko, the company grew significantly and now employs more than 90 people and has distribution in nearly every country.

"I've known David for over 15 years," said Bill Corbett, Chief Operations Officer, KTA-Tator, Inc. "He was well-respected and technically astute. He was integral in both the development and maintenance of several ASTM, ISO and SSPC standards.

"He had a true passion for making certain that information was technically accurate before it was disseminated to the industry. His pleasant demeanor and calm disposition, as well as his technical acumen will be missed by all that had the pleasure of knowing him."

In his memory, donations can be made to the Brockville and District Hospital Foundation's Palliative Care unit.

PAINTSQUARE USERS OFFER REGARDS

Members of the coatings community also gave condolences to the Beamish family on PaintSquare.com.

Gunnar Ackx:
"This is so sad ... I have always thoroughly enjoyed any meeting with David and have known him as a very knowledgeable, trustworthy and positive person who was very dedicated to contributing to a better industry. Our most sincere condolences go out to his family and the team [at] DeFelsko. Thank you for all that you meant to all of us, David."

Patricia Engelbert:
"This is indeed sad news. David's influence has a positive impact on the industry and he will be greatly missed in so many ways. Linda and family, you're in our hearts."

Rob Francis:
"A great loss to the industry. A gentleman and well-informed person and I, also, always enjoyed catching up with David. He'll be missed."

Ken Tator:
"David was a fine, knowledgeable leader of DeFelsko, following its founder Frank Koch. I knew them both quite well and they were wonderful helpers to KTA and our instrument group. My sincere condolences to Linda, the Beamish family and the DeFelsko employees."

Ron Berry:
"David, the industry will sadly miss your positive contribution. R.I.P."

TPC Holds Third Contractor Connect in Tucson

In November, Technology Publishing Company conducted its third annual Contractor Connect event at the Omni Tucson National Resort in Tucson, Arizona. The event, which pairs painting contractors with coatings and equipment suppliers for three days of networking and one-on-one meetings, ran Nov. 12–15.

"The event was a great success, and it's a perfect platform for us to connect contractors with major suppliers in the industry," said TPC CEO, Brion Palmer. "We take the responsibility of facilitating the connection between our two core audiences seriously, and we take great pride in the continued growth and success of this unique event."

Photos courtesy of Technology Publishing Co.

In addition to one-on-one meetings between contractors and suppliers, Contractor Connect was again highlighted by a series of panel discussions with industry experts touching on topics of coatings, application and surface-prep equipment, and workforce issues that affect painting project results.

The event was also filled with social networking activities and receptions, including a golf tournament, a sporting-clay shooting outing, visits to the Arizona-Sonora Desert Museum and the Pima Air and Space Museum, stops at a local distillery and wine-tasting room, and a classic Wild West experience at the Old Tucson Movie Studio.

"The event's success is predicated on the intimate nature of it," said Palmer. "We've grown it over the past few years, but it's managed growth, because we want to keep the intimate dynamic as one of the key value propositions for participants."

In 2020, Contractor Connect will return to the Hammock Beach Resort in Palm Coast, Florida, Nov. 3–6. For more information, visit paintsquare.com/contractor_connect.

PAINTSQUARE COMMENTS

In Response to "New $14M AL Bridge Visibly Sags" (PaintSquare News, Nov. 11)

Debate sites over who to blame for the sagging and cracking of a new $14 million bridge in Escambia County, Alabama—the contractor's performance, or the owner's (in this case, the Alabama DOT's) design flaws.

Tony Rangus:

"... the construction company has assigned blame to ALDOT ..." I am just a nuts and bolts metallurgist, but wouldn't [the contractor] have registered engineers on staff or as consultants reviewing design and construction requirements to avoid litigation? I would have thought that if [the contractor] felt the ALDOT [spec] was deficient, somebody would have raised the issue. Maybe profit trumps this stuff."

Michael Halliwell:

"Tony, you'd think so, but not necessarily. Some construction firms are pretty much only that. They take the drawings and build to the drawings. Any questions or changes go back to the client and have to go through their engineering services to make changes. Even so, you'd hope that any competent and experienced bridge builder should notice when something seems so far amiss as to lead to the deficiencies noted."

Martin Rose:

"A contractor is hired to build the structure in strict accordance with the construction documents, period. They cannot change or alter the design on their own. That said, when discovering deficiencies, or having significant concerns about the documents, there are procedures to question and receive instructions. This should have a huge paper trail, not just a couple letters."

PAINT POLL paintsquare.com/poll

In October, two members of the U.S. House of Representatives introduced a program that aims to reestablish the federal Highway Bridge Replacement and Rehabilitation Program, which would provide federal grant money to states in need of bridge repairs or replacements found by the Federal Highway Administration. Do you believe this can help save some of the country's most structurally deficient bridges?

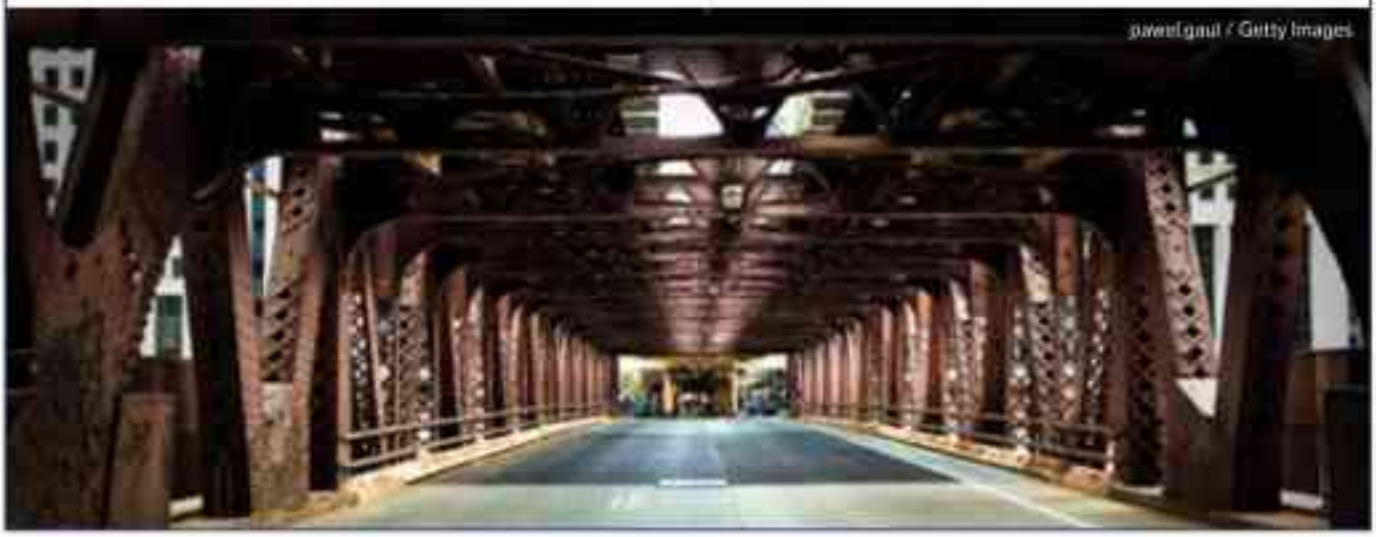
Yes. **89%** No. **9%** Other. **2%**

Robert Dahlstrom:

"It may help and it is better than nothing. If it is additional funding not deducted from funding provided by the Federal Highway Administration or any DOT or other sources, it is a very good thing."

Kalpesh Patel:

"Definitely [the] right repairs at [the] right time will extend the life of [a] bridge. [The] most detrimental condition for bridges is rusting, which is not avoidable but can be delayed by cleaning, repairing and coating."



pawelgaul / Getty Images

COATINGS CONVERSATION

Problem Solving Forum

paintsquare.com/psf

What is the best media to use to remove aged coal-tar epoxy from a steel tank before re-lining?

Larry Mizzia,
Exceletech Coating & Applications, LLC:
"Typically, aged coal tar is brittle and with good procedure can be removed without great effort. Crushed glass works well if you are in an area near a distribution center, otherwise, [coal slag] can do the work as well. As should be noted, use clean air [with] plenty of cfm and psi for the nozzle size. Use a sweeping technique to reduce heat build-up within the layer of coal tar, which can slow down the removal process. If you do not require a deep blast profile, a fine grade will do a nice job."

Geir Christianslund,
Aker Solutions MMO:
"Use ultra-high-pressure water."

Paul Tsourous, Jupiter:
"If performing the work during warm weather, I would suggest removing the coating first with UHP (+40k water pressure), then select the appropriate abrasive to achieve proper surface profile. If you are performing this work during cold temps, the coal tar should become brittle, and could be removed efficiently with medium to large angular abrasives."

Aajjay Sunkay of ASSETRefurb Engineers on December 6, 2019:
"Use of dry ice as the media for blasting prevents heat generation during removal of coal-tar epoxy. One of the important benefits of dry ice for blasting is no dust generation. But limitations include no surface profile generation and [a] high level of noise generation, which requires hearing protection. You can also try wet blasting, which contains a mix of chilled iron grit and water as media with high pressure above 35,000 psi up to 45,000 psi. Care should be taken that no heat is generated during blasting and hence wet slurry blasting will serve the purpose of removal of coal tar epoxy coating from steel tank."

PAINTSQUARE NEWS TOP 10

paintsquare.com/news, Nov. 4–Dec. 8

1. **Tappan Zee Consortium Files Lawsuit**
2. **2 Dead After Bridge Collapse In France**
3. **New $14M AL Bridge Visibly Sags**
4. **Obituary: David Beamish, DeFelsko President**
5. **Cost of Mexico's Scrapped Airport Reaches $9B**
6. **Full Demo for NOLA Hard Rock Planned**
7. **EPA Proposes Cleanup for Sherwin-Williams Site**
8. **$2B Vegas Stadium on Time Despite Roof Delay**
9. **Bridge Collapses in Italy, No Fatalities**
10. **Keystone Pipeline Leak Reported in ND**

Fig. 1: View of the interior roof from ground level. Photos courtesy of KTA-Tator, Inc.

It Looks Good from Here!

BY ROBERT S. LANTERMAN, PCS, KTA-TATOR, INC.

A coating failure investigation often begins with a telephone call, where the person on the other end of the line has a problem with a recently completed paint job. Whether the coating failure is on a bridge, tank, pipe, building, floor or some type of equipment, the words and descriptors they use in that conversation begin to create a mental picture of how things look and what the potential causes may be.

It is also not unusual for the failure to look completely different once on-site, as the descriptive words they use can be relative. "Widespread blistering," to an asset owner, may actually culminate in less than 5% of the total surface area, and "some areas of minor peeling," to a contractor, could be greater than 50% of the topcoat peeling once the investigator arrives on-site and performs a complete investigation.

Further, any digital images provided in advance may illustrate only the good or the bad areas. You never really know the magnitude of the failure until you see it for yourself, and even then, you can still be surprised by what you see.

This article describes a reported coating failure at a newly constructed industrial vehicle washing facility. The steel roof decking, roof trusses and vertical columns were all shop-primed and then field-coated after construction. The walls were constructed of water-resistant tile block. Construction of the facility spanned 2016 and 2017, and late in 2018, the telephone call came about the interior roof that "was rusty all over."

BACKGROUND

As mentioned, the steel roof members were shop-primed before being shipped to the construction site, but there was no project documentation for the shop surface preparation and primer application. The project did not have a detailed coating specification—only a brief letter from the coating manufacturer (included in the project building plans) addressing the coatings. The letter called out a high-performance system consisting of an epoxy intermediate coat and two coats of polyurethane for field-coating of the interior steel substrate.

The building's washing stalls contained numerous spray nozzles, hoses and automated brushes. Mass-transit vehicles are periodically rotated through for cleaning. The interior environment consisted of cyclical periods of high humidity, splashing and exposure to mild cleaning detergents.

After being in service for less than a year, a maintenance engineer at the facility raised concerns about the visible rusting on the ceiling structure. As a result of those visual observations, an independent investigation of the coating problem was requested by the facility owner.

SITE INVESTIGATION

Background information provided by the facility owner or contractor is helpful, but is rarely sufficient to tell the whole story of what occurred during project execution. A site investigation is thus necessary to establish the actual condition of the coatings, observe failure patterns and collect samples—all to aid in determining the failure mechanism and repair and/or replacement options.

A visual assessment of the quantity and distribution of disbonding and other visible coating deterioration on the coated surfaces was performed. The initial assessment upon first stepping inside the facility and looking up at the steel roof from the floor was that the coatings on the steel looked to be in good condition. The comment that "the roof was rusty all over" seemed exaggerated from this perspective. "It looked good from here!" (Fig. 1).

A scissor lift was subsequently used to access the roof members—and that is where the initial assessment quickly changed. While the coating on the roof trusses appeared to be in good condition when viewed from the ground, it was obvious that it was in poor condition when viewed from high up (Figs. 2 and 3).

The degree of rusting on the trusses was classified according to SSPC-VIS 2 as Grade 6-S (spot rusting, > 0.3%–1%) on the bottom and easily visible surfaces, and Grade 3-S (spot rusting, > 10%–16%) on the top surfaces and connections. The top surfaces had a rough, porous finish (Figs. 4 and 5, p. 18). Widespread rust staining through the coating was observed throughout

Fig. 2: Rusting on the top surfaces.

Fig. 3: Close-up of rusting on the top surfaces.

the top surfaces, and there were areas observed along the top angle where foreign material was painted over. The coating on the corrugated roof panels themselves was visually in good condition overall, and the degree of rusting was classified as Grade 9-S (spot rusting, > 0.01%–0.03%). Digital images of typical conditions were observed.

The total coating-system thickness was measured using a nondestructive electronic coating-thickness gauge per ASTM D7091. Measurements were obtained at random locations on all the major painted steel components. The total system thickness ranged from 4.4–16.7 mils with an average of approximately 9.2 mils. Thickness values varied throughout the areas measured.

Destructive thickness measurement of individual coats performed per ASTM D4138 revealed two or three layers of paint on the structural steel member surfaces (either a red- or gray-colored primer with one or two coats of a white topcoat). The thickness of the primer ranged from 1–4 mils, and the white topcoats ranged from 5–11 mils. The red and gray layers represented the shop-applied primer.

Coating adhesion testing was performed in random areas on all the major components in accordance with Method A of ASTM D3359. Ratings of 4A–5A are typically considered to represent good adhesion, 2A–3A represent fair adhesion, and 0A–1A represent poor adhesion. The adhesion was rated 4A–5A (good) for all areas tested.

Samples of the coating system were obtained at areas of disbondment for forensic laboratory analysis. Interestingly, sample collection from areas that appeared to be non-failing began to fail (disbond) during the sample collection process.

Table 1: Result of Microscopic Examination of Field Samples.

Sample Description	Layer/Coat	Thickness (mils)
North roof beam, web (three layers)	Top – White	3.2–6.2
	White	6.3–7.0
	Bottom – Red	4.0–4.9
Roof member (thick large chip, three layers)	Top – White with voids	31.3–36.3
	White	8.3–9.3
	Bottom – Gray	0.9–1.2
Roof member (thin small chip, three layers)	Top – White with voids	3.7–4.7
	White	2.2–3.1
	Bottom – Gray	0.5 – 0.8
South beam, bottom flange (four layers)	Top – White	4.1–5.9
	Off-white	1.5–2.2
	White	3.1–3.6
	Bottom – Red	1.8–2.8
Roof cross member, beige, south end bottom face (four layers)	Top – White	0.9–1.2
	White	0.8–1.0
	White	6.3–7.0
	Bottom – Gray	0.5–1.0
Roof cross member (two layers)	Top – White	6.8–7.5
	Bottom – Gray	0.3–1.0

LABORATORY INVESTIGATION

The laboratory investigation consisted of microscopic examination to generate more precise paint-layer-thickness data and infrared spectroscopic analysis to determine the generic type of coatings used.

Examination of the samples was conducted using a digital microscope with magnification capability up to 200X. The coating-thickness data including the number of coating layers and color are shown in Table 1.

Infrared spectroscopic analysis was performed using a Fourier transform infrared spectrometer. This analysis revealed that the specified epoxy and polyurethane coatings were indeed used.

Fig. 4: Representative condition of the coating.

Fig. 5: Close-up of the rough, porous surface.

SUMMARY AND FAILURE MECHANISM

Visual inspection of the steel members revealed widespread areas of corrosion on the top surfaces of horizontal members. These areas exhibited a dull, rough (sandpaper-like), porous surface typical of dry spray. Widespread rust-staining through the coating was observed throughout. These types of defects are indicative of poor application technique.

Dry spray is typically caused by a coating material partially drying before wetting out the substrate. For interior applications, dry spray can be caused by positioning the spray gun too far from the surface, excessive atomization air (if conventional [air] spray is employed), or an inappropriate thinner selection. The dry spray was typically observed on the tops of members; the bottoms and sides of the same members exhibited a smooth, consistent film. The tops of these members were not sprayed directly, with the overspray droplets creating a rough, porous layer.

The average total coating thickness (including the shop primer) ranged from 4.4–16.7 mils. The recommended dry-film thicknesses in the manufacturers' product data sheets were 4–8 mils for the epoxy and 3–6 mils (per coat) for the polyurethane. The specified three-coat system should have a minimum thickness of 10 mils and a maximum 20 mils.

Based on the destructive coating-thickness measurements from the site investigation and the laboratory microscopic cross-sectional examination, the field-applied white coatings were typically below the minimum thickness for the system. While it is not always possible to visually distinguish multiple coats of the same color, based on the actual thickness values, either not all the specified coats were applied, or they were applied too thin (below manufacturer's recommended minimum).

REMEDIAL WORK

Repairs to the coatings would require the complete removal of all existing corrosion, as any corrosion left on the substrate and painted over would continue to progress and cause future coating failure.

This was especially problematic. Spot-repairing all the corroded areas could have been performed by power-tool cleaning in accordance with SSPC-SP 15, "Commercial Power Tool Cleaning." However, due to the widespread defects on the top surfaces throughout the ceiling (and the configuration of the steel), abrasive blast-cleaning in accordance with SSPC-SP 6, "Commercial Blast Cleaning," was likely a better option. But abrasive blast-cleaning presented its own set of challenges. Installation of protective coverings and containment of debris was paramount to prevent over-blast damage to adjacent surfaces and damage to equipment inside the facility.

The recommended replacement coating system consisted of an epoxy primer and mid-coat, followed by a polyurethane finish coat. Significant costs would be incurred for the repair work, versus performing the work correctly the first time.

LESSONS LEARNED

With nearly every coating failure there are lessons that may be learned by factoring in the root cause of the failure and what preventative actions could have been taken to keep it from occurring in the first place. In this case, the coating applicators used poor technique in areas that were not readily visible from ground level. A trained quality-control inspector, with owner-represented quality-assurance oversight, would likely have accessed the areas from a lift, observed the results of these poor application practices and required rework well before the facility was put into service.

ABOUT THE AUTHOR

Rob Lanterman is a Coatings Consultant with KTA-Tator, Inc. He is an SSPC-certified Protective Coatings Specialist and a NACE-certified Level III Coating Inspector with more than 20 years of coatings engineering experience.

THE LOST ART OF CONTROLLING SITE CLEANLINESS: NEW METHODS FOR VERIFICATION & WHY IT'S IMPORTANT

BY ALISON B. KAELIN, ABKAELIN LLC

If you are a QP 2 contractor, have performed lead removal since the 1990s, or own a structure that contains hazardous materials in the existing coating system, then you've seen requirements for preventing environmental releases and maintaining site cleanliness. Major bridge-painting specifications by the Triborough Bridge and Tunnel Authority (TBTA), Delaware River Port Authority (DRPA) and PennDOT, and federal Unified Facilities Guide Specifications (UFGS), among countless others, have multiple references and sometimes even entire sections devoted to prevention of releases, environmental protection, spill prevention and more. SSPC certification programs require environmental-protection and waste-management plans, and SSPC documents such as Guide 6, "Guide for Containing Debris Generated During Paint Removal Operations" describe necessary controls to prevent releases. SSPC-TU 7, "Conducting Ambient Air, Soil and Water Sampling of Surface Preparation and Paint Disturbance Activities" provides monitoring strategies to verify cleanliness. EPA and OSHA require hazardous-waste and hazardous-materials programs, training, spill prevention/control and documentation.

With all that scrutiny, our projects should be pristine during and following work, with few or infrequent releases of any kind. If a release did happen, we'd expect certified contractors to quickly identify it, take prompt corrective action to control and clean the spill, or release and take action to prevent it from occurring in the future, just like it says in all their written programs. Right? Unfortunately, that's not always the case. Instead of preventing releases as required, some owners, third parties and contractors alike believe that it's acceptable to let releases happen and clean them up later. Cleanup often happens days or weeks after the release has occurred.

Often, we incorrectly focus on looking for visible releases from the containment system (such as dust in the air) during abrasive blast-cleaning, which are generally infrequent, rather than looking for visual or measurable releases from platforms, recycling equipment, poor material handling and storage, and removal or relocation of containment systems on the ground, roadways and drainage systems.

It is unacceptable for competent persons, or anyone for that matter, to ignore steel grit or other abrasives, debris or paint chips on the street or ground while completing visible-emission observations and paperwork stating that there are no emissions.

