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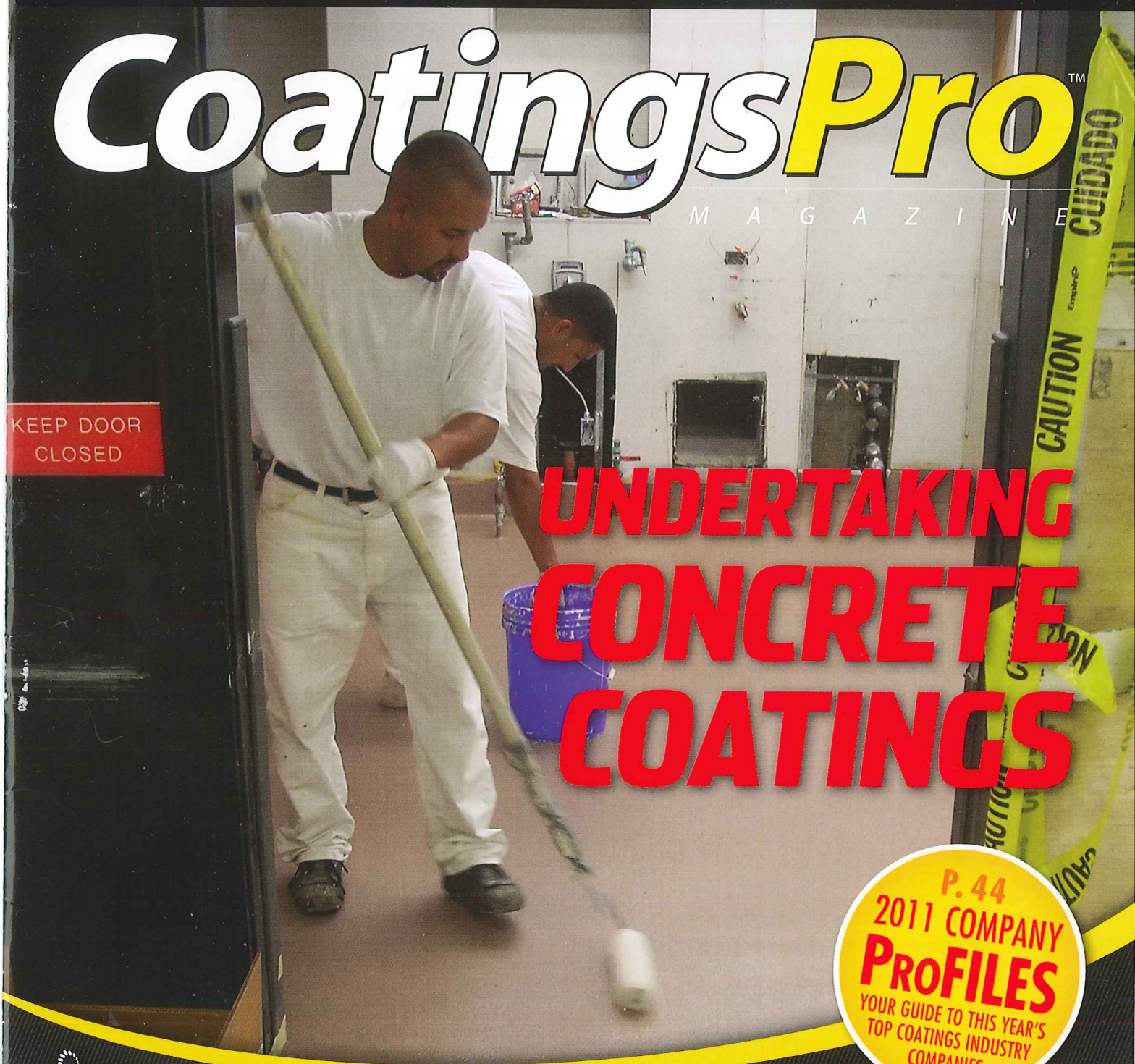

