

The Role of Specialty Coatings in Façade Repair

By Tim Kenworthy



The façade of this bridge along Pennsylvania State Route 322 was coated with a high-performance urethane primer/coating system to protect it from graffiti and unify its appearance

High-performance specialty coatings can play an important role in concrete façade repair on commercial, industrial, and even historic structures. Whether the project is a parking garage, an office building, or a historic library, a specialty coating can complement concrete repair to return the building to its original level of aesthetics and a long service life.

Targeted Solutions

When properly selected and applied, high-performance specialty coatings offer a cost-effective, long-term solution to many problems typically encountered in repairing vertical concrete surfaces that have been degraded by environmental or other conditions.

Coatings can solve common façade problems such as:

- Stains, such as dirt, chemical, or rust stains that are not removed during repair;
- Degradation due to chemical or environmental exposure, such as industrial chemicals, pollutants, or salt spray in a marine environment;
- Graffiti on buildings in locations where vandalism of this nature is a problem; and
- Overall aesthetics, when the restored façade may lack uniformity in color due to the mix of materials of varying ages. A pigmented coating can achieve a uniform color and surface. Specialty coatings for this purpose are growing in popularity in the repair of historic façades that require duplication of glazing, colors, or textures that cannot be achieved by mortar alone.



Following repair and restoration of the concrete façade, the South Daytona City Hall in Florida was coated with a urethane primer/coating system to upgrade the aesthetics and protect it from the effects of ultraviolet rays

Specifying Coatings

A wide variety of coatings is available on the market today at an equally wide variety of price points. The cost, and therefore, the price, of a coating is determined by the formulation, i.e. the percent solids the coating contains and any specialized, often proprietary, additives that confer high-performance features such as chemical resistance.

The up-front cost of a good-quality coating will, in the long run, prove to be an investment. A properly specified and applied high-quality coating will outlast paint and lesser-quality, cheaper coatings by many years and generate long-term savings in maintenance and replacement. Expected service life for a good-quality coating on a concrete façade is up to 15 years.

A high-solids (40 to 60% by volume) urethane coating that is formulated to be weather- and chemical-resistant is a good choice for many façade repair projects. These products typically can be applied in two thin coats, have a long service life, and will withstand exterior temperature fluctuations without degradation.

A high-quality urethane coating will tolerate a wide range of temperatures, from -40° to +250° F, without chipping or cracking. The coating should have a rating of good to excellent in resistance to most common industrial chemicals and pollutants. Additionally, the best-quality urethane coatings are

formulated to withstand years of cleaning with harsh solvents, so that graffiti and dirt can be removed without damaging the finish or diminishing its protective qualities.

Ideally, the urethane coating specified should be specifically formulated for exterior applications and available in a wide range of colors and clear, so that the desired aesthetics can be achieved readily. Another plus in regards to aesthetic concerns is that a high-quality urethane coating is typically resistant to chalking and fading from ultraviolet light, thus retaining its color and high-gloss finish through many years of service.

Primer Selection

Urethane coatings will perform best when applied over a primer that seals the concrete and enhances adhesion by promoting a physical bond between the concrete and the coating. The primer specified should be one that is specifically formulated by the manufacturer to create a coating system with the urethane topcoat. If the primer selected is formulated with aluminum particles, it will be sufficiently pigmented to block any bleed-through of stains that otherwise could create shadowing in the final coating.

Substrate Preparation

Proper surface preparation is critical to the success of any coating application, and ICRI Guidelines should be followed. The initial condition of the façade and the degree of repair undertaken will determine how the coating will be used and the amount of substrate preparation required.

Aesthetic Repairs

Years of exposure to environmental conditions often cause a concrete façade to become stained and aged. If the original structure was painted, ultraviolet light, rain, and pollutants will cause the paint to fade, chalk, or peel over time. The end result is a structurally sound but tired-looking, dirty, and unappealing façade. A high-performance coating that covers stains and replaces faded or flaking paint will restore the aesthetic appeal of the structure.

Surface preparation requires two steps:

1. Cleaning the surface with a pressure washer and trisodium phosphate (TSP) to remove dirt and other bonded contaminants; and
2. Removing flaking or faded paint by scraping or grinding.

The compatibility of the urethane coating with any paint remaining on the surface after preparation must be checked to ensure that the coating will adhere.

Spalled Concrete

When a concrete façade has deteriorated to the point that it contains ¼ to 1-inch deep areas of missing concrete, including exposed bug holes (air pockets left in the concrete when formed), a more extensive repair is required before the coating can be applied.

Surface preparation here requires several steps:

1. Cleaning the surface with a pressure washer and trisodium phosphate (TSP) to remove dirt and other bonded contaminants;
2. Removing flaking or faded paint by scraping or grinding;
3. Removing all spalling concrete until a solid surface is reached; and
4. Patching all bug holes and deteriorated areas with a trowelable, high-build concrete patch product.

Patch compounds suitable for this application will be a combination of concrete and sand in an epoxy resin that creates a dense patch but is readily applied with a trowel in a single coat up to 1 inch thick. With this type of product, the dry patch will have higher compressive and adhesive strengths than the surrounding concrete, thereby preventing further degradation.

Severely Deteriorated Concrete

In extreme cases, the concrete façade may have deteriorated down to the reinforcing steel. If the façade is to be repaired and not replaced, one of the goals is to prevent further corrosion of the steel.

The same steps for surface preparation outlined previously for spalled concrete should be followed, with the concrete patch applied in several layers and allowed to dry for 8 hours between coats. Additionally, the rusted reinforcing steel should be properly prepared according to ICRI Guidelines.

In Marine Environments

An additional step is required when preparing a substrate in a marine environment: it is essential for the life of the coating to ensure that any chloride that has penetrated the concrete is removed. Chloride penetration test kits are readily available from several sources. If the chloride exceeds acceptable levels, the concrete must be thoroughly cleaned to remove it. TSP or a specially formulated cleaner can be used for this purpose.

Primer and Coating Application

After surface preparation is completed, primer and coating application are typically the same for all situations:

Using a penetrating urethane primer, the entire surface to be coated should be primed and allowed



Urethane coatings can be applied easily by brush, roller, or sprayer at a thickness of 3 to 4 mils DFT

to dry thoroughly for 8 to 12 hours. Typically, the primer can be applied by using a roller, brush, or sprayer. Expansion joints, if present, should be caulked, but not primed or coated.

The finish coat also can be applied using a roller, brush, or sprayer; usually, two coats of 3 to 4 mils DFT each are desirable. Drying time between coats is approximately 4 hours.

Urethane coatings offer performance characteristics not found in traditional latex paints, and add years of beauty and service to a concrete façade that has been repaired or renovated. Available in a wide array of colors, urethane coatings are compatible with any building style or designated use.



Tim Kenworthy, Vice-President, Perma-Tech Industrial Coatings, Cleveland, Ohio, has more than 15 years' experience in industrial coatings manufacture and application. He is a member of the National Association of Corrosion Engineers and the Polyurea Development Association.