WHAT DO THE REGULATIONS SAY?

Put briefly, a hazardous substance is any element, compound, mixture, solution or substance designated as hazardous by EPA. Designated hazardous substances include arsenic, cadmium, beryllium, chromium, lead and all organic hydrocarbons, among other materials. Nearly every EPA regulation—the Clean Air Act (CAA), Clean Water Act (CWA), Toxic Substances Control Act (TSCA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA)—prohibits "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, emitting, leaching, dumping or disposing into the environment" by any facility defined as "any building, structure, installation, equipment, pipe or pipeline, storage container ... or any site or area where a hazardous substance has been deposited, stored, disposed of, placed or otherwise come to be located ..." EPA updated the lists for hazardous substances in June 2019, which can be found at bit.ly/33jk0fR.

This means that any release of materials containing hazardous substances violates local, state and federal regulations, requires immediate cleanup and requires corrective action to prevent re-occurrence. Larger amounts exceeding reportable quantities must be reported to local and federal regulatory agencies.

When navigable waters or storm drains are present, prevention of releases of oil, diesel and other hydrocarbons are also required under the Spill Prevention Preparedness and Control (SPPC) regulations.

Fig. 1: When recyclable steel abrasives are used, magnets can be employed to evaluate cleanliness. Photos courtesy of the author.

OSHA's Comprehensive Health Standard for arsenic, beryllium, cadmium, hexavalent chromium and lead all require cleanup of releases as soon as possible, typically by HEPA vacuuming.

WHAT DO THE SPECIFICATIONS SAY?

A review of the previously mentioned specifications and others indicates the following consensus requirements.

1. Prevention of releases is required as the first level of control.
2. Immediate shutdown of operations is required until a release is cleaned, and the source is corrected.
3. Immediate cleanup of releases outside of the work area or near drains is required.
4. Daily (at a minimum) cleanup by HEPA vacuums of the work area and surrounding areas is required.
5. Documentation of all releases, actions and cleanup is required.
6. All of the specifications reviewed relied upon visible or visual identification of paint chips, dust or debris as evidence of a release and none of them required the use of soil sampling as a method of verification of cleanliness.

WHY SHOULD WE CARE?

Any abrasive used has the potential to contain any of the above hazardous substances, whether or not the existing coatings contain hazardous substances. Safety data sheets (SDS) for commonly used expendable and recyclable abrasives indicate the presence of hazardous substances. EPA identifies lead in soil as a key transport mechanism because lead and most other metals remain on the top layers of soil for long periods of time, can be re-entrained into the air and can be tracked to other locations, including indoors. Lead allowed to enter storm sewers passes into waterways. Any amount of lead is harmful, especially to children.

Recent studies of childhood blood lead levels versus soil lead levels indicate that there is a direct correlation between the two. EPA housing regulations suggest that soil lead levels in play areas and family yards should be less than 400 ppm and 1,200 ppm, respectively. It should be noted that EPA has not reduced these soil levels since 2001.

HOW TO VERIFY CLEANLINESS AND IDENTIFY CONTAMINATION

There is no consensus on how best to evaluate or quantify site cleanliness in the field, but any visible debris, paint chips or dust is considered to be too much.

SSPC-TU 7 Method 10, "Ground (Soil) Sampling and Analysis for Hazardous and Toxic Substances" provides procedures for the controlled sampling and analysis of ground (soil) prior to project start-up and upon completion in order to assess the effectiveness of the controls of emissions, and to determine if the ground was contaminated from project activities.

While originally used extensively, this method has fallen out of use due to the erratic distribution of previously dislodged paint chips, dust and debris in the soil and the variability in laboratory analysis methods. This method also only identifies a problem after work is finished and does not provide for a meaningful evaluation of ongoing or daily cleanliness.

Soil sampling has largely been replaced by visual evaluations, looking for debris, paint chips, spent abrasive and materials on the ground. This relies solely on someone using an unspecified, undocumented qualitative method to evaluate compliance with the CAA, CERCLA and other regulations.

In the case of visible abrasive, if you see or detect it, it's likely that lead and other hazardous substances are present as well. But what if we wanted to quantitatively determine if hazardous substances are present at the site?

To quantify potential releases, the author offers three new methods for your consideration.

Method 1 – Recyclable Abrasives: The Magnet Method

When recyclable steel abrasives are used, consider employing magnets to evaluate cleanliness (Fig 1). On several jobsites, this author recently used three different types of magnets and two different techniques to evaluate site cleanliness:

- Magnet A: 1 square foot of commercially available magnet material, with no identified strength;
- Magnet B: Neodymium fishing magnets, 250-pound with eyebolt; and
- Magnet C: Neodymium fishing magnets 175-pound with eyebolt.

Magnet A was placed onto the test area and

Fig. 2: In accordance with ASTM D7144, "Standard Practice for Collection of Surface Dust by Micro-Vacuum Sampling for Subsequent Metals Determination" the author collected a sample of visible debris observed near a storm drain.

Table 1: Material Collected from Magnets A and B.

	Arsenic (µg/g)	Beryllium (µg/g)	Cadmium (µg/g)	Chromium (µg/g)	Hexavalent Chromium (µg/g)	Lead (µg/g)
Sample 1 – Magnet A – 1 ft² template (8/11/19)	< 20.0	Not Performed	102	1,350	< 4.0	413
Sample 1 0.45 micron MCE filter (8/27/19)	< 0.05	< 0.005	< 0.0125	1.01	Not performed	1.74
SAMPLE 2 Magnet A – near storm drain (8/27/19)	20.2	< 0.955	218	1,850	2,388	520
SAMPLE 3 Magnet B – near storm drain using 100 cm² template (8/27/19)	231	< 0.980	239	2,180	6,292	482

observed for detectable abrasive. There was minimal visible material.

Magnets B and C were suspended by string above or on the test area. Test areas were either 1 square foot or 100 cm² templates, or random areas (such as along curbs leading to storm drains or areas below the work area). Each magnet was visually observed for material. Samples were also collected from each magnet for analysis for hazardous substances.

OBSERVATIONS

Cover the magnets with a plastic storage bag or other permeable material before use. To use as sample bags, turn them inside out first. Once a magnet has grit on it, it is almost impossible to remove 100% of it. Also, Magnet A was too weak and Magnet B, too strong to use effectively.

Method 2 – Recyclable and Non-Recyclable Abrasives: Vacuum Cassette Method

The author obtained 25 mm carpet dust sampling cassettes with a 45 um MCE filter attached to a low-flow sampling pump set to maximum flow rate (3.5 liters per minute [LPM]). She collected a sample in general accordance with ASTM D7144, "Standard Practice for Collection of Surface Dust by Micro-Vacuum Sampling for Subsequent Metals Determination" and operated the pump for approximately 3–5 minutes. Using this method, she collected one sample of visible debris observed near a storm drain (Fig 2, p. 21).

OBSERVATIONS

In the future, this author would use a high-flow area pump (5–14 LPM) and would operate the

vacuum for a longer period of time (5–10 minutes).

Method 3 – Recyclable and Non-Recyclable Abrasives: Field Chemical Method

The author recently came across *A Field Procedure to Screen Soil for Hazardous Lead*, by Franziska C. Landes, Anna Paltseva, Jennifer M Sobolewski, Zhongqi Cheng, Tyler K Ellis, Brian J. Mailloux and Alexander van Geen.

It provides a field-testing method for lead that involves adding sodium rhodizonate (the chemical used for testing lead paint) to about 1.5 grams of soil (collected and passed through a kitchen sieve) to develop a slurry. The amount of lead in the soil is based on the slurry color.

Laboratory Analysis of Samples

Samples were collected from the material obtained from Magnets A and B and from the vacuum filter, and submitted for analysis for total lead, beryllium, cadmium, arsenic, chromium and hexavalent chromium. The results are shown in Table I.

The results indicated that in all cases and methods, hazardous substances, except for beryllium, were discovered in areas where abrasives were visible or detected using a magnet. In the case of cadmium, lead and chromium, the materials may have also tested as hazardous if subjected to a TCLP test, using the 20:1 rule. For example, because the hazardous waste threshold for lead is 5 mg/L, total lead results of 5 times 20, or greater than 100 ug/g, could potentially test hazardous by TCLP.

HOW TO CLEAN UP

Cleanup should always be performed with HEPA-equipped vacuums. Often, workers use metallic brooms for cleanup. While this will pick up grit, lead and the other hazardous metals are non-magnetic, so will not be picked up. Brooms, brushes and other materials should not be used as they can re-entrain the hazardous substances into the air.

CONCLUSION

We are required by law to prevent emissions of hazardous substances and when we do not do so, we put water, soil, people and animals at risk. Owners, contractors and third parties have an obligation to prevent releases and verify that the prevention is effective. Cleanliness should be evaluated visually every day and any releases should be cleaned up as soon as they are observed.

When necessary, or to provide additional protection, the previously described methods may provide additional ways to quantify the extent and the impact of a release, including the boundaries of where a release occurred, and the amount and types of hazardous substances released. It did not take long to conduct any of these methods, and the cost of laboratory analysis was reasonable.

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1986

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1991

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PARTNERING WITH THE U.S. NAVY:

WATER-STORAGE TANK MAINTENANCE ON A GLOBAL SCALE

BY GREGORY "CHIP" STEIN, TANK INDUSTRY CONSULTANTS

Fourteen countries, 20 states, and 76 bases—that sounds like quite a deployment! But what if, instead, you are charged with the evaluation and maintenance of over 500 water-storage tanks and related structures on those bases. Who would you turn to for professional guidance? How would you keep all of the details of the structures' conditions and recommendations for maintenance organized in a manner that would allow you to rate and prioritize tank-maintenance requirements?

The U.S Navy originally awarded Tank Industry Consultants an indefinite delivery/indefinite quantities contract for water-storage-tank engineering services worldwide in 2003. The contract has been renewed multiple times and is still in effect. Throughout the years, this partnership has grown and developed into an efficient program of monitoring and maintenance of the Navy's global inventory of tanks at naval facilities worldwide, and is a textbook example of how a consistent approach to professional tank engineering and inspection can benefit a tank owner with either hundreds of tanks, or only a few.

MOBILIZATION OF EQUIPMENT AND CREWS

As you can imagine, a great deal of time and effort goes into mobilizing equipment and crews to some of the more remote bases. Circumstances change and resolving issues on the fly becomes critical. For instance, during a recent deployment to Singapore, the naval transport carrying the field crew and equipment developed mechanical problems, and the crew had to wait 10 days to secure alternate transportation. In Japan, the field crew, along with their military escort, tramped through jungles to locate the tanks to be inspected. Equipment shipped to Bahrain took five months to be returned. Some island locations require the use of barges and private planes to reach the facilities, and armed escorts are required in other locations.

The myriad types of tanks owned and operated by the Navy require skilled professionals with many years of experience and expertise with all types and styles of structures, such as above-grade, elevated, buried, partially buried, vertical and horizontal tanks constructed of a variety of materials, including:

- Steel—welded, bolted and riveted;
- Concrete;
- Stainless Steel;
- Fiber-Reinforced Plastic (FRP);
- High-Density Polyethylene (HDPE); and
- Earthen.

Fig. 1: Water-storage standpipe with aluminum jacketing. Photos courtesy of the U.S. Navy.

Some of the tanks are equipped with typical roof structures, some have wooden roofs and others have open-topped roofs. Some are inside buildings and some are multi-chamber structures. Technicians use

(Left) Viktoria Fokina / Getty Images

Fig. 2: A stainless steel water-storage tank, one of the unique types of water-storage tanks encountered at naval facilities worldwide.

proven techniques for conducting thorough, detailed evaluations of the tanks, providing all of the information required for tank operation and maintenance.

EXECUTION OF STRUCTURE EVALUATIONS

Tank evaluations are all-inclusive of a tank's structural, sanitary and safety conditions and must note deficiencies according to applicable OSHA, ASTM and American Water Works Association (AWWA) standards for the type of construction of the tank.

There are currently three popular methods of evaluating tank interiors, including a drained (dry) evaluation, an underwater evaluation performed by divers and a robotic inspection. Each of these inspection methods is utilized based on the operational requirements of the water system. Many of the tanks evaluated for the Navy must remain full for the inspection due to their importance in providing water for fire protection. In these situations, remote-operated vehicles (ROVs) perform evaluations of the tank interior, or a certified commercial dive team performs a dive inspection of the tank interior in strict accordance with *U.S. Navy Diving Manual*, ACOE EM385-1-1 and OSHA Diving Standards.

During the field evaluation, technicians access the external tank surfaces by rigging and rappelling down the exterior to identify safety or structural deficiencies. The exposed portions of the concrete tank foundations and walls are visually inspected to locate cracks, spalling, erosion or other types of deterioration. At a minimum, the following items are addressed:

- Measurements are taken of tank members and accessories;
- Coating adhesion measurements are taken (if coatings are present);
- Coating thickness measurements are taken (if coatings are present);
- Coatings on tank appurtenances are evaluated;
- Sanitary deficiencies are identified;
- Safety deficiencies are identified;
- Structural deficiencies due to deterioration are identified;
- Irregularities or unusual circumstances are identified; and
- Photographs are taken to further document the condition of the tank.

The evaluation crew must have rope-access qualifications and specialized equipment needed to act as primary rescue in the event of an emergency. Prior to the commencement of fieldwork, the Navy is provided with site-specific health-and-safety programs (HASPs) and a certificate of third-party training with elements of tower-climbing, self-rescue, rope access and high-angle rescue for all climbing personnel. No hazardous materials are used in fulfillment of this assignment.

COATING EVALUATION

Coating samples taken during the field evaluation are tested for lead, chromium, zinc and cadmium content. Based on the findings of the coating evaluation, the environmental concerns that need to be addressed during the cleaning and painting of the tank are determined and plans are made for containment, testing and disposal requirements that must be included in the project specifications. A corrosion survey, which includes an investigation of the condition of any cathodic protection anodes, wiring and the control unit (the system's impressed current potential rectifier) installed on the tanks is performed, with recommendations made for repairs necessary to maintain an adequate and functional cathodic-protection system.

STRUCTURAL REVIEW

As part of the evaluation, the technicians identify any observed structural deficiencies or damage that may have occurred since the tank was erected. These deficiencies include deviations of existing tank conditions from the tank's original construction. Any deficiencies found will be analyzed for their effect on the structural integrity of the tank.

EVALUATION REPORT

An engineering report concerning the condition of the tank, certified by a Licensed Professional Engineer, is issued for each tank. The reports are provided in the NAVFAC EXWC report format.

SAFE WORKING PRACTICES

Safe working practices are paramount when working around all the various types of equipment, buildings and machinery maintained on each base. Operations must be conducted in strict conformance with OSHA and the Department of the Army, Corps of Engineers EM-385-1-1, *Safety and Health Requirements Manual*. To fulfill the Navy's stringent safety requirements, divers must perform dive evaluations in accordance with the very latest dive regulations—both OSHA and Navy requirements.

Fig. 3: Tripod rescue training, part of the specialized safety training required for technicians accessing water-storage tanks at naval facilities around the world.

COMPUTERIZED MAINTENANCE MANAGEMENT PRIORITIZATION SYSTEM

To aid the Navy in tracking the condition of their tanks, TIC developed a Computerized Maintenance Management Prioritization System to monitor and prioritize tank maintenance. A computerized management tool for comparing the relative overall condition of tanks within the same water system simplifies long-term maintenance prioritization. The rating and maintenance-prioritization system also includes provisions for estimating the cost of forecasted maintenance.

DATABASE DEVELOPMENT

From the information gathered during the field evaluation and the engineering report, individual numerical ratings are applied to various aspects of the structural, sanitary, safety, coating and corrosion adequacies of the tanks. The ratings are obtained by choosing the numbers corresponding to the most correct answer listed for a variety of questions presented in an evaluation booklet. The entire tank is evaluated, beginning with the immediate tank site and moving on to the foundation, anchor bolts (if present), shell, roof, and both the interior and exterior of the tank. All tank accessories, such as ladders, balcony safety railing, vents, overflow piping and interior piping are evaluated. These individual ratings are then transferred to the database.

The ratings and prioritization system program perform multiple logical and mathematical functions to determine, among other things:

- Style of tank;
- Condition of the exterior coating (if present);
- Condition of the interior coating (if present);
- Safety rating;
- Sanitary rating;
- Structural rating; and
- Overall comparative rating.

The system rates and prioritizes tanks by five standardized criteria:

- Structural requirements;
- Sanitary requirements;
- Safety requirements;
- Painting, corrosion, and general maintenance requirements, and;
- A weighted combination of the previous four.

This variety of criteria allows the Navy to base the maintenance schedule on multiple considerations such as structural integrity, liability risks, corrosion prevention, the importance of aesthetic appeal, and conformance to sanitary and safety standards.

ECONOMIC FACTORS

The rating system also provides estimated economic factors for each tank based on an anticipated scope of work. These economic factors allow the Navy to more confidently prepare a yearly maintenance schedule and establish accurate budget requests up to five years in advance.

SELECTION OF A QUALIFIED ENGINEERING AND INSPECTION CONSULTANT

Choosing the right water-storage-tank engineer is critical. *AWWA Steel Water-Storage Tanks Manual M42* makes the following recommendations to guide the selection process.

1. The consultant should be a registered Professional Engineer with extensive experience in water-storage-tank engineering and inspection.
2. The engineer should have an extensive knowledge of:
   a. Industry standards;
   b. Traditional engineering disciplines;
   c. Specialized training;
   d. Tank construction practices; and
   e. Surface cleaning and cleanliness standards.
3. The engineer should possess effective communications skills to:
   a. Interpret specifications; and
   b. Resolve potential issues.

Fig. 4: High-angle rescue training, another integral part of the specialized safety training required for technicians accessing water-storage tanks at naval facilities worldwide.

4. The engineer should have climbing abilities and knowledge of:
   a. Proper rigging;
   b. Safety practices; and
   c. Respect for heights.

The Navy has developed selection criteria for the tank consultant as well. Key points of their evaluation process follow.

1. Professional qualifications and technical competence of the team proposed for the project.
   a. Inspection team members are evaluated based on certifications earned that are generally accepted by the water-tank industry including NACE and SSPC QP.
   b. For design and analysis, professional qualifications include professional registrations of the design personnel assigned to the project.
   c. Diving personnel requirements include diving training, the ability to meet OSHA safety standards and dive industry standards.
2. Specialized experience in the type of work required.
   a. Evaluation of both interior and exterior coating systems.

including lead-based and heavy-metal coatings.

b. Evaluation of the tank for compliance with existing structural, sanitary, safety standards and codes.

c. Design and engineering services for repair of water tanks.

d. Evaluation of both impressed-current and sacrificial-anode-type cathodic protection systems.

3. Past performance on projects of similar scope.
4. Demonstration of long-term public or private business relationships.
5. Repeat business on related efforts and construction support are valued.
6. In-place quality-control and safety-assurance procedures or programs for conducting both dry and wet inspections.
7. Capacity of the firm to perform the work in the required time period.

Both of these sets of criteria should be considered when preparing a Request for Qualifications (RFQ) for water-storage-tank engineering and inspection contracts.

An effective tank management program includes four major elements.

1. Tank evaluations every three to five years as recommended by AWWA. Of the more than 500 Navy tanks evaluated by TIC, more than one-third have been evaluated more than once since 2005, and several have been evaluated multiple times, despite the remote locations of many of the tanks.
2. Preparation of detailed technical specifications based on the observations and recommendations of the certified engineering report and the work authorized by the tank owner. Project specifications should be prepared in accordance with AWWA, API, NACE, NFPA and SSPC standards; local, state and federal laws; and all specific requirements. Specifications should include a level of detail adequate for contractors to provide competitive bids for the rehabilitation project.
3. Observation of the contractor's workmanship is the most important part of tank painting and repair projects. The

most well-written, thorough specifications do not assure that the project is completed correctly. Technicians experienced in tank repair, painting and erection, and familiar with proper coating-application techniques and the underlying reasons for tank painting standards should monitor the contractor's work. The observation technicians (inspectors) should have access to supplemental technical and engineering support for any special problems that might occur.

4. Development of a method for rating and prioritizing tank maintenance in order to compare the relative overall condition of tanks within the same water system will simplify long-term maintenance prioritization. With today's emphasis on infrastructure maintenance, the need for a procedure to rate and prioritize tank-maintenance requirements has become increasingly evident. This is especially critical for sites with more than one tank. The rating and maintenance-prioritization system should also include provisions for estimating the cost of the forecasted maintenance schedule.

CONCLUSION

Tank management is much the same for five tanks within a few miles of each other as it is for hundreds of tanks scattered throughout the world. Lessons learned from this global partnership may be applied to large and small tank systems everywhere.

ABOUT THE AUTHOR

Gregory R. "Chip" Stein, P.E., is Managing Principal of Tank Industry Consultants, specializing in the evaluation and design of steel-plate and concrete structures of all types. Stein is responsible for scheduling and overseeing all work conducted by TIC's staff of civil, mechanical, chemical and structural engineers, and specially trained field staff.