UNDERTAKING CONCRETE COATINGS

P. 44
2011 COMPANY PROFILES
YOUR GUIDE TO THIS YEAR'S TOP COATINGS INDUSTRY COMPANIES

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JANUARY 2011

- BID GOVERNMENT JOBS
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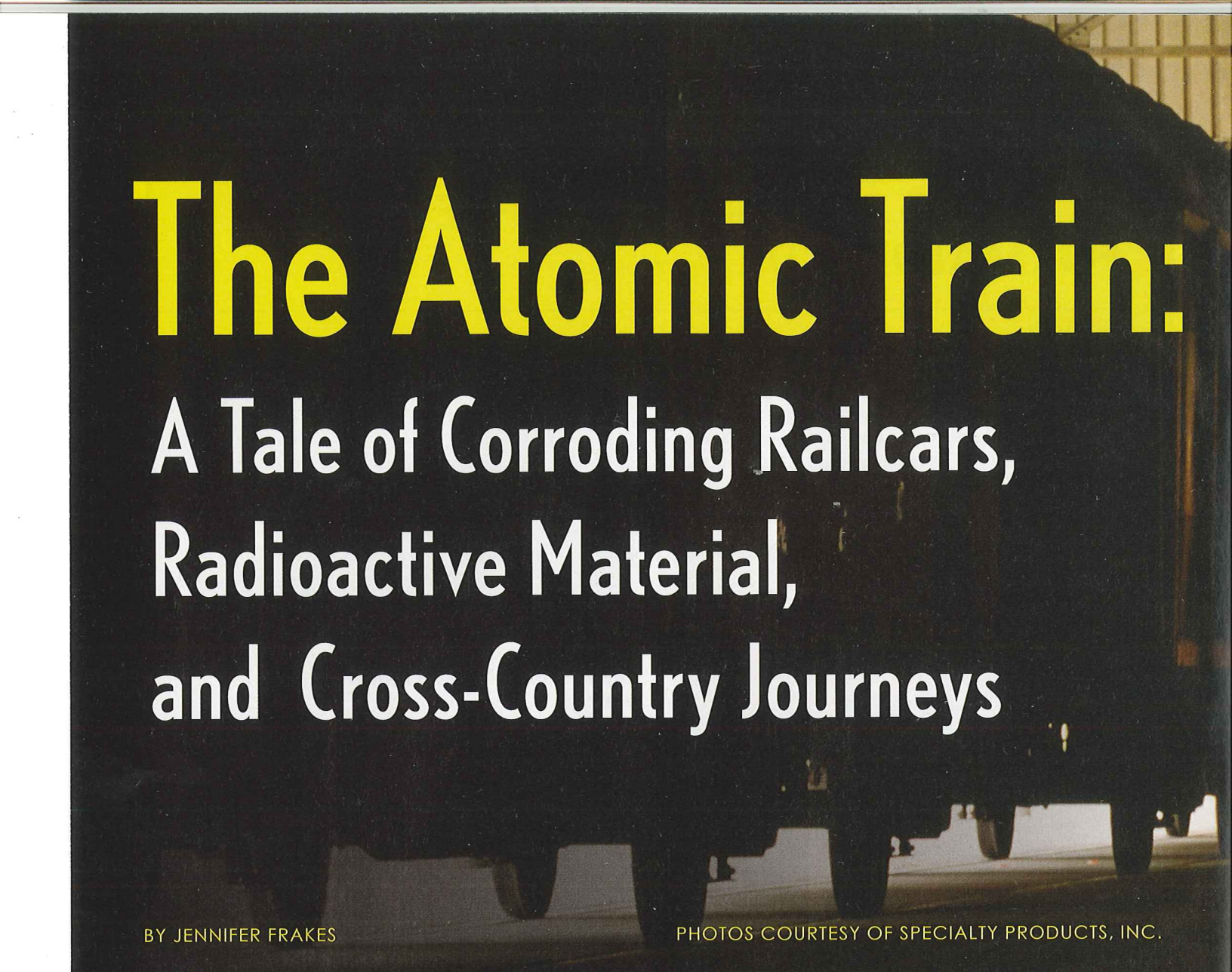
The Atomic Train:

