

Coatings

A long-term solution for resilient infrastructure

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America's infrastructure has reached its breaking point. Many of the nation's bridges, roads, waterways, and other forms of infrastructure are in dire need of repair or replacement, having been originally constructed between the 1940s and 1970s. In the 2025 edition of its "Report Card for America's Infrastructure," the American Society of Civil Engineers (ASCE) estimates the cost of bringing nationwide infrastructure into a state of good repair at approximately \$9.1 trillion.



Despite these concerning figures, the future of U.S. infrastructure is rife with opportunities for improvement. The State of New Jersey in particular has seen gradual improvements in the condition of its infrastructure, earning an overall grade of "C" in 2025 following "D+" scores in 2016 and 2021. This, coupled with over \$5.33 billion of New Jersey's FY2026 budget earmarked for transportation infrastructure maintenance and rehabilitation, puts New Jersey municipalities in a prime position to make long-term

investments in their local infrastructure.

Simply bringing our infrastructure into good repair is not enough, however. Municipalities must also consider how to bolster the longevity of local infrastructure to avoid costly repairs down the line. Thoughtful, skilled surface preparation and application of chemical coatings is one way to add years, if not decades, to the lifespan of a structure while enhancing its aesthetic and improving safety.

A Primer on Coatings

Different coatings serve different purposes, but all are designed to protect structures from various causes of degradation such as physical abrasion, chemical corrosion, extreme temperatures, and moisture exposure. A proper coating system can add years, if not decades, to the lifespan of a structure, as well as enhance the structure's aesthetic and improve safety.

Consulting with a coatings specialist is key to determining which coatings to properly protect a structure while meeting state and local regulations. The coating process can be broadly divided into three phases.

Structure Inspection and Product Selection: When rehabilitating an existing structure, the coatings specialist performs an evaluation to identify any existing structural deficiencies requiring repair prior to coatings application. This evaluation can also help identify any specific areas of corrosion and other weak points of the structure that require additional attention during the specification preparation process. The specialist then selects the proper coatings to be used in the system based on several factors, including the substrate to be protected, service environment, life expectancy, and local regulations. Different states have different environmental regulations, which may affect which coatings can and cannot be used for a particular application. Water-based products and other coatings low in volatile organic compounds are ecologically responsible options that can also help facilities achieve LEED sustainability certification.

Specification: The coatings specialist then develops a project-specific specification that includes detailed surface preparation instructions, as well as the specific requirements for coating application based on the selected products.

Inspection: Inspection should be performed before, during, and after the surface preparation and coating application processes. The coatings specialist can perform follow-up inspections to ensure that there are

no deficiencies with the coating system, such as a low film build or uneven coating. Inspections should occur on a recurring basis thereafter to look for potential weaknesses in the coating system that may arise over time.

The Coating Process at Work

The City of Paterson, recently replaced a pedestrian bridge in Great Falls National Park. The bridge was originally constructed in 1984 but lacked a coating system that could provide long-term protection. Over time, the bridge developed a significant amount of corrosion, resulting in the bridge's closure in 2020. In replacing the structure, the City opted for a comprehensive coating system to extend the longevity of the new bridge.

The new steel bridge was hot dip galvanized, resulting in a protective zinc coating that prevents rusting and provides superior durability compared to non-coated structures. Hot dip galvanization adds 20 to 25 years to the bridge's lifespan. Further bolstering its longevity is a phenalkamine epoxy with an aliphatic acrylic polyurethane finish coat; these two layers yield an additional 12 to 15 years of usability.

Collectively, this coating system

extends the life of the bridge by up to 40 years, longer than the entire lifespan of the previous bridge. Additionally, the reduction in life cycle costs will save the City of Paterson approximately \$7 million in maintenance and repair costs over the life of the bridge.

Continuity of Care (and Other Considerations)

The ideal consultant will have a Protective Coatings Specialist (PCS) and/or Coatings Inspector Program (CIP) certification, as well as a deep knowledge of qualified product lists and each state's environmental standards.

Furthermore, because coating systems should be reinspected on a recurring basis, consultants should be able to provide long-term assistance well after the coatings have been applied.

Right now, Americans are facing the impacts of 50 years of infrastructural decay. By implementing the right coating systems under the guidance of an experienced specialist, state and local governments can ensure that New Jersey's infrastructure remains vibrant, safe, and effective for decades to come. 📌

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