He is extensively involved in industry-related activities and has presented papers at AWWA, SSPC and NACE regional and national conferences. Stein chairs the AWWA Standards Committee on Steel and Composite Water Storage Tanks, the D101 Standard Subcommittee for Inspection of Water Tanks and Related Facilities Revision Task Force, and the AWWA M42 Manual Revision Task Force. He sits on the Board of Directors for the Steel Tank Institute and previously chaired the STI Field-Erected Steel Tank Committee. Stein holds a Bachelor of Science degree in mechanical engineering from the Rose-Hulman Institute of Technology with a concentration in structural and material analysis and an MBA from Indiana University. **JPCL**

THERMAL INSULATIVE COATINGS:

CORROSION MITIGATION & BURN PROTECTION

BY BRUCE TOEWS, GLOBAL MARKET DIRECTOR – OIL & GAS, AND JOHNNY C. POURCIAU, OIL & GAS MARKET DIRECTOR, SHERWIN-WILLIAMS PROTECTIVE & MARINE

Temperatures on the external surfaces of equipment throughout petroleum refineries and chemical processing plants—including process piping, tanks, vessels and ductwork—can reach well above OSHA guidelines for incidental skin contact and must be properly insulated to mitigate burn potential.

Two primary options for burn protection exist: the traditional method of covering hot surfaces with insulation and cladding to protect the insulation, and a more modern method using thermal insulative coatings. While both enable plants to meet OSHA's guidelines for burn protection, the options differ in terms of installation, maintenance, insulation values and corrosion potential.

Traditional systems mitigate burn potential and offer high insulation values, particularly when first applied. However, they are susceptible to water infiltration. Water significantly reduces insulating properties and, worse, causes corrosion under insulation (CUI), a hidden and costly problem that can lead to serious plant hazards (Fig. 1).

Thermal insulative coatings, alternatively, require no external insulation system to mitigate burn potential (Fig. 2). With a few layers of material, coated surfaces remain safe to touch on assets running at temperatures up to 350 F (177 C). The need for insulation and metal cladding to mitigate burn potential is eliminated, and with it the threat of CUI. Further, by insulating process fluids and gases inside assets, thermal coatings help systems retain process heat up to approximately 275 F (135 C). Therefore, insulative coatings are an ideal option to reduce corrosion for applications that require pipe and vessel contents to remain at moderate temperatures—such as asphalt storage tanks, pressure vessels and process lines—as well as applications that reach up to 350 F when the additional heat retention is not required, such as steam exhaust lines.

Fig. 1: CUI has eaten away at the surface of this process pipe, which was previously covered with a traditional insulation and cladding system. Figures courtesy of Sherwin-Williams Protective & Marine.

PERSONNEL SAFETY

Surfaces throughout a plant—including boilers, compressors, containers, ductwork, heaters, piping, pumps, stacks, tanks, valves and vessels—can easily reach temperatures that create burn hazards, causing skin to blister and burn after only a few seconds of incidental contact with a hot surface. OSHA's published limit is a maximum skin temperature of 140 F (60 C) after five seconds of exposure. By definition, no reportable injury will occur at this skin temperature and exposure time. A traditional surface temperature probe

Fig. 2: Using a thermal insulative coating (left) on processing ductwork prevents the hidden and costly threat of CUI that comes from using traditional insulation and cladding systems (right).

Fig. 3: Processing tanks coated with thermal insulative coatings protect personnel from burns, without the threat of hidden CUI.

will not provide an accurate reading of skin temperature, due to the wide variability of substrate thermal conductivities. Instead, in laboratory testing of coated surfaces, an instrument called a thermesthesiometer is required to determine skin temperature after a given exposure time.

Exterior surfaces of ductwork, piping and vessels are safe to the touch when coated with thermal insulative coatings because the coatings prevent heat from internal fluids and gases from radiating to the surface (Fig. 3). Inside the coatings, ceramic microspheres—small beads filled with air—create a high air content in the final dried surface. The air serves as an ideal insulator: It limits the transfer of heat energy through the coating so exterior surfaces remain safe to touch for at least the OSHA-mandated five-second threshold. Even dangerously hot systems like steam piping and boiler ductwork may be coated to prevent burns.

APPLICATION AND MAINTENANCE

Plants applying traditional insulation systems must typically shut down processes that produce heat in the process areas being insulated. Once surfaces have cooled, workers engage in a time-consuming process: remove and discard the old insulation, inspect all areas for surface corrosion, potentially abrasive blast and coat any areas that have corroded, and then rewrap the entire area with insulation and cladding. Fitting bulky insulation around curves, tight spaces and valves takes even more time.

A plant may not have to shut down any processes to apply thermal insulative coatings. Advanced single-component, waterborne acrylic insulative coatings can be applied to ambient or hot surfaces with temperatures up to 350 F (177 C). This flexibility saves plants significant downtime by enabling them to keep processes running while performing maintenance.

Maintenance personnel can apply thermal insulative coatings to a prepared and primed surface or directly to an intact, existing coating. The substrate must be tightly adherent and sound, and compatible with the coating.

Each coat is approximately 20 mils thick. The number of coats required, as well as the associated material costs, depend on the operating temperature of the system: Systems operating up to 250 F (121 C) may need only two to three coats, for example, but systems reaching temperatures up to 350 F may require as many as five coats to ensure surface temperatures are below OSHA's skin-contact threshold. Substrates above 350 F exceed the temperature resistance of the acrylic resin and will still require a conventional insulation and cladding system. OSHA compliance of an insulative coating system should be laboratory-confirmed using a thermesthesiometer.

For inspections, traditional insulation systems require more steps than coated surfaces. Insulation systems—because they hide metal surfaces from view and have a void space prone to moisture infiltration—are subject to CUI inspection protocols, which require visibly inspecting the surface of the metal. Some process vessel, tank and piping inspections also require ultrasonic testing to assess the metal thickness and monitor for internal corrosion. For either or both inspections, personnel must remove some insulation material and cladding and/or install inspection ports, allowing easy access to the metal surface. The likelihood that water or moisture vapor will penetrate the metal cladding increases with both actions.

Assets protected by thermal insulative coatings are removed from CUI inspection protocols because their external surfaces are exposed. Only periodic visual inspections as prescribed by the plant's maintenance schedule are required to ensure that coatings are intact and are still providing corrosion protection to the substrate. Coating inspections are fast and inexpensive compared to those for conventional insulation and cladding.

MITIGATING CUI

Globally, CUI is one of the costliest problems facing processing plants today. According to *Steam Digest: Volume IV*, "Insulation Management and its Value to Industry," annual CUI maintenance costs for inspection, prevention and remediation total $250,000 and $500,000 for average mid-size chemical plants and refineries, respectively.

CUI starts when water infiltrates the metal cladding protecting a traditional insulation system. Water sources include rainfall, cooling tower drift, steam discharge, wash downs and/or condensation. The cladding traps the water and keeps the insulation moist. Next to the substrate surface, the insulation forms an annular space or crevice that retains the water and other corrosive substances from the environment and from the insulation materials themselves. That corrosive mixture eats away at the metal surface. The result? Corrosion cells that will ultimately lead to metal loss, fluid or gas leaks, and potential explosions.

Plants can eliminate the risk of CUI altogether when using thermal insulative coatings. Coated surfaces do not require cladding, eliminating the opportunity to trap moisture against metal surfaces. Coatings also create a barrier to prevent moisture and condensation from contacting the metal substrate, effectively removing the risk of hidden CUI.

A plant choosing a traditional insulation system can still mitigate CUI concerns by applying a specially designed CUI-resistant coating to the substrate. The coating is formulated for immersion service in the chemical-laden water that is present, so the metal surfaces will resist corrosion even if moisture is trapped against them.

MAJOR SELECTION CRITERIA

Four key criteria can aid plant operators when choosing between traditional insulation systems and thermal insulative coatings to protect personnel from burn injuries.

1. How well is safety enhanced? Both methods provide similar protection.
2. How easy are installation and maintenance? Coatings offer simpler installation and minimal inspection requirements.
3. Is CUI a concern? Coatings eliminate the threat of CUI.
4. How efficient are insulative properties? While insulation systems offer greater heat-retention capabilities, coatings provide sufficient insulation for many applications. The process and operating environment will dictate the choice.

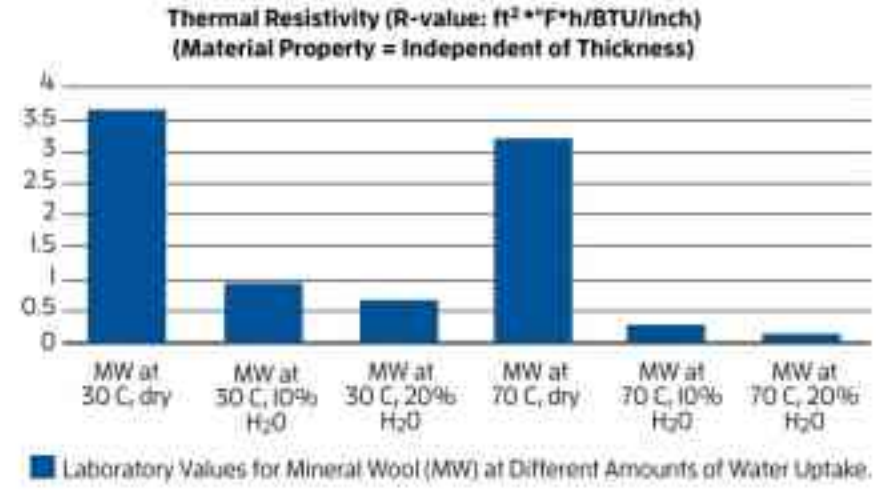

Fig. 4: Lab testing of wet insulation versus dry insulation. The R-value of an insulation system drops rapidly as water infiltrates the system and humidity rises.

Fig. 5: Although this asphalt tank operates at up to 220 F (104 C), five coats of spray-applied insulative coating provide a safe-to-touch surface, while also helping to conserve process heat.

PROCESS TEMPERATURES MAINTAINED

Maintaining the designed process temperature inside piping and vessels is critical if plants are to minimize energy consumption and ensure process flow. In cold conditions, for example, hydrocarbons increase in viscosity as they lose heat while passing through exposed piping. This forces a plant to increase pumping pressure and/or increase heating needs—both of which increase operating costs. To control energy loss, some form of insulation is necessary.

When first installed, traditional insulation systems have been proven to provide high insulation R-values, per lab tests. These systems, however, typically lose a significant portion of their stated R-value shortly thereafter—a loss driven by infiltration of water and/or water vapor into the insulation material, which displaces the air content that had initially provided the stated R-value. Lab testing at 160 F (70 C) has shown that typical mineral wool insulation material will lose up to 85% of its R-value when 10% water-by-volume is present in the material (Fig. 4). Alternative insulation materials under cladding may provide better heat retention when wet, but they are consistently susceptible to water infiltration and therefore will lose R-value. Conventional insulation systems will also provide inconsistent thermal properties due to varying levels of humidity under the cladding, a phenomenon that makes the thermal efficiency of a process unit unpredictable.

The main purpose of an insulating system is to protect the production process. Thermal insulative coatings are designed primarily to protect personnel by mitigating burns, not to insulate processes. However, their inherent insulative properties allow coatings to provide sufficient insulation to help process fluids and gases retain heat and maintain flow through piping and ductwork.

Insulative coatings, due to their relatively low thickness, cannot offer R- values at the stated values of dry conventional insulation. But conventional insulation systems are very rarely fully dry and delivering their stated insulation efficiency. If they were dry, no electrolyte would be present to drive the CUI development previously described.

In providing initially lower, yet consistent

Fig. 6: A spray-applied insulative coating is helping to minimize burn hazards to personnel, as well as maintain the internal temperature of this crude-oil pipeline, which operates at 180–200 F (82–93 C) with spikes to 350 F.

and predictable insulation to piping, tanks and vessels, insulative coatings have been shown to be effective. They are especially effective for insulated assets operating at temperatures of 150–275 F (66–135 C). Asphalt storage tanks (Fig. 5), pressure vessels and process lines (Fig. 6) are excellent candidates for this technology.

Thermal insulative coatings are typically applied in multiple coats, depending on the commodity temperature and level of thermal insulation required. With each additional layer, their insulation value goes up. Plant owners can use thermal modeling software to help estimate the insulation efficiency achievable with thermal insulative coatings under ambient and process conditions. This software helps to determine if the desired insulation efficiency can be achieved, along with how many coats are needed. Such modeling can help owners and operators determine whether thermal insulative coatings are an option compared to traditional insulation systems.

CONCLUSION

To protect personnel from burns and meet OSHA requirements, refinery and processing-plant operators have traditionally opted for bulky insulation systems with cladding to provide protection from hot surfaces. Those systems, however, have drawbacks such as extensive maintenance needs, requirements for plant downtime and an increased risk of CUI. Thermal insulative coatings can offer the required burn protection, as well as reduced maintenance and downtime, and the elimination of CUI.

ABOUT THE AUTHORS

Bruce Toews is Global Market Director – Oil & Gas for Sherwin-Williams Protective & Marine. Previously, he was the Global Market Director for Process Industries and the Vice President of Global Accounts for Sherwin-Williams Protective & Marine. His 30-year coatings industry experience includes work as Sales Director and the Vice President of Sales for the International Division. He also has marketing management and sales management experience. He is a NACE Coating Inspector Program (CIP) Level 3 instructor as well as a committed NACE International and SSPC: The Society for Protective Coatings member.

Johnny C. Pourciau is Oil & Gas Market Director – United States, Canada and the Caribbean for Sherwin-Williams Protective & Marine. He has 24 years of experience in coatings. He has been a NACE Level 3 Certified Coating Inspector since 2001 and is a member of NACE International and SSPC: The Society for Protective Coatings. He holds a Bachelor of Arts from Louisiana College. ***JPCL***

CATHODIC PROTECTION AND PIPELINE COATINGS: A CRASH COURSE FOR PAINTERS

BY BRIAN GOLDIE, TECHNOLOGY PUBLISHING CO.; AND BRIAN WYATT, CORROSION CONTROL ASSOCIATES LTD

Those involved in pipelines will often find that cathodic protection is specified together with protective coatings for corrosion protection. However, to most coating technologists and applicators, cathodic protection is an unknown technology, and many do not understand how it operates.

Cathodic protection (CP) is a technique to control corrosion of a metal by making it the cathode of an electrochemical cell. It is not a new process, having been first invented by Humphry Davy in the 1800s to protect the iron nails used to fix copper sheathing to the wooden hulls of U.K. naval vessels by using galvanic or sacrificial anodes of zinc or iron. Although successful in preventing the corrosion of the nails, it also reduced the corrosion of the copper, affecting its intended ability to prevent marine growth.

In the early 1900s, patents for CP of buried pipelines were filed by German Herbert Geppard. It was not used extensively until the 1930s, when the rapidly expanding oil industry in North America suffered extensive corrosion leaks to both coated and bare-steel pipelines.

CP by both zinc galvanic anodes and impressed current systems was very successful in preventing the corrosion and reducing the leak frequency. CP was applied to marine terminal pipelines in Bahrain in 1938 and by the 1950s, cathodic protection was regularly used throughout Europe. Due to its proven success, it is now mandated for many uses including offshore oil and gas facilities and onshore buried pipelines.

CP can only be applied to metals that are buried or immersed, or encapsulated in a conductive solid or liquid, such as steel reinforcement in concrete, or the insides of water-filled tanks or pipes. It is commonly used together with protective coatings to prevent corrosion when and where the coating is damaged. CP can increase the life of a coating as it can prevent corrosion undercutting of the coating, which would otherwise accelerate coating failure. However, to explain how CP works, we must first look at the principle of corrosion of metals.

THE CORROSION REACTION

In the protective coatings industry, we are mainly concerned with protecting steel structures, so the following discussion on corrosion and its protection by CP will be restricted to steel and irons. Cast and ductile irons corrode at very similar rates to steel when buried or immersed.

To extract a metal from its naturally occurring ore requires a lot of energy. If you can imagine that this energy is stored in the refined metal, the metal becomes unstable with respect to its environment and wants to return to a more stable, lower-energy, state. For example, iron or steel want to revert to iron oxide, or rust (they want to corrode). Similarly, we are normally concerned with protecting a structure from wet environments where iron (or steel) corrodes producing a hydrated form of iron oxide—the red rust we all recognize.

Corrosion is an electrochemical process involving the passage of an electric current

(electrons) between two sites with different chemical processes. The two chemical processes are oxidation, which happens at what are termed anodic sites, and reduction, which happens at cathodic sites.

At the anode, the oxidation process is where the solid iron (Fe) or steel passes into a solution (corrodes) to form soluble ions (Fe^{2+}, which are positively charged) and electrons (negatively charged), represented in the following equation.

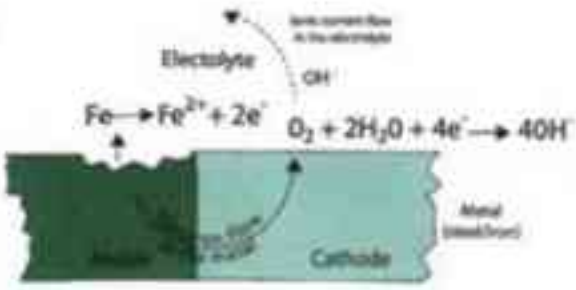

Fig. 1: Mechanism for anodic or cathodic potential. Figures courtesy of the authors.

$$Fe \rightarrow Fe^{2+} + 2\,e^{-}\ (electrons)$$

In this process, there must be a balance of charge (energy is not lost or generated). Therefore, to reach this balance, electrons must pass through the iron or steel to the site where the opposite reduction reactions occur. This site is known as the cathode, where, in the presence of oxygen and water, the electrons are involved in the following reaction.

$$O_2 + 2\,H_2O + 4\,e^{-}\ (electrons) \rightarrow 4\,OH^{-}$$

By electrical convention, the flow of direct current in an electrical circuit is actually in the opposite direction to the direction of electron flow. So, at the anode (where the corrosion occurs), low-voltage DC power flows off of the iron or steel into the surroundings (what we term the "electrolyte" in our applications). The current is carried in the electrolyte by the movement of charged ions like OH^-. The magnitude of current is directly proportional to the rate of corrosion; simplistically, 1 amp passing for one year will be associated with the loss into solution of about 10 kg of carbon steel. The overall reaction follows.

$$2Fe + O_2 + H_2O \rightarrow 2Fe(OH)_2$$

This reacts further, resulting in the hydrated iron oxide.

$$4Fe(OH)_2 + O_2 + 2H_2O \rightarrow 2Fe_2O_3.H_2O$$

However, as mentioned previously, there must be a balance of charge and no energy lost or created. Therefore, the reactions at the anode can only proceed in balance with the reactions at the cathode. The anode and cathode in the corrosion cell can be two dissimilar metals connected together, or may be sites close together on the same metal surface, and the driving force for corrosion is the difference in potential between them, which causes a flow of current (or electrons) between the sites of anodic reactions (oxidation) and the sites of cathodic reactions (reduction).

Particular sites may become anodes or cathodes because of the natural corrosion potentials of the different metals in the soil or water (such as steel, a corroding anode, connected to copper or brass, non-corroding cathodes); because of metallurgical variations in the metal surface (grain boundaries or composition variations); or by differences in the environment (composition, flow rate, oxygen content and others) (Fig. 1).

HOW CP FITS IN

The principle of CP is to overcome or reverse the corrosion current that flows off of the corroding anodic sites, into the electrolyte. If this current can be prevented, it will stop the corrosion; in more theoretical terms, an excess of electrons is provided in the metal at the anodic site, and this forces the reaction to go from right to left, or to be suppressed. The corrosion current is overcome by the cathodic-protection current, which flows from an anode, buried or immersed in the same electrolyte as the steel or iron, onto the steel or iron.

The CP current is forced to flow from the electrolyte onto the iron or steel. This is done through:

- Galvanic, or sacrificial anode CP: by connection of an external anode, which is more active (or wants to corrode more than the iron or steel) to the metal surface to be protected. The anode's own corrosion causes the CP current to flow from it, through the electrolyte onto the steel, making it a cathode; or
- Impressed-current CP: by using an external DC power source and an inert anode in the electrolyte, so that an electric current flows from the anode through the electrolyte onto the steel, making it the cathode.

As seen from the previous corrosion reactions, iron is only lost from the anodic areas where there are electrons released. Therefore, by providing an excess of electrons, making the entire steel surface the cathode, no corrosion occurs.

Most paint technologists are aware of the problem of bi-metallic corrosion, which occurs when two dissimilar metals are in direct contact—in which case the less noble (more active) metal will corrode. This is the same principle as cathodic protection, although in this case dissimilar metals are deliberately joined together, so that the less noble metal corrodes to protect the steel structure.

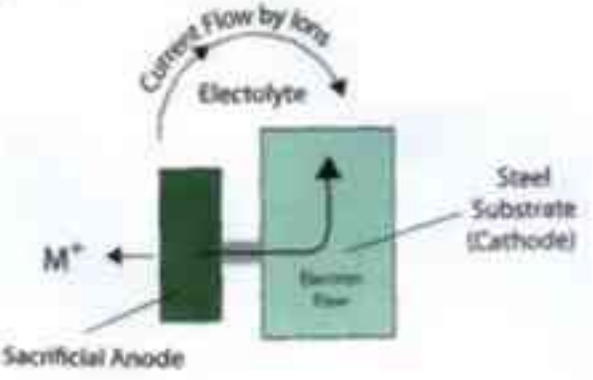

Fig. 2: Galvanic cathodic protection mechanism.

