



Guide for Application of Coating Systems With Zinc-Rich Primers to Steel Bridges

AASHTO/NSBA Steel Bridge Collaboration
SSPC: The Society for Protective Coatings



Document Sharing Hub

Preface

This document is a standard developed by the AASHTO/NSBA Steel Bridge Collaboration and SSPC: The Society for Protective Coatings. The primary goal of the Collaboration is to achieve steel bridge design and construction of the highest quality and value through standardization of the design, fabrication, and erection processes. The mission of the SSPC is to advance the technology and promote the use of protective coatings to preserve industrial, marine and commercial structures, components and substrates. Each standard represents the consensus of a diverse group of professionals.

As consensus documents, the Collaboration standards represent the best available current approach to the processes they cover. It is intended that Owners adopt and implement Collaboration standards in their entirety to facilitate the achievement of standardization. It is understood, however, that local statutes or preferences may prevent full adoption of the document. In such cases Owners should adopt these documents with the exceptions they feel are necessary.

This document establishes and defines the functions, operations, requirements, and activities needed to achieve consistent quality in steel bridge painting. It is based on a cooperative approach to achieving quality, where both the Owner's and Contractor's representatives work together with a clear understanding of their roles and responsibilities, resulting in steel bridges completed in an efficient manner while meeting all contractual requirements. Its acceptance does not in any respect preclude anyone, whether he has adopted the standard or not, from manufacturing, marketing, purchasing, or using products or procedures not addressed in this standard.

Copyright © 2006 by National Steel Bridge Alliance. All rights reserved.

Disclaimer

All data, specifications, suggested practices presented herein, are based on the best available information and delineated in accordance with recognized professional engineering principles and practices, and are published for general information only. Procedures and products, suggested or discussed, should not be used without first securing competent advice respecting their suitability for any given application.

Publication of the material herein is not to be construed as a warranty on the part of the American Association of State Highway and Transportation Officials (AASHTO), the National Steel Bridge Alliance (NSBA) or SSPC: The Society for Protective Coatings - or that of any person named herein - that these data and suggested practices are suitable for any general or particular use, or of freedom from infringement on any patent or patents. Further, any use of these data or suggested practices can only be made with the understanding that neither AASHTO, NSBA nor SSPC makes any warranty of any kind respecting such use and the user assumes all liability arising therefrom.

AASHTO Document No: NSBAACS-1-OL

AASHTO EXECUTIVE COMMITTEE 2006–2007

Voting Members

Officers:

President: Victor M. Mendez, Arizona

Vice President: Pete K. Rahn, Missouri

Secretary-Treasurer: Carlos Braceras, Utah

Regional Representatives:

REGION I: Allen Biehler, Pennsylvania, One-Year Term
David Cole, Maine, Two-Year Term

REGION II: Joe McInnes, Alabama, One-Year Term
Stephanie Kopelousos, Florida, