Research Report
KTC-03-04/KH 42-01-1F

KENTUCKY TRANSPORTATION CENTER

College of Engineering

MAINTENANCE PAINTINGS OF VARIOUS BRIDGE PROJECTS DURING 2001-2002

Kentucky Highway Investigative Task #42

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176 Raymond Building
University of Kentucky
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(859) 257-4513
(859) 257-1815 (FAX)
1-800-432-0719
www.engr.uky.edu/ktc
ktc@engr.uky.edu

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Maintenance Painting of Various Bridge Projects During 2001-2002

Kentucky Highway Investigative Task 42

By

Rick Younce
Senior Engineer Technician

Sudhir Palle
Associate Engineer Senior, Research

And

Theodore Hopwood II
Associate Engineer III, Research

Kentucky Transportation Center
College of Engineering
University of Kentucky
Lexington, Kentucky

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16. Abstract

The Kentucky Transportation Center (KTC) at the University of Kentucky has performed a series of research studies for the Kentucky Transportation Cabinet (KYTC) to monitor various experimental bridge painting projects and conduct investigative work focusing on new paint systems. The research study addressed in this report "Maintenance Painting of Various Bridge Projects During 2001-2002" Kentucky Highways Investigative Task No: 42 were intended to address experimental projects in fiscal years 2001 and 2002.

KTC and KYTC Project Design Team's joint efforts in 2000 into early 2001 centered on the preparation of experimental bridge maintenance painting special notes, preliminary field testing/development of new experimental paint systems and testing of proprietary and KYTC standard specification coatings. The laboratory tests identified candidate coatings systems that were subsequently used in the KYTC experimental bridge maintenance painting projects conducted under this study. Developmental work focused on total removal and some overcoating systems.

The objectives of experimental project monitoring were to: assess the condition of existing paint systems on bridges prior to maintenance painting, monitor the project throughout completion, note problems, describe problem resolution, appraise the condition of the final product, and report observations and/or conclusions about the project.

This report will begin with a summary of the coatings testing work undertaken by KTC researchers and the KYTC Project Design Team. The experimental bridge maintenance painting monitoring work is presented for each bridge in the appendices. The overall results/findings of this research study are contained in the "Conclusions" section of this report.

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EXECUTIVE SUMMARY

The Kentucky Transportation Center (KTC) at the University of Kentucky has performed a series of research studies for the Kentucky Transportation Cabinet (KYTC) to monitor various experimental bridge painting projects and conduct investigative work focusing on new paint systems. The research study addressed in this report "Maintenance Painting of Various Bridge Projects During 2001-2002" Kentucky Highways Investigative Task No: 42 were intended to address experimental projects in fiscal years 2001 and 2002.

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INTRODUCTION

Background

Over the past decade, Kentucky Transportation Cabinet (KYTC) bridge painting operations have been significantly impacted by a multitude of regulations from resource agencies. They have been under close scrutiny by both enforcement personnel and the public. Public environmental concerns are driving increasingly more stringent regulations and bridge painting requirements. All of those factors are combining to make bridge-painting operations more expensive from both the first- and life cycle cost standpoints.

Since the early 1990s, KYTC officials directly involved with bridge painting operations (both new and maintenance painting) have sought cost-effective bridge painting practices that complied with environmental and worker safety regulations. Over that period, Kentucky Transportation Center (KTC) researchers have provided assistance in identifying pertinent regulations and necessary actions for compliance. Both parties worked closely to identify cost-effective painting processes (focusing on overcoating) and coatings that performed successfully. Since then, the scope of technical demands posed by bridge painting has increased requiring that additional KYTC personnel from other divisions become more actively involved.

Currently, the Project Design Team is composed of KYTC personnel from the Divisions of Operations, Construction, Materials, Employee Safety and Health, and Environmental Analysis and researchers from the KTC Environmental Section. KYTC personnel from the Employee Safety and Health and Environmental Analysis Divisions address issues within their technical oversight. While representatives of the other KYTC Divisions and KTC exercise authority in their respective areas, they cooperate openly in exchanging ideas and opinions that cut across all issues related to bridge painting. The Project Design Team uses consensus-based decision-making on the bulk of the issues they address.

The Project Design Team employs an incremental improvement approach to gradually implement changes, and hopefully enhancements, in the bridge painting process. Proposed changes are the result of observations of previous bridge painting projects, laboratory or field research, information from outside parties, and Project Design Team "brain storming" sessions. Changes involving processes (i.e. cleaning, application, containment, contract procurement etc.) are typically introduced on small field trials. Changes involving materials are typically first analyzed in laboratory accelerated coatings tests. Those appearing to be satisfactory are typically introduced as experimental coatings on subsequent bridge painting projects. KTC researchers typically monitor those projects, evaluating the performance of the experimental features. Those findings are subsequently shared with the entire Project Design Team that makes a group decision on whether to employ the features on future bridge painting projects. The benefits of that approach are:

- A continual emphasis on improvements,
- A mechanism to rapidly implement change in a field (bridge painting) subject to major impacts from regulation and technical innovation, and
- The reduced potential for a negative project outcome if an experimental feature does not perform as anticipated.

Project Design Team members usually cooperate in developing project special notes during meetings designated for that purpose. Large projects may require several meetings to address all necessary topics and provide mutually acceptable special note wording. Also, decisions are made as to the need for special pre-bid meetings or contractor partnering.

EXPERIMENTAL COATINGS TESTING

Laboratory Performance Testing

Five manufacturers supplied coatings systems for the tests. Manufacturer M1 provided 8 coatings systems. Manufacturer M2 provided 5 coating systems including the KYTC specification standard to be used as a control coatings system. Manufacturer M3 provided 3 coatings systems. Manufacturer M4 provided 6 coatings systems and Manufacturer M5 provided 5 coatings systems.

As mandated by the Project Design Team, the Division of Materials personnel sampled the coatings and performed chemical analysis to assure that they conformed to manufacturer and/or KYTC specifications. That work was completed prior to coatings application to ensure that the applied/tested coatings conformed to either the manufacturer or KYTC standards.

The capacities of the KTC laboratory test equipment limited the number of coatings tested and also the number of panels of each coating type. To achieve high confidence in the test results, each experimental coating system was applied to seven panels. Those with application flaws were discarded and the best 5 panels for each coatings system were tested. The KYTC standard system was used as the control system in each test run.

The coatings from the manufacturers were applied at KTC (Figure 1) application; measurements were taken of environmental conditions to ensure conformity with manufacturer requirements. A prime coat was applied to both faces of the panels. Thereafter, only the test side of the panels received additional coats of paint. All coatings were applied by spraying with a 24-hour curing period between coats. During painting, frequent wet film measurements were taken using wet film thickness gauges to ensure that the dry-film coating thicknesses would be within manufacturer requirements.

The painted panels were cured for 20-25 days at room temperature and humidity prior to the onset of laboratory testing. Prior to testing, the coupons were photographed and a 2-inch scribe mark was placed near one 6-inch edge of the panels using a Tooke cutter (Figure 2). A Tooke gage was used for preliminary dry-film thickness measurement of each coat of paint. Measurements were taken of the initial gloss using a 60° gloss meter in conformance with ASTM D523. The laboratory performance tests incorporated accelerated weathering (cyclic UV/humidity-QUV), corrosion (cyclic condensation/evaporation-Prohesion) and accelerated environment (cyclic freezing & thawing/humidity) in a controlled environmental test chambers.

The QUV light condensation chamber was used for the accelerated weathering test. Normal tap water was used in this test. A test cycle consisted of a four-hour UV exposure cycle with UVA-

340 lamps set at normal irradiance at 60° C alternated with a four-hour condensation cycle at 50° C (Figure 3).

Prohesion tests were performed in a cyclic corrosion test chamber. The test employed an electrolyte solution of deionized water, 0.05% sodium chloride, and 0.035% ammonium sulfate (Figure 4). The Prohesion cycle consisted of a one-hour fog application (condensation) of the electrolyte followed by a one-hour dry off period (evaporation). Prohesion tests were performed at room temperature (approximately 20° C).

Freeze-thaw tests were performed in a cyclic freeze-thaw chamber with humidity (Figure 5). Hourly temperature data from KYTC bridges indicated that they experienced about 60 freeze-thaw cycles annually. However, the average temperature range of those cycles only varied from about +3° C to -3° C. Freezing of coatings in a water-saturated condition was possible. To replicate that exposure, the freeze-thaw cycle test consisted of a one-hour exposure at +3° C at 90 percent relative humidity followed by a one-hour ramp down of the temperature to -3° C at 0 percent humidity. Those conditions were maintained for one hour followed by a one-hour ramp up to +3° C at 90 percent humidity. This test design emphasizes a large number of freeze-thaw cycles at small temperature excursions above and below freezing. That minimizes the potential for thermally shocking the applied coatings.

The tests were conducted in the previously described sequence. Panels were exposed for one-week periods (168 hours) and then shifted to the following test chamber for the next test. The tests were stopped at 6-week intervals (1,008 hours) to examine the panels and take necessary measurements and photographs (Figure 6 & 7). Measurements were taken of gloss (ASTM D-523), blistering (per ASTM D-714), scribe undercutting (per ASTM D-1654), and rust-through (per ASTM D-610).

The tests were run for five 6-week intervals (1,006 hours). Typically, the coatings on the panels possessed significant degradation after 5,040 hours of testing (Figure 8).

The resulting laboratory data-percent rust, amount of scribe undercutting, percent blistering and 60° gloss were correlated versus test durations. As the KYTC control system was the accepted standard for acceptable performance, the test results of the other paint systems were normalized to the results obtained with the control system (Figures 9-23). KYTC and KTC personnel reviewed the data and identified the coatings systems that performed satisfactorily. Plans were made to conduct experimental overcoating projects on several KYTC bridges using some of those systems.

Additional Coatings Investigations

The painting contractors in various discussions with the KYTC Project Design Team voiced concerns that isocyanate and aluminum pigment content was too high in the moisture cure aluminum-pigmented primer/intermediate coating specified by KYTC. During this study period, the KYTC Project Design Team had KTC researchers test a series of coatings which different percentages of icocyanates and aluminum pigment to determine if this made any difference in coating performance. After the testing, it was decided based on the performance of the coatings

that there was no reason to change the specification of the moisture cure aluminum-pigmented primer/intermediate coating.

MONITORING OF EXPERIMENTAL PROJECTS

During this study, a total of twelve experimental bridge overcoating projects and one abrasive blast project were let and completed. Those are described in detail in Appendices A-M below. All of these projects were relatively similar, with the exception of the abrasive blast project, in terms most Special Notes and the general types of structures to which they were performed (i.e., steel girder bridges and thru trusses). The only major variances were the coatings applied, the KYTC Districts/QA inspectors who oversaw the work, and the contractors who performed the work.

The pressure washing for the projects ranged from 2,000 psi using 0° spinner and 30° fan tips to 9000 psi using 0° spinner tips. The reasons for varying the pressure washing requirements were: 1) to limit waste generation in several cases where sensitive receptors were nearby and 2) to determine the effect of washing variables (pressure & nozzle type) on lead content in the resulting waste water (filtered & unfiltered). The latter work was performed under a separate study KYSPR 02-224 "Environmental Impacts of Bridge Cleaning Operations" which will be reported separately. The mechanical surface preparation was to be performed to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3 **Visual Standards for Power- and Hand-Tool Cleaned Steel.** During this study, SSPC VIS3-SP2 and SP3 surface conditions were specified for mechanically cleaned surfaces.

Based upon KYTC Project Design Team inspections of the projects, it was determined that most were completed satisfactorily. The primary source of problem issues was contractor quality. Another factor was that the KYTC did not adequately inspect the work in some cases or that the districts did not compel the contractors in question to adequately complete the projects.

CONCLUSIONS

Coatings Performance and Acceptance Testing

The KYTC/KTC coatings performance and acceptance testing provides a mechanism for assuring new coatings used on KYTC maintenance painting projects will perform successfully. The testing program is evolving with continued modifications to both test processes. Currently, the testing is used to evaluate coatings used in the next 2-5 years. Future tests will be intended to identify new coatings that will be mandated by more restrictive regulations. That will place KYTC in a proactive position for responding to regulatory changes.

In the future, the Project Design Team will investigate new and emerging coating technologies that offer significant performance enhancements over conventional organic coatings. Among the anticipated benefits of the new coatings are more durable coatings, better corrosion resistance, longer gloss and color retention and reduced environmental impacts. The Project Design Team will be investigating one and two-coat systems that are contractor friendly and that can be applied over marginally prepared substrates. Those coatings are to be used on bridges on low-

volume roads in overcoating applications where the existing paint is typically in very poor condition. Durability and aesthetic considerations are subordinated to ease of application and the likelihood that a suitable end product will be obtained.

Experimental Maintenance Painting Projects

The experimental overcoating projects conducted under this study incorporated detailed requirements for all phases of contractor work. These projects were not inexpensive with the costs ranging from \$2.20 to \$5.50 per ft^2. KYTC officials should have every right to expect uniform acceptable contractor quality on all of the projects. In several instances, KYTC officials encountered both sub-standard workmanship and ineffective site inspection. There are two factors that come into play relative to those projects – KYTC qualification procedures for painting contractors and the attentiveness of KYTC inspectors to their duties. Experience with KYTC painting practices and expectations may also factor in, but education doesn't. The contractor and most of the KYTC inspectors involved attended KYTC qualified paint inspector school prior to working on the projects and were well informed of KYTC specifications, practices, and, possibly, expectations. But, sometimes, expectations have to be experienced rather than learned. Certainly, those parties should have been aware of requirements related to the specification and the work that was to have been provided.

To a large measure, this issue could have been avoided by not qualifying the contractor. KYTC painting operations have become more demanding of contractor technical expertise in all facets (i.e., practice, documentation, environmental, worker safety and traffic control). Many contractors that could work on KYTC projects in the past can no longer accommodate those demands. As many of those are inexperienced with current KYTC practice, they mistakenly assume that KYTC projects are similar to those conducted in other states or in other industries.

Under the present circumstances, poorly qualified painting contractors can bid on KYTC projects. Based upon statutory law, KYTC is generally obliged to accept the lowest bid. This indicates that KYTC must pay more attention to painting firms wishing to do business with it and restrict the market to those who are technically capable, and willing to provide satisfactory work. With small projects, the bidding intensifies, as more painting contractors are bondable. One obvious solution would be to bundle projects to increase the bonding requirements. In any case more attention must be paid to painting contractor qualifications.

During this study, one of the bridges (Hart County) was an abrasive blast project. The cost to perform this work was approximately \$6.00 per ft^2. Another abrasive blast project during the same time frame (I-65) cost approximately \$9.30 per ft^2.

Table I. Coatings Systems Supplied by Manufacturer M1			
System #	**Primer**	**Intermediate**	**Top**
1	Zinc Rich Epoxy		Acrylic Polyurethane
2	Zinc Rich Epoxy		Acrylic Polyurethane
3	High Solids Epoxy		Aliphatic Polyurethane
4	High Solids Epoxy		Aliphatic Polyurethane
5	Epoxy		Acrylic Polyurethane
6	Epoxy Sealer	High Build Epoxy	Aliphatic Polyurethane
7	Epoxy	Acrylic	Acrylic
8	MC Urethane zinc		Acrylic

Table II. Coatings Systems Supplied by Manufacturer M2			
System #	**Primer**	**Intermediate**	**Top**
1	MC Urethane Aluminum	MC Urethane Aluminum	Urethane
2	Mcu Aluminum	Mcu Aluminum	Urethane
3	MC Urethane Aluminum	MC Urethane Aluminum	Urethane
4	MC Zinc	MC Mio	Urethane
5	MC Zinc	MC Aluminum	Urethane
6	MC Aluminum		MC Aluminum

MC- MOISTURE CURE

Table III. Coatings Systems Supplied by Manufacturer M3			
System #	**Primer**	**Intermediate**	**Top**
1	Epoxy Organic Zinc	Aluminum	2- Comp. Aliphatic Acrylic Urethane
2	Epoxy Organic Zinc	epoxy	2- Comp. Aliphatic Acrylic Urethane
3	Epoxy Organic Zinc	Gloss Acrylic	Gloss Acrylic

Table IV. Coatings Systems Supplied by Manufacturer M4			
System #	**Primer**	**Intermediate**	**Top**
1	Acrylic	Acrylic	Acrylic
2	Acrylic	Acrylic	Acrylic
3	Epoxy Zinc	Acrylic	Acrylic
4	Epoxy Zinc	MC Mio	Urethane
5	MC Mio Zinc	MC Mio	Urethane
6	MC-Aluminum	MC-Aluminum	Urethane

Table V. Coatings Systems Supplied by Manufacturer M5			
System #	**Primer**	**Intermediate**	**Top**
1	Epoxy	Urethane	Urethane
2	Epoxy	Acrylic	Acrylic
3	Zinc	Urethane	Urethane
4	Zinc	Acrylic	Acrylic
5	MC Aluminum	Mc Aluminum	2-Comp Top Coat

MC- MOISTURE CURE

Table VI. Matrix Coatings Systems			
System Number	**Primer**	**Intermediate**	**Top**
1	26 Al 10.5 NCO	26 Al 10.5 NCO	
2	23 Al 10.5 NCO	23 Al 10.5 NCO	
3	20 Al 10.5 NCO	20 Al 10.5 NCO	
4	26 Al 9 NCO	26 Al 9 NCO	
5	23 Al 9 NCO	23 Al 9 NCO	
6	20 Al 9 NCO	20 Al 9 NCO	
7	26 Al 7.5 NCO	26 Al 7.5 NCO	
8	23 Al 7.5 NCO	23 Al 7.5 NCO	
9	20 Al 7.5 NCO	20 Al 7.5 NCO	
10	26 Al 6 NCO	26 Al 6 NCO	
11	23 Al 6 NCO	23 Al 6 NCO	
12	20 Al 6 NCO	20 Al 6 NCO	
13	MC Al	MC Al	Urethane
14	10.5 NCO	10.5 NCO	
15	20 Al 10.5 NCO	20 Al 10.5 NCO	
16	26 Al 9 NCO	26 Al 9 NCO	
17	23 Al 9 NCO	23 Al 9 NCO	
18	20 Al 9 NCO	20 Al 9 NCO	
19	26 Al 7.5 NCO	26 Al 7.5 NCO	

AL-Aluminum
NCO-Content of Isocyanates in Coatings

Table VI. Matrix Cont.			
System Number	**Primer**	**Intermediate**	**Top**
20	23 Al 7.5 NCO	23 Al 7.5 NCO	
21	20 Al 7.5 NCO	20 Al 7.5 NCO	
22	26 Al 6 NCO	26 Al 6 NCO	
23	23 Al 6 NCO	23 Al 6 NCO	
24	20 Al 6 NCO	20 Al 6 NCO	
25	MC Al	MC Al	Urethane

AL-Aluminum
NCO-Content of Isocyanates in Coatings

FIGURES

Figure 1. Coating system being applied in paint booth at KTC.

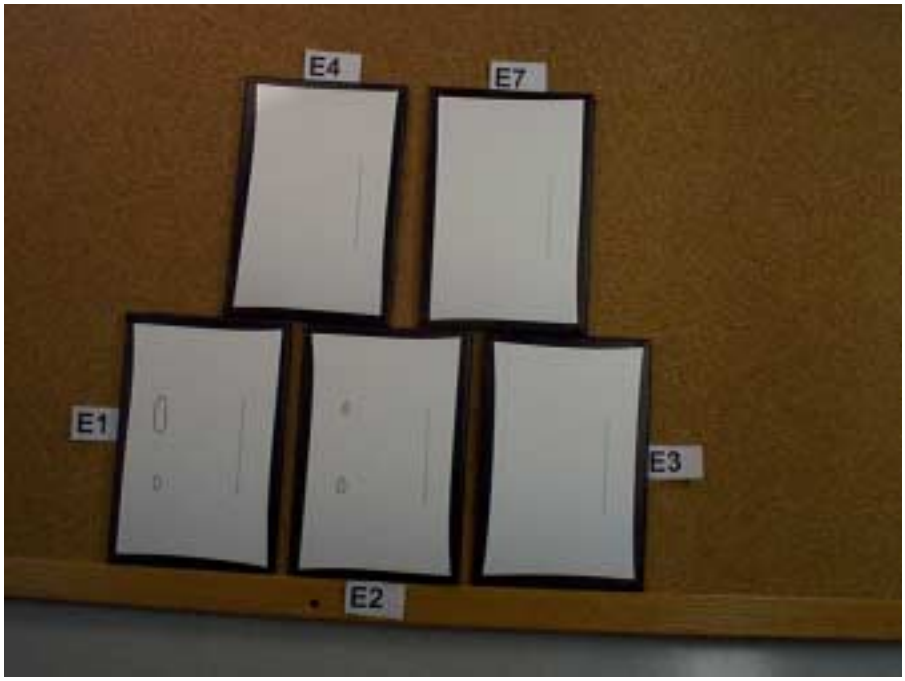

Figure 2. Coated panels with scribe marks and taped edges prior to testing.

Figure 3. Test Panels being placed in QUV chamber.

Figure 4. Tests panels being placed in the Prohesion chamber.

Figure 5. Test panels placed in a rack in the freeze/thaw chamber.

Figure 6. Panels were evaluated after each 1,008 (6-week) block of testing. A 60° gloss test is being performed in this picture.

Figure 7. Panels were evaluated after each 1,008 (6-week) block of testing. A $20^0/60^0$ gloss test is being performed in this picture.

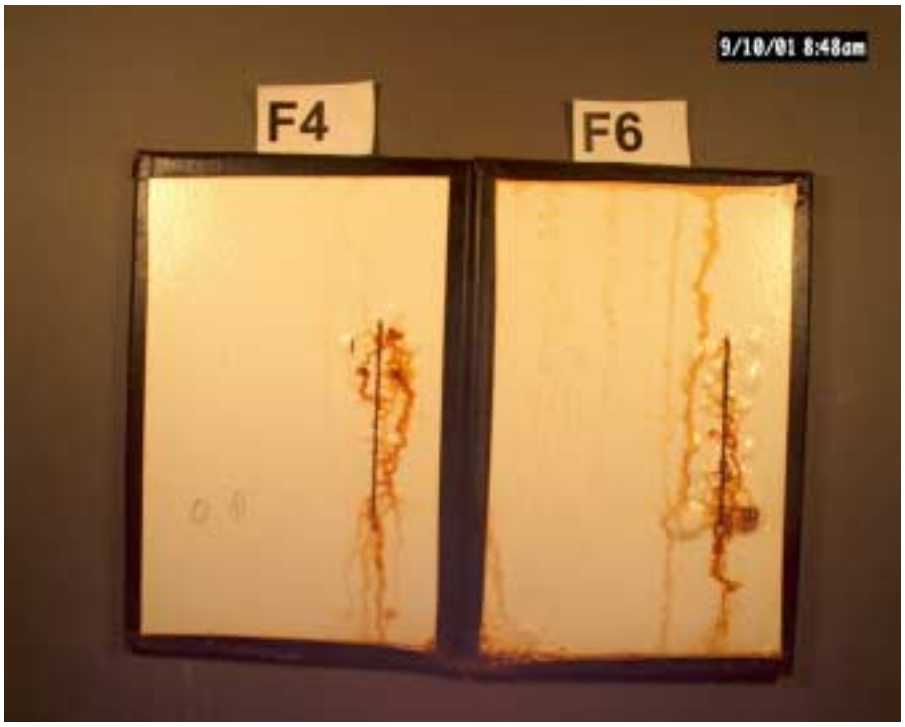

Figure 8. Typical panels after 5,040 hours of accelerated weathering and corrosion testing.

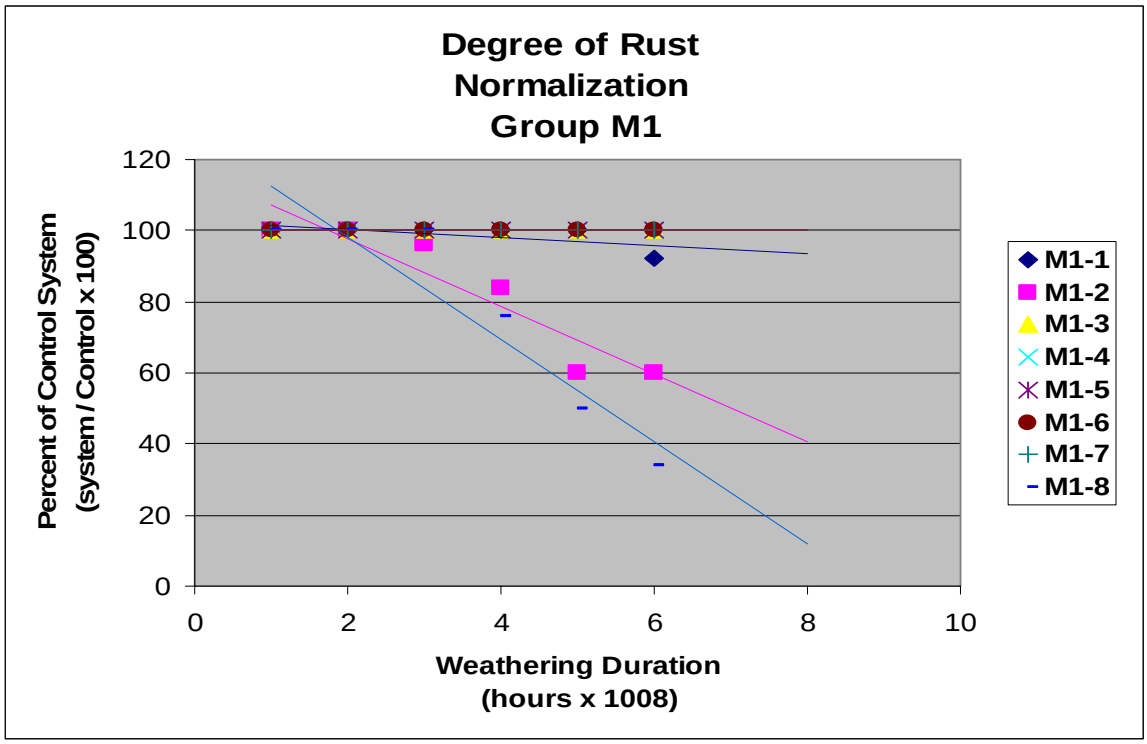

Figure 9. Percent rust normalization curves systems from manufacturer M1 based upon performance on the control system.

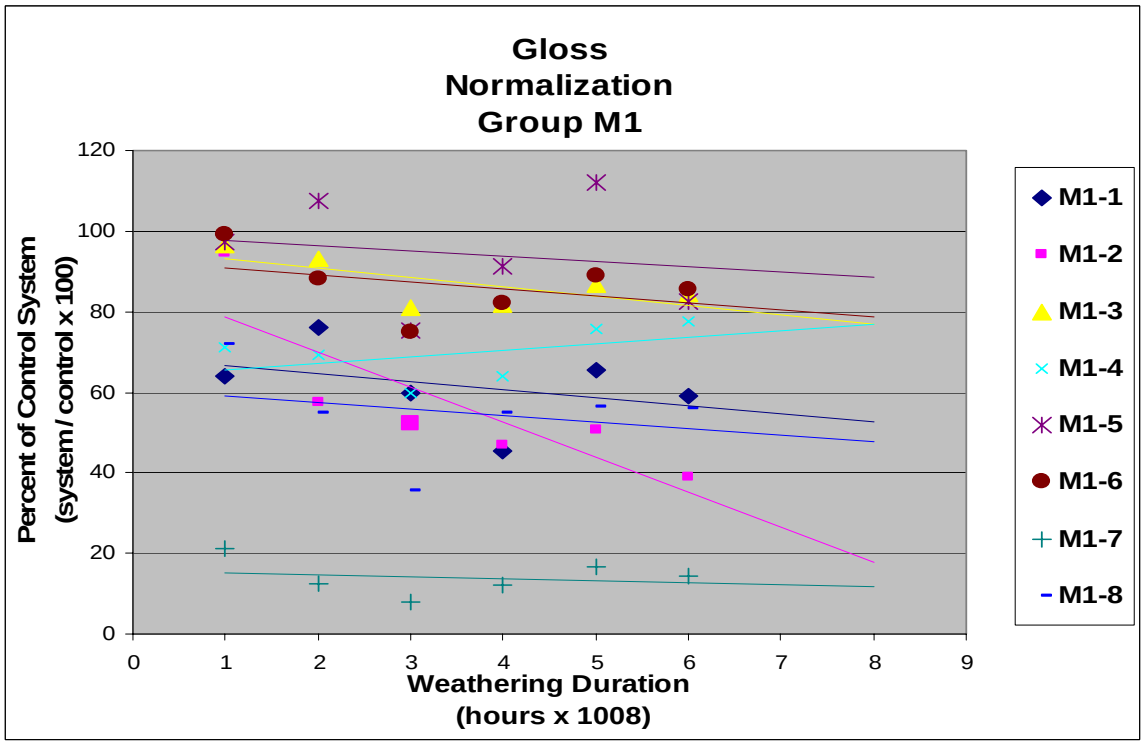

Figure 10. Gloss normalization for coatings systems from manufacturer M1 based upon performance on the control system.

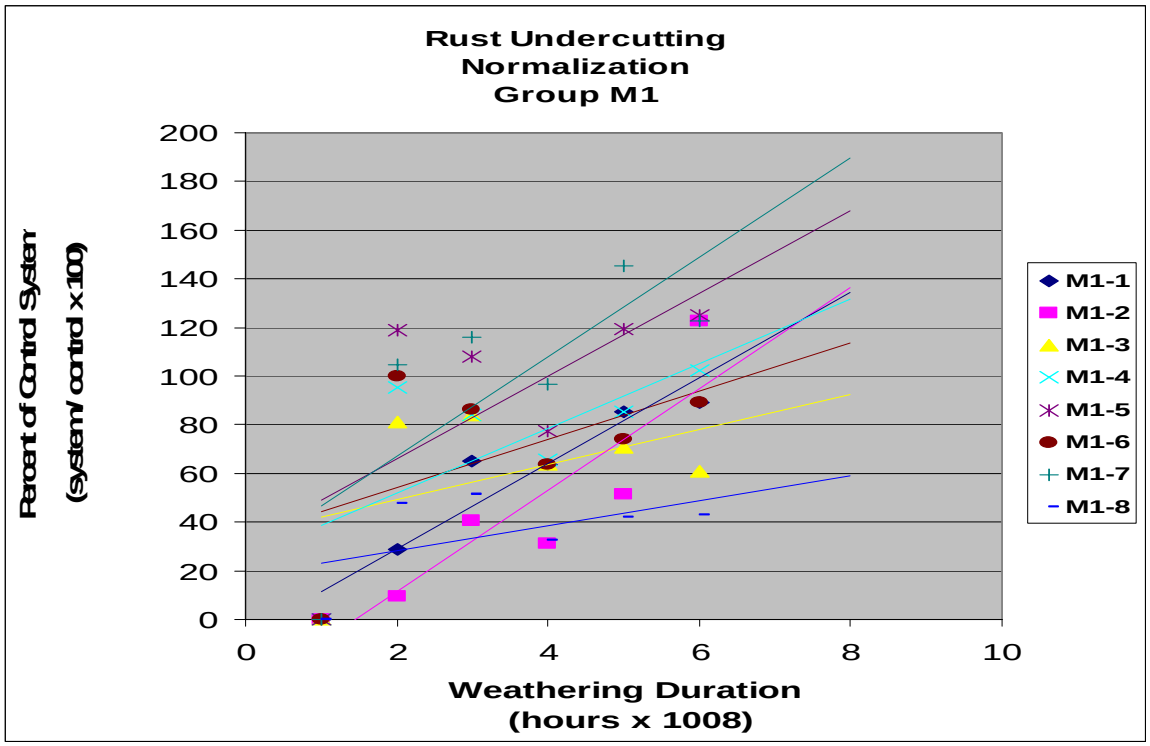

Figure 11. Scribe undercutting curves for coatings systems from manufacturer M1 based upon performance on the control system.

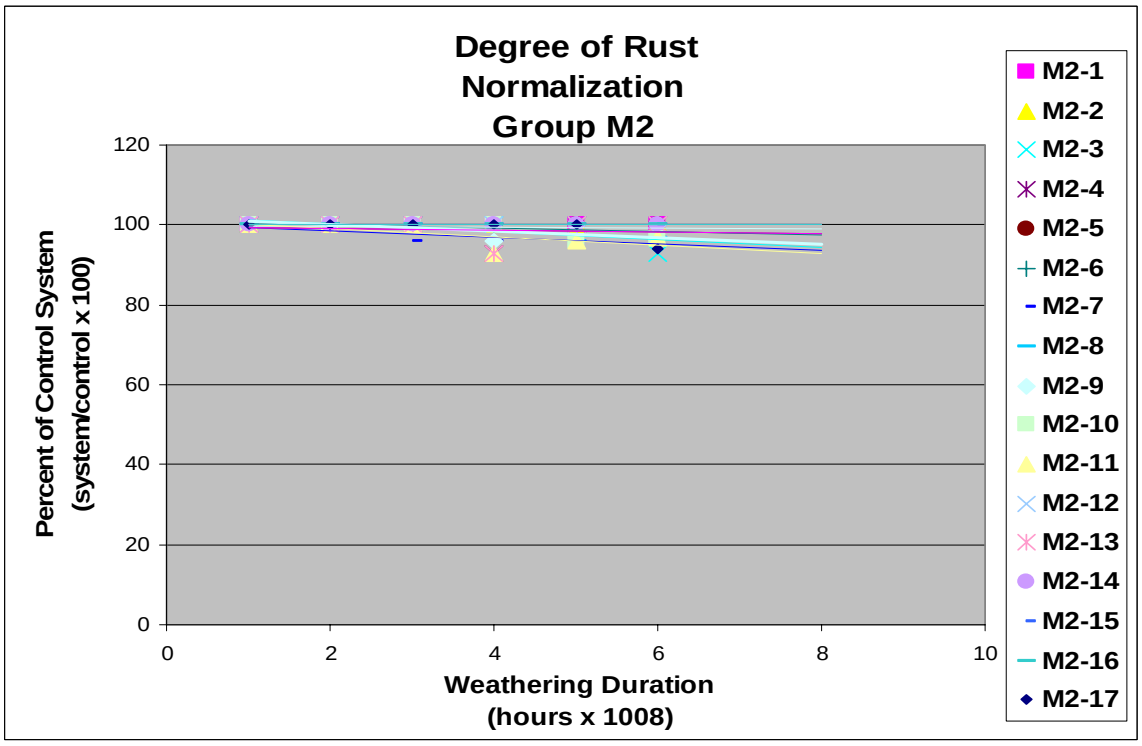

Figure 12. Percent rust normalization curves systems from manufacturer M2 based upon performance on the control system.

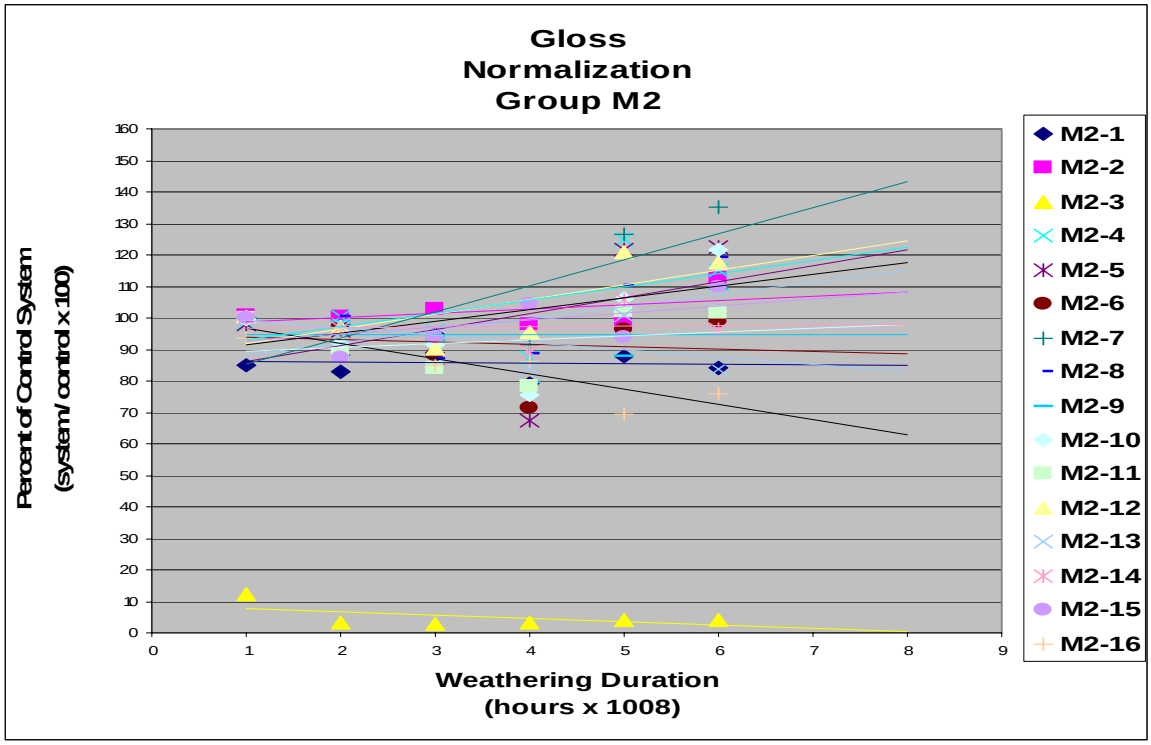

Figure 13. Gloss normalization for coatings systems from manufacturer M2 based upon performance on the control system.