The external source of electric current (electrons) can be a sacrificial (galvanic) metal anode typically of zinc, aluminum or magnesium, all of which corrode preferentially to the iron or steel to which they are connected. Alternatively, the CP current can be provided by an external DC

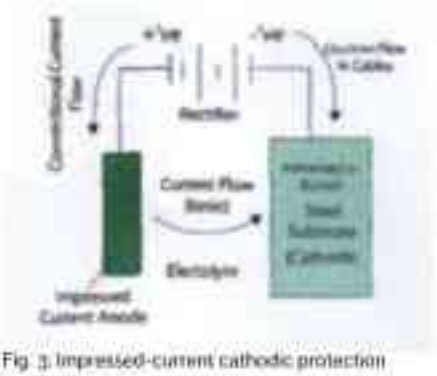

Fig. 3. Impressed-current cathodic protection mechanism.

power supply, such as a mains-powered transformer/rectifier or a battery that may be maintained with solar and wind power. In this case, the DC-positive terminal is connected to the CP anode (typically a corrosion-resistant material such as mixed metal oxide, MMO, coated titanium or a cast iron-silicon-chrome alloy), and the negative terminal is connected to the steel or iron being protected.

In both cases, irrespective of the generating source of current (such as corroding zinc, a battery or a transformer/rectifier), it flows from the anode through the electrolyte, onto the steel or iron being protected. If enough current flows onto the steel to overcome the corrosion current (or a sufficient surplus of electrons), the corrosion will be stopped.

GALVANIC ANODES

Galvanic anodes are metal castings that are physically (either metallically or electrically) connected to the metal to be protected—normally by welding a steel core (which is cast into the anode) to the metal being protected.

The anode material is selected from one with a more negative (or more active) electrical potential than steel, as defined by their relative positions in the galvanic series. This difference in natural potential causes a positive current to flow from the anode to the steel through the electrolyte, making the surface of the steel more negatively charged and hence the cathode of the corrosion cell. In this situation, the anode material corrodes, or sacrifices itself, to protect the steel (Fig. 2, p. 37). Of all the metals that are more reactive than steel, those most commonly used as cathodic-protection anodes are alloys of aluminum, zinc and magnesium.

With this said, connecting carbon steel to copper or stainless steel in seawater will almost certainly increase the corrosion of the steel, because it is more active (more negative) than the copper or stainless. The same would appear to be the case for titanium, but in practice, the protective insulating oxide films that form on the titanium and provide its corrosion resistance, also limit the "galvanic current" flowing between the steel and the titanium.

Further, as previously stated, connecting the appropriate alloys of zinc, aluminum or magnesium to steel will reduce—and, if done sufficiently, stop—the corrosion of the steel.

Looking now at paint technology, active pigments are often used to control corrosion. Protective coatings either contain anticorrosion pigments such as zinc phosphate, which retards the reactions occurring at the cathodic and anodic sites, or coating applicators use zinc-rich primers.

The latter could be classified as a special case of cathodic protection. In this case, the anode is the zinc metal powder rather than a solid lump of zinc. The zinc powder has a very high loading in the primer, such that the zinc particles touch each other and also are in contact with the steel surface, and hence there is electrical continuity. The zinc then corrodes preferentially to the steel substrate.

Similarly, galvanized steel is a form of cathodic protection. If the zinc coating is damaged and the underlying steel exposed, the surrounding areas form a galvanic cell and the zinc corrodes to protect the bare steel.

Galvanic anodes are widely used in the protection of cargo and ballast tanks on ships; for the external hulls of smaller vessels; for most offshore oil, gas and electricity-generating wind farm facilities; and for internal and external protection of flood defense and lock gates. Generally, anodes of zinc or aluminum are used, though magnesium anodes are widely used in the protection of short buried pipelines and smaller buried tanks.

Galvanic anodes in waters generally need to be installed below low tide as they cannot function when exposed, because there is no "electrolyte" (estuary or seawater) to allow the corrosion current from the anode to flow onto the steel. Zinc or magnesium anodes are often buried in specialist backfills, typically of gypsum, bentonite and sodium sulphate, to provide a moist, low-electrical-resistance environment and maintain contact to the soil.

IMPRESSED-CURRENT SYSTEMS

For large structures including many pipelines, tank farms, larger ship hulls and some port and offshore facilities, a large number of galvanic anodes would be necessary to produce the required current, and to properly distribute it to provide complete protection. This may render this method uneconomical in these cases.

Thus, for many larger current demand applications when too many galvanic anodes would be needed, impressed-current systems are used, where an external source of DC power is used to impress a current from an (external) inert anode through the electrolyte to the cathode surface (Fig. 3). Anodes for these systems are normally smaller than galvanic anodes, and there may be a smaller number of them than would have been necessary if galvanic protection had been used; however, they will generally be of a higher anode current output.

Impressed-current anodes are typically fabricated from mixed-metal-oxide-coated titanium (MMO/Ti), or cast iron/silicon/chrome alloys (known as silicon iron [SiFe] anodes). Historically, anodes were also made of scrap steel, graphite, lead alloys (lead is still used as an anode for some external hull systems), and titanium and niobium coated with platinum.

Impressed-current anodes in waters are generally provided with a "dielectric shield" to prevent excessive levels of CP on the steel close to the anode, and to promote good current distribution. These shields may be glass-reinforced plastics or very high-build epoxy coatings, and they should prevent the more conventional coatings that may be used on the steel from excessively negative local potentials near the anode, which could otherwise result in damage to the coatings by either excessive alkalinity or by excessive hydrogen formation.

For buried pipelines, the impressed-current anodes are typically buried in carbonaceous material (calcined petroleum coke or similar) up to hundreds of meters away from the pipeline in order to optimize the current distribution.

CONCLUSION

In summary, for both galvanic-anode and impressed-current CP, it is important to understand that, if properly designed and maintained, CP can stop corrosion damage to uncoated structures and at coating damage on coated structures. CP applied to the external surfaces of, say, a pipeline will have no effect on any corrosion on the internal surfaces, as the CP current from the anodes discharges on the steel fabric and flows (as electrons) in the steel. This has no effect on the corrosion rate on the other surface of the steel.

CP will not be fully effective above mid-tide level and will have no effect on steel, coated or otherwise, which is always above the water, or is not buried or encased in concrete. The steel does not "know" where the CP current (or, if you prefer, the electrons) come from. Both galvanic and impressed-current CP systems must provide the same current density and distribution to the steel surface. Both can be equally effective, if properly designed and maintained.

Returning again to protective coatings, the barrier properties of these coatings will reduce the overall current demand of a CP system and improve current distribution, by largely isolating the metal from the (corrosive) environment. The CP will then protect the steel at damaged areas of the coating where the underlying metal is exposed.

The combination of a protective coating and CP can normally provide the most economical long-term protection system for certain structures, such as buried pipelines. However, not all coating systems are suitable, as they must be compatible with the CP operation. Coatings to be used in conjunction with CP should be subject to "cathodic disbondment" testing to demonstrate that, given the proper surface preparation and application procedures, they are not damaged by the cathodic reactions.

If coatings disbond from the surface, whether because of cathodic disbondment due to excessive CP potentials, or due to other deficiencies in the specification, materials or surface preparation prior to application, then there is the risk that any intact, disbonded film will shield the steel below from the CP current, preventing it from penetrating down narrow spaces and thus allowing corrosion to occur under the coating. This has been seen on pipelines, where the current has not been able to penetrate along areas of damage where there has been a loss of adhesion of thick-film coatings at the primer coat along a length of the pipe. Such faults are particularly troublesome, as they cannot normally be detected by traditional CP monitoring techniques. Thus, in addition to coatings having good barrier properties and compatibility with alkaline environments, excellent adhesion to the metal surface is also required.

ACKNOWLEDGEMENT

The authors would like to thank Mike Moffat of Corrpro Europe Ltd for his helpful suggestions. ***JPCL***

RILEY INDUSTRIAL SERVICES, INC. was established in 1970 by founder and president G.W. "Sonny" Riley. We are a third-generation family-owned and operated corporation. Our customers know they can count on Riley Industrial Services to deliver and their loyalty has fueled our continuous expansion.

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COATINGS+

SSPC

Dear Conference Attendees,

It is my pleasure, as President of the SSPC Board of Governors, to invite you to attend SSPC's 70th Anniversary Annual Meeting and Coatings+ Convention to be held at the Long Beach Convention Center from February 3–6, 2020. In addition to the world-class technical sessions, state-of-the-art training programs and a fully interactive exhibition hall, attendees will find themselves surrounded by historical markers documenting milestones achieved over the last 70 years by SSPC and its members.

If you haven't visited Long Beach lately, you don't know Long Beach. The Long Beach Convention Center is a state-of-the-art facility located in the heart of all the attractions Long Beach has to offer. The Convention Center and hotels are conveniently located steps away from the Long Beach Boardwalk, the Aquarium of the Pacific, the Queen Mary and the Catalina Island Express. You will be pleased to find a myriad of world class dining, nightlife and entertainment options all within walking distance.

The 2020 conference will include a jam-packed exhibit hall with over 135 exhibitors displaying and demonstrating the latest in surface preparation, coatings, coatings application, inspection equipment and professional services. We are pleased to introduce our live demonstration stage with new technology demonstrations every 30 minutes!

We will also be offering our most popular SSPC training and certification courses in conjunction with Coatings+. Courses are staggered throughout the week leading up to the conference with plenty of time for students to attend the show and participate in some of its many networking functions.

The technical program will include over 100 presentations from the world's leading experts from every facet of the coatings industry. Technical tracks include surface preparation, application, failure analysis, inspection, health and safety and other coatings-related topics. Each program will address current challenges and provide solutions for issues faced by asset owners, chemists, craft workers, inspectors and professional service providers.

Standards development is core to SSPC's mission, and this year's event will expand on our commitment to providing the industry with some of the world's most specified standards and guides. SSPC Technical Committees will meet to discuss the latest information regarding standards development, technical guidelines, and other committee related items. Attendees are encouraged to attend committee meetings and asked to consider joining committees in which they are interested. For more information, please visit sspc.org/std-comm-mem.

Another commitment of SSPC is to provide opportunities for younger members to make progress in their careers and provide opportunities for career advancement. This year, we are introducing the SSPC Professional Development Panel, which will bring together Young Professionals, PCS-certified individuals, students and anyone else new to the industry in an educational leadership discussion and cocktail hour. This is a great opportunity to meet and network with industry mentors and subject matter experts in a relaxed setting. There will also be a Student Poster Session featured in the Exhibit Hall. Posters will feature the latest research and technological concepts coming from educational institutions around the country.

As SSPC celebrates its 70th anniversary, I think it is important to consider how vital the protective coatings industry is to every aspect of our lives. The assets we protect are all around us: they transport our water, energy and goods. They protect our homes, schools, facilities and infrastructure. In short, our industry is everywhere and our responsibility to those we serve is tremendous. Therefore, I encourage you to take full advantage of this opportunity to educate yourself, lend your expertise to the development of standards, and share your experience in a technical track. Most importantly, take the time to meet and connect with colleagues and those looking to advance their careers in what I believe to be the most exciting and innovative period in our organization's history.

Sincerely,

Joseph Walker
Vice President, Elcometer Inc.
President, SSPC Board of Governors

COATINGS+
February 2–6, 2020 | Long Beach, CA

SSPC COATINGS+ 2020

Long Beach, CA | Feb. 3–6, 2020

EVENTS & AWARDS

In addition to the technical program and training and certification offerings, Coatings+ 2020, SSPC's annual conference and exhibition, will feature a full schedule including the annual Awards Luncheon, opening and closing celebrations, networking get-togethers and more.

The year 2020 will also mark SSPC's 70th anniversary, and SSPC hopes attendees will join in the different celebrations planned to take place over the course of the week.

All events will be held at the Long Beach Convention Center unless otherwise noted. For a complete schedule of events, visit sspc.org/event/coatings.

ANNUAL AWARDS LUNCHEON

Monday, Feb. 3, 11:30 a.m.–1:00 p.m.

Each year, Coatings+ attendees are invited to join SSPC President Joe Walker, Executive Director Bill Worms and the Board of Governors in recognizing the coatings industry's finest with the following honors.

The **SSPC Honorary Life Member Award** is given for extraordinary contribution and long-term activity on behalf of SSPC. To become an Honorary Life Member, an individual must be nominated by an SSPC Board member and approved by two-thirds of the Board. Only one Honorary Life Membership is awarded each year.

The **John D. Keane Award of Merit**, named after SSPC's executive director from 1957 to 1984, recognizes outstanding leadership and significant contribution to the development of the protective coatings industry and to SSPC.

The **SSPC Coatings Education Award** is given for significant development and dissemination of educational material and technical information related to protective coatings and their application.

The **SSPC Technical Achievement Award** is awarded for outstanding service, leadership and contribution to the SSPC technical committees.

The **Women in Coatings Impact Award** recognizes women who have helped create a positive impact on the culture of the coatings industry. These women are leaders in their profession and demonstrate commitment to the advancement of the industry.

The **President's Lecture Series Award** is presented to papers handpicked by the SSPC President and chosen for the reflection of the coatings industry and profession.

The **SSPC Outstanding Publication Award** is presented annually to the author(s) of the best technical paper or presentation from the SSPC conference 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 to vote on the award.

The **JPCL Readers' Choice Awards**, selected from a field of more than 70 JPCL articles published between May 2018 and July 2019, are voted on by JPCL readers and judged on significance to the industry among other criteria. One article will recieve the **JPCL Editors' Choice Award**.

The **SSPC Outstanding Chapter Awards** are presented to an Outstanding North America Chapter and an Outstanding International Chapter each year. Chapters are evaluated on their overall operation and the creativity and quality of the events held each year.

The **14th annual SSPC Structure Awards**, recognizing teams of contractors, designers, end users and other personnel for excellence and expertise demonstrated on industrial and commercial coatings projects, will also be presented at the luncheon. The Structure Awards categories include:

- The *William Johnson Award* for aesthetic merit in industrial coatings work;
- The *E. Crone Knoy Award* for commercial coatings work;
- The *Charles G. Munger Award* for the longevity of an original coating;
- The *George Campbell Award* for the completion of a difficult or complex industrial coatings project;

- The *Military Coatings Award of Excellence* for exceptional coatings work performed on U.S. Military ships, structures or facilities;
- The *Eric S. Kline Award* for industrial coatings work performed in a fixed shop facility; and
- The SSPC *Coatings Industry Spirit Award* for a coatings project that demonstrates extraordinary service benefitting a community or the industry at large.

JPCL will feature Structure Award-winning projects in articles published throughout 2020.

OPEN TOWN HALL FORUM ON THE SSPC-NACE MERGER

Monday, Feb. 3, 2:30–3:30 p.m.

This is your opportunity to voice any comments or concerns over the possibility of combining the two organizations. Additional open forums will be held throughout the week.

CHAPTER BREAKFAST & NETWORKING

Monday, Feb. 3, 8:00–9:00 a.m.

SSPC's influence continues to grow with the establishment of new chapters both in the U.S. and abroad. Chapter members are invited to attend this breakfast at the start of the conference to discuss chapter activities and share ideas for continued chapter growth.

WELCOME RECEPTION

Monday, Feb. 3, 5:30–7:30 p.m.

Sponsored by Carboline Company

SSPC will be celebrating its 70th anniversary in 2020, so join us at the retro beach-themed Welcome Reception for a slice of SSPC birthday cake, and be sure to visit the SSPC booth to see SSPC history throughout the years.

KEYNOTE BREAKFAST

Tuesday, Feb. 4, 8:00–9:30 a.m.

For the second year in a row, the Coatings+ conference will feature a keynote speaker touching on relevant topics in both the coating industry and business as a whole. This year, speaker Erik Qualman will present, "Digital Leadership: The Five Simple Habits of Digital Leaders."

SSPC NBPI INSTRUCTOR MEETING

Tuesday, Feb. 4, 10:30–11:30 a.m.

All SSPC-approved NBPI instructors are encouraged to attend this meeting.

FACILITY OWNERS LUNCH & PEER TECHNICAL DISCUSSION

Tuesday, Feb. 4, 11:30 a.m.–1:00 p.m.

Sponsored by IUPAT

SSPC invites facility owners to a complimentary lunch to thank them for their commitment to SSPC standards and quality programs for their industrial coating projects. A peer technical discussion session will follow lunch, where facility owners can share their thoughts on best practices and solutions related to industrial coatings, surface preparation, new technologies, asset life-cycle extension and budget efficiencies. An RSVP is appreciated.

STUDENT POSTER SESSION

Tuesday, Feb. 4, 3:00–4:00 p.m.

Wednesday, Feb. 5, 10:00–11:00 a.m.

Bringing more young people into the organization and coatings industry as a whole remains one of SSPC's top goals, and the Student Poster Session provides an annual forum for college students and young professionals to participate in the conference. Posters will be judged by a panel of SSPC members, and prizes will be awarded to the first-, second- and third-place posters. For more information, contact Don Molinari (molinari@sspc.org) or Christine Lajzo (lajzo@sspc.org).

EXHIBIT HALL GRAND OPENING

Tuesday, Feb. 4, 5:00–8:00 p.m.

Sponsored by The Sherwin-Williams Company

Once Joe Walker and SSPC Board members cut the ribbon to the exhibit hall, be among the first to peruse the floor and enjoy complimentary food and drinks. The Coatings+ 2020 exhibit hall will feature a new Activity Zone with games, simulated surfing and a professional headshot station. Visit the booths and get to know members of SSPC's worldwide chapters, including the Mexico chapter, exhibiting for the first time. Also debuting in the hall this year is the Product Demonstration Stage, where exhibitors will showcase and demonstrate new products every 30 minutes during regular exhibit hall hours.

*The Coatings+ 2020 Exhibit Hall is nearly sold out! Limited prime locations remain available for purchase. Please contact Nicole Lourette at lourette@sspc.org or 412-288-6023 for information on exhibiting.

MEGARUST MID-YEAR FOLLOW-UP

Wednesday, Feb. 5, 8:00 a.m.–12:00 p.m.

This annual follow-up meeting to the MegaRust Naval corrosion conference—held this past May in Portsmouth, Virginia—is designed to continue the discussions on key corrosion issues concerning the Navy, generate questions and talking points for potential presenters at the 2020 conference, and draft the conference theme and agenda. If interested in participating, please email meganust@navalengineers.org.

LUNCH WITH EXHIBITORS

Wednesday, Feb. 5 and Thursday, Feb. 6, 11:30–1:00 p.m.

Sponsored by *CoatingsPro* Magazine

SSPC and *CoatingsPro* Magazine will provide complimentary lunch tickets with your conference registration packet. The outdoor exhibit demonstrations area will also be open during regular exhibit hours.

SSPC APPROVED INSTRUCTOR MEETING

Wednesday, Feb. 5, 12:30–1:30 p.m.

Approved SSPC instructors will meet to discuss initiatives for 2020 and to brainstorm about how to improve SSPC training.

INTERNATIONAL CHAPTER MEETINGS: LATIN AMERICA AND ASIA PACIFIC

Wednesday, Feb. 5, 1:00–2:30 p.m.

SSPC's industry influence continues to grow internationally with the establishment of a number of new chapters around the world. Stop in and listen to what some of SSPC chapters abroad are up to.

JOINT MEETING OF SSPC EDUCATION & INSTRUCTOR COMMITTEES

Wednesday, Feb. 5, 3:00–4:30 p.m.

(Invitation Only)

The committee will discuss recommendations regarding the improvement of educational curriculum and training delivery processes and procedures.

SSPC PROFESSIONAL DEVELOPMENT PANEL

Wednesday, Feb. 5, 3:30–5:00 p.m.

Sponsored by PPG Protective & Marine Coatings

This session, new to Coatings+ 2020, seeks to provide practical advice for both newcomers and industry veterans who are working to shape the future of the coatings industry. It will open with a panel setup, headlined by the winner of the Women in Coatings Impact Award and a panel consisting of SSPC-certified Protective Coatings Specialists, contractors and engineers, as well as other young professionals and their mentors. After a brief Q & A period, the reception will be followed by a cocktail hour.

CLOSING BLAST

Thursday, Feb. 6, 7:00–9:00 p.m.

Sponsored by LiUNA

Before returning home, gather one last time with your friends both new and old for salsa dancing, salsa eating and a chance to win a Harley Davidson motorcycle! All attendees will receive a raffle ticket in their registration packets and must drop their tickets off at LiUNA's exhibit hall booth to enter. The winner will be picked at the closing party and must be present to collect the prize.

COATINGS+
February 2–6, 2020 | Long Beach, CA

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As it does each year, SSPC will offer a wide range of on-site training and certification courses for attendees at Coatings+ 2020 in Long Beach.

Registration for all SSPC training courses must be done separately from the Coatings+ conference registration. Individuals who register for a training course will receive a $100 discount on full conference registration.

