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RESEARCH UPDATE

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EVALUATION OF LOW V.O.C. COATINGS

HISTORY:

This study was undertaken to identify and evaluate lead free, low volatile organic component, (V.O.C.) and less toxic alternatives to Vermont's basic lead silico-chromate and acrylic bridge coating systems.

In mid-1987 paint manufacturers were asked to recommend and provide samples of their V.O.C. compliant, lead free coatings for testing. Each manufacturer who agreed to participate was asked to provide a Material Safety Data Sheet, and complete application instructions with the samples. Additionally each coating was required to be brush applicable even if this was a less preferred method.

Samples of Vermont's BLSC system were obtained for use as a control. One manufacturer provided a rust-converting primer only, and one system which was being used on a bridge construction project was applied by the contractor.

A test rack was installed below and behind the face of the guardrail of a bridge on US 302 over Benjamin Falls brook in Berlin Vt. One foot sections were cut from used "channel iron" sign posts which had been removed from Vermont roadsides due either to damage or normal replacement. These posts had previously been coated with an unknown black paint which had failed to some degree allowing the posts to rust. Two specimens were prepared for each coating by blasting the steel with silica sand and glass beads. Each was blasted to a uniform near-white condition with all old paint and other visible pollutants and rust removed. Surface texture varied somewhat and was not measured. It is believed that the texture represents the typical condition of corroded steel beams on Vermont bridges.

Coatings were then applied to each specimen according to the manufacturer's recommended procedure.

STATUS:

On December 1st, 9th, and 15th, 1987 the coated specimens were attached to the rack and exposed to the chloride laden highway environment.

The attached table summarizes the coating systems under evaluation.

'Structural Coatings Evaluation Tabular Summary 10/13/88

Specimen Number	Rack-Location Number	Product Name	Manufacturer	Type of Coating	Number of Coats	Remarks
1	1-1	Steel Clad	M & M Paint	Basic Lead-Silico Chromate	3	Control Standard
2	1-2	Steel Guard	CON-LUX	Oil/Alkyd	3	
3	1-3	Endura Shield	Tnemic	Tnemic/Zinc	3	Shop Ctd
4	1-15	Rust Destroyer Primer	Advanced Protective Coatings	Rust Converting	1	Primer Only
5	1-4	Rust-O-Crylic 5700	RustOleum	Water Reducible Acrylic/Emulsion	3	
6	1-5	Water Based Epoxy 5300	RustOleum	Water Based Epoxy	3	
7	1-6	High Performance Epoxy 9100	RustOleum	Polyurethane	2	Top Coat CONTAINS LEAD
8	1-7	Nalzin II	NL Chemicals	Oil/Alkyd Zinc/Hydroxy-Phosphate	~~2~~ 3	
9	1-8	Nalzin Water Borne	NL Chemicals	Water Base	3	
10	1-9	Moly White	Sherwin-Williams Lab	Phenolic/Alkyd Molybdenum	3	
11	1-10	Busan 11-M-1	CON-LUX for Buckman Labs	Oil/Alkyd Barium Metaborate	3	
12	1-14	Epoxy-Mastic Enamel	Sherwin-Williams TG	Epoxy Mastic Enamel Titanium Dioxide Silica	2	2 Coats Same Product
13	1-12	Epoxy Mastic Aluminum / Acrylic	Sherwin-Williams TG	Epoxy-Mastic/Aluminum Titanium Dioxide Silica	2	Aluminum in in Base Coat
14	1-11	Latex-Water Based	Sherwin-Williams TG	Calcium/Zinc/Molybdate Titanium Dioxide Silica	3	
15	1-13	Epoxy/Aluminum Enamel	Sherwin-Williams TG	Epoxy Aluminum/Epoxy Enamel	2	
16	1-16	Epoxy/Enamel	Sherwin-Williams TG	Epoxy Mastic Aluminum Enamel Aluminum Silica	2	
17	2-2	Heavy-Duty Epoxy-Mastic Enamel	Sherwin-Williams TG	Epoxy Mastic Enamel Titanium Dioxide, Silica	2	
W1	2-13	Weathering Steel		A 588	Uncoated	For future use
W2	2-14	Weathering Steel		A 588	Uncoated	For Future use
W3	2-15	Weathering Steel		A 588	Uncoated	For Future use
W4	2-16	Weathering Steel		A 588	Uncoated	For Future use

