



# PAINT AND CORROSION LABORATORY FACT SHEET

*Research that is Essential, Indispensable, and Connected to our Customers.*

## PURPOSE

The mission of the Paint and Corrosion Laboratory (PCL) is to provide technical support to the Office of Infrastructure Research and Development (R&D) to develop and analyze the effectiveness of innovative coatings test procedures while evaluating the durability of new coating systems, especially environmentally compliant materials for the corrosion protection of steel bridges.

## DESCRIPTION

The PCL tests numerous durable and environmentally compliant bridge coatings using both accelerated laboratory tests and natural outdoor exposure. The PCL also develops innovative cyclic laboratory test methods for evaluating bridge coating performance and highly reproducible techniques for evaluating coating failures. In addition, PCL assists State departments of transportation (DOTs) to solve a variety of bridge coating problems and recommends appropriate coatings for different environmental conditions.

## SPECIAL CAPABILITIES

- Produces essential bridge coating performance data for DOTs.

- Develops reliable laboratory test methods to study the performance of various bridge coatings.
- Develops rapid forensic analytical techniques for identifying bridge coating type and determining causes of field coating failures.
- Develops easy-to-use and quantitative methods for measuring coating failures.
- Measures coating mechanical properties by various physical test methods.
- Characterizes paint composition using various wet chemistry methods, scanning electron microscopy/energy dispersive analysis and other spectroscopic techniques.
- Performs American Association of State Highway Officials (AASHTO) standard paint tests.
- Determines toxicities of bridge coatings and their disposal options.
- Detects early coating failures using microscopic and spectroscopic techniques.
- Determines chloride concentrations on steel and coating surfaces.
- Investigates wetting properties of paint materials on substrates using contact angle measurement system.
- Determines presence and rate of corrosion, and moisture content of coating prior to corrosion using nondestructive electrochemical impedance spectroscopy (EIS).

## ACCOMPLISHMENTS

- Conducted analysis on bridge paint chips and suggested proper procedures for coating repair.
- Determined chloride concentration on paint chips and on peeled weathering steel.
- Developed test protocols for evaluating bridge coatings: the cyclic test protocol concept has been adopted by AASHTO/National Transportation Product Evaluation Program (NTPEP).
- Developed reproducible and quantitative techniques to measure the degree of coating failures. AASHTO/NTPEP implemented one technique, and the American Society for Testing and Materials (ASTM) approved it as a standard test method.
- Participated in AASHTO Materials Reference Laboratory Proficiency Paint Sample Test Program.
- Participated in AASHTO/NTPEP roundrobin test for several paint materials.
- Studied performance of two-coat rapid-deployment bridge coatings and compared them with three-coat zinc-rich coatings.
- Monitored the water permeability in the membrane placed on the experimental Bridge of the Future at the Turner-Fairbank Highway Research Center using EIS technique.

*The Turner-Fairbank Highway Research Center (TFHRC) has more than 24 laboratories for research in the following areas: safety; operations, including intelligent transportation systems; materials technology; pavements; structures; and human centered systems. The expertise of TFHRC scientists*

*and engineers covers more than 20 transportation-related disciplines. These laboratories are a vital resource for advancing this body of knowledge created and nurtured by our researchers. The Federal Highway Administration's Office of Research, Development, and Technology operates and*

*manages TFHRC to conduct innovative research to provide solutions to transportation problems both nationwide and internationally. TFHRC is located in McLean, VA. Information on TFHRC is available on the Web at [www.tfbrc.gov](http://www.tfbrc.gov).*

## **SERVICES**

- Assist State DOTs in selecting durable coatings that perform well in different environmental conditions.
- Recommend rapid and effective physical and chemical techniques to State DOTs and industries to identify causes for coating failures.
- Serve on the quality assurance/quality control team for the AASHTO/NTPEP.
- Serve on task group “Scanning Techniques” in the ASTM D01.25 subcommittee on Evaluation of Weathering Effects.
- Present up-to-date coating research to the Society for Protective Coatings conference, AASHTO/National Steel Bridge Alliance (NSBA) Steel Bridge Collaboration meeting, and Transportation Research Board meeting.
- Assist in solution preparations and sample analyses for other groups within TFHRC.

## **CONTACT**

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