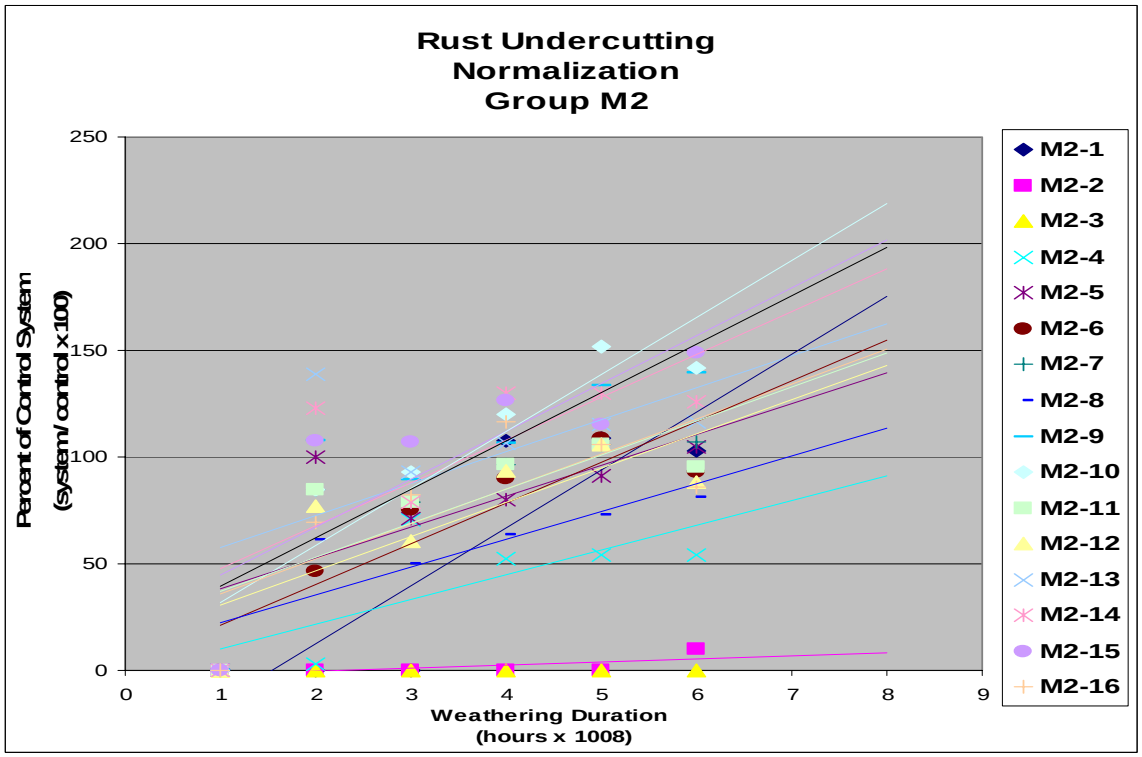

Figure 14. Scribe undercutting curves for coatings systems from manufacturer M2 based upon performance on the control system.

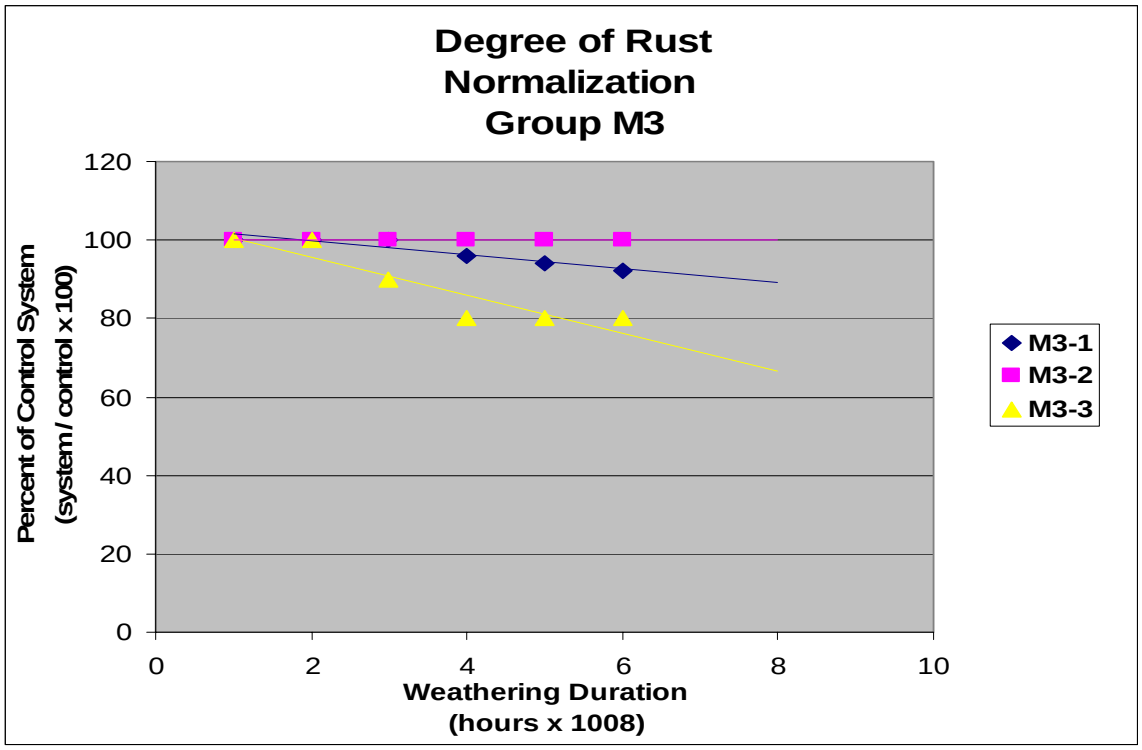

Figure 15. Percent rust normalization curves systems from manufacturer M3 based upon performance on the control system.

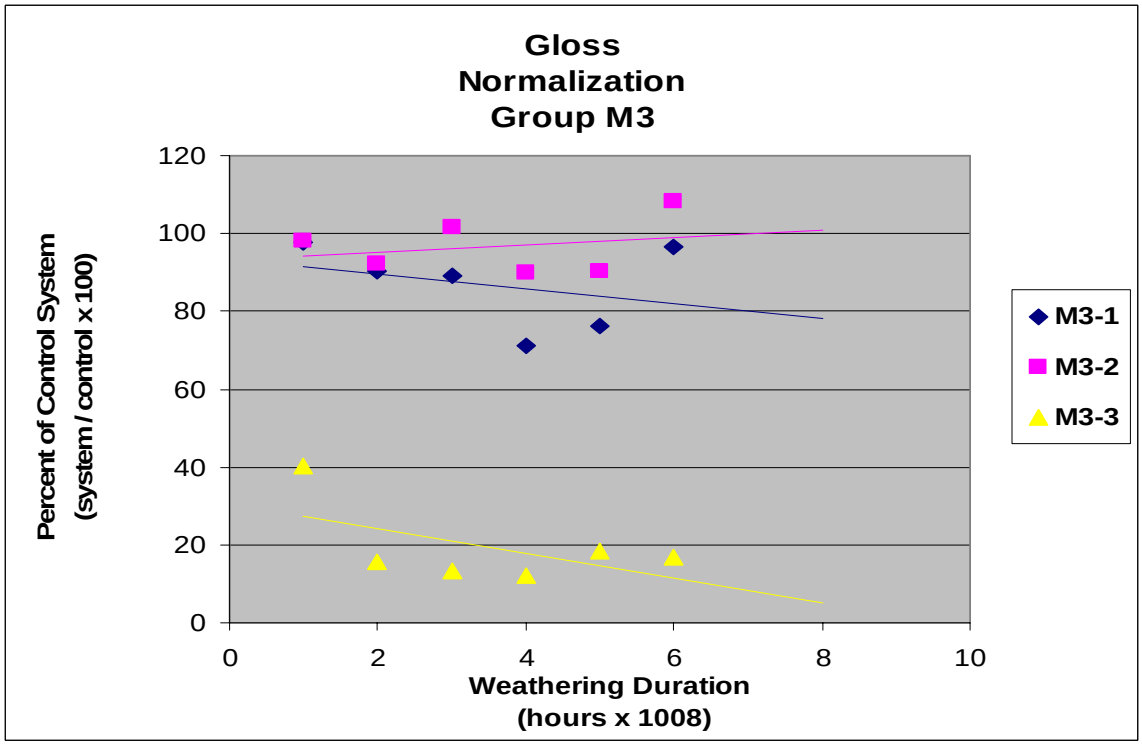

Figure 16. Gloss normalization for coatings systems from manufacturer M3 based upon performance on the control system.

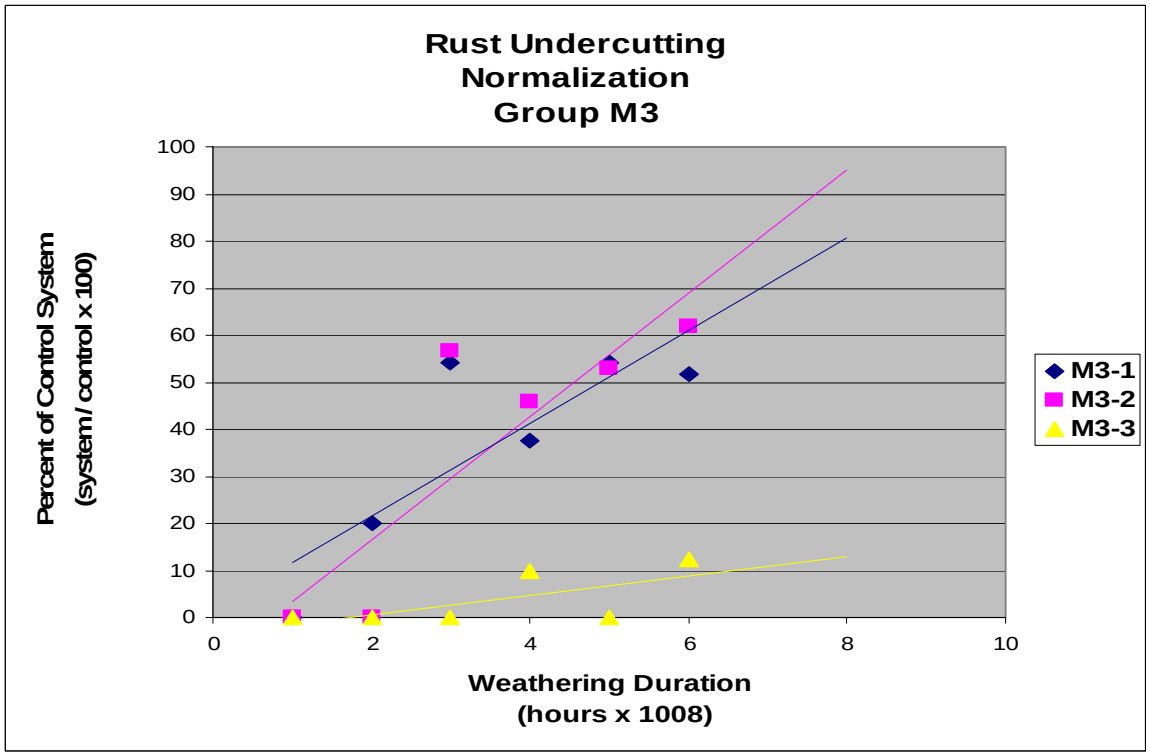

Figure 17. Scribe undercutting curves for coatings systems from manufacturer M3 based upon performance on the control system.

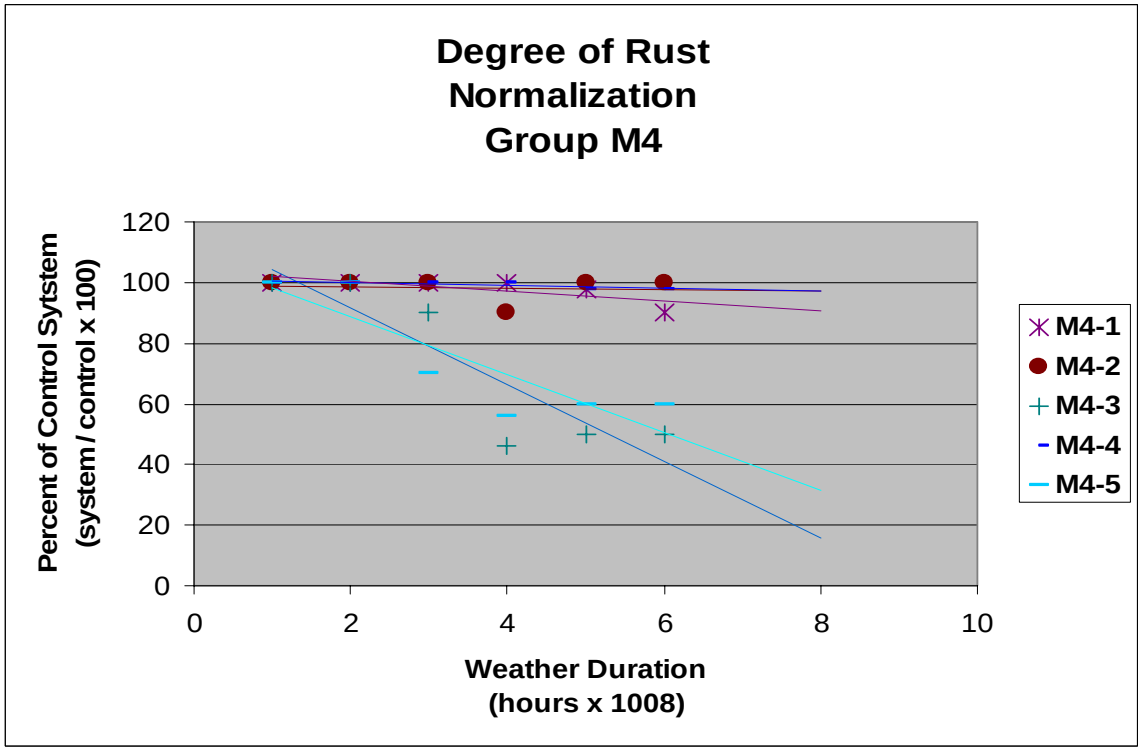

Figure 18. Percent rust normalization curves systems from manufacturer M4 based upon performance on the control system.