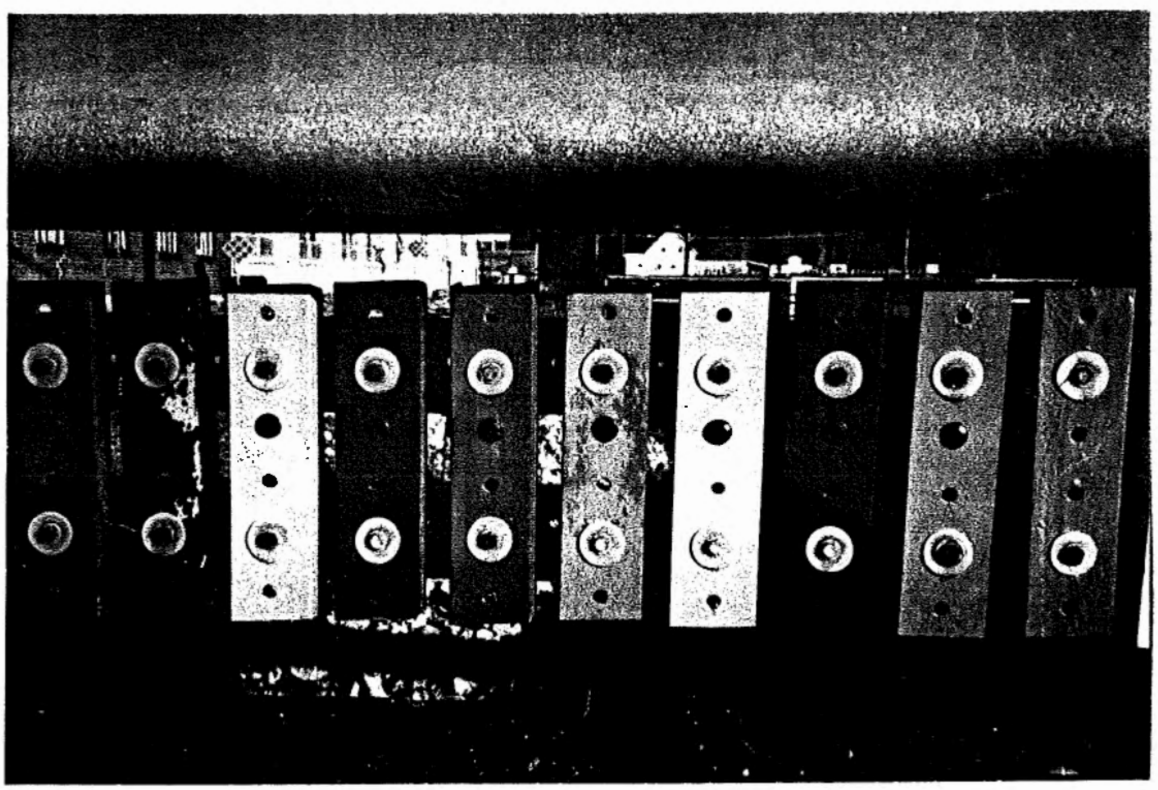
Inspections were made informally throughout the winter of 1987-88, and on April 29th it was noted that one system's topcoat was peeling. A formal inspection was performed on June 17, 1988 when it was noted that another product had rust bleeding through from beneath, indicating that the coating is not performing as expected. Detailed reports are planned when more definitive information on a greater number of specimens is available.

FOLLOW UP

With recent announcements by EPA of a reduction of allowable lbs/gallon V.O.C. to be phased in with an eventual goal of 0 lbs/gallon in "architectural coatings", consideration is being given to an expansion of this test program to include more products.

The frequency of formal inspections will be increased from 6± mo. to 3 mo.

Criteria to be met by participating products will also be reviewed before acceptance of new samples.



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