A Tale of Corroding Railcars, Radioactive Material, and Cross-Country Journeys



BY JENNIFER FRAKES

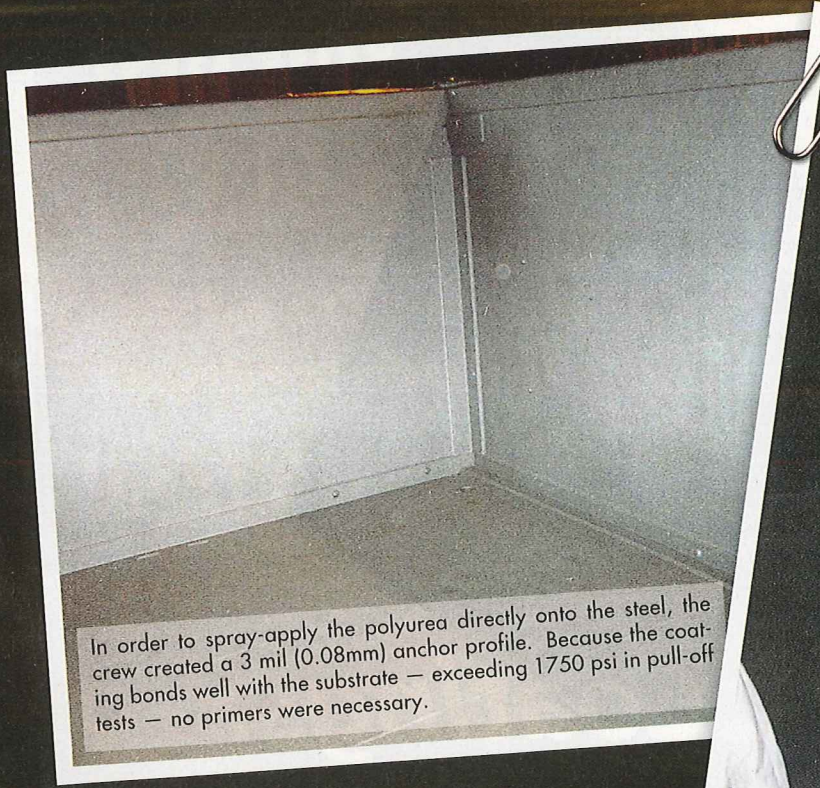
PHOTOS COURTESY OF SPECIALTY PRODUCTS, INC.

It is no small wonder that railcars are areas where corrosion occurs on a regular basis. They are typically used to ship large, heavy commodities and are subject to a great deal of abuse during the loading and unloading process. Add to that the exposure to harsh and wildly variable weather conditions and you have an ideal environment for initiating and fostering corrosion.

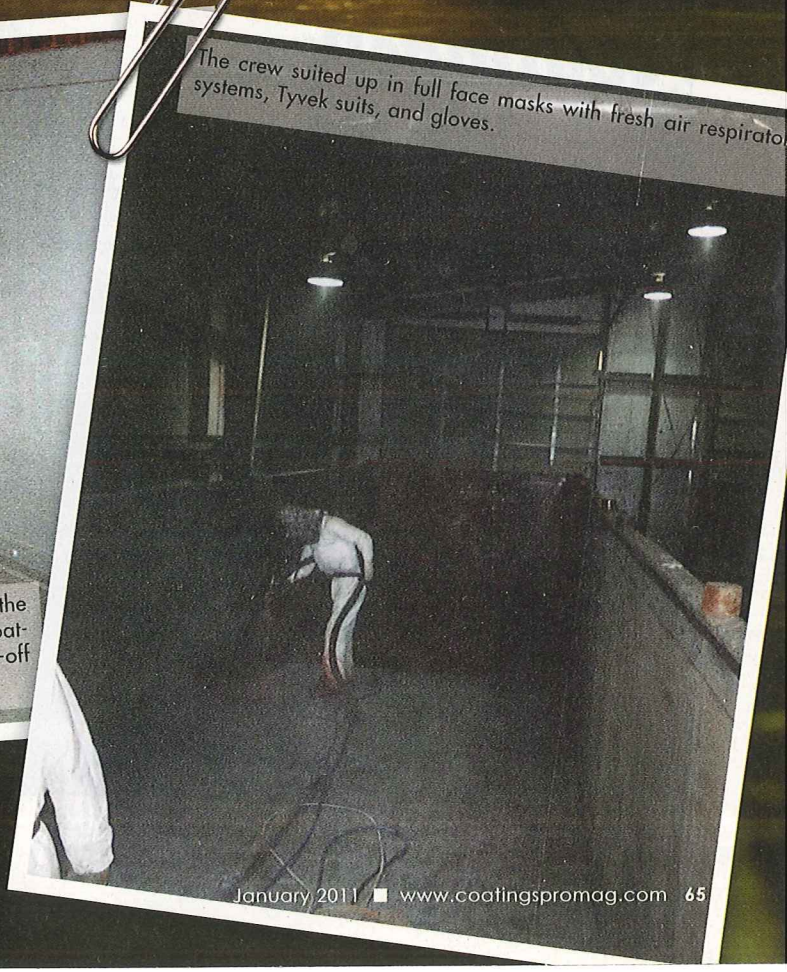
According to Cliff Haskins, Vice President of Marketing for SPI, the railroad industry is always looking for ways to manage the damaging effects of corrosion. "Despite the dramatic improvements in train engines and railcars since their invention in the 1800s, corrosion and contamination control remain difficult problems to mitigate. This $50 billion a year industry has a huge incentive to protect the assets that haul freight all across the United States," says Haskins.