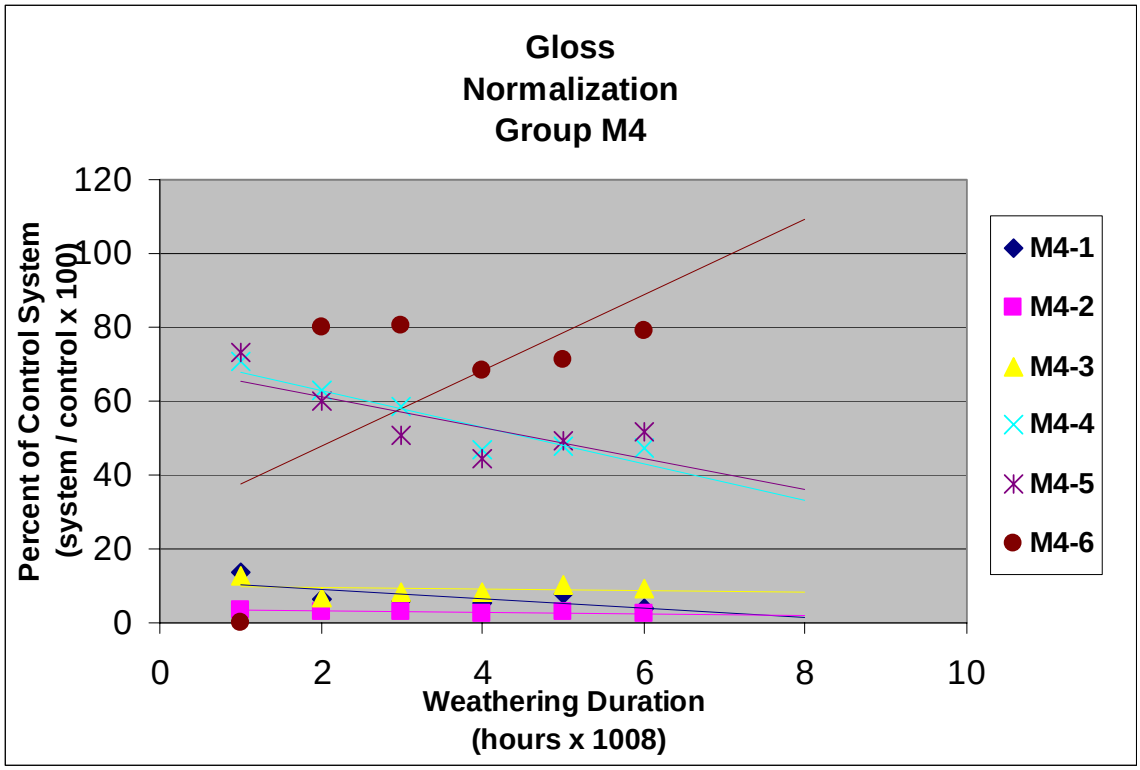

Figure 19. Gloss normalization for coatings systems from manufacturer M4 based upon performance on the control system.

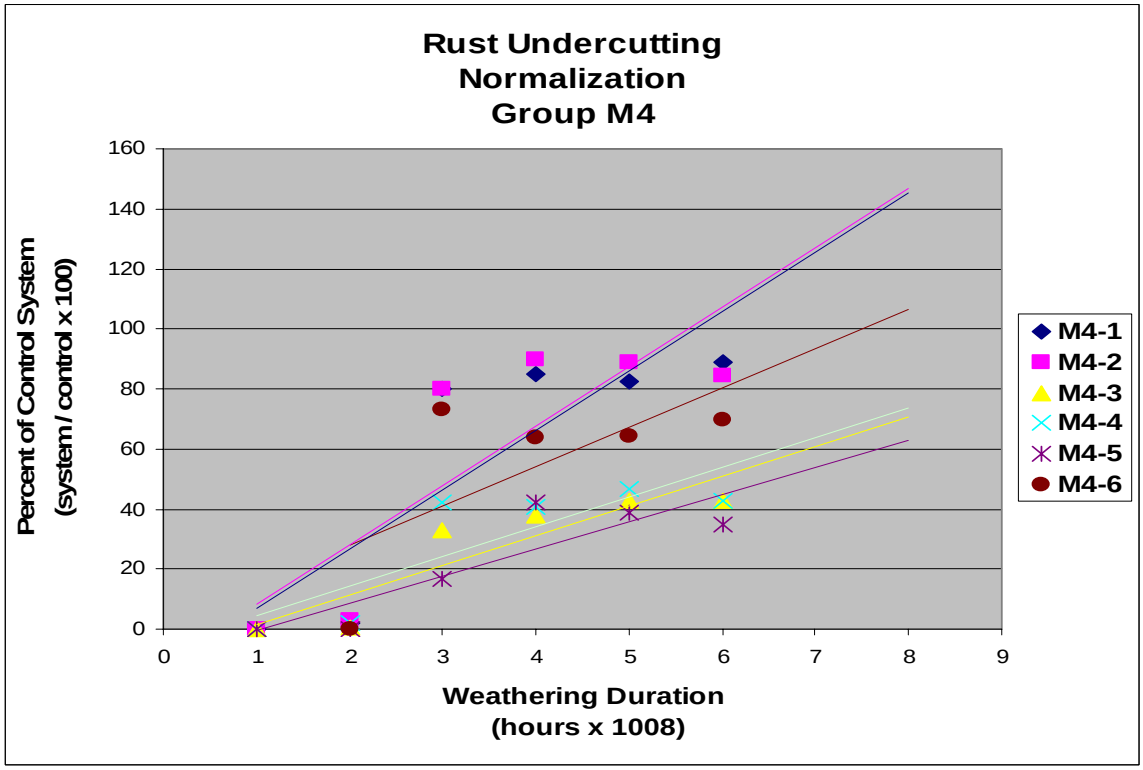

Figure 20. Scribe undercutting curves for coatings systems from manufacturer M4 based upon performance on the control system.

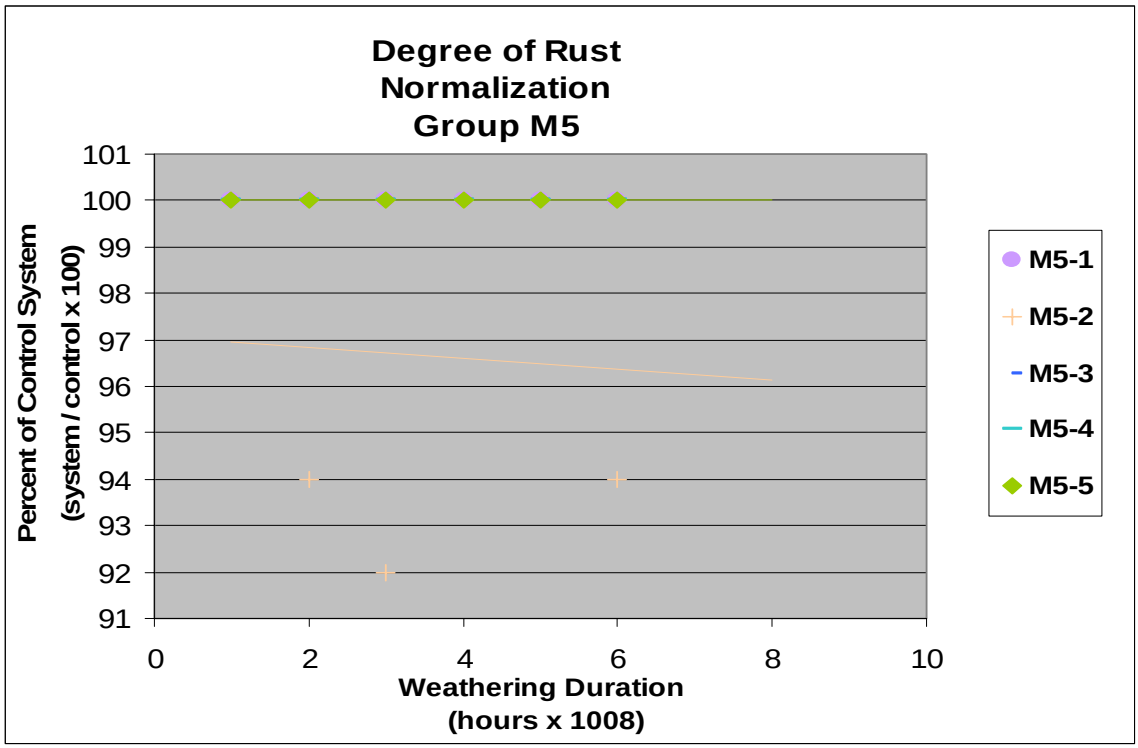

Figure 21. Percent rust normalization curves systems from manufacturer M5 based upon performance on the control system.

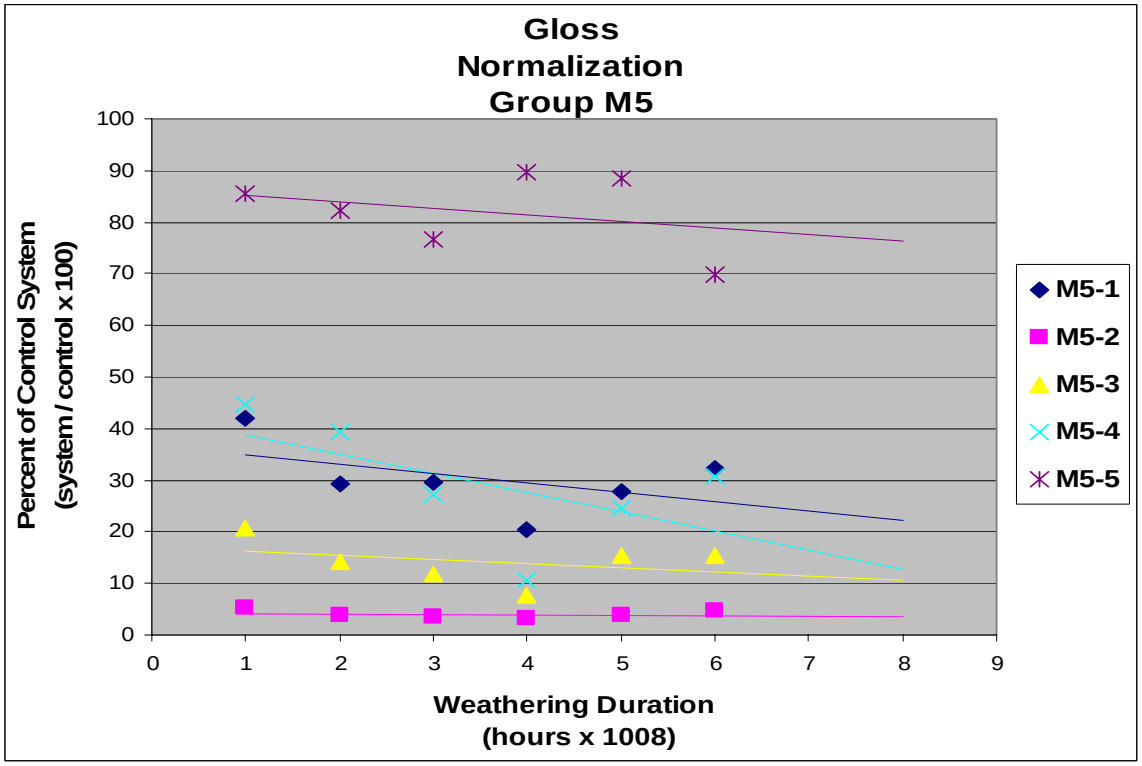

Figure 22. Gloss normalization for coatings systems from manufacturer M5 based upon performance on the control system.

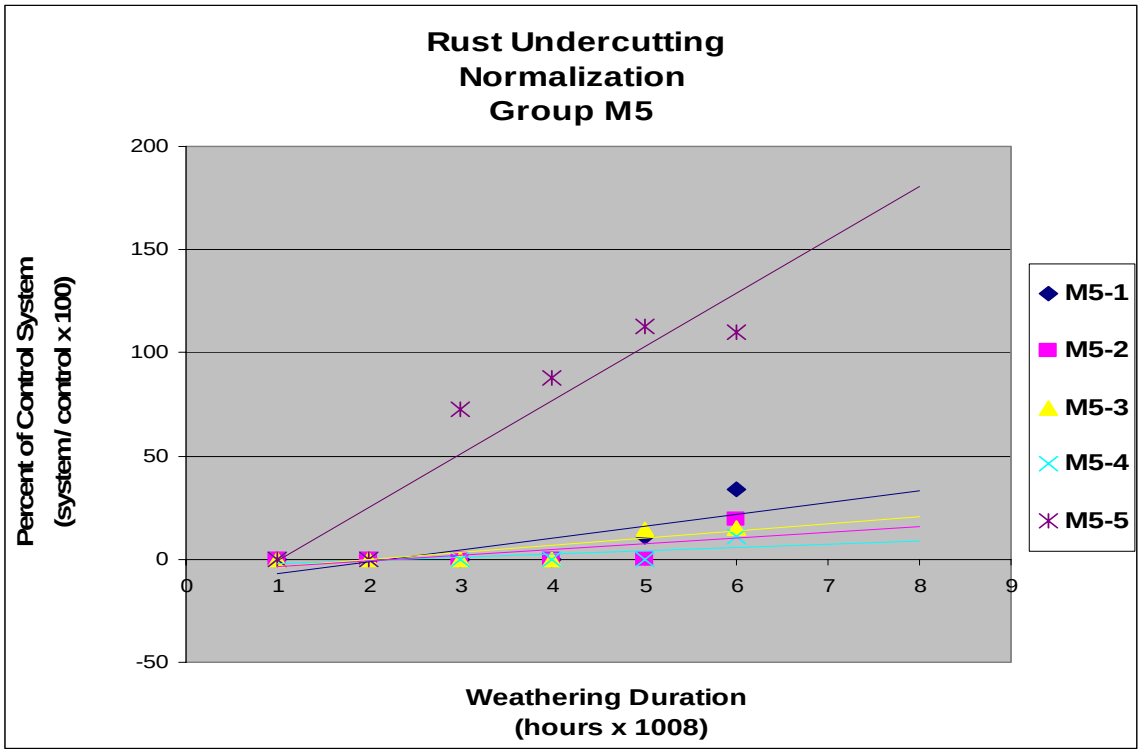

Figure 23. Scribe undercutting curves for coatings systems from manufacturer M5 based upon performance on the control system.

APPENDICES

Appendix A: KY 551 Over Green River Lake In Adair County

FE02 001 0551 006.98 (B00034)

BACKGROUND

In June 2001 a contract was awarded to Vimas Painting Company, Inc. for the experimental cleaning and painting of the KY 551 Bridge over Green River Lake in Adair County (1). This bridge is a welded plate girder structure with three spans totaling 370 feet (2). There is approximately 21,860 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $147,800 to the high bid of $415,000. The contract award was for a lump sum of $147,800.

The existing coating included a 615D red-lead primer with one coat of 615D with lamp black intermediate and one coat of nonleafing aluminum top coat. The existing coating was very brittle and dirty with very little rust (3).

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control
- Environmental And Worker Safety Regulations,
- Project Review, and
- Project Monitoring

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In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 615 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to hand-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 2,000 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC

VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of three coats. A full coat of Environmental Protective Coating's penetrating sealer (E2000-Yellow) primer was to be applied at 1.0 to 3.0 mils dry film thickness (DFT). One full intermediate coat of Environmental Protective Coating's (E400) was to be applied at a DFT of 2.0 to 4.0 mils. The finish coat of Environmental Protective Coating's (E600) was to be applied 2.0 to 4.0 mils DFT. Application method was to be determined by the contractor for all three coats.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site around the 1st of August of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. On August 17, 2001 the painting of the test patch began. The prime coat was applied at 2.0 to 4.0 mils wet film thickness (WFT). The contractor had decided to use the whole bridge as one control area so when the KYDOH Paint Team returned on August 20, 2001 the prime coat had been applied to all of the steel. The contractor had a few minor areas in the prime coat to touch up before proceeding to the next phase of the test patch. The intermediate coat was applied at 3.0 to 5.0 mils WFT in most areas. In some areas the intermediate coat had been applied to thick. The contractor then had to sand down those areas. The intermediate coat then was accepted and the contractor proceeded to apply the top coat. The top coat was then applied at 3.0 to 5.0 mils WFT. Once the top coat had cured the test patch was complete. The contractor then proceeded to work toward completing the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: "Portions of the structure have holidays and thin DFT's in the topcoat, which will need to be corrected with application of the topcoat paint to proper mileage. Above deck work, touch up work and stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed."

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00034. Most areas indicate that SP2 was obtained during cleaning of the bridge. All three coats of paint were applied to meet the specifications of

this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 24. The condition of the bridge prior to the onset of work.

Figure 25. The completed test patch the three specified coats of paint. Note the color contrast.

Figure 26. The hazardous waste storage site for the KY 551 Bridge.

Figure 27. The containment used on the KY 551 Bridge.

Figure 28. The completed experimental coating during the final inspection of the bridge.

Appendix B: KY 30 Over Middle Fork KY River In Breathitt County

FE02 013 00030 004.88 (B0001

BACKGROUND

In July 2001 a contract was awarded for the experimental cleaning and painting of the KY 30 Bridge over Middle Fork KY River in Breathitt County. This bridge is a thru truss with two 120-foot spans. There is approximately 28,000 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $284,000 to the high bid of $469,000. The contract award was for a lump sum of $284,000.

The existing coating included a 615D red-lead primer with one coat of 615D with lamp black intermediate and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Moisture Cure Polyurethane Aluminum Primer/Intermediate,
- Aliphatic Acrylic Polyurethane Finish Coat,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 615 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,000 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of three coats. A full coat of untinted moisture cure aluminum polyurethane primer was to be applied by brushing, rolling or spraying at 2.0 to 4.0 mils dry film thickness (DFT). One full intermediate coat of tinted moisture cure aluminum polyurethane was to be applied at a DFT of 2.0 to 4.0 mils by brushing, rolling or spraying. The finish coat of acrylic aliphatic polyurethane was to be applied 2.0 to 4.0 mils DFT by brushing, rolling or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site August of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. On September 4, 2001 the painting of the test patch began. The prime coat was applied at 4.0 to 6.0 mils wet film thickness (WFT). Later the same day, the prime coat had cured and was accepted. The intermediate coat was then applied at 4.0 to 6.0 mils WFT. On September 7, 2001 the top coat was applied at 4.0 to 6.0 mils WFT. After the top coat had cured the test patch was complete. The contractor then proceeded to work toward completing the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: “Portions of the structure have holidays and thin DFT’s in the topcoat, which will need to be corrected with application of the topcoat paint to proper DFT. Numerous areas of cracking in the intermediate coating were found. The cracked areas must be ground down to remove the cracks, have additional intermediate coating applied to the proper DFT if needed and reapplication of the top coat to proper DFT. Above deck work (drains and joint plates), touch up work and stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.”

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00017. Most areas indicate that SP2 was obtained during cleaning of the bridge. All three coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 29. The condition of the bridge prior to painting.

Figure 30. The test patch area prepared for paint application.

Figure 31. The containment used on the KY 30 Bridge.

Figure 32. The contractor performing washing operation on KY 30 Bridge.

Figure 33. The bridge on KY 30 after painting was completed.

Appendix C: KY 7 Bridge Over Grayson Lake Spillway In Carter County

FE02 022-0007 B00018 003.92

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 7 Bridge over Grayson Lake Spillway in Carter County (1). This bridge is a continuous welded plate girder with six 115-foot spans (2). There is approximately 28,500 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $93,190 to the high bid of $606,500. The contract award was for a lump sum of $93,190.

The existing coating included a 615D red-lead primer and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 615 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to hand-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 2,000 psi with a spray fan tip with a maximum 30° fan. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats. A full coat of Watson's Coatings Red Oxide Penetrant (AS 8201) was to be applied by spraying at 3.0 to 5.0 mils dry film thickness (DFT). The finish coat of Watson's Coatings Calcium Sulfonate (AS 8301) was to be applied 6.0 to 10.0 mils DFT by spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site August of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. On August 8, 2001 the painting of the test patch began. The prime coat was applied at 5.0 to 7.0 mils wet film thickness (WFT). The following day, the prime coat had cured and was accepted. The top coat was applied at 8.0 to 12.0 mils WFT. After the top coat had cured the test patch was complete.

During the early part of the project there were some minor problems that the contractor needed to correct. These problems occurred during the cleaning of the steel and with the containment. The contactor seemed to have trouble removing an oily substance on the steel. He also had difficulty removing the pact rust. Also, all structural steel was to be totally enclosed during all phases of work. During some of the cleaning operations, there were holes in the containment and at times both ends of the containment were left open. Once these problems were solved the contactor proceeded toward the completion of the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: "The finish coat had areas of lifts and areas of separation where the continuity of the coating film had been broken. These areas will require additional application of topcoat to achieve a continuous film. Repair holidays and missed spots with finish coat. Touch up where rigging has been removed. Stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site."

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00018. Most areas indicate that SP2 was obtained during cleaning of the bridge. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 34. The bridge at KY 7 over the spillway before painting began.

Figure 35. The hazardous waste storage site for the bridge on KY 7 over the spillway.

Figure 36. The completed test patch KY 7 Bridge over the spillway.

Figure 37. The containment used on KY 7 Bridge over the spillway.

Figure 38. The KY 7 Bridge over the spillway after painting.

Appendix D: KY 7 Bridge Over Grayson Lake In Carter County

FE02 022-0007 B00019 001.64

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 7 Bridge over Grayson Lake in Carter County. This bridge is a continuous welded plate girder with six 115-foot spans. There is approximately 56,131 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $190,689 to the high bid of $587,500. The contract award was for a lump sum of $190,689.

The existing coating included a red-lead primer and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 615 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 2,000 psi with a spray fan tip with a maximum 30° fan. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats. A full coat of Keeler & Long KL6000, Tri-Polar Ferrite Primer was to be applied by spraying at 2.0 to 3.0 mils dry film thickness (DFT). The finish coat of Keeler & Long KL4404, Anodic Self-Priming Galvanize Gray was to be applied 6.0 to 10.0 mils DFT by spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site in September of 2001. The contractor began preparing a test patch area. The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. The painting of the test patch began with the prime coat being applied at 4.0 to 5.0 mils wet film thickness (WFT). After the prime coat had cured and was accepted the top coat was applied at 8.0 to 12.0 mils WFT. After the top coat had cured the test patch was complete.

During the early part of the project there were some minor problems that the contractor needed to correct. These problems occurred during the cleaning of the steel and with the containment. The contractor had some difficulty removing the pact rust. Also, all structural steel was to be totally enclosed during all phases of work. During some of the cleaning operations, there were holes in the containment and at times both ends of the containment were left open. Once these problems were solved the contactor proceeded toward the completion of the project.

FINAL INSPECTION REPORT

Comments from the final inspection report were as follows: “Repair holidays and missed spots with finish coat. Touch up where rigging has been removed. Stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00019. Most areas indicate that SP2 was obtained during cleaning of the bridge. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 39. The KY 7 Bridge on Grayson Lake prior to painting.

Figure 40. The containment used on the KY 7 Bridge over Grayson Lake.

Figure 41. The completed experimental coating during the final inspection of the bridge.

Appendix E: Interstate 275 Over Ohio River At Brent In Campbell County

MP 019 0275 073.06 B00040 AND B00040P
MP 019 0275 073.27 B00041 AND B00041P

BACKGROUND

In February 2001 a contract was awarded for the experimental cleaning and painting of the twin bridges on Interstate 275 over the Ohio River at Brent in Campbell County. The main truss contains two 720-foot continuous truss spans per bridge. The approaches are continuous welded plate girders with four spans with lengths of 156 ft, 156 ft, 124 ft and 124 ft per bridge. There is approximately 56,131 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $190,689 to the high bid of $587,500. The contract award was for a lump sum of $190,689.

The existing coating included a 615D primer and one coat of aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Experimental Pressure Washing, Mechanical Surface Preparation and Paint Application,
- Joint Re-seal,
- Paint,
- Polyurethane Paint System
- Quality Control,
- Project Monitoring,
- Pertaining to Public Water Supply Use of the River,
- Environmental and Worker Safety,
- Pre-bid Conference.

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for washing, surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment screens were employed to trap all loose solid debris generated during the washing and surface preparation operations. The Special Note also required the use of containment screens with 85% (minimum) mesh. In addition to containment screens, the Special Note required the use of a filter fabric consisting of a polypropylene, non-woven, needle-punched geotextile or equivalent attached to the containment screens to filter all waste wash-water. The filter fabric had an apparent opening size of 430 microns. The contractor was required to provide a written manufacturer's certification that all screens and filter fabric met the project specifications.

All pack rust was to be removed from all structural steel prior to tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,500 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by power tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP3 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats except for the floor beams where an intermediate coat was applied. A full coat of tinted moisture cure aluminum polyurethane primer was to be applied by brushing, rolling or spraying at 2.0 to 4.0 mils dry film thickness (DFT). The intermediate coat of untinted moisture cure aluminum polyurethane was to be applied at 2.0 to 4.0 mils DFT by brushing, rolling or spraying on the floor beams only. The finish coat of acrylic aliphatic polyurethane was to be applied at 2.0 to 4.0 mils DFT by brushing, rolling or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site in late in the 2001 painting season. The contractor began preparing a test patch area. The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. The painting of the test patch began with the prime coat being applied at 4.0 to 6.0 mils wet film thickness (WFT). After the prime coat had cured and was accepted the intermediate coat was applied at 4.0 to 6.0 mils WFT on the floor beams only. The top coat was then applied at 4.0 to 6.0 mils WFT and the test patch was complete.

