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PUTTING THE BEST FACE ON CAST IRON FAÇADES

Across the U.S., efforts are ongoing to preserve and restore a part of 19th century Americana representing the "golden age" of cast iron architecture.

"Cast iron was the metal of choice throughout the second half of the 19th century," reported John G. Waite, AIA, and Margot Gayle in an article for oldhouseweb.com. "Not only was it a fire-resistant material in a period of major urban fires, but also large façades could be produced with cast iron at less cost than comparable stone fronts."

The authors noted that cast iron was used extensively on storefronts in towns and cities across the U.S. into the 1920s. Cast iron storefronts were characterized by large show windows that allowed natural light into the shops while providing a display area for goods.

"The preservation of cast iron architectural elements, including entire façades, has gained increasing attention in recent years as commercial districts are recognized for their historic significance and revitalized," Waite and Gayle reported. "The successful conservation of cast iron architectural elements and objects is dependent upon an accurate diagnosis of their condition and the problems affecting them, as well as the selection of appropriate repair, cleaning and painting procedures."

Guidelines for restoring cast iron façades were discussed by Robert A. Baird, vice president of Operations at Historical Arts & Castings, Inc., in an article published in This Week in Metalwork. According to Baird, "Historically, cast iron was used to replicate stone and it is common to find during a paint analysis that the earliest coats of paint were light stone colors impregnated with sand and applied in heavy coats."

Typically, cast iron façades feature "repetitive elements connected by a series of clips, angles, and mechanical fasteners," Baird stated. "It can be tricky to locate these fasteners under several layers of paint, but they are there. After removing the fasteners, iron elements are lifted or hoisted from the façade."

Baird explained that today's high-tech coatings require that cast iron be prepared in accordance with SSPC-SP6/NACE No. 3 Commercial Blast Cleaning, or with chemical strippers where sandblasting isn't feasible. "Manufacturers specify immediate application of primers after blasting to prevent any buildup of surface rust," Baird noted.

When surface preparation uncovers imperfections in cast iron, reconditioning may be needed. "Those imperfections that could possibly hold water from a driving rain are the ones that should be filled," Baird stated. "Be aware that the paint you are removing most likely contains lead, so disposal of the blasting debris must be done according to Federal EPA (Environmental Protection Agency) regulations."

A critical part of the restoration process involves the application of high-performance coatings, Baird emphasized. "Coating systems that we use today are extremely high tech," he shared. "The best system for iron that we have worked with is manufactured by Tnemec."

"Landmark projects require high performance coating systems," acknowledged Michelle Call, Tnemec coating consultant with

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Protective Coatings Intermountain, Inc. "Tnemec is the shop standard for Historical Arts & Castings, Inc., and is written into all of their projects."

Call worked closely with Historical Arts & Castings throughout the restoration of the iconic façade from Zion's Cooperative Mercantile Institution (ZCMI), founded by Brigham Young in 1868, and now attached to the west face of Salt Lake City's new Macy's department store. The 75-foot high by 140-foot long structure features a cornice section made of galvanized sheet metal at the top of the façade, cast iron colonnades with 63 bays for windows and thousands of ornate castings.

The façade's galvanized metal sections were prepared and coated under controlled shop conditions. "They originally tried to sandblast the substrate, but the sheet metal was too thin," Call explained. "So they used a chemical stripper on the metal then pressure-washed it."

Galvanized metal sections of the ZCMI façade were shop-primed with a polyamide epoxy, followed by a finish coat of Series 1072 Fluoronar, a high-solids fluoropolymer resin, in various custom colors. The gold accent was a custom color to simulate 24-karat gold leafing of Series 1078 Fluoronar Metallic that was then coated with Series 1079-0762 Metallic Clearcoat.

The ultraviolet (UV) light stability and durability of Fluoronar was cited by Tom Quammen, principal coating consultant with Protective Coatings Intermountain, Inc., in a documentary video titled "ZCMI—A Legacy Cast in Iron." "This next generation of formulations that Tnemec has presented has a 20-plus year design life given the number of days of sunshine and the number of freeze-thaw cycles we experience here in the intermountain west," Quammen mentioned in the ZCMI documentary.

Cast iron colonnades, replacement pieces re-cast in aluminum and ornamental pieces of the façade were prepared by abrasive blast cleaning and shop-primed with an epoxy coating that doubled as field-applied tie coat. Specified primers were Series 66 Hi-Build Epoxoline and Series N69 Hi-Build Epoxoline II. Pitted cast iron pieces were reconditioned using Series 215 Surfacing Epoxy and primed with a coat of Series N69 epoxy. Structural steel used to secure cast iron components to the building was blast-cleaned and primed by the fabricator with Series 90-97 Tneme-Zinc, a zinc-rich aromatic urethane.

The face of Macy's department store was surrounded by scaffolding and enclosed to help control environmental conditions while tie-coats, finish coats and the gold accent finishes were brush, roller, and spray applied to the cast iron colonnades and to ornate castings that were then reattached to the façade. Approximately 2,300 hours were required by Daniels Painting, Inc. to complete the field coatings and installation.

"With a cast iron storefront restoration, you're spending so much time, you want to go with the best product so you don't have to do it twice," Call emphasized. "It's such an expense to do these projects—you don't want to come back in less than 10 years and recoat it."

Reflecting on the completed project, Call added, "I get an immense amount of pride standing there and looking at this project knowing that it's something I'll be able to take people by and say 'I was part of that.' That Tnemec 'Test of Time' will be a project that we'll be showcasing 20 or 30 years down the road."

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