If corrosion control is problematic in railcars transporting typical cargo, such as steel, lumber or grain, imagine the repercussions if corrosion is not mitigated in railcars carrying low-level radioactive material. There is a great deal at stake in this situation: a coating system must be applied to these railcars that will protect the cars from corrosion and be the final line of defense in order to protect the environment and the general public from any accidental contamination. SPI's Polyshield HT was the high performance polyurea coating system chosen for this important job. "This project presented several unique challenges and required more than your average protective coating. Polyshield HT polyurea was specifically formulated to offer the best of both worlds, combining high tensile strength, abrasion-resistance, and good elongation properties. The fact that the Polyshield HT is a monolithic coating and has no seams helps greatly to reduce the possibility of a corrosion cell. This gave our client, in this case the U.S. Department of Energy (D.O.E.), an extremely strong and durable coating solution, with ample flexibility to withstand drastic annual weather cycles," says Dan Helton, President and Founder of SPI.

In addition, with proper surface preparation, the Polyshield HT coating with AE-4, an adhesion enhancer, can be applied directly to the steel substrate without first applying a primer. The AE-4 admixture dramatically increases the coating adhesion to the steel or metal substrate. This was extremely beneficial on this fast-track project, saving both time and money.



In order to spray-apply the polyurea directly onto the steel, the crew created a 3 mil (0.08mm) anchor profile. Because the coating bonds well with the substrate — exceeding 1750 psi in pull-off tests — no primers were necessary.



The crew suited up in full face masks with fresh air respirato systems, Tyvek suits, and gloves.

RIGHT ▶ Using a Gusmer 20/35 proportioner, the crew applied the coating at a thickness of 60 to 80 mils (1.52mm to 2.03mm).

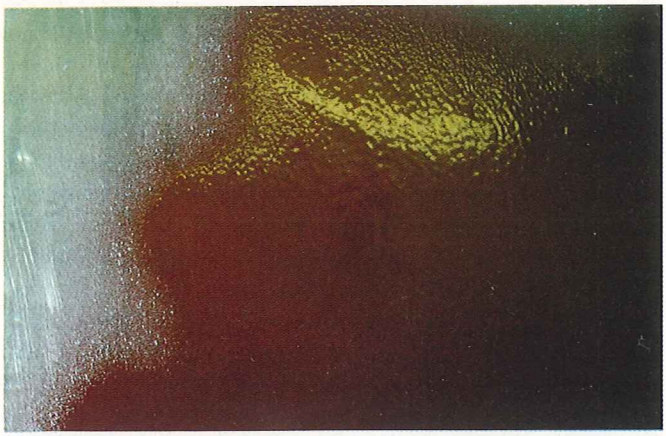
ALL ABOARD

The U.S. Department of Energy commissioned SPI to apply Polyshield HT to the interior of 35 railcars in Cincinnati, Ohio. As an aside, although the D.O.E. was the entity responsible for transporting the low-level radioactive material through the U.S., they were not the owners of the railcars. According to Charlie Hancock, of AIC Foam and Coating, "It is common for companies or wealthy private individuals to purchase railcars, customize them for the intended end-use, and then rent or lease them out. In the case of this particular project, the railcars were leased to the D.O.E."

