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STEEL ACRYLIC

Going to Great Heights: Steel Smoke Stacks Recoat

BY **JENNIFER FRAKES**
PHOTOS COURTESY **HIGHCLIMBERS CO.**

Baltimore, Maryland's Inner Harbor was once an industrial port — an area filled with warehouses, factories, manufacturing facilities, and power plants. Today, the Inner Harbor is a tourist attraction known for its retail shops, restaurants, hotels, leisure activities, and high-end office buildings. One of these buildings by the water was once a power plant, complete with four very large and very tall smoke stacks. The structure is now a mixed-use building that houses office space, retail stores, and restaurants. It's owned by the Cordish Companies. The smoke stacks are no longer in use, and they are now simply decorative reminders of the industrial history of the Inner Harbor. To keep the smoke stacks protected and looking their best, they require recoating every five to six years.

To repair and recoat the smoke stacks, a specialized contractor was needed. According to Eric Bennung of Acrymax, the manufacturer of the coating materials used on the smoke stacks, many contractors proposed designing and building complicated scaffolds that would be cost prohibitive and very difficult to construct in the space available. This is where Highclimbers Company comes into the picture. "Marton and Zolton Zuberecz — the brothers who own the company — and their crew don't require any expensive, difficult-to-assemble scaffolding. They only need chair platforms, ropes, harnesses, and two buckets," said Bennung.

From Climbing Rocks

Highclimbers Company is uniquely positioned to work on structures such as the smoke stacks in the Inner Harbor. According to Marton Zuberecz, he and his brother are rock climbers. They began working in the repair and coating business to make a profit from the skills and knowledge they acquired in their sport. "They began as steeplejacks — people who climb high structures such as chimneys and steeples to make repairs

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It was up to a Highclimbers crew with knowledge of both rock climbing and coatings to recoat a total of 12,000 sq. ft. (1,114.8 m²) on four steel smoke stacks.

Wearing gloves, safety goggles, and hard hats, the six-person crew removed any loose materials by hand and then brush or roller applied Acrymax's PC-535 to areas with corrosion.

— in their native Hungary. Now they do a great deal of work in the United States, as well as overseas," said Bennung. The Highclimbers team has completed repair and coating work on structures such as steeples, bell towers, cupolas, domes, and, of course, smoke stacks. "It's an opportunity to use our skills and do what we love," explained Zuberecz. Many of the company's projects also involve historic preservation and repair.

Zuberecz is quick to point out that safety is the number one priority on every job that Highclimbers Company undertakes. All workers are highly trained, and compliance with all Occupational Safety and Health Administration (OSHA) regulations is a must. "We use Safety Services Company to make sure we understand all of the OSHA regulations. This company helps us to have all the training manuals and guides we need, as well as any other type of safety training," said Zuberecz. He added that finding the right qualified workers can be a challenge. "It is not easy to find people who can do this type of job. It is important to find the right people and work together as a team. My brother and I double check everything. Nothing is more important than safety," said Zuberecz.

Highclimbers purchases all specialized equipment, including platforms, ropes, and full-body harnesses, through J. Racenstein, a company dedicated to manufacturing and distributing equipment for window cleaning and building maintenance. In addition to fall protection equipment, the crew wore hard hats, gloves, and safety goggles on this job.

High Up How-To

For this job, the six-member Highclimbers crew operated with two buckets attached to a platform: one bucket with the tools needed for the job and the other with the coating materials to be applied. "For this job, there was always one person on the roof for safety checks and with the other materials," said Zuberecz.

Because the Inner Harbor is such a popular tourist attraction and a high traffic area, spraying the coating material was never an option. Nor was pressure washing an option to clean the steel surface. All loose and peeling materials were taken off the smoke stacks by hand. Since spraying did not occur either in the surface preparation or coating application process, the crew did not put up containment. "However, we did have safety netting around the smoke stacks to prevent tools from accidentally falling to the ground if dropped," stated Zuberecz.

The four steel smoke stacks are approximately 3,000 square feet (278.7 m²) each, making the project 12,000 square feet (1,114.8 m²) in total. "We coated from top to bottom. Each worker applied the material in four-foot [1.2 m] sections,"

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Because of the height and location of the project, scaffolding wasn't the best option. Instead, they used full-body harnesses for themselves and safety nets for any tools that could potentially drop.

explained Zuberecz. The job took about eight weeks from start to finish, and the crew worked on two smoke stacks simultaneously. "While each layer of the coating system was drying, work began on the other one. This way, the crew didn't have any real downtime," he said.

The weather cooperated as well, so there were no delays in the schedule. According to Zuberecz, although there were no real weather issues during the job, if it was too windy, the crew temporarily suspended work. "We watched the forecast for windy weather. For the most part, the late summer/early fall weather was very nice — calm and not humid either," said Zuberecz.

Fixing the Stacks

The first order of business for the crew was to fix all areas where the steel needed repair. According to Bennung, the smoke stacks were capped with a roofing material when the building changed over from industrial to commercial use. "The caps were not watertight, and there was water intrusion inside of the smoke stacks. This led to corrosion of the steel from the inside out," explained Bennung. In some areas on the exterior of the smoke stacks, the metal had rusted and deteriorated down to the masonry liner.