During the 2001 paint season the contactor worked on the Kentucky approaches only. In 2002 the contractor completed the rest of the approaches and the main trusses of both bridges. All work was completed in early October of 2002.

FINAL INSPECTION REPORT

There were many partial final inspections done on this project. Some problems noted on these final inspections were cracking, thin coatings, holidays, lifted edges and overspray. The work area was to be cleaned and all debris and waste removed from the site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridges B00040, B00040P, B00041 and B00041P. Most areas indicate that SP3 was obtained during cleaning of the bridge. All coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 42. View of the twin bridges over I-275 in Campbell County.

Figure 43. The containment used on the twin bridges on I-275 in Campbell County.

Figure 44. The containment used on the approaches of the bridges on I-275 in Campbell County.

Figure 45. The twin bridges on I-275 in Campbell County after painting.

Appendix F: US 60 Bridge Over CSX Railroad Spur In Daviess County

FE02 030-00060 B00001 016.66
FE02 030-00060 B00004 016.66

BACKGROUND

A contract was awarded for the experimental cleaning and painting of the US 60 Bridges over CSX Railroad Spur in Daviess County. The bridges are continuous welded plate girders with six 45-foot spans. There is approximately 12,000 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $119,340 to the high bid of $177,999.53. The contract award was for a lump sum of $119,340.

The existing coating included a red-lead primer and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Moisture Cure Polyurethane Aluminum Primer/Intermediate,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment screens were employed to trap all loose solid debris generated during washing and hand tool cleaning operations. Impermeable containment tarps were used with the exception of 85% containment screens used to support the filter fabric.

All pack rust was to be removed from all structural steel prior to tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 9,000 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For

this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats. A full coat of tinted moisture cure aluminum polyurethane primer was to be applied by brushing, rolling or spraying at 2.0 to 4.0 mils dry film thickness (DFT). The finish coat of untinted moisture cure aluminum polyurethane was to be applied 2.0 to 4.0 mils DFT by brushing, rolling or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site in June of 2002. The contractor began preparing a test patch area. The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. The painting of the test patch began with the prime coat being applied at 4.0 to 6.0 mils wet film thickness (WFT). After the prime coat had cured and was accepted the top coat was applied at 4.0 to 6.0 mils WFT. After the top coat had cured the test patch was complete.

The contractor elected to apply the coatings by brushing and rolling. There were no problems during the duration of the project.

FINAL INSPECTION REPORT

Comments from the final inspection report were as follows: “Repair holidays and missed spots with finish coat. Touch up where rigging has been removed. Stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridges B00001 and B00004. Most areas indicate that SP2 was obtained during cleaning of the bridge. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 46. View of the bridges in Daviess County before painting.

Figure 47. View of the bridges in Daviess County after painting.

Appendix G: KY 453 Bridge Over P & L Railroad In Livingston County

FE02 070-00453 B00045 000.21

KY 131 Over East Fork Clarks River In McCracken County

FE02 073-00131 B00010 002.01

KY 139 Over Little River In Trigg County

FE02 111-00139 B00014 016.55

BACKGROUND

In November 2001 a contract was awarded for the experimental cleaning and painting of the KY 453 Bridge over P & L Railroad in Livingston County, the KY 131 Bridge over East Fork Clarks River in McCracken County and the KY 139 Bridge over Little River in Trigg County. The Livingston County Bridge is a continuous welded girder with two 100 ft spans and two 150 ft spans. The McCracken County Bridge consists of two 71.83 ft simple spans, two 74.17 ft and one 90 ft continuous girder spans. The Trigg County Bridge consists of two 70 ft and two 105 ft continuous I-beam spans. There is approximately 40,800 ft^2 of steel surface on the Livingston County Bridge, 20,700 ft^2 of steel surface on the McCracken County Bridge and 20,500 ft^2 of steel surface on the Trigg County Bridge. Six bids were submitted for this project ranging from the low bid of $223,300 to the high bid of $348,000. The contract award was for a lump sum of $223,300.

The existing coating for the Livingston County Bridge included a 615D red lead primer and an aluminum topcoat. The McCracken County Bridge included a red lead, aluminum, 615D red lead and an alkyd topcoat. The Trigg County Bridge had six coats of existing paint consisting of a red lead, aluminum, 615D red lead, aluminum, 615D red lead and an alkyd topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Wash Water At McCracken County,
- Experimental Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used with the exception of 85% containment screens used to support the filter fabric. The filter fabric consisting of a polypropylene, non-woven, needle-punched geotextile or equivalent was to be attached to the containment screens to filter all waste wash water. The Filter fabric had an apparent opening size of 430 microns. The contractor was required to provide a written manufacturer's certification that all screens and filter fabric met the project specifications.

All pack rust was to be removed from all structural steel prior to power-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,000 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP3 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats. A full coat of Watson's Coatings Armour-Shield 236 RQD was to be applied by spraying at 4.0 to 6.0 mils dry mil thickness (DFT). The finish coat of Watson's Coatings Armour-Shield 236 GQD was to be applied by spraying at 4.0 to 6.0 mils dry mil thickness (DFT).

OBSERVATIONS DURING PROJECT

The painting contractor moved to the Livingston County Bridge first. The contactor prepared a test patch area that did not meet the specifications of the project. Some disagreements occurred during the cleaning of the bridge. The major problem was the contractor did not bring and did not deem necessary the use of power tools during the cleaning of the bridge. After this problem was solved the contractor proceeded toward finishing the test patch. The contractor then completed the painting on this bridge.

The contractor then moved to McCracken County where no problems occurred during the test patch or the painting of the bridge.

While at the Trigg County Bridge the contractor prepared a test patch that did meet the specifications for this bridge. The contractor tried to remove the pact rust by washing at 4000 psi which did not work. He then went back and used hand and power tools to remove the remaining pact rust. The contractor then proceeded toward finishing the project.

FINAL INSPECTION REPORT

Comments from final inspection report for the Livingston County Bridge were as follows: “Touch up light spots and holidays with additional topcoat. Inspect areas around diaphragms where gusset plates are near bottom flange creating a difficult to access area. These spots are missing coatings and will need proper coating application to meet specification. Repair areas of lifted paint by popping off lifts and/or coating with finish coating to lock down the old coatings and create a continuous unbroken film with the new topcoat. Stenciling of required information must be painted on bridge. The work area must be cleaned and all debris and waste removed from site.”

Comments from final inspection report for the McCracken County Bridge were as follows: “Touch up light spots and holidays with additional topcoat. Inspect areas around diaphragms where edges are near the web creating a difficult to access area. These spots are missing coatings and will need proper coating application to meet specification. Repair areas of lifted paint by popping off lifts and/or coating with finish coating to lock down the old coatings and create a continuous unbroken film with the new topcoat. Remove any painted over dirt or Mud Dobber’s nests and make coating repairs as necessary. Stenciling of required information must be painted on bridge. The work area must be cleaned and all debris and waste removed from site.”

Comments from final inspection report for the Trigg County Bridge were as follows: “Touch up light spots and holidays with additional topcoat. Inspect areas around diaphragms where edges are near the web creating a difficult to access area. These spots are missing coatings and will need proper coating application to meet specification. Repair areas of lifted paint by recoating to lock down the old coatings and create a continuous unbroken film with the new topcoat. Remove any painted over dirt or Mud Dobber’s nests and make coating repairs as necessary. Stenciling of required information must be painted on bridge. The work area must be cleaned and all debris and waste removed from site.”

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of the bridges in Livingston County (B00045), McCracken County (B00010) and Trigg County (B00014). Most areas indicate that SP3 was obtained during cleaning of the bridges. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 48. View of KY 453 Bridge in Livingston County after painting.

Figure 49. View of KY 131 Bridge in McCracken County before painting.

Figure 50. View of KY 131 Bridge in McCracken County after painting.

Figure 51. View of KY 139 Bridge in Trigg County before painting.

Figure 52. View of KY 139 Bridge in Trigg County after painting.

Appendix H: KY 1661 Bridge Over Little Sandy River In Carter County

FE02 022-01661 B00017 001.56

KY 519 Over North Craney Creek In Rowan County

FE02 103-00519 B00063 000.02

BACKGROUND

In January 2002 a contract was awarded for the experimental cleaning and painting of the KY 1661 Bridge over Little Sandy River in Carter County and the KY 519 Bridge over North Craney Creek in Rowan County. The bridge in Carter County is a thru truss with one span of 200 ft. The Rowan County Bridge is a welded plate girder with two spans of 100 ft and one 150 ft span. There is approximately 27,900 ft^2 of steel surface on the Carter County Bridge and 30,000 ft^2 of steel surface on the Rowan County Bridge. Six bids were submitted for this project ranging from the low bid of $256,000 to the high bid of $350,175. The contract award was for a lump sum of $256,000.

The existing coating for the Carter County Bridge included a zinc primer and a vinyl topcoat. The Rowan County Bridge included a lead primer with an aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Wash Water At Rowan County,
- Experimental Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used with the exception of 85% containment screens used to support the filter fabric. The filter fabric consisting of a polypropylene, non-woven, needle-punched geotextile or equivalent was to be attached to the containment screens to filter all waste wash water. The Filter fabric had an apparent opening size of 430 microns. The contractor was required to provide a written manufacturer's certification that all screens and filter fabric met the project specifications.

All pack rust was to be removed from all structural steel prior to power-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,000 psi with 0° spinner nozzles. Additional cleaning (i.e.,

solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP3 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats for the entire bridge and one coat for the joints and faying surfaces. A full coat of Bridgecote BC8200 Penetrant/Sealer was to be applied by spraying. A caulk coat of Bridgecote BC8100 Self Priming Topcoat was to be applied by spraying at 15.0 to 18.0 mils wet film thickness (WFT) on the joints and faying surfaces only. The finish coat of Bridgecote BC8100 Self Priming Topcoat was to be applied by spraying at 15.0 to 18.0 mils wet film thickness (WFT).

OBSERVATIONS DURING PROJECT

The painting contractor moved on site April of 2002. A test patch was done on this bridge and all three coats of paint were applied according to the specifications.

No major problems occurred during this project.

FINAL INSPECTION REPORT

Comments from final inspection report for the Carter County Bridge were as follows: “Repair holidays and missed spots with finish coat, pay attention to rivets and lattice work. Repair areas where tarps have blown against steel and damaged paint, pay attention to edges and corners of structural members. Touch up where rigging will be removed and areas damaged by rigging removal.”

Comments from final inspection report for the Rowan County Bridge were as follows: “Repair areas where tarps and debris have blown against steel and marred paint. Repair lifted paint areas. Touch up around bolt heads and threads. Touch up holidays and any light spots. Touch up areas where rigging will be removed and areas damaged by rigging removal. Stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.”

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of the bridge in Carter County (B00017) and the bridge in Rowan County (B00063). Most areas indicate that SP3 was obtained during cleaning of the bridges. All three coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 53. View of KY 1661 Bridge in Carter County before painting inside the containment.

Figure 54. Contractor applying prime coat to the test patch area on KY 1661 Bridge in Carter County.

Figure 55. View of KY 1661 Bridge in Carter County after painting.

Figure 56. View of KY 519 Bridge in Rowan County before painting.

Figure 57. Contactor applying coating on the test patch on KY 519 Bridge in Rowan County.

Appendix I: KY 88 Bridge Over Nolan River Lake In Hart County

FE02 050-0088 B00007 000.01

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 88 Bridge over Nolan River Lake in Hart County. This bridge is a continuous steel girder with two 122-foot spans and two 153-foot spans. There is approximately 45,000 ft^2 of steel surface. Five bids were submitted for this project ranging from the low bid of $270,844.63 to the high bid of $532,875. The contract award was for a lump sum of $270,844.63.

The existing coating included a red-lead primer with one coat of aluminum and an alkyd finish coat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2A was to be used.

All pack rust was to be removed from all structural steel prior to abrasive blast cleaning.

Cleaning Specifications

The contractor was required to perform surface preparation by abrasive blast cleaning on all steel surfaces. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-1. For this project, SSPC VIS-1 SP6 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of three coats. A full coat of Environmental Protective Coating's (EPC) EZ2800 zinc rich primer was to be applied by spraying at 2.0 to 4.0 mils

dry film thickness (DFT). One full intermediate coat of EPC E-400 was to be applied at a DFT of 2.0 to 4.0 mils by spraying. The finish coat of EPC E-600 was to be applied 2.0 to 4.0 mils DFT by or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site in June of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. On July 9, 2001 the painting of the test patch began. The prime coat was applied at 4.0 to 6.0 mils wet film thickness (WFT). Later the same day, the prime coat had cured and was accepted. The intermediate coat was then applied at 4.0 to 6.0 mils WFT. The top coat was applied at 4.0 to 6.0 mils WFT. After the top coat had cured the test patch was complete.