In order to get an accurate picture of the scope of the project, it is important to understand the players and the payload involved. John Hall, of the Ohio Field Office of the D.O.E., was the project manager on the job. Dick Hugo, of Applied Surface Technology, served as the general contractor on the project. SPI supplied the polyurea coating system. Hancock was the certified technical representative on the job. He was recommended for the project by SPI. "Charlie has an excellent reputation for his quality of work, especially for difficult, high-profile jobs," says Haskins.

Hancock was responsible for training the applicators from Gunderson Midwest on application methods and technique for spraying Polyshield HT. The Gunderson Midwest team consisted of two men, Rick Roth and Robert Pendleton.

The most intriguing part of this project is, of course, the payload that the railcars would ultimately be transporting across the country. According to Hancock, the freight consisted of low-level radiological waste that contained alpha or beta particles. The radiological waste was stored in extremely strong and virtually



ABOVE ▲ The specs called for Polyshield HT, an aromatic polyurea, which can change color when exposed to UV rays. So, the crew used a formulation of Polyshield HT in a terra cotta color with a high pigment load and a UV enhancer to reduce color fading.

indestructible metal radioactive containers. These metal containers were designed to remain intact and sealed even in the event of a collision with another train or vehicle.

"The polyurea was used as a secondary containment liner system to prevent any unlikely spillage or environmental contamination and to protect the steel railcars from abrasion and impact damage from loading and transportation," says Hancock.

He adds that "after each shipment, to help protect the environment and ensure no post-shipment contamination, each railcar was power washed and cleaned. All of the water from the cleaning process was saved and analyzed to make sure the water did not contain any alpha or beta particles."

FULL STEAM AHEAD

The unusual payload notwithstanding, this job had a great deal of challenge. The two-man crew only had 28 days at the repair facility to complete the surface preparation and coating application on the steel interior of 35 railcars, each one measuring approximately 40' (12.19m) in length and 8' (2.44m) in width. To make the deadline even more imposing, the train yard had strict restrictions about the timeframe within which the crew could prep and spray the railcars.

It was imperative for the crew to have a strategy in place for the preparation and application process, considering there was no room for error with such a short timeline. According to Hancock, the railcars were brought into a repair facility that had multiple buildings interconnected by an elaborate track system with roundhouse tables, allowing for the cars to be moved easily from building to building.

The area was divided into a prep area and a spray area. The railcars were first brought into the sandblasting booth area to have all debris and rust removed from steel substrate. A 3 mil (0.08mm) anchor profile was created with the blast media to ensure a proper surface for spraying the polyurea directly onto the steel. The cars were then moved into the spray area, which was contained to prevent overspray onto any other railcars or structures in the vicinity.

Once the cars were in the spray area, they were ready for the

JOB AT A GLANCE

PROJECT:

Coating the interior of railcars transporting low level radioactive material across the United States

COATINGS MANUFACTURER:

Specialty Products, Inc. (SPI)
2410 104th Street, Ct. S., Suite D
Lakewood, WA 98499
(800) 627-0773
www.specialty-products.com

COATINGS APPLICATOR:

Gunderson Midwest Rail Services
Highway 59 West
PO Box 436
Atchison, KS 66002
(913) 367-1635
www.gundersonrailservices.com

TECHNICAL REPRESENTATIVE:

AIC Foam and Coatings
2912 Boniface Parkway
Anchorage, AK 99504-3132
(907) 333-8533

PRIME CLIENT:

United States Department of Energy

SUBSTRATE:

Corroded steel interior of railcars

SIZE OF JOB:

35 railcars, each measuring approximately 40' (12.19m) in length and 8' (2.44m) in width

DURATION:

28 days

SIZE OF CREW:

2 men

CHALLENGES:

- A coating system must be applied to these railcars that will protect the cars from corrosion and be the final line of defense in order to protect the environment and the general public from any accidental contamination
- Any imperfections or holidays in the coating could lead to a coating system failure and the possible release of the low level radioactive materials into the environment
- The two-man crew only had 28 days to complete the surface preparation and coating application on the steel interior of the 35 railcars
- The train yard had strict restrictions about the timeframe within which the crew could prep and spray the railcars

PROCESS:

- The railcars were brought into a repair facility which had multiple buildings that were interconnected by an elaborate track system with roundhouse tables, allowing the cars to be moved easily from building to building
- The area was divided into a prep area and a spray area
- The railcars were first brought into the sandblasting booth area to have all debris and rust removed from steel substrate; a 3 mil (0.08mm) anchor profile was created to ensure a proper surface for spraying the polyurea directly onto the steel
- The cars were then moved into the spray area, which was contained to prevent overspray onto any other railcars or structures in the vicinity
- Using a Gusmer 20/35 proportioner, the crew spray-applied Polyshield HT in terra cotta at a thickness of 60-80 mils (1.52mm to 2.03mm)

SAFETY CONSIDERATIONS:

- During the application of the coating, the crew was outfitted with full face masks with fresh air respirator systems, Tyvek suits, and gloves

polyurea application. Polyshield HT is a plural component, pure polyurea elastomer. It is a 100% solids coating and contains no solvents or volatile organic compounds (VOCs). It is an aromatic polyurea, which means that it is susceptible to color change when exposed to ultraviolet (UV) rays. For this particular job, the formulation of Polyshield HT was a terra cotta color with high pigment loading and contained a UV enhancer to reduce color fading.

The crew applied the coating with a Gusmer 20/35 proportioner at a thickness of 60 to 80 mils (1.52mm to 2.03mm). "The coating was a perfect choice. It could be quickly and easily applied in the train yard with the plural component equipment. We bought the equipment directly from SPI. It helped having a one stop source for the material and equipment," says Hugo.

It is also important to note that during the application of the coating, the crew was outfitted with full face masks with fresh air respirator systems, Tyvek suits, and gloves. All appropriate safety precautions were followed throughout each step of the project.

ON THE RIGHT TRACK

The process had to work like clockwork in order to ensure that the cars could immediately be on their way to pick up the radioactive material. According to Hugo, "To meet the deadline we literally had to line up the railcars and start spraying."

This quick turnaround was possible because of Polyshield HT's rapid curing properties. Downtime was minimized and the railcars were quickly returned to service. In addition, Mother Nature cooperated for the duration of the project and there were no delays due to inclement weather.

Although speed was imperative in every other aspect of the job, a slower than average gel time helped make the Polyshield HT the right choice for the project. Polyureas are typically known for their fast gel times, in some instances as little as five seconds. This helps prevent any ambient or surface moisture from affecting the material. When polyurea gels this quickly, the coating tends to form a bumpy, or "orange peel" surface. However, polyurea can be engineered to gel more slowly, creating a smooth surface and enhancing adhesion.

On this job, excellent adhesion of the coating system was an absolute must. Pinholes and flaws in the coating system could not be tolerated: the coating system was after all the secondary containment for the radioactive material. Any imperfections or holidays in the coating could lead to a coating system failure and the possible release of low-level radioactive materials into the environment.

The coating system was literally put to the test during the final inspection of the project. The Polyshield HT exceeded the 1,750 psi pull-off test requirement. The coating system passed the test, and no defects were found in any of the railcars.

Over time, the coating has been exposed to extreme heat, freezing temperatures, and the constant loading and unloading of the canisters of radioactive material. According to Hall, the Polyshield HT coating system has had an exemplary track record out in the field. "We're very impressed with how well the [coating] is holding up over time. It adhered very well and it is meeting our project's intended use," says Hall.

In other words, the coating system lived up to the expectations of excellent abrasion resistance and the ability to withstand a broad range of weather conditions. Hall is also impressed with the ease with which the coating system can be repaired in the field if needed. "We maintain an aggressive inspection and repair program for the interior of all of our railcars since large chunks of debris such as concrete or metal can damage the integrity of a lining. The SPI product has been successfully patched in the field by our project personnel using patch kit materials," says Hall.

A coating system is only as good as the crew who applied it, and Hancock and SPI are quick to credit the Gunderson Midwest team, as well as the product for the success of this project. According to Haskins, subsequent testing of a cross section of the final product proved superior spray application as these test results exceeded the SPI published physical standards.

"The project was a true success thanks to the diligence of the Gunderson West application team. They went the extra mile and delivered an excellent coating solution under a tight deadline," adds Hancock. CP

VENDOR TEAM

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