Download the Coatings+ 2020 training registration form at sspc.org/event/coatings or visit sspc.org/training-and-education to register by January 8, 2020. Please contact Joe Corll at corll@sspc.org; or 412-281-2331, ext. 2241 with questions about training course registration.

The following is a list of the training and certification courses that will be offered at Coatings+ 2020. Please note that some course dates extend before and after the official conference dates. This list is preliminary and current as of press time; courses will not be confirmed until January 8, 2020.

For complete, up-to-date information on the SSPC Coatings+ 2020 conference and exhibition, visit sspc.org/event/coatings.

ABRASIVE BLASTING PROGRAM (C7)

Feb. 1–2

The C7 course is designed for contractor personnel and 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. A certificate of attendance will be given to those attending the lecture portion and observing the blaster demonstration.

AEROSPACE ENGINEER COATING APPLICATION TRAINING

Feb. 4–7

The objective of this course is to support corrosion prevention and control during the life cycle of Department of Defense aircraft. The course includes multiple workshops and problem-solving exercises so that participants may immediately apply the learning in a classroom setting, without the pressures of production and project schedules. Instructors will explain how proper design is required to prevent corrosion; define the performance properties needed to qualify, validate and verify a coating for aircraft; and define military documents, specifications and requirements for corrosion control of aircraft.

BRIDGE COATINGS INSPECTOR PROGRAM (BCI)

Level 1: Jan. 30–Feb. 3

Level 2: Jan. 30–Feb. 4

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

COAST GUARD BASIC PAINT INSPECTOR COURSE (COAST GUARD)

Jan. 30–Feb. 3

This five-day inspection course was developed to train coatings inspectors in the duties and responsibilities involved in inspecting surface preparation and protective coatings application for the U.S. Coast Guard.

COATING APPLICATION SPECIALIST REFRESHER (CAS REF)

Jan. 30

The CAS Refresher is an overview of surface preparation and application covered in the Body of Knowledge of SSPC-ACS/NACE No. 13,

"Applicator Certification Standard No. 1 Industrial Coating and Lining Application Specialist Qualification and Certification." This training program covers those topics for Level I in the areas of surface preparation and coating application. Level I training is especially designed for entry-level employees new to the coatings industry.

COATING APPLICATION SPECIALIST (CAS)

Level 1: Jan. 31

Level 2: Jan. 31–Feb. 1

Level I of the CAS program consists of a one-hour written exam and is intended for entry-level/trainee Application Specialists, who customarily work with and under the supervision of Level 2 and Level 3 Application Specialists. CAS Level 2 requires passing a closed-book written exam drawn from the core areas of the SSPC Transition Plan Body of Knowledge, as well as a hands-on portion certifying proficiency in abrasive blasting and coating application using conventional or airless spray.

FUNDAMENTALS OF PROTECTIVE COATINGS (C1)

Jan. 30–Feb. 3

This course provides a practical and comprehensive 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/HAZARDOUS COATINGS REMOVAL (C3)

Jan. 30–Feb. 2

The C3 course includes information on the hazards of lead and other toxic metals, and the current legal and regulatory environment. Topics include protecting workers, compliance with environmental regulations and specifications, waste stream management, associated control technology, insurance and bonding issues, and other safety and health issues.

LEAD/HAZARDOUS COATINGS REMOVAL REFRESHER (C5)

Feb. 5

This one-day course provides a review of Competent Person duties and responsibilities in working with lead and other hazardous materials encountered in industrial coatings work. It also reviews relevant OSHA and EPA regulations.

NAVSEA BASIC PAINT INSPECTOR (NBPI)

Jan. 30–Feb. 3

Developed by Naval Sea Systems Command (NAVSEA), this course covers inspection of critical coated areas defined by U.S. Navy policy documents such as cofferdams, decks for aviation and UNREP, chain lockers, underwater hull, bilges, tanks, voids, well deck overheads and others. It provides both the technical and practical fundamentals for coating inspection work for many steel structure projects other than ships.

PLANNING AND SPECIFYING INDUSTRIAL COATINGS PROJECTS (C2)

Feb. 3–7

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

PROTECTIVE COATINGS SPECIALIST (PCS) PROGRAM

Feb. 5

SSPC's highest level of certification, the PCS program awards recognition to individuals who have in-depth knowledge in the principles and practices of industrial coatings technology. It attests to the professional credibility of the coatings practitioner and raises the standards of the profession.

PROTECTIVE COATINGS INSPECTOR (PCI) PROGRAM

Level 1: Jan. 30-Feb. 3

Level 2: Jan. 30-Feb. 4

Level 3 Exam: Feb. 5

The PCI program thoroughly trains individuals in the proper methods of inspecting surface preparation and coatings installation 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 meets the requirements of ASTM D3276, the IMO Performance Standard for Protective Coatings, and IACS CSR.

SPRAY APPLICATION CERTIFICATION (C12)

Feb. 2–3

This program assesses the skills of sprayers who have a minimum of 800 hours applying protective coatings with airless/conventional spray in an industrial or marine environment. Candidates are certified through a brief written exam and a practical hands-on skill assessment.

THERMAL SPRAY INSPECTOR TRAINING (THERMAL INSP)

Feb. 2

This program covers the inspection of thermal spray from pre-surface preparation through coating application.

THERMAL SPRAY APPLICATOR TRAINING (THERMAL APP)

Feb. 1

This course is designed to train and certify applicators of thermal spray coatings to industrial substrates. Students who do not want to receive the certification can attend the one-day lecture and classroom workshops to receive a certificate of training.

TRAIN THE TRAINER (TTT) TRAINTHEPAINTER (TTP)

Feb. 1–2

This two-day class prepares a company's internal trainer(s) to deliver the SSPC Trainthepainter (TTP) Program to their internal craft workers.

SSPC will also be conducting exams for its **Fireproofing Inspector**, **Insulation Inspector** and **Pipeline Inspector** programs during Coatings+ 2020. These exams will be held on Feb. 5.

COATINGS+
February 3–6, 2020 | Long Beach, CA

SSPC COATINGS+ 2020

Long Beach, CA | Feb. 3–6, 2020

TECHNICAL PROGRAM

The Coatings+ 2020 schedule includes a four-day-long technical program, packed with sessions covering new coating types, specific structures, surface prep techniques, novel application methods, best health and safety practices and a long list of other topics of interest to coating professionals.

The following is a list of scheduled technical presentations; the list is current as of press time and is subject to change. For more information about the technical program, contact Christine Laizo (laizo@sspc.org) or Donald Molinari (molinari@sspc.org).

MONDAY, FEB. 3

MORNING SESSION 1: INDUSTRY ESSENTIALS

• "5 Essential Benefits of the Pre-Project Hazardous Materials Inspection and Survey," by Julie Zak, Forensic Analytical Consulting Services, Inc.; 9:30–10:00 a.m.

Failing to identify the presence of hazardous materials and mitigate the danger they pose before a coating project begins can prove costly. The presenter will highlight many of the regulatory and compliance issues that show up daily on coatings and construction projects to show the importance of performing an inspection and survey beforehand.

• "The Correlation of Appearance Changes and Long-Term Corrosion Protection for Aromatic Polyurethane Coatings Used on Steel Water Pipes," by Dr. Stuart Croll, North Dakota State University; 10:00–10:30 a.m.

When steel water pipeline sections are stored aboveground before installation, the coatings can yellow, lose gloss and chalk. The presenter will discuss a two-year study of five such coatings exposed in Florida and Texas, as well as in accelerated weathering, to show how corrosion protection is affected as well as some of the problems involved in choosing experimental conditions to assess how parameters might change.

MORNING SESSION 2: PROJECT EXPECTATIONS

• "Coating Condition Assessments: What Is It, What Value Does It Bring?" by David Hunter, Pond & Company; 9:30–10:00 a.m.

What are the elements of a coating condition assessment? This presentation will discuss the requirements of personnel, the steps that should be taken and suggested reporting requirements to obtain information to act on from a facilities maintenance point-of-view.

• "UHP Waterjetting: The Oldest New Method for Surface Preparation," by Reggie Richey, Innovative Surface Prep Smart Blasting & Robotics; 10:00–10:30 a.m.

Surface preparation techniques have evolved with the acceptance of ultra-high-pressure waterjetting. With some abrasive users still hesitant to make the change to water, the presenter will provide information on the use of remote controlled robotics to perform UHP waterjetting.

• "Mind the Gap: Increasing Coating Life Cycles Through Quality Program Implementation," by David Hunter, Pond & Company; 10:30–11:00 a.m.

Some agencies require the prime contractor to use a special inspection subcontracting agency to manage the coating application subcontractors. This presentation will illustrate two recent coating failures to show methodologies that can relink performance and liability, improve quality and reduce costs to the U.S. military.

MORNING SESSION 3: GOING ABOVE AND BEYOND INSPECTION

• "Fiber-Reinforced Polymer Applications, Process and Inspection," by Ramon Pelaez, Greenman-Pedersen, Inc.; 9:30–10:00 a.m.

The presenter will inform coating contractors and consultants about what to do when the asset to be coated exhibits far worse damage than

anticipated, calling into question its structural integrity. Engineered FRP design solutions can save time and money to owners and widen opportunities to the contracting and consulting community.

• "Variability in Accelerated Corrosion Testing," by Nicole Rakers, PPG Industries; 10:00–10:30 a.m.

This presentation will examine different variables that can impact reproducibility of salt fog testing. Discussion will be focused on coating application and sample preparation before salt fog exposure, covering different analytical tools used to understand the variability.

• "New Coating Methodology for the Electro-chemical Deposition of Aluminum-Based Layers from Aqueous Systems," by John Watkins, LumiShield Technologies; 10:30–11:00 a.m.

The presenter will discuss how aluminum oxide coatings can improve paint adhesion and corrosion resistance of metal surfaces, mitigating corrosion to damaged or incomplete paint surfaces and potentially allowing less frequent or extensive corrective measures to minor damage.

MORNING SESSION 4: FAILURES IN COATINGS

• "Analysis of Coating Blister Failures and Associated Coating and Substrate Risks," by Michael Kibler, Elzly Technology Corporation; 9:30–10:00 a.m.

Blistering is a common failure seen in marine coatings that can be caused by both physical, such as osmotic pressure and temperature gradients, and electrochemical forces like cathodic or anodic polarization. This presentation will discuss the various mechanisms that lead to coating blistering, how blisters form and how to prevent them.

• "Mechanical Testing of Epoxy Free-Films to Assess Cure Behavior and Integrated System Performance," by Gregory Smith, Naval Research Laboratory; 10:00–10:30 a.m.

The presenter will explore use of non-traditional mechanical test methods and chemical analytics, such as measurement of glass transition temperature (Tg), together to assess cure behavior of both low- and high-solids epoxy-based paint systems.

• "Evaluation of Polysiloxanes as Green Alternatives to Solution Vinyl Coatings," by Allen Skaja and Stephanie Prochaska, U.S. Bureau of Reclamation; 10:30–11:00 a.m.

Solution vinyl resin coatings are an effective coating system that have been used on raw water hydraulic steel structures since the 1950s, but release high amounts of volatile organic compounds into the air. This presentation will study polysiloxane coating systems as greener alternatives to compare their laboratory performance to vinyl.

AFTERNOON SESSION 1: CASE STUDIES

• "'Should Have Done It Right the First Time': Life Cycle Cost of a Job Gone Wrong," by Sam Scaturro, Alpine Painting and Sandblasting Contractors; 1:30–2:00 p.m.

In 2005, two tanks were repainted by two different contractors. By 2018 one tank was performing exceptionally well and one tank had completely failed on both the interior and exterior. This presentation will discuss the original and maintenance costs and also identify wording for writing specifications that will attract better-quality contractors.

• "Case Studies on Coating Failure Analysis by Analytical Techniques," by Heather Cui, International Paint, LLC; 2:00–2:30 p.m.

This paper provides two examples of root-cause analysis of coating failure, mainly focusing on the laboratory investigation by analytical instruments, such as optical microscope, infrared spectrometer (IR) and scanning electron microscope/energy dispersive spectrometer (SEM/EDS).

• "A Unique and Challenging Mississippi DOT Rehabilitation and Painting Project of the US-84 Westbound Bridge Over the Mississippi River in Natchez, MS," by Greg Richards, KTA-Tator, Inc.; 2:30–3:00 p.m.

This presentation will cover the rehab of the Natchez-Vidalia Bridge Westbound U.S. 84, a 4,205-foot-long through-truss bridge over the

Mississippi River. The project was one of the largest rehabilitation projects that the Mississippi DOT had awarded. The presenter will discuss the project coordination and partnering process to realize a full one-year closure for completion.

• "Corrosion Protection of the Halifax Harbour Suspension Bridges: Challenges, Issues and Opportunities," by Ahsan Chowdhury, Halifax Harbour Bridges; 3:00–3:30 p.m.

There are many unique challenges related to bridge corrosion-protection projects. The presenter will describe the design, implementation and lessons learned from a pilot program conducted by Halifax Harbour Bridges on the Angus L. Macdonald Bridge in an effort to develop a coating maintenance program that would offer a minimum 25–30-year service life.

• "Corrosion Maintenance on the Sydney Harbour Bridge: A 30-Year Case Study," by Charlie Gooden, BlastOne International; 3:30–4:00 p.m.

The Sydney Harbour Bridge is an 88-year-old structure with 60% still coated with its original coating. This case study will share lessons learned over the past 30 years of preserving an Australian icon, providing best practice with a maintenance program for corrosion control and repainting.

• "Houston's Best Practices for Coating Rehabilitation of Large-Diameter Above-Grade Water Line Crossings," Christine Kirby, Lockwood, Andrews & Newnam, Inc.; 4:00–4:30 p.m.

Houston's water system serves more than 4.5 million people regionally and produces more than 146 billion gallons of treated water every year. The city has more than 300 above-grade water line crossings, some of which have been in service for over 75 years. The presenter will discuss best practices for planning, design and construction for rehabilitating large-diameter above grade crossings.

• "The Benefits of Digitalization: A Case Study with Champion Painting," by Ross Boyd, TruQC LLC; and Duane Hough, Champion Specialty Services Corp.; 4:30–5:00 p.m.

This presentation will outline how one global industrial painting contractor uses the TruQC digitalization platform in its daily operation. The most common barriers to successful digitalization projects will be detailed, and proven solutions for overcoming these barriers will be outlined.

• "A Viable Alternative to Mineral Abrasive," by Joe McGreal, Ervin Industries; 5:00–5:30 p.m.

The presenter will compare use of stainless-steel grit in an installation that was used to cleaning with aluminum oxide, in order to characterize material behavior over a number of cycles in terms of surface roughness.

AFTERNOON SESSION 2: CORROSION CONTROL

• "Lifetime Corrosion Control Cost Minimization," by Douglas Mittlesteadt, Hempel A/S; 1:30–2:00 p.m.

The presenter will show the cost reduction benefits of using an optimized two coat paint system compared to a standard three coat system. The benefits will be demonstrated for the building contractor and the operating owner.

• "Evaluation of High-Ratio Co-Polymerized Calcium Sulfonate (HRCSA) Effectiveness Addressing Crevice Corrosion for Structural Steel," by Barry Marcks, Caltrans; 2:00–2:30 p.m.

This presentation will show results of Caltrans' five-year corrosion study evaluating the potential effectiveness of using a single component high ratio co-polymerized calcium sulfonate (HRCSA) coating to address pack rust and crevice corrosion on the state's structural steel bridges.

• "Down-the-Hole Without a Paddle: Corrosion of Wellhead Surface Casings Using IMM Coatings," by Mike O'Donoghue and Vijay Datta, AkzoNobel; and Nicole de Varennes, IRISNDT; 2:30–3:00 p.m.

The first part of this presentation will outline the aggressive service conditions experienced by wellhead casings and resulting failures seen in the Alberta oil patch. In the second part, the chemistry and performance attributes of the IMM coating technology, and why it offered a novel a solution to the hitherto massive costs of addressing wellhead surface casing corrosion, will be reviewed.

• "Corrosion Resistance Comparison of Direct-to-Metal, Weatherable Protective Coatings," by Mary Roley and Steve Liebart, Carboline Company; 3:00–3:30 p.m.

The presenters will explain the importance of direct-to-metal coating performance and the benefits of comparing the various weatherable technologies for direct-to-metal performance over a few different surface preparations.

• "Combatting Localized Galvanic Corrosion at Bolted Connections in Gravity Sludge Thickeners and Clarifiers in Wastewater Treatment Plants," by Robert Nixon, Corrosion Probe, Inc.; 3:30–4:00 p.m.

This presentation will discuss localized galvanic corrosion of coated carbon steel rake mechanisms at stainless steel bolted connections, which can result in significantly high corrosion rates, particularly when connections are over-tightened. This issue occurs routinely in gravity sludge thickeners and clarifiers.

• "Combatting Corrosion of Nuts and Bolts (Support Rods and Fasteners)," by John Glass, Amcorr Products & Services, Inc.; 4:00–4:30 p.m.

The presentation will discuss the challenges, overall objective and unique characteristics of the viscous-elastic semi-solid compound and bolt cap protection system used for onshore and offshore structures. Testing, installation procedures and previous projects will be covered.

• "The Edgy Truth About Corrosion: How Carbon Nanotubes (CNTs) are Redefining Edge Protection," Joe Davis, Tesla NanoCoatings; 4:30–5:00 p.m.

This presentation will focus on an often-overlooked benefit of carbon nanotubes—their mechanical strength—showing how the edge retention ratio (ERR) of coatings utilizing CNTs can be significantly improved, allowing for reduced process steps, increased productivity and throughput, and improved edge-coating performance.

• "Structural Polyurethane and Rehabilitation of America's Infrastructure," by Chip Johnson, Sprayroq; 5:00–5:30 p.m.

The presenter will outline structural polyurethane technology and its ability to rehabilitate an already corroded asset, provide significant strength, an extended lifetime, a fast-curative technology, and a high-build application for a fast return to service in comparison to other technologies.

AFTERNOON SESSION 3: TANKS

• "Criticality of Weld Details Under Ultra-High-Solids Tank Linings," by Sean Meracle, The Sherwin-Williams Company; 1:30–2:00 p.m.

This presentation will discuss the often-overlooked surface defect of weld joints in steel tanks and how the concerns related to lining application over these conditions are magnified when the coating system incorporates ultra-high-solids coatings into the project.

• "Advantages and Disadvantages of Utilizing UHP Robotics in Carbon Steel Preparation in Existing Storage Tanks," by Jeb Rush, The Sherwin-Williams Company; 2:00–2:30 p.m.

The presenter will speak about the advantages and disadvantages of using robotic UHP to remove an existing liner and preparing the surface to re-install a liner into an existing carbon steel storage tank.

• "Advantages and Saving by Using Portable Wheel Blast Machines for Maintenance of Storage Tanks," by Mauricio Herrera, Blasting Experts, Ltda.; 2:30–3:00 p.m.

This presentation will outline the benefits of using portable wheel blast machines, including money and resources saved, less environmental impact, better health conditions for operators and high quality of surfaces prepared.

• "Throughput Optimization for Tank Fabricators," by Joseph Windover, The Sherwin-Williams Company; 3:00–3:30 p.m.

Competition is fierce in the tank fabrication market, and fabricators are constantly looking for a competitive edge that promises new capabilities and an expanded capacity for their business. During this presentation, participants will learn a methodology and repeatable model to attain similar results.

• "Cal Water Tank Maintenance Program," by Bryan Wilfley, Cal Water; 3:30–4:00 p.m.

The presenter will outline updates to Cal Water's tank maintenance program, including changing the geometry of the tanks so that it will help benefit the effectiveness of the coatings and using SSPC standards to inspect tanks and create new coating projects.

• "OAP Coating Systems and Linings for Petroleum & Water Storage Tanks," by Deborah Simmons, The Sherwin-Williams Company; 4:00–4:30 p.m.

This presentation will introduce OAP technology, a viable solution that is gaining acceptance in the coatings industry by eliminating coating guesswork in petroleum- and potable-water-storage-tank linings.

AFTERNOON SESSION 4: PROJECT MANAGEMENT

• "How Specific is Your Coating Specification?" by Chuck Fite, The Sherwin-Williams Company; 1:30–2:00 p.m.

This presentation will provide some examples of varying degrees of specifications and some guidance on producing a more applicable specification for a project.

• "'Herding the Cats'—An EPC's Perspective on Good Project Execution and Dealing with Failures," by Mark Maresko, Kiewit Engineering Group, Inc.; and and Greg Hansen, The Sherwin-Williams Company; 2:00–2:30 p.m.

This presentation will use several case histories from the perspective of a large EPC firm on new construction power market projects. The firm is challenged to work with hundreds of suppliers while managing risk, cost and stakeholder expectations. The task amounts to "herding cats" to obtain the most successful outcome.

• "Coating System Test Patches and Mock-Ups: Value to the Specifier and Your Owner Client," by William Seavy and David Hall, The Sherwin-Williams Company; 2:30–3:00 p.m.

The presenters will discuss the importance of applying and specifying coating system mock-ups, test patches and other similar measures for successful project completion and owner satisfaction.

