Structural Steel Coating Technologies for Corrosion Mitigation

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National University Transportation Center (NUTC) at Missouri S&T

The research is part of a collaborative program between MoDOT, the NUTC, and the University of Missouri System on transportation structures research. The two-year program is intended to extend service life of MoDOT's existing bridges and to optimize MoDOT's bridge design and construction for effective cost reduction.

Objectives:

Significant maintenance costs are extended nationwide each year for coating structural steel bridge elements in an effort to protect them from corrosion and deterioration. Coating of structural steel presents a significant, costly maintenance challenge that is critical to mitigating the detrimental effects of corrosion to extend the service life of bridges and reduce operational costs.

The ***primary goal*** of this study is to determine the effectiveness and performance of existing structural coating systems that have been used in Missouri and surrounding States through laboratory and field study. This undertaking will provide key data on what existing systems have been most effective from a life cycle perspective and also identify what key characteristics and practices are related to the performance of coating, such that future systems can be improved and optimized.

The ***second*** objective of the research is to utilize acquired data to identify and test promising new coating technologies for coating and recoating structures in the field, especially encapsulating existing systems such as lead-based paint on existing bridges. Tasks consider a broad range of available coating types including polyurea-based coating systems. Systems that provide a low cost life cycle, low risk of failure are targeted.

Laboratory Tests:

Specimen Preparation : 3/16"×3"×6" A36 steel panels, blast cleaned, 2.5-3 mil profile.

Salt Fog Spray (ASTM B117)

UV Exposure (ASTM G154)

Adhesion Test Atmospheric (ASTM D4541)

Two-year Exposure

Coating Systems in Current Test:

1	Control coating system SYS G from MoDOT's Specification Primer: Inorganic Zinc rich Epoxy, Ployurethane finish coat
2	Primer: Zinc rich Polysiloxane finish coat
3	Primer: Mio based Polyurea finish coat
4	Primer: Mio-zinc Polyaspartic polyurea finish coat
5	Polyaspartic polyurea coating: Primer: high solid epoxy Aliphatic Polyaspartic polyurea
6	Primer:High solid epoxy Aliphatic polyurea coating
7	Polyurea coating: Polyurea designated primer 100% solid polyurea elastomeric coating