The prime coat was applied with no problems. On July 21, 2001 the intermediate coat was applied by spraying on two control areas. On July 22, 2001 the intermediate coat on these control areas was inspected. Cracks and peeling on lips, stiffeners, bolts and x-braces were discovered. After further inspection it was determined that the contractor had applied the too many mils of the coating. The contractor then proceeded to correct this problem by sanding and scraping these areas. He then reapplied the intermediate coating at the mil thickness specified for this project. The inspector accepted these corrections and the project continued toward completion.

FINAL INSPECTION REPORT

The final inspection was performed on August 2, 2001. Comments from final inspection report were as follows: “During the inspection numerous locations of cracking in the intermediate coat were found. These locations will need to be ground down into the intermediate coat to remove the failures, cleaned, touched up with the intermediate paint if millage is not adequate, and have topcoat applied. Portions of the structure have holidays and thin DFT’s in the topcoat, which will need to be corrected with application of the topcoat paint to proper millage. Above deck work, touch up work when rigging is removed and stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00007. Most areas indicate that SP6 was obtained during blasting cleaning of the bridge. All three coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 58. View of KY 88 Bridge in Hart County before painting.

Figure 59. Containment used on KY 88 Bridge in Hart County.

Figure 60. Contractor abrasive blasting steel on KY 88 Bridge in Hart County.

Figure 61. The hazardous waste storage site for the KY 88 Bridge in Hart County.

Figure 62. View of KY 88 Bridge in Hart County after painting.

Appendix J: US 62 Over The Cumberland River In Livingston County

FE02 070-0062 0002.78 (B00065)

BACKGROUND

In July 2001 a contract was awarded for the experimental cleaning and painting of the US 62 Bridge over the Cumberland River in Livingston County. This bridge is a combination steel thru truss with three spans totaling 700 ft and steel girder approaches of nine spans totaling 767 ft. There is approximately 254,200 ft^2 of steel surface. Three bids were submitted for this project ranging from the low bid of $1,116,500 to the high bid of $2,212,700. The contract award was for a lump sum of $1,116,500.

The existing coating included a lead primer, a coat of aluminum, with another coat of lead and an alkyd topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 7,000 psi with 0° spinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of three coats. A full coat of Environmental Protective Coating's (EPC) penetrating sealer (E2000-yellow) was to be applied by brushing, rolling or spraying at 1.0 to 3.0 mils dry film thickness (DFT). One full intermediate coat of EPC's E400 was to be applied at a DFT of 2.0 to 4.0 mils by brushing, rolling or spraying. The finish coat of EPC's E600 was to be applied 2.0 to 4.0 mils DFT by brushing, rolling or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site August of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. On August 21, 2001 the painting of the test patch began. The prime coat was applied at 3.0 to 4.0 mils wet film thickness (WFT). The next day, the prime coat had cured and was accepted. The intermediate coat was then applied at 4.0 to 6.0 mils WFT. On September 1, 2001 the top coat was applied at 4.0 to 6.0 mils WFT. After the top coat had cured the test patch was complete. The contractor then proceeded to work toward completing the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: "East approach; touch up where rigging has been removed. Touch up light spots and holidays. Remove areas of lifted paint and reapply top coat. Below deck truss sections; vertical portions of the truss have breaks in the coatings from impacts which will need to be scraped, feathered and have top coat reapplied. Repair lifted edges. Touch up light spots and holidays. Above deck truss section and hand rails; touch up large spots where pin holes and orange peel are seen with sanding and reapplication of top coat. Repair lifts and breaks by scraping and feathering edges and reapplication of top coat. Prior to all corrective reapplication of coatings, the area being corrected must be prepared by scuffing or sanding if the reapplication window has been exceeded. The work area must be cleaned and all debris and waste removed from site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00065. Most areas indicate that SP2 was obtained during cleaning of the bridge. All three coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 63. View of US 62 Bridge in Livingston County before painting.

Figure 64. Containment used on the US 62 Bridge in Livingston County.

Figure 65. Contractor performing washing operation on the US 62 Bridge in Livingston County.

Figure 66. View of US 62 Bridge in Livingston County after painting.

Appendix K: KY 9002 Bridge Over Chaplin River In Nelson County

FE02 090-09002 B00019N 039.25
FE02 090-09002 B00019P 039.25

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 9002 Bridge over Chaplin River in Nelson County. These bridges are continuous welded plate girders with three spans of 100 ft, 130 ft and 100 ft. (2). There is approximately 24,000 ft^2 of steel surface per bridge. Five bids were submitted for this project ranging from the low bid of $198,250 to the high bid of $584,200. The contract award was for a lump sum of $198,250.

The existing coating included a lead primer and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to hand-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,500 psi with a spray fan tip with a maximum 30^0 fan. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC

VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of two coats. A full coat of Keeler & Long KL6000, Tri-Polar Ferrite primer was to be applied by spraying at 2.0 to 3.0 mils dry film thickness (DFT). The finish coat of Keeler & Long KL4404, Anodic Self-Priming Galvanize Gray was to be applied 6.0 to 10.0 mils DFT by spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site October of 2001. The contractor began preparing a test patch area (4). The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. The painting of the test patch began with the prime coat being applied at 5.0 to 6.0 mils wet film thickness (WFT). When the prime coat had cured and was accepted the top coat was applied at 8.0 to 12.0 mils WFT. After the top coat had cured the test patch was complete.

During the early part of the project there were some minor problems that the contractor needed to correct. These problems occurred during the cleaning of the steel and with the containment. He had difficulty removing the pact rust. Also, the paint job throughout the bridge in general showed poor workmanship. Some examples of the poor workmanship included portions of the bridge not being cleaned or painted with one or both coats of paint. Once these problems were solved the contactor proceeded toward the completion of the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: “Portions of the structure have holidays and light spots in the topcoat, which will need to be corrected with application of the topcoat paint to proper millage. The top of most of the diaphragms had not been cleaned nor had either coating been applied. These will have to be corrected by wiping clean with a rag to remove any contaminates and application of both prime and topcoat. Touch up of lifts and small cracks will be required. Rigging removal touch up work and stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site.”

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridges B00019N & B00019P. Most areas indicate that SP2 was obtained

during cleaning of the bridges. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 67. View of the bridges on KY 9002 in Nelson County before painting.

Figure 68. View of the under side of the bridge on KY 9002 in Nelson County before painting.

Figure 69. Containment used on KY 9002 Bridge in Nelson County.

Figure 70. View of holes and openings in the containment on the KY Bridge 9002 in Nelson County.

Figure 71. Contractor applying coating to the test patch area.

Figure 72. View of under side of KY 9002 Bridge in Nelson County after painting.

Figure 73. View of KY 9002 Bridges in Nelson County after painting.

Appendix L: KY 80 Over Cumberland Lake In Pulaski County

FE02 100-0080 0013.71 (B00029)

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 80 Bridge over Cumberland Lake in Pulaski County. This bridge is a combination deck truss with three 360 ft spans and steel deck girder with two 60 ft spans. There is approximately 390,800 ft^2 of steel surface. Two bids were submitted for this project with the low bid of $1,069,810 and the high bid of $1,439,300. The contract award was for a lump sum of $1,069,810.

The existing coating included a zinc primer and a vinyl topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Waste Removal,
- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-Bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 9,500 psi with 0^ospinner nozzles. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation by hand-tool cleaning on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC

VIS-3. For this project, SSPC VIS3-SP2 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of three coats. A full coat of Environmental Protective Coating's (EPC) penetrating sealer (E2000-yellow) was to be applied by brushing, rolling or spraying at 1.0 to 3.0 mils dry film thickness (DFT). One full intermediate coat of EPC's E400 was to be applied at a DFT of 2.0 to 4.0 mils by brushing, rolling or spraying. The finish coat of EPC's E600 was to be applied 2.0 to 4.0 mils DFT by brushing, rolling or spraying.

OBSERVATIONS DURING PROJECT

The painting contractor moved on site June of 2001. The contractor began preparing a test patch area. The purpose of the test patch is for visual reference for the Quality Control Inspector (QC) and the Quality Assurance Inspector (QA) to refer to during the life of the project. The painting of the test patch began in early July. The prime coat was applied at 3.0 to 4.0 mils wet film thickness (WFT). While the sealer was being applied it started to destroy the existing coating. Once it was determined that the sealer would not work with the existing coating the contractor was told to use EPC's E400 as the prime coat. The E400 was then applied at 4.0 to 6.0 mils WFT and seemed to work well with the existing coating. The intermediate coat was then applied at 4.0 to 6.0 mils WFT. The top coat was then applied at 4.0 to 6.0 mils WFT. After the top coat had cured the test patch was complete. The contractor then proceeded to work toward completing the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: "Some large areas of missing topcoat were found, most notably on two of the 45 degree members on the downstream side in the middle section of the bridge. The groove formed by the joining of the angle and flat steel in the lower box work cords is missing topcoat and must be completed by application of topcoat. Repair holidays and missed spots with finish coat."

Stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from the site.

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridge B00029. Most areas indicate that SP2 was obtained during cleaning of the bridge. All three coats of paint were applied to meet the specifications of

this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 74. View of the KY 80 Bridge in Pulaski County before painting.

Figure 75. View of the under side of KY 80 Bridge in Pulaski County before painting.

Figure 76. The bridge on KY 80 in Pulaski County showing the containment.

Figure 77. The hazardous waste storage site for the KY 80 Bridge.

Figure 78. View of the KY 80 Bridge after painting.

Appendix M: KY 9002 Bridge Over Chaplin River In Washington County

FE02 115-9002 B00041N 042.08
FE02 115-9002 B00041P 042.08

BACKGROUND

In June 2001 a contract was awarded for the experimental cleaning and painting of the KY 9002 Bridge over Chaplin River in Washington County. These bridges are continuous welded plate girders with three spans of 94.5 ft, 124.5 ft and 94.5 ft. There is approximately 35,000 ft^2 of steel surface per bridge. Five bids were submitted for this project ranging from the low bid of $174,200 to the high bid of $510,200. The contract award was for a lump sum of $174,200.

The existing coating included a lead primer and one coat of nonleafing aluminum topcoat.

SPECIAL NOTES

The contract for this project included Special Notes for:

- Surface Preparation And Paint Application,
- Paint,
- Quality Control,
- Environmental And Worker Safety Regulations,
- Pre-bid Review,
- Project Monitoring

In addition to the listed Special Notes the contract required that all work be done in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Section 614 Maintenance Cleaning and Painting Steel Bridges.

The Special Note for surface preparation and paint application required total enclosure of the structural steel during all phases of the work. Containment that met the criteria for SSPC Guide 6 – Classification Class 2W was to be used.

All pack rust was to be removed from all structural steel prior to hand-tool cleaning.

Washing Specifications

The contract required that all structural steel be cleaned by pressure washing. The steel was washed at a minimum of 4,500 psi with a spray fan tip with a maximum 30° fan. Additional cleaning (i.e., solvent, steam, or hand cleaning) were required if pressure washing did not sufficiently clean the steel.

Cleaning Specifications

The contractor was required to perform mechanical surface preparation on all surfaces not possessing clean, adherent paint. Clean those surfaces to correspond with visual standards set forth in the Steel Structures Painting Council SSPC VIS-3. For this project, SSPC VIS3-SP3 surface condition should have been present at time of painting.

Painting Specifications

Painting of the bridge consisted of one coat. A full coat of Sherwin Williams Towerguard was to be applied by brushing, rolling or spraying at 8.0 to 10.0 mils dry film thickness (DFT).

OBSERVATIONS DURING PROJECT

The painting contractor moved on site November of 2001. No test patch was done on this bridge.

During the project there were some minor problems that the contractor needed to correct. These problems occurred during the painting of the steel and consisted of holidays and light spots in the top coat. Once these problems were solved the contactor proceeded toward the completion of the project.

FINAL INSPECTION REPORT

Comments from final inspection report were as follows: "Portions of the structure have holidays and light spots in the topcoat, particularly around the bolt patterns, which will need to be corrected with application of the topcoat paint to proper millage. The top of most and the ends of the angle steel on the diaphragms had holidays or light spots. Touch up of lifts and small cracks will be required. This touch up can be done by scraping off the lifts and reapplying topcoat. Rigging removal touch up work and stenciling of the appropriate information is also needed. The work area must be cleaned and all debris and waste removed from site."

After the corrective work was finished, the project was accepted as complete.

SUMMARY

The Special Notes and Standard Specifications were followed throughout the cleaning and painting of bridges B00041N & B00041P. Most areas indicate that SP3 was obtained during cleaning of the bridges. Both coats of paint were applied to meet the specifications of this project. All work inspected was completed within conformance of the Standard Specifications and Special Notes applicable to this project.

Figure 79. View of KY 9002 Bridge in Washington County before painting.

Figure 80. General condition of the bridges on KY 9002 in Washington County before painting.

Figure 81. View of KY 9002 Bridge in Washington County after painting.

Figure 82. View of under side of KY 9002 Bridge in Washington County after painting.