• "Complicated Siphon Rehab Challenges Pre-Job Planning Process," by Greg Smith, Coblaco Services, Inc.; 3:00–3:30 p.m.

The presenter will recap the recent rehab of the Jim Creek siphon in Colorado, which required navigation through 1,800 feet of pipeline, staging and moving equipment through narrow routes along rocky, tree-lined trails, using ultra-high-pressure washing and applying 40 mils of coating materials while dealing with winter weather and environmental challenges.

• "Truth or Marketing? Hocus Pocus or Real Information? How Are You Selecting Products for Your Projects?" by Murray Heywood, The Sherwin-Williams Company; 3:30–4:00 p.m.

This presentation will speak to the various methods of product comparison currently being used and provide insight into why they may be inefficient, inaccurate and sometimes completely wrong. It will also provide solutions to a better path forward for product selection.

TUESDAY, FEB. 4

MORNING SESSION 1: SURFACE PREP

• "Wet Abrasive Blasting Standards: The Future of Surface Preparation and the Effects it Has on Steel," by Joshua Bell and Casey McCartney, Tnemec Company, Inc.; 10:30–11:00 a.m.

The presenter will discuss a study on available additives intended to aide in the removal of soluble salts and preventing flash rust. Ultimately, the use of these additives in tandem with the wet abrasive blast standards effectively removed soluble salts, inhibited flash rusting and did not adversely affect the performance of applied coating systems.

• "Surface Roughness Profile and its Effect on Coating Adhesion and Corrosion Protection," by Stuart Croll, North Dakota State University; 11:00–11:30 a.m.

It appears that there is no single measure of surface roughness that adequately describes coating performance, and common "pull-off" adhesion testing cannot characterize the forces between the coating and metal substrate that might prevent liquids from invading that interface. This will be covered in this presentation.

• "Relevance of Surface Roughness," by Dinko Cudic, MontiPower; 11:30 a.m.–12:00 p.m.

The presenter will discuss methods of bristle blasting, which covers both the required cleanliness and the roughness as the anchoring point for the mechanically adhering coatings. Additionally, he will discuss the various surface profile amplitudes in coloration to viscosity and wetting properties of coatings.

• "The Time Has Come: Use of Robotics in Surface Preparation is Here," by Garron Ross, J.H. Fletcher & Co.; 12:00–12:30 p.m.

This presentation will cover the history of moving from manual to true robotic surface preparation, development and case studies of the technology and the imminent paradigm shift in the surface preparation industry.

• "Numerical Simulation of Blast Nozzles," by Gavin Gooden, BlastOne; 12:30–1:00 p.m.

The presenter will describe the numerical simulation of two commercially available #6 blast nozzles, operating with garnet. Blast-nozzle performance measures will be developed, and geometries will be compared to show how geometry influences performance.

MORNING SESSION 2: INSPECTION

• "The Emergence of Contact Based Non-Destructive Testing (NDT) at Height Utilizing Aerial Robotic (Drone) Systems," by Robert Dahlstrom, Apellix; 10:30–11:00 a.m.

The presenter will outline the use of a new aerial robotics platform utilizing existing

technologies such as DFT, SP, UT readers, drones, and so on, with a system of complex integrations.

• "How the Development of Electronics and Methods Can Support Visual Assessment of Surface Preparation?" by Craig Wallbank, WINOA USA; 11:00–11:30 a.m.

For the past 30 years, surface cleanliness has been measured visually, which can generate differences between stakeholders. The presenter will offer the foundation of a developing ISO standard as well as the new technologies available for the analysis of surface preparation in support of current visual processes.

• "QA-ing the QC from a Distance," by Troy Fraebel, ABKaelin, LLC; 11:30 a.m.–12:00 p.m.

The presenter will discuss how the owner, contractor's project manager and the QA consultant can accomplish an inspection from QC inspector training, pre-construction meeting, data-sharing, coordination to final inspection.

• "A New Film Thickness Gauge with Built-In Temperature and Humidity Measurement", by Rick Trawick, BYK-Gardner USA; 12:00–12:30 p.m.

This presentation will describe a new, dry-film coating-thickness gauge that combines the most critically needed functions into one convenient pocket-sized instrument.

MORNING SESSION 3: MILITARY

• "Coatings for the Future: Addressing the Challenges for Military Assets," by John Escarsega, CCDC Army Research Laboratory; 10:30–11:00 a.m.

This presentation will highlight current challenges and spotlight new paradigm shifts and perspectives, which will tie the foundation for creating, developing and transitioning new technologies for the DOD.

• "The NSRP Surface Preparation & Coatings (SP&C) Panel 2020 Update," by Arcino Quiero, Jr., Huntington Ingalls Industries–Newport News Shipbuilding; 11:00–11:30 a.m.

The NSRP SP&C Panel's mission is to reduce the coatings cost of Navy ships. The Panel's Specs to Decks approach seeks to reduce cost and maintain/enhance quality of coatings and corrosion control of Naval and commercial ships. This presentation will summarize implementable work and gauge the value of future work.

• "State of Technology: Cleaning and Coating UAV Systems," by Robert Dahlstrom, Apellix; 11:30 a.m.–12:00 p.m.

This presentation will provide an introduction to the current state of coating and cleaning drones, along with limitations and benefits the system can provide to the coatings industry.

• "Next-Generation Ships' Force Maintenance Coatings," by Jeff O'Dell, Vision Point Systems, Inc.; 12:00–12:30 p.m.

Currently, the Navy's maintenance and repair painting is conducted by Ships' Force (SF) during pierside periods as well as while on deployment. The presenter will outline a study being conducted to evaluate newer epoxy coatings in regards to the key characteristics of high-solid primers for SF applications.

• "Workforce Development," by Nancy Pescinski, Advanced Marine Preservation; 12:30–1:00 p.m.

This presentation will give an in-depth description of what the NSRP's Workforce Development initiative is and also provide insight and details on what the SCA is doing to recruit qualified labor.

MORNING: WORKSHOP

• "Mix Ratios and Induction Times: Should We Really Sweat It?" by Andrew Croll, IUPAT, Finishing Trades Institute; 10:30 a.m.–12:00 p.m.

The presenter will take a closer look at how the mix ratio and induction time affect a high-build polyamide epoxy's appearance as well as its adhesion. The presenter will be using the correct and incorrect mix ratios with the proper induction time as well as the improper induction time.

AFTERNOON SESSION I:
GAS & OIL PIPELINE COATINGS

• "Internal Robotic Field Joint Coating Equipment Today," by Kris Kemper, SSPC: The Society for Protective Coatings; 1:30–2:30 p.m.

This presentation will cover internal field joint robotics and the path forward to a holiday-free coated weld. Today's robotics will be discussed and how they have been developed to overcome past obstacles, related to internal field joint coatings.

• "Lifting of Multiple In-Service Lines for CUPS Inspections and Maintenance," by Kurt Gribnitz, Ovolifts; 2:30–3:00 p.m.

The presenter will introduce a newly developed and patented jacking solution developed in conjunction with the petrochemical industry for providing safe access to multiple CUPS while the lines are in-service, giving plant engineers and contractors critical information on pipe condition and access to perform maintenance.

• "Polyols for Improved Durability of Pipeline Coatings," by Sarah Wolek, Stepan Company; 3:00–3:30 p.m.

The presenter will discuss a new class of 100%-solids polyester polyols that have been developed to offer improved performance in a urethane coating compared to other common systems such as epoxies, aspartics and solvent-borne polyesters.

AFTERNOON:
WORKSHOPS

• "Exploring Differing Views on Causes of Coating Failures," with panelists Gabe Gonzales, Vigor Industrial LLC; Gunnar Ackx, Scicon Worldwide Bvba; and TBD; 1:30–3:30 p.m.

In this session, the audience and the panel will interact to discover who is at fault for a project's coating failure. The audience will question a panel that consists of a paint manufacturer, contractor, specification writer and inspector to work together on solving who is at fault and why.

• "Master the Maze: Interactive Coating Failure Investigation," by Valerie Sherbondy, KTA-Tator, Inc.; 1:30–4:30 p.m.

This interactive workshop will follow a failure investigation through the maze of background information, the site visit to collect information and samples, and a forensic investigation in the laboratory. Participants will determine what went wrong, who is at fault and how to remedy the problem so that the failure does not reoccur.

• "Basic Coatings Inspection Instrument Use," by William Corbett and Matthew Fajt, KTA-Tator, Inc.; 1:30–4:30 p.m.

Ideal for entry-level personnel, this workshop gets back to the basics of instrument use. This year's workshop will include info on scanning probe/continuous read-out dry film thickness measurement per the new Appendix X1 in SSPC-PA 2.

• "Fundamentals of Waterborne Coatings," by Leo Procopio, Dow Chemical Company; 1:30–4:30 p.m.

This workshop will provide an introduction to the major types and chemistries of waterborne coatings and describe where they can be utilized for commercial and industrial painting.

• "Coatings 101: An Overview," by Charles Brown, Greenman-Pedersen, Inc.; 1:30–4:30 p.m.

This workshop will provide an overview of an industrial protective coatings project, including design considerations, material selection, surface preparation guides, ambient conditions and basic quality-control techniques.

WEDNESDAY, FEB. 5

MORNING SESSION 1: SOLUBLE SALTS

• "Surface Soluble Salts Impact on Protective Coating Performance," by Andrew Recker, Chlor Rid; 8:00–8:30 a.m.

This presentation will review new corrosion rate data for different salt chemistries at different temperatures with different dissolved oxygen concentrations, as well as the impact of surface salts on a rusted steel substrate's impact on epoxy barrier coating performance versus a new panel performance.

• "A Discussion of the Effect of Soluble Salts on Corrosion and Coatings," by Rudy Uibel, Eric Brandhorst and Bob Wissinger, The Sherwin-Williams Company; 8:30–9:00 a.m.

The presence of soluble salts accelerates the corrosion of steel, and specifiers, end-users, contractors and inspectors lack the appropriate guidelines for testing, limits and removal. This presentation will outline the effects of soluble salts on corrosion and coatings and when and where testing should occur.

• "Salt Contamination Testing Method and Accuracy Improvement," by Dejin Feng, Rader Coating Technolgy, Shanghai; 9:00–9:30 a.m.

Self-adhesive rubber film patches are often used during salt testing, but there is no requirement to check to see if these patches were contaminated by salt. The presenter will discuss considerations regarding patch contamination and how it can affect the accuracy of salt testing and the impact it has on the contractor.

• "Detection of Soluble Salts Prior to Painting," by J. Peter Ault, Elzly Technology Corporation; 9:30–10:00 a.m.

This presentation will explore various issues associated with detection of soluble salts prior to painting including detection methods, industry standards, repeatability, sources of variability and sampling methods.

MORNING SESSION 2: SEVERE ENVIRONMENTS

• "Why Epoxy Coatings are the Most Practical Lining Material for Manhole

Rehabilitations," by Tim Bauman, The Sherwin-Williams Company; 8:00–8:30 a.m.

The presenter will explain why epoxy is the most practical lining to be used to prevent manholes from H_2S/sulfuric acid degradation, particularly when compared to other technologies that are currently available.

• "Lessons Learned, The Search Continues: Impact and Abrasion Resistant Coatings and Overlays for Immersion Structures in Severe Environments," by Jeffrey Ryan, U.S. Army Corps of Engineers; 8:30–9:00 a.m.

This presentation will recap a 2014 field test of two different ceramic composite coatings and an adhesively applied ultra-high molecular weight polyethylene (UHMWPE) sheet applied to steel dam gates. After 5 years in service, the demonstrations had failed, but lessons were learned regarding the material performance properties required, as well as optimal application procedures for the UHMWPE.

• "Permeability: An In-Depth Look at the ASTMs, When the Data Can Be Important, and When the Information is Irrelevant," by John Sierzega, The Sherwin-Williams Company; 9:00–9:30 a.m.

One of the criteria often used to evaluate immersion coatings is permeability, which is often misunderstood. This presentation will help attendees understand what permeability really is and when it matters in a coating system.

• "Novel Two-Coat Water Repellent System for Long-Life Offshore Maintenance," by David Morton, Hempel A/S; 9:30–10:00 a.m.

The presenter will describe the development of a water-repellent polyurethane topcoat and its impact compared to conventional polyurethane coatings. A long-life, two-coat system consisting of the water-repellent topcoat with an activated zinc-rich primer will be demonstrated.

MORNING SESSION 3: COATING TYPES & CHARACTERISTICS

• "Very High-Solid Acrylic Polyol Technology for Low-VOC 2K Direct-to-Metal (DTM) Coatings," by Jeff Arendt, Arkema Coating Resins; 8:00–8:30 a.m.

The presenter will introduce a new, very-high-solid, solvent-borne acrylic technology has been developed to deliver corrosion protection and strong adhesion to a large variety of substrates under adverse conditions.

• "The Evolution of Waterborne Acrylic Protective Coatings," by Leo Procopio, Dow Chemical Company; 8:30–9:00 a.m.

This presentation will take a look both backward and forward in time to see how far waterborne acrylics have advanced, the challenges overcome and remaining to be conquered, and some predictions on where the technology is headed.

• "Self-Healing Microcapsule-Thickened Oil Barrier Coatings," by Jiaxing Huang, Northwestern University; 9:00–9:30 a.m.

The presenter will demonstrate how a self-repairing coating can be applied on-demand as a pinhole-free, self-healing anticorrosion barrier (even underwater) that is stable in high turbulence and in highly corrosive environments.

• "Developments in Polyamide Rheology Modifiers for Very High Solids and 100% Solids Industrial, Protective and Marine Coatings," by Yannick Naïbil-Moreau, Arkema Coating Resins; 9:30–10:00 a.m.

This presentation will provide details on rheology modifiers developed for very-high-solids and solvent-free coatings, presented through relevant case studies.

• "Why Do We Record the Attributes of a Coating Failure as a Result of an Adhesion Test?" by David Barnes, Elcometer Limited; 10:00–10:30 a.m.

International standards require that the attributes exhibited during an adhesion test are recorded as part of the results. This paper will examine what these attributes are, how they should be recorded and what value they hold to the inspector and applicator in assessing the reason for failure.

MORNING SESSION 4: ENVIRONMENTAL HEALTH & SAFETY

• "Regulatory Update: New and Revised Regulations and Actions Affecting the Coatings Industry," by Alison Kaelin, ABKaelin, LLC; 8:00–8:30 a.m.

This annual presentation will summarize environmental, health and safety issues that may impact SSPC members: current and expected EPA and OSHA regulatory rulemaking; emphasis programs, enforcement initiatives or other similar topics.

• "Plasma Coating Removal: A Safety and Industrial Hygiene Analysis," by Peter Yancey, Atmospheric Plasma Solutions, Inc.; 8:30–9:00 a.m.

The Atmospheric Plasma Coating Removal (APCR) process provides a unique new way to quickly and safely remove the toughest industrial coatings. This presentation will provide an assessment of noise, dust and select chemicals to determine the safety of the APCR process.

• "Understanding the Inhalation Hazards Associated with Abrasive Blasting," by Thomas Enger, Clemco Industries Corp.; 9:00–9:30 a.m.

This presentation will cover the most common inhalation hazards associated with abrasive blasting, their impact on lung diseases and the impact these diseases have on workers, and what employers and employees can do to prevent workplace inhalation dangers.

• "Updates to the SSPC/NACE Joint Corrosion Prevention and Control Planning Standard," by Stephen Spadafora, DoD Corrosion Office (Leidos, Inc.); 9:30–10:00 a.m.

This presentation will provide an update on the SSPC–NACE joint CPC planning standard, including a recent revision that added two new key elements and the characteristics of what they should look like as well as a method for determining the adequacy of the CPC planning.

"Fall Protection Training for the Construction Industry," by Charles Brown, Greenman-Pedersen, Inc.; 10:00–10:30 a.m.

The presenter will review what owners, contractors and safety personnel need to know in order to comply with the OSHA 1926.500 Fall Protection regulations.

• "The Rebranding of a Safety Culture 2.0: Leadership and Accountability," by Chris Peightal, KTA-Tator, Inc.; and Joe Singerhouse, Vulcan Painters, Inc.; 10:30–11:00 a.m.

This continuation to an SSPC 2019 presentation will provide more in-depth detail on the Leader Commitment and the Practicing Accountability aspects of rebranding a safety culture.

AFTERNOON SESSION 1: SURFACE PREP

• "Foundation for Strong Performance," by Stephen Streich, SC Streich Enterprise; 1:00–1:30 p.m.

This presentation will explore the process of preparing concrete substrates for application of protective sealers, coatings or linings, outlining the road map provided in SSPC-SP 13/NACE No. 6, "Surface Preparation of Concrete," to attain long-term barrier protection performance.

• "The Development of Surface Preparation Technology," by Kenneth Rossy, Holdtight Solutions; 1:30–2:00 p.m.

This presentation will briefly analyze the evolution of the steel surface-preparation market by focusing on three common methods for steel surface preparation used today: dry abrasive-blasting, wet abrasive-blasting and ultra-high-pressure (UHP) blasting.

• "Effects of Surface Conditioning on Corrosion Resistance Using New vs. Traditional Abrasive Blasting Media Types," by Wesley Towle, Saint-Gobain Specialist Grains and Powders; 2:00–2:30 p.m.

The presenter will discuss the results of a study comparing the performance of various blasting media used for surface conditioning. Considered media includes sintered bauxite, brown-fused alumina, garnet, coal slag and staurolite—all selected based on their similar performance and cost relative to one other.

• "How the Right Pot Choice and System Setup Can Improve Blasting Efficiency," by David Barnes, Elcometer Limited; 2:30–3:00 p.m.

Shot and grit blasting has been around for many years, but are we getting the most from our systems? This presentation will look at the various adjustable parameters that can and do affect the productivity (yardage), media usage and effectiveness of a blasting operation.

• "The Morphology and Performance Effects of Under-Blasted and Re-Blasted Carbon Steel Substrates," by Kat Coronado and Heather Cui, AkzoNobel; and Carl Reed, Greenman Pedersen, Inc. (GPI); 3:00–3:30 p.m.

This presentation will examine the effect on coating corrosion resistance after remediating an under-blasted substrate, which is then remediated to standard preparation.

AFTERNOON SESSION 2:
CONCRETE

• "Optimization of High Solids Self-Leveling Epoxy Floor Coatings," by Eric Ripplinger, Olin Corporation; 1:00–1:30 p.m.

This presentation will describe the optimization of epoxy self-leveling floor formulations to give coatings with excellent aesthetics, fast return to service, an application window down to 13 C, with good compressive strength and durability performance.

• "Determining When to Coat Concrete," by Manuel Najar, V&A Consulting Engineers, Inc.; 1:30–2:00 p.m.

This presentation will identify some of the service environments and data that can prompt an owner to protect their structures with coatings and linings. The data can be compared to industry standards and owners can make more informed decisions about whether to coat or not coat.

• "Lining Concrete Ground Storage Tanks," by Cory Brown, Thernec Company; 2:00–2:30 p.m.

The presenter will discuss the different options for lining large concrete water-storage tanks, including flexible materials such as aromatic polyurethanes, cementitious water-based epoxy primers and more.

• "Lining Below-Grade Concrete," by Matt Apsley, The Sherwin-Williams Company; 2:30–3:00 p.m.

The presenter will discuss what is involved when installing a liner to concrete in water/wastewater structures below grade, reviewing some of the questions typically received during lining project specification.

AFTERNOON SESSION 3:
COATING TYPES & CHARACTERISTICS

• "Field Testing of Coatings for Shielding of Cathodic Protection Currents," by Benjamin Bussard, Shell Pipeline; 1:00–1:30 p.m.

This presentation will outline results of field tests conducted on a fiber-wrap composite system to determine their shielding tendencies and whether or not the coating is likely to disbond in such a way that polarization of the exposed steel surface is not possible.

• "Duplex Coatings for Bridge Structural Steel," by J. Peter Ault, Elzly Technology Corporation; 1:30–2:00 p.m.

This paper will review the benefits and challenges associated with using duplex coating systems—a combination of metallic and organic coatings—to protect steel bridges from corrosion in severe environments.

• "Insights into the Consideration and Selection of Viscoelastic Materials for Potential Use in Field Patch Application," by Sherry Rao, A Plus Coating Solutions Inc.; 2:00–2:30 p.m.

This presentation will explore potential field maintenance products with a service temperature range of 0–65 C for patch application. The presenter will analyze literature and performance

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data from coating suppliers to identify the critical parameters for field patch repairing.

• "Glass-Flake Epoxy vs. Fiber-Filled Epoxy: A Comparison of Design, Performance and Benefits," by Eric Zimmerman, The Sherwin-Williams Company; 2:30–3:00 p.m.

The presenters will provide a comprehensive comparison of glass-flake-reinforced epoxy and fiber-filled epoxy technologies, specifically for use in severe sewer environments on concrete structures.

• "Improvements of Waterborne Acrylic Latex Finish Paint Properties by Incorporating Fluoroethylene Vinyl Ether (FEVE) Emulsion Technology," by Barry Marcks, Caltrans; 3:00–3:30 p.m.