JOB AT **A GLANCE**

PROJECT:
Repair and recoat four steel smoke stacks on a converted power plant

COATINGS CONTRACTOR:
Highclimbers Company
1349 Green Lane
Chester Springs, PA 19725
(215) 953-1962
www.highclimbers.net

SIZE OF CONTRACTOR:
4 permanent employees

SIZE OF CREW:
6-person crew

PRIME CLIENT:
The Cordish Companies
601 E Pratt St., 6th Floor
Baltimore, MD 21202
(800) 733-5444
www.cordish.com

SUBSTRATE:
Steel

CONDITION OF SUBSTRATE:
Areas of corrosion and rust

SIZE OF JOB:
12,000 sq. ft. (1,114.8 m^2) total

DURATION:
~8 weeks

UNUSUAL FACTORS/CHALLENGES:
- Due to the height of the job and the high tourist and high traffic area, scaffolding would have been cost prohibitive and very difficult to construct.
- The owners of Highclimbers Company are rock climbers who have been trained to make repairs and apply coatings on tall, difficult-to-access structures.
- Because of the location of the job, all surface prep and coating application was done with hand tools.

MATERIALS/PROCESSES:
- Removed all loose materials by hand from the smoke stacks
- Brush and roller applied Acrymax's PC-535 to areas with corrosion
- Hand troweled Conproco's Structural Skin, a fiber cement material, in areas of deteriorated metal; covered these areas with Acrymax's AF-315 material either alone or with Acrymax's Poly-1 Reinforcement Fabric
- Applied the PC-535 rust-inhibiting coating to the entire exterior of the smoke stacks at an average dry film thickness (DFT) of 8 mils
- Applied Acrymax's AF-440 in two coats, 2–3 mils (50.8–76.2 microns) DFT per layer

SAFETY CONSIDERATIONS:
- Wore full-body harnesses for fall protection, as well as gloves, safety goggles, and hard hats
- Used a safety net to catch any dropped tools

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In these areas of deteriorated metal, a fiber cement material, Conproco Structural Skin, was applied. This concrete-modified, fiber-reinforced structural coating material smoothed any areas of damage. It is durable, provides freeze/thaw cycle stability, and is breathable. "The crew used hand trowels to put the fiber cement in all cavities, crevices, and seams that needed to be filled in," said Zuberecz.

It also must be mentioned that the areas of corrosion were primed with Acrymax PC-535 prior to the application of the fiber cement. As stated by Bennung, PC-535 is an environmentally responsible DTM (direct-to-metal) water-borne acrylic primer, containing corrosion-inhibiting pigment, but no toxic compounds, such as chromium or lead. "PC-535 provides long-term corrosion protection with service life equal to or exceeding conventional corrosion inhibiting coatings, with the added benefits of extreme low temperature flexibility and low VOCs [volatile organic compounds]. It also has great adhesion characteristics," said Bennung. The crew applied the PC-535 using brushes and rollers.

After the deteriorated steel was primed and then filled with the Structural Skin, the crew applied Acrymax's AF-315 material to these areas. This water-borne fibrated acrylic compound dries to form a flexible and waterproof membrane ideal for flashing, seaming, and filling cracks. It can be applied using a trowel or brush, and it is often used with Acrymax's Poly 1 reinforcement fabric. "On the smoke stacks, the AF-315 was used to patch areas where water intrusion occurred and at all seams. AF-315 was used alone and in with the Poly-1 fabric to build mil thickness. When the fabric was used, it was saturated with the coating material. The Highclimbers crew created a protective sandwich, so to speak, over areas of concern," said Bennung. Poly-1 Reinforcement Fabric is a high-strength stitch-bonded fabric that is resistant to moisture, mildew, chemicals, and ultraviolet light. According to Bennung, it is lightweight and saturates quickly and easily.

High Altitude Application

With the repair of the steel substrate completed, it was time for the Highclimbers team to apply the PC-535 rust inhibiting coating to the entire exterior of the smoke stacks at an average of 8 mils (203.2 microns) dry film thickness (DFT). At this point, the smoke stacks were ready to receive Acrymax's AF-4400, an acrylic-modified fluoropolymer resin technology. "This unique blend of resins takes advantage of the flexibility of acrylic technology and combines it with the superior durability of a fluoropolymer. It has excellent color retention, which was an issue with the existing coating," said Bennung. Two coats at a DFT of 2 to 3 mils (50.8–76.2 microns) were applied by the Highclimbers team, once again using hand tools.

Top Down Success

According to Bennung, the success of the smoke stack project is directly attributable to the expertise of the Highclimbers crew and the right combination of materials for the job. "Marton and Zolton and the rest of their crew are highly trained for work at excessive heights. They did what many other contractors couldn't do as far as repairing the substrate and applying the coatings. Also, the PC-535 material was a great choice for a job like this where minimal surface prep work could be performed. It has excellent adhesion once any loose material is removed. Finally, all of the Acrymax materials have great flexibility; they aren't going to break and crack. This means that next time the smoke stacks need to be coated, repairs won't be necessary — just a simple recoat," said Bennung. ***CP***

The crew hand troweling Conproco's Structural Skin onto any deteriorated metal followed by AF-315 material and in some areas Poly-1 Reinforcement Fabric. The final step was to apply PC-535 rust-inhibiting coating and AF-440 to all surfaces.

VENDOR TEAM

Acrymax Technologies
Coating manufacturer
221 Brooke St.
Media, PA 19063
(610) 566-7470
www.acrymax.com

Conproco Corporation
Material manufacturer
17 Production Dr.
Dover, NH 03820
(800) 258-3500
www.conproco.com

J. Racenstein
Safety equipment manufacturer
1 Madison St., Building D4
East Rutherford, NJ 07073
(800) 221-3748
www.jracenstein.com

Safety Services Company
Safety compliance
2626 South Roosevelt St.
Tempe, AZ 8582
(877) 201-8923
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TB Philly Inc.
Material distributor
400 Thoms Dr., Suite 411
Phoenixville, PA 19460
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