This presentation will discuss reformulation of Caltrans coatings utilizing FEVE emulsion technology, comparing its properties with other types of selected coatings and formulations using QUV and cyclic prohesion for accelerated weathering.

THURSDAY, FEB. 6

MORNING SESSION 1: ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY (EIS)

• "Investigation of Antifouling Coating Degradation in Marine Environments by Electrochemical Impedance Spectroscopy," by Samanbar Permeh, Florida International University; 9:00–9:30 a.m.

The presenter will outline field examinations to evaluate the applicability of a water-based antifouling coating to mitigate biodeterioration. Coated steel coupons were installed at three natural water sites with different environmental characteristics; EIS measurements were made, and analysis by equivalent circuit fitting provided description of the coating condition, its degradation, film development and steel corrosion activity.

• "EIS Evaluation of Single Layer Coating Performance in Corrosive Environments," by Donald Lawson III, AGC Chemicals Americas, Inc.; 9:30–10:00 a.m.

This presentation will explore results of a study using EIS along with accelerated exposure testing to determine the influence of corrosion inhibitors on the adhesion of direct-to-metal topcoats.

MORNING SESSION 2: FIREPROOFING

• "Passive Fire Protection Under Artic Conditions: Is It Going to Crack?" by JP Leon, PPG Industries; 9:00–9:30 a.m.

This presentation will discuss factors to consider when choosing protective fire protection coatings used in the oil and gas industry. The presenter will touch on safety, flexibility, artic conditions, thickness/weight and cost considerations in the use of PFP.

• "Doing It Differently: The Impact of Off-Site Intumescent Coating Application," by Greg Hansen and Paul Trautmann, The Sherwin-Williams Company; 9:30–10:00 a.m.

The presenters will provide an understanding of shop-applied, epoxy-based intumescent coatings compared to the typical field installations normally associated with construction projects, with insight into spray-applied intumescent fireproofing processes, various generic product solutions, performance characteristics for evaluating off-site spray applied intumescent fire protection and more.

MORNING SESSION 3: CORROSION CONTROL

• "A New Protocol for Evaluating the Effectiveness of Coatings Used to Reduce Corrosion of Steel Structures," by Giri Venkiteela, New Jersey Department of Transportation; 9:00–9:30 a.m.

The presenter will introduce a proposed test method, evaluated by comparing the performance of six coating systems during a 20-year field study. The results will show that the proposed protocol provides clear difference between strong and weak coatings and simulates the field behavior well.

• "Going Beyond Standard Corrosion Prevention Efforts and Getting Improved Life Cycle of Wind Energy Equipment," by Michael McLampy, PPG; 9:30–10:00 a.m.

This presentation will discuss current accelerated testing methods used to approve coatings

used on wind tower foundations, towers and other related equipment, including a review of global standards used for coating system selection.

• "Air Force Corrosion Prevention and Control," by Dr. Walter Juzukonis, U.S. Air Force; 10:00–10:30 a.m.

This presentation will discuss the aging fleet problem and what the Air Force is doing to decrease the cost of corrosion and improve weapon system availability.

• "Development of Polymeric Cold Galvanizing Compound (CGC) for Metallic Protection," by Muhammad Abid, University of the Punjab, Lahore, Pakistan / Marjan Polymer Industries Pakistan; 10:30–11:00 a.m.

This presentation will be based on the advanced scientific research and development of cold galvanizing compound (CGC) in the field of polymer science for the protection of metallic structures from corrosion attack.

MORNING SESSION 4: COATING OPERATIONS

"Can You Use a Zinc-Rich Primer When Painting Offshore?" by Raquel Morales, Hempel A/S; 9:00–9:30 a.m.

This presentation will examine the performance of new, activated zinc-rich epoxy primers compared to conventional zinc-rich epoxy primers on steel prepared to different surface profiles using standard techniques of today.

• "Challenging the Organic 'Zinc-Rich' Primer SSPC Standard," by David Morton, Hempel A/S; 9:30–10:00 a.m.

This presentation will examine the formulation and performance of new, activated zinc epoxy primers. It will demonstrate comparable corrosion resistance at reduced zinc levels in the dried film and show that zinc metal levels can be reduced without compromising galvanic corrosion protection while improving adhesion and mechanical properties of the dry film.

• "Seven Ways Spraying with Plural Component Equipment Provides Savings and Improved Performance on the Job," by John Lihwa, Graco, Inc.; 10:00–10:30 a.m.

The presenter will explain how plural-component equipment can help end users increase efficiencies while also providing ease of mind by using tools like pressure and ratio monitors to make sure the materials are applied correctly.

• "How the DH Do I Get the DH I Need?" by Don Schnell, Polygon US Corp.; 10:30–11:00 a.m.

This presentation will explore some techniques that can be used to help determine what DH is required, some methods to help you get what it is that you need from a supplier, as well as some checks to do on equipment to help ensure that it is functioning properly.

COATINGS+
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SSPC COATINGS+ 2020
Long Beach, CA | Feb. 3–6, 2020
EXHIBITORS

The Coatings+ 2020 exhibit hall will feature more than 155 companies from the protective and marine coatings industry showcasing their products and services.

In addition, the exhibit hall will feature a new Activity Zone with games, simulated surfing and a professional headshot station. Also debuting in the hall this year is the Product Demonstration Stage, where exhibitors will showcase and demonstrate new products every 30 minutes during regular exhibit hall hours.

Exhibitor descriptions follow in the proceeding pages; a list of companies with corresponding booth numbers can be found on p. 72. All information is current as of press time.

For more information on the Coatings+ 2020 exhibit hall, contact Nicole Lourette at lourette@sspc.org.

Abrasives Inc. manufactures and sells Black Magic coal slag, blast media and equipment. The company delivers to surface-prep and coating customers throughout the world. Glen Ullin, ND; abrasivesinc.com. Booth 728.

Air Systems International provides confined-space ventilation, Grade D and E breathing-air equipment and environmental products. Chesapeake, VA; airsystems.com. Booth 1326.

ARID-DRY mobile desiccant dehumidifiers are manufactured by Controlled Dehumidification for temporary humidity control and constructive drying. Brighton, MI; cdms.com. Booth 1152.

ARMEX is a brand of the Church & Dwight Co., Inc., makers of Arm & Hammer products, including sodium bicarbonate abrasive blasting media. Princeton, NJ; armex.com. Booth 851.

ARS Recycling Systems, LLC manufactures abrasive blasting recycling systems, dust collectors, vacuum recovery units and rapid deployment equipment for steel surface preparation, painting and coating applications. Lowellville, OH; arsrecycling.com. Booth 453, EQ4.

Atlantic Design, Inc. is a full-service engineering and manufacturing business with over 30 years of industry experience. The company sells and rents both new and used equipment and can retrofit, upgrade and troubleshoot equipment customers already own. Baltimore; atlanticdesigninc.com. Booth 673, EQ11.

Axxiom Manufacturing, Inc. manufactures Schmidt abrasive-blast equipment and related components, including the AmphiBlast wet/dry blast system. Fresno, TX; schmidtabrasiveblasting.com. Booth ID141.

Barton International supplies Mil-Spec- and CARB-approved high-performance garnet abrasives for a variety of blasting applications, offering a variety of grades to match project requirements. Glen Falls, NY; barton.com. Booth 1409.

Bellemare Abrasives & Minerals sells and distributes a variety of mineral products for sandblasting, waterjet cutting, filtration, grouting and foundry, as well as specialized, high-performance products. Trois-Rivières, Quebec; groupebellemare.com. Booth 952.

BlastOne International has been a specialist consultant and supplier to the coatings and corrosion-control industry for over 40 years, helping clients become more competitive, efficient and profitable on blasting and painting jobs. Columbus, OH; blastone.com. Booth 917.

Borchers provides CHLOR*RID International soluble salt and decontamination products, field test kits and education for surface preparation. CHLOR*RID products have provided a biodegradable, non-hazardous and economical way to ensure the longevity of applied coatings. Westlake, OH; chlor-rid.com. Booth 639.

BrandSafway manufactures engineered suspended access systems for use with bridges, buildings, offshore platforms and special structures. BrandSafway sells and rents to contractors. Kennesaw, GA; brandsafway.com. Booth 1244.

Bullard has manufactured personal protective equipment worldwide since 1898, including hard hats, face shields, respirators, air quality equipment, rescue helmets and thermal imagers. Cynthiana, KY; bullard.com. Booth 534.

Burleigh Industries. Greenville, SC; burleighindustries.com. Booth 762.

BYK-Gardner USA. Columbia, MD; byk.com. Booth 1437.

Carboline Company, founded in 1947, produces high-quality performance coatings, linings and fireproofing products in more than 20 manufacturing facilities around the world. St. Louis; carboline.com. Booth 1111.

CESCO supplies abrasive-blasting, paint-spray and safety equipment, including the Aqua Miser ultra-high-pressure water blaster. The company provides product sales, rentals, service and used equipment. North Charleston, SC; blastandpaint.com. Booth 1229.

Chemours manufactures Starblast and AIZEBlast low free silica, CARB-, SSPC- and QPL-approved natural mineral abrasives for waterjetting, etching, and dry and vapor blasting. Starke, FL; chemours.com. Booth 1346.

ClemcoIndustriesCorp. 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; clemcoindustries.com. Booth 719.

CoatingsPro Magazine features case studies written from the coating applicator's perspective, as well as articles on successful business operation, new products, industry news and the proper use of coatings and equipment. San Diego; coatingspromag.com. Booth 339.

Cold Jet develops environmentally responsible dry-ice-cleaning solutions and dry-ice-production equipment, with international operations. Loveland, OH; coldjet.com. Booth 1057.

Cor-Ray Painting Co. Santa Fe Springs, CA; corraypainting.com. Booth 753.

Corrodere Academy. Surrey, U.K.; corrodere.com. Booth 954.

Cortec Corporation develops environmentally friendly Vapor-phase Corrosion Inhibitor (VpCI) and Migrating Corrosion Inhibitor (MCI) technology. St. Paul, MN; corteccoatings.com. Booth 1252.

CSI Services, Inc. is an SSPC-QP 5-certified third-party consulting engineering firm that provides services worldwide, including field and laboratory testing, corrosion surveys, coating evaluations, technical specifications, failure analysis and more. Santa Clarita, CA; csiservices.biz. Booth 1141.

Dampney manufactures industrial and heat-resistant coatings for the petrochemical, power-generation and OEM markets, including Thurmalox, a unique silicone resin technology that allows for ambient or hot applied applications in challenging environments. Everett, MA; dampney.com. Booth 1235.

Daubner Advanced Coating Solutions offers professional-grade paint brushes and rollers, rigging and lifting products, wire rope and chain attachments, SharpWire containment ties, and hose couplings and accessories. Wilmington, NC; daubnerusa.com. Booth 752.

DeFelsko Corporation manufactures inspection instruments, including the PosiTector, PosiTest and PosiPen brands for measuring coating thickness, profile, environmental conditions, salt contamination, hardness, porosity and ultrasonic wall thickness. Ogdensburg, NY; defelsko.com. Booth 1209.

Dehumidification Technologies, LP provides temporary humidity and temperature control solutions to multiple industries in the U.S., Canada, Australia and Thailand. Houston; rentdh.com. Booth 1421.

DESCO Manufacturing Inc. produces dust-free surface preparation tools for weld prep, coating applications and abatement. Industries served include commercial and industrial contractors, U.S. Navy, shipyards and nuclear. Rancho Santa Margarita, CA; descomfg.com. Booth 936.

Detroit Tarp Inc. has manufactured tarps, covers and custom enclosures for 49 years, including materials used for containing lead from abatement projects, overspray, weather enclosures and tarps for all needs. Romulus, MI; detroittarp.com. Booth 1249.

Doosan Portable Power specializes in air compressors, generators, light towers and light compaction equipment. Statesville, NC; doosanpowermoves.com. Booth 243.

Dumond Chemicals. West Chester, PA; dumondchemicals.com. Booth 741.

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Dupont Protection Solutions provides protective apparel for first responders and industrial workers, including the Tyvek, Tychem and ProShield brands. Richmond, VA; dupont.com/personal-protective-equipment. Booth 1328.

Dustnet by EMI. Pensacola, FL; dustnet.com. Booth 735.

Eagle Industries supplies a wide range of jobsite enclosures and containment products, including tarps, reinforced poly sheeting, safety netting, shrink wrap, equipment, scaffolding and weather enclosure products. New Orleans; eagleind.com. Booth 1143.

Easy-Kleen Pressure Systems Ltd. is a family-owned and -operated manufacturer of high-pressure cleaning systems. Sussex, New Brunswick; easykleen.com. Booth 540.

ecoFinish LLC. Warminster, PA; ecofinishcoatings.com. Booth 344.

Ecomaterials, Inc. Oakville, Ontario; ecomaterials.net. Booth 726.

Elcometer produces coating and concrete inspection equipment, with a range of products specifically developed to meet the needs of the protective coatings industry. Warren, MI; elcometerusa.com. Booth 1011.

Element Materials Technology. Houston; element.com. Booth 1253.

COATINGS+ *Exhibitors*

The following is a list of companies planning to showcase their products and services in the Coatings+ 2020 exhibit hall. For questions about exhibiting, please contact Nicole Lourette (lourette@sspc.org).

Abrasives Inc. 738
Air Systems International 1326
Anti-Dry 1152
ARMEX 831
ARS Recycling Systems, LLC 483, EQ4
Atlantic Design Inc. 673, EQ11
Axxiom Mfg./Schmidt Engineered Abrasive Systems 1041
Barton International 1409
Bellemare Abrasives & Minerals 952
Blast One 917
Borchers /Chlor Rid 639
BrandSafway 1344
Bullard 534
Burleigh Industries 763
BYK-Gardner USA 1437
Carboline 1111
CESCO 1229
Chemours 1346
Clemco Industries Corp. 719
CoatingsPro Magazine 339
Cold Jet, LLC 1057
Cor-Ray Painting Co. 753
Corrodere Academy 954
Cortec Corporation 1252
CSI Services 1141
Dampney 1235
Daubner Advanced Coating Solutions 752
DeFelsko Corporation 1209
Dehumidification Technologies, LP 1431
DESCO Manufacturing Inc. 936
Detroit Tarpaulin, Inc. 1249
Doosan Portable Power 343
Dumond 741
Dupont Protection Solutions 1328
Dustnet by EMI 735
Eagle Industries 1143
Easy Kleen Pressure Systems, Ltd. 540
ecoFinish LLC 344
Ecomaterials, Inc. 726
Elcometer 1011
Element Materials Technology 1253
EnTech Intl. 558, EQ6
ErgonArmor 1031
Erven Industries 667
Express Chem 829
Federal Signal Environmental Solutions Group 1401
Fischer Technology, Inc. 928
Forensic Analytical Consulting Services (FACS) 853
Garnett Fleming 1055
GMA Garnet USA 1427
GMA Industries 1157
GMP Ceramics, LLC 1334
Graco Inc. 447
Greener Blast 645
Greenman-Pedersen, Inc. 1130
Harsco Minerals 1147
Herc Rentals 725
Hippo Multipower 760
Hippowrap Containment 1237
HoldTight Solutions, Inc. 1225
HRV Conformance Verification Associates Inc. 836
Induron Protective Coatings 1413
Industrial Vacuum Equipment Corp. 347, EQ3
International Paint/Akzonobel 1239
ITW Polymers Sealants North America 1139
IUPAT/ Finishing Trades Institute 911
J.H. Fletcher & Co. 437
JPCL 1135
Kennametal 631
KleenBlast 953
KTA-Tator 834
Langley Blast Technologies 1047
LIUNA 956
Mericka Group LLC 1256
MES Rentals & Supplies 669, EQ9
Minerals Research, Inc. 846
Monarflex by Soplast 842
Montipower 1415
NACE Institute 343
NACE International 341
National Equipment Corp. (NECO) 1146
Navitas Credit Corp. 1441
NCERCAMP @ The University of Akron 844
Nextec, Inc./ProTex 1236
Novatek Corporation 834
Nu Way Industrial Waste Management, LLC 1135
Olimag Sand 1148
OPTA Minerals, Inc. 738
Opti-Blast, Inc. 1340
P & L Metalcrafts 1234
Pacific Dust Collectors & Equipment 663, EQ7
Polygon 1324
PPG Protective & Marine Coatings 813
Pro-Tect Plastic & Supply 1342
Rapid Prop 345, EQ2
RD Coatings - Dothee S.A. 653
Rizhao Garnet Ltd. 1154
Rust-Oleum 1137
Saint-Gobain 828
SAFE Systems, Inc. 1238
San-Blast-Tore LLC 438
Sherwin-Williams 1035
Spider 1250
Sponge-Jet 1215
Spray Foam Systems 1352
Sprayroq, Inc. 1508
SSPC Gulf Coast Chapter 747
SSPC Steel City Chapter 749
SSPC Southern California Chapter 745
SSPC Mexico Chapter 743
Sulzer Mixpac USA 848
Tarps Manufacturing 1435
TDI Group 853
Technolink, LLC 722
Technology Publishing Co. 935
Texan Stone LLC 1140
Thermon Inc. 1425
Tinker & Rasor 1423
Titan Tool 734
Tnemec Company Inc. 835
Trelawny SPT Ltd. 923
Trenton Corporation 1153
TruQC 830
U.S. Minerals 1026
Van Air Systems 729
Vector Technologies Ltd. 444
VersaFlex 935
Vulkan Blast Shot Technology 1435
W Abrasives 552
The Warehouse Rental & Supply 649
Wasser Coatings 1347
Western Technology 1027
WIWA 819
ZIBO TAA Metal Technology Co. Ltd. 1053

EnTech Industries manufactures field-tested mobile and skid dust collectors, offered in diesel, electric and diesel/electric combination, in capacities from 2,000–60,000 cfm. Grand Forks, MN; entechindustries.com. Booths 558, EQ6.

ErgonArmor. Flowood, MS; ergonarmor.com. Booth 1031.

Ervin Industries manufactures highly engineered abrasives for blast-cleaning, shot-peening, stone-cutting and other processes. Ann Arbor, MI; ervinindustries.com. Booth 667.

Express Chem. Kirkwood, MO; expresschem.com. Booth 829.

Federal Signal Environmental Solutions Group. Oak Brook, IL; fssolutionsgroup.com. Booth 1401.

Fischer Technology, Inc. will showcase instruments for nondestructive measurement of protective coatings, including thermal-spray aluminum over stainless steel, intumescent coatings, holiday testing, surface profile of blasted surfaces and more. Windsor, CT; fischer-technology.com. Booth 928.

Forensic Analytical Consulting Services (FACS) is an environmental health consulting firm providing industrial hygiene services. Hayward, CA; forensicanalytical.com. Booth 852.

Gannett Fleming has been providing global infrastructure solutions for more than a century. The company employs a staff of SSPC-certified Protective Coatings Specialists and Protective Coatings Inspectors. Camp Hill, PA; gannettfleming.com. Booth 1055.

GMA Garnet (USA) Corp. supplies garnets for the surface-preparation industry, available through its global distribution network and warehouses. Spring, TX; gmagarnet.com. Booth 1427.

GMA Industries. Romulus, MI; gmaind.com. Booth 857.

GNP Ceramics, LLC. Amherst, NY; gnpceramics.com. Booth 1334.

Graco Inc. designs, manufactures and markets systems and equipment to move, measure, control, dispense and spray fluid and powder materials and coatings in industrial and commercial applications. Minneapolis; graco.com. Booth 447.

Greener Blast Technologies manufactures a surface prep system using water and blasting materials to be as effective as conventional methods while using only a fraction of the product. Tyngsboro, MA; greenerblast.com. Booth 645.

Greenman-Pedersen, Inc. is an engineering consulting firm that specializes in design and construction of transportation infrastructure and building projects. GPI provides engineering, design, planning and construction management services to a wide variety of entities. Babylon, NY; gpinet.com. Booth 1130.

Harsco Minerals provides processed mineral products for environmentally beneficial uses, including its high-performance BLACK BEAUTY abrasives, roofing granules and aggregate products. Mechanicsburg, PA; blackbeautyabrasives.com. Booth 1147.

Herc Rentals Inc. is a full-service equipment rental firm, providing equipment, services and solutions for safe, efficient and effective jobs. Bonita Springs, FL; hercrentals.com. Booth 725.

Hippo Coatings, a division of Hippo Multipower, produces spray rigs and combined compressed air/power solutions, and distributes Graco and PMC products. Riverside, MO; hippomultipower.com. Booth 740.

HippWrap Containment specializes in shrink-wrap containment enclosures for protective coatings, asbestos and weather protection projects. San Diego; hippwrap.com. Booth 1237.

HoldTight Solutions Inc. manufactures and distributes surface prep additives to remove soluble salts and contaminants and prevent flash rusting. The company also distributes a preservation coating, as well as testing equipment for surface conductivity and water quality. Houston, holdtight.com. Booth 1225.

HRV Conformance Verification Associates Inc. provides certified inspectors for materials fabrication plants and project sites nationwide, including materials and coatings QA/QC inspection for a variety of industrial markets. Moon Township, PA; hrvinc.com. Booth 836.

Induron Protective Coatings is a 70-year-old family-owned industrial coatings manufacturer focused on providing solutions for infrastructure. Birmingham, AL; induron.com. Booth 1143.

Industrial Vacuum Equipment Corp. manufactures the Hurricane line of industrial vacuum loaders and FiltAire dust collectors, selling and renting throughout North America. Ixonia, WI; industrialvacuum.com. Booths 347, EQ3.

International Paint is a brand of AkzoNobel that supplies coatings to industries and consumers around the world. Houston; international-pc.com. Booth 1239.

ITW Polymers Sealants North America. Irving, TX; itwsealants.com. Booth 1139.

The IUPAT/Finishing Trades Institute is committed to providing workforce coating application training with SSPC programs. Hanover, MD; lmcionline.org. Booth 911.

J.H. Fletcher & Co. Huntington, WV; jhfletcher.com. Booth 437.

JPCL recently celebrated 35 years as the technical journal of record for the coatings industry and the official voice of SSPC. In 2019, JPCL launched JPCL En Español for Spanish-speaking coating professionals. Pittsburgh; paintsquare.com/jpcl. Booth 935.

Kennametal manufactures high-performance abrasive blast nozzles, providing innovations and expertise in engineering and material science. Latrobe, PA; kennametal.com. Booth 631.

KleenBlast. Danville, CA; kleenblast.com. Booth 953.

KTA-Tator, Inc. employs over 130 NACE-certified Coating Inspectors and more than 70 Certified Welding Inspectors worldwide, offering coating assessments, laboratory testing, failure analysis, EHS services, instrument sales and training. KTA celebrates its 70th anniversary this year. Pittsburgh; kta.com. Booth 824.

Langtry Blast Technologies. Burlington, Ontario; langtry.org. Booth 1047.

LiUNA. Washington, D.C.; liuna.org. Booth 956.

Mericka Group LLC. Anchorage, AK; merickagroup.com. Booth 1256.

MES Rentals & Supplies is a nationwide equipment rental house serving the blast and paint market. Its fleet contains dust collectors, vacuums, blast pots, steel grit equipment and more. Spanish Fort, AL; mesrentals.com. Booths 669, EQ9.

Minerals Research, Inc. manufactures SHARPSHOT slag abrasives and represents and distributes technical abrasives and equipment products. Tucson, AZ; mineralsresearch.com. Booth 846.

Monarflex by Siplast has provided contractors with containment and scaffold sheeting since the 1950s, including a full range of reinforced sheeting materials, attachments and accessories. Irving, TX; monarflexusa.com. Booth 842.

Montipower will showcase the MBX Bristle Blaster, a power tool that removes corrosion, scale and coatings while imparting a 3-mil surface profile and near-white metal clean—well suited for spot repairs and for jobs where abrasive blasting is prohibited. Manassas, VA; mbxt.com. Booth 1415.

NACE International. The Worldwide Corrosion Authority, serves more than 36,000 members in 130 countries; its membership includes engineers, inspectors, technicians, scientists, business owners, CEOs, researchers, educators, students and other corrosion professionals. Houston; nace.org. Booth 341.

The NACE International Institute was formed to support the corrosion-control field, improve the business conditions of the industry, and advance knowledge through programs that promote public safety, protect the environment and reduce the economic impact of corrosion. Houston; naceinstitute.org. Booth 343.

National Equipment Corp. (NECO) will display its Neco Blast Couplings and complete product line. Brenham, TX; hosecouplings.com. Booth 1146.

Navitas Credit Corp. is a nationwide direct lender with a focus on the small- and medium-sized business sector, providing leases and loans to assist businesses in acquiring equipment and financing. Ponte Vedra, FL; navitascredit.com. Booth 1141.

The National Center for Education and Research on Corrosion and Materials Performance (NCERCAMP) at the University of Akron, launched in 2010 with a grant from the DoD, focuses on predicting, preventing and managing the nation's destructive corrosion and materials degradation problems. Akron, OH; uakron.edu/ncercamp. Booth 844.

NexTec, Inc./PreTox markets products that render lead waste non-hazardous for disposal. The products are compatible with all abrasives and removal methods. Dubuque, IA; pretox.com. Booth 1236.

Novatek Corporation manufactures surface preparation equipment and portable air filtration systems, including a range of needle scalers, peening prep tools, hand grinders and HEPA-filtered vacuums. Phoenixville, PA; novatekco.com. Booth 834.

Nu Way Industrial Waste Management, LLC is a WBE- and WOSB-certified hazardous and non-hazardous waste transportation

and disposal company. North Lima, OH; nuwayindustrialwm.com. Booth 1135.

Olimag Sand produces non-toxic abrasive for sandblasting in eastern Canada. The company's synthetic olivine JETMAG is produced in a rotary kiln at 2,300 F. Thetford Mines, Quebec; olimag.com. Booth 1148.

OPTA Minerals, Inc. Waterdown, Ontario; optaminerals.com. Booth 738.

Opti-Blast, Inc. Jacksonville, TX; optiblast.com. Booth 1240.

P&L Metalcrafts offers rigging supplies at wholesale pricing, designing and fabricating complete containment systems for bridges and water tanks. Youngstown, OH; metalcraftsyng.com. Booth 1234.

Pacific Dust Collectors & Equipment. Damascus, OR; pacificdustequipment.com. Booths 663, E07.

Polygon provides energy-efficient, engineered temporary climate solutions and drying technology. North Andover, MA; polygongroup.com. Booth 1324.

PPG Protective & Marine Coatings is a global coatings supplier with a complete range of coating solutions to protect assets in the world's most challenging conditions. Pittsburgh; ppgpmc.com. Booth 813.

Pro-Tect Plastic & Supply. Jacksonville, OR; shrinkwrapcontainments.com. Booth 1242.

Rapid Prep is a full-service surface-preparation-equipment provider for large-scale projects to small requests. North Kingstown, RI; rapidprep.com. Booths 345, E02.

RD Coatings-Dothée S.A. offers water-based protective coatings for commercial and industrial facilities, equipment, engineered structures and building envelope. Assesse, Belgium; rd-coatings.com. Booth 653.

Rizhao Garnet Ltd. owns and operates garnet mines and large modern processing plants to produce hard rock abrasive. The company is certified under ISO 9001:2008. Shandong, China; rzggarnet.com. Booth 1154.

Rust-Oleum. Vernon Hills, IL; rustoleum.com. Booth 1137.

Saint-Gobain Abrasive Materials manufactures specialty grains and powders for cutting, grinding, blasting, lapping and polishing, and filler and additive applications. Worcester, MA; saint-gobain.com. Booth 828.

SAFE Systems, Inc. designs and manufactures abrasive air blast facilities and portable air blast equipment in the U.S. Kent, WA; safesys.com. Booth 1238.

San-Blast-Ture LLC produces a patented robotic arm for blasting and painting in hazardous confined spaces such as petroleum storage tanks, vessels and wind generators. Saline, MI; h2towers.com. Booth 438.

The Sherwin-Williams Company is a coatings and linings manufacturer that has offered a complete line of products, market expertise and on-time distribution for nearly 150 years. Cleveland; sherwin-williams.com/protective. Booth 1035.

Spider by BrandSafway provides innovative suspended powered access solutions to the commercial painting and coating industry, including the ST-17 work basket, hoists and swing stages, netting solutions and more. Tukwila, WA; spiderstaging.com. Booth 1255.

Sponge-Jet manufactures composite abrasives by bonding conventional abrasives with polyurethane sponge. The company also manufactures high-production, composite abrasive blasting and recovery systems. Newington, NH; sponge-jet.com. Booth 1215.

Spray Foam Systems. Greensboro, GA; sprayfoamsys.com. Booth 1352.

Sprayroq, Inc. develops, manufactures and markets polyurethane protective coating and lining systems designed for corrosion protection and asset life extension. Irondale, AL; sprayroq.com. Booth 1508.

SSPC is a 501(c)3 non-profit organization focused on the protection and preservation of concrete, steel and other industrial and marine structures and surfaces through the use of high-performance protective, marine and industrial coatings. Be sure to visit some of the SSPC International Chapters in the exhibit hall, including the **Gulf Coast Chapter (Booth 747)**, the newly reinstated **Steel City Chapter (Booth 749)**, the **Southern California Chapter (Booth 745)** and the **Mexico Chapter (Booth 743)**, who will be exhibiting for the first time. Pittsburgh; sspc.org.

Sulzer Mixpac USA offers a delivery system for two-component epoxies, polyurethanes and polyureas, including Mixcoat cartridge technology for stripe coating, pipeline applications and coating touchups and repairs. Salem, NH; sulzer.com. Booth 848.

Tarps Manufacturing, Inc. produces custom containment tarps, building wraps and ground tarps in strong nylon and poly mesh. Meredosia, IL; tarpsmfg.com. Booth 1435.

TDJ Group. Barrington, IL; blastox.com. Booth 853.

Technofink, LLC provides solutions for high-performance polymers, leak sealing and structural reinforcement in pipes as well as control and protection against corrosion. Spring, TX; technofink.com. Booth 722.

Technology Publishing Company has published JPCL for 35 years and launched *JPCL En Español* in 2019. It provides its audience with a daily e-newsletter (*PaintSquare News*) and a digital edition. TPC also offers PaintBidTracker, the only project lead service dedicated to coatings work, and PaintSquare Press, a quarterly print magazine for the industrial, commercial and architectural professionals. Pittsburgh; technologypub.com. Booth 935.

Texan Stone LLC is a wholesale supplier and processor of India Beach Garnet and Staurolite abrasives. All products are mined and sourced legally and available in the U.S., Canada, Mexico and other global destinations. Houston; texanstone.com. Booth 840.

Thermion Inc. Silverdale, Washington; thermioninc.com. Booth 1425.

Tinker & Rasor manufactures holiday detectors, Detectron pipe and cable locators and fluid leak detectors, plus a sizable line of cathodic protection instrumentation. New Braunfels, TX; tinker-rasor.com. Booth 1423.

Titan manufacturers professional-grade sprayers for applying 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, Minnesota; titantool.com. Booth 734.

Tnemec Company Inc. offers products developed to protect against the most severe environments facing the water industry, supported by extensive performance data and technical service. Kansas City; tnemec.com. Booth 835.

Trelawny SPT Ltd. Warwickshire, U.K.; trelawnyspt.com. Booth 623.

Trenton Corporation. Ann Arbor, MI; trentoncorp.com. Booth 1153.

TruQC is a field-friendly document and workflow framework configured to meet specific business needs, including compliance with QP, QS and QN certifications. St. Louis; truqc.com. Booth 830.

U.S. Minerals produces Black Diamond abrasives, offering a selection of standard and custom gradations in coal and copper slag. Tinley Park, IL; blackdiamondabrasives.com. Booth 1126.

Van Air Systems produces a completely portable deliquescent drying system that requires no electricity, has a plug-and-play design and is conveniently assembled on a forklift skid with lifting lugs to easily move around a worksite. Lake City, PA; vanairsystems.com. Booth 729.

Vector Technologies Ltd. builds trailer and skid mounted industrial vacuum machines, with over 7,000 machines installed around the world. Milwaukee; vector-vacuums.com. Booth 444.

VersaFlex/Raven Lining Systems has produced high-build, 100%-solids epoxy linings for the protection and rehabilitation of wastewater, water and storm-water infrastructure for 30 years. Broken Arrow, OK; versaflex.com, ravenlining.com. Booth 635.

Vulkan Blast Shot Technology. Brantford, Ontario; vulkanshot.com. Booth 435.

W Abrasives. Bedford, VA; wabrasives.com. Booth 552.

The Warehouse Rental & Supply provides a large inventory of quality abrasive blasting and painting equipment and related parts. Greensburg, PA; twrs.com. Booth 649.

Wasser Coatings. Auburn, WA; wassercoatings.com. Booth 1247.

Western Technology manufactures the "Kick It Tough" line of portable explosion proof, low voltage, wet location LED lights. Bremerton, WA; westerntechnologylights.com. Booth 1027.

WIWA is an industrial and commercial spray equipment manufacturer specializing in equipment for protective coatings and linings application. Alger, OH; wiwalp.com. Booth 819.

ZIBO TAA Metal Technology Co, Ltd. Zibo Shandong, China; taa.net.cn. Booth 1053.

COATINGS+

Coatings+ 2020: Daily Schedule

MONDAY, FEB. 3

8:00–9:00 a.m.	SSPC Chapter Networking Breakfast
9:30–10:30 a.m.	Concurrent Technical Sessions
11:30 a.m.–1:00 p.m.	Awards Lunch
1:30–4:30 p.m.	Concurrent Technical Sessions
2:30–3:30 p.m.	Annual Meeting & Open Town Hall on SSPC/NACE Merger
5:30–7:30 p.m.	Welcome Reception (sponsored by Carboline)

TUESDAY, FEB. 4

7:00 a.m.–3:00 p.m.	Exhibitor Move-In
8:00–9:30 a.m.	Keynote Breakfast
10:30–11:30 a.m.	SSPC NBPI Instructor Meeting
10:30 a.m.–12:30 p.m.	Concurrent Technical Sessions
11:30 a.m.–1:00 p.m.	Facility Owners' Lunch & Peer Technical Discussion
1:30–4:30 p.m.	Concurrent Technical Sessions
3:00–4:00 p.m.	Student Posters On Display
5:00–8:00 p.m.	Exhibit Hall Opening Reception (Sponsored by Sherwin-Williams)

WEDNESDAY, FEB. 5

8:00 a.m.–12:00 p.m.	MegaRust Mid-Year Follow-Up
8:30–9:30 a.m.	Mini Sessions
10:00–11:00 a.m.	Student Posters On Display
10:00 a.m.–12:00 p.m.	Concurrent Technical Sessions
11:00 a.m.–4:00 p.m.	Exhibit Hall Open
11:30 a.m.–1:00 p.m.	Complimentary Lunch in Exhibit Hall (Sponsored by CoatingsPro Magazine)
12:30–1:30 p.m.	SSPC Approved Instructor Meeting
1:00–2:30 p.m.	SSPC International Chapter Meetings: Latin America & Asia Pacific
1:00–3:30 p.m.	Concurrent Technical Sessions
3:00–5:00 p.m.	SSPC Education & Instructor Committees (Invitation Only)
3:30–5:00 p.m.	SSPC Professional Development Panel (Sponsored by PPG)

THURSDAY, FEB. 6

9:00–10:30 a.m.	Concurrent Technical Sessions
10:00 a.m.–3:00 p.m.	Exhibit Hall Open
11:30 a.m.– 1:00 p.m.	Complimentary Lunch in Exhibit Hall (Sponsored by CoatingsPro Magazine)
3:00–8:00 p.m.	Exhibitor Move-Out
7:00–9:00 p.m.	Closing Blast (Sponsored by LIUNA)

SSPC Committee Meetings

SUNDAY, FEB. 2

1:00–3:00 p.m.	SSPC Standards Review Committee (Invitation Only)

MONDAY, FEB. 3

7:30–9:00 a.m.	C.2.0 Surface Preparation Steering Committee (Invitation Only)
9:30–11:00 a.m.	C.1.3.0 Polyurethane Coatings C.2.3 Revision of SP 11 and SP 15 C.7.3 Surface Preparation Standards for Concrete
1:30–3:00 p.m.	SSPC/NACE TG 323 Wet Abrasive Blast Cleaning Report C.1.8 Fluoropolymer Coatings Committee
3:30–5:00 p.m.	Bridge Coating Advisory Committee C.3.7 Revision of QP 5 C.2.21 Partial Blast Cleaning

TUESDAY, FEB. 4

10:00 a.m.–12:00 p.m.	PCCP Advisory (Open Meeting)
10:30–11:30 a.m.	NBPI Instructor Meeting
10:30 a.m.–12:00 p.m.	C.8.2 Commercial Coating Materials C.1.1 Zinc-Rich Coatings
1:00–3:00 p.m.	PCCP Advisory Business Meeting (Invitation Only)
1:30–3:00 p.m.	C.1.15 Revision of SSPC-Guide 14 C.2.8 SP 16 Revision
3:00–4:30 p.m.	C.1.9 Polyurea Coatings C.2.4/TG 006 Dry Blast Cleaning Standards Review

WEDNESDAY, FEB. 5

8:30–10:00 a.m.	C.1.10 Paint 15 Revision
10:00 a.m.–12:00 p.m.	C.4.1/NACE TG 527 Revision of CPC Standard
12:30–3:00 p.m.	Open Instructor Meeting
1:30–3:00 p.m.	C.2.23 Non-Profiling Surface Cleaning Technologies C.5.6 Review of PA Guide 10
3:30–5:00 p.m.	SSPC Education Committee/Instructor Joint Meeting (Invitation Only) C.2.8 Profile Measurement

THURSDAY, FEB. 6

8:30–10:00 a.m.	C.2.7 Revision of SSPC-Guide 15
10:30 a.m.–12:30 p.m.	C.2.22 Assessment of Adhesion Interference Material

Courtesy of SSPC.

How Members Benefit from the Technical Program

BY MICHAEL KLINE, DIRECTOR OF TECHNOLOGY AND COMMUNICATIONS, SSPC

The technical program at Coatings+ is the primary reason many people attend the SSPC conference each year. Even with the wide availability of technical content at your fingertips on your mobile device or computer, the conference program still offers a great, live learning opportunity to coatings professionals who attend.

If you're a member of SSPC, here are a few things you can do to take advantage of being at the conference.

FOR ATTENDEES

Savvy conference veterans will know this, but for you newbies, nothing beats the opportunity to hear speakers in-person, ask questions directly and connect with them after their presentations. While SSPC publishes the presentations as part of the conference proceedings, and some of the sessions are recorded for video proceedings, there is no greater benefit than being present and hearing and interacting with the information first-hand. Furthermore, being there provides you the chance to personally meet the experts and have substantive professional conversations. Connections made at the conference can lead to collaboration, mentorship, career advancement and lifelong friendships.

In addition, conference speakers are often presenting key research results or revealing new technology for the first time. Being in the room puts you first in line to learn about and take advantage of new materials, equipment or processes.

In short, go through the technical program and make a plan for which sessions you want to attend. Read the abstract in the book and prepare questions to ask. After the presentation, take a minute to meet the presenter and exchange business cards or visit them later on at their booth in the exhibit hall.

FOR SPEAKERS

Paper selection is a formal process that is conducted by the SSPC Education Program Advisory Committee (EPAC). It is a blind process in which abstracts are submitted by authors and reviewed by the committee based on originality and technical merit. Authors of accepted abstracts are invited to submit formal papers and then speak at the conference in the technical program. Using a blind process removes any potential bias or favoritism.

However, there is a reason that so many Coatings+ speakers return year after year. Often their topics are timely and important to the industry, and the evaluation committee is looking for that type of content. In addition, they are frequently providing updates to long-term research that is continuously relevant over a period of years.

Take this as a hint: if you want to present at a future conference, make sure to choose a subject that is current, forward-looking or provides a different take on a common theme.

Next, many speakers look at presenting as a chance to show their expertise to the industry. It provides for great networking, and many careers have been built by professionals speaking at SSPC and other such conferences. Having the opportunity to stand up in front of your peers and some of the heavy hitters in the industry can demonstrate that you are intelligent, well-spoken, thoughtful and diligent, and is a fantastic way to build your credentials and enhance your professional reputation. Further to that, it's great PR for your company in that they have the foresight to employ such respectable, forward-thinking people.

Finally, there is personal recognition that goes along with presenting. All speakers at Coatings+ are eligible for the President's Lecture Series Award, which is awarded by the SSPC President based on his or her personal favorite paper, chosen prior to the conference. That paper/presentation is given feature status in the conference program. JPCL, The Voice of SSPC, also reviews every paper given at the conference for potential publishing in the magazine in the year following the event.

OTHER SUGGESTIONS

Another way to become involved and take advantage of the technical program is to volunteer for the EPAC or serve as a Track Chair within the technical sessions. As mentioned earlier, EPAC members are involved in developing the technical program. Track Chairs are active onsite at the conference and function as moderators and emcees within the technical sessions.

The biggest takeaway from this should be that the Coatings+ technical program is built by SSPC members for SSPC members. Whether you are presenting a paper, sitting in the audience listening or guiding a session as a moderator, it's an opportunity for you to actively participate, network with other professionals and take advantage of one of the biggest resources that SSPC provides.

10 kg

The average annual section loss of steel into solution per every 1 amp of electrolytic current that takes place during the corrosion reaction.
See page 38.

500

The number of water-storage tanks at 78 U.S. Navy bases in 14 countries, maintained by the company of the author of "Partnering with the US Navy: Water Storage Tank Maintenance on a Global Scale."
See page 28.

2001

The last time that the EPA reduced housing regulation soil lead levels in play areas and family yards—to less than 400 ppm and 1,200 ppm, respectively.
See page 20.

9.2 mils

The average total film thickness of a failing three-coat system applied to the topsides of steel roof trusses at an industrial vehicle wash facility; the specification called for a minimum of 10 mils and a maximum of 20 mils.
See page 18.

$500,000

The annual global cost of CUI inspection, prevention and remediation in a mid-sized refinery.
See page 32.

135+

The number of companies showcasing their products and services in the exhibit hall at SSPC Coatings+ 2020 in Long Beach, California, Feb. 3–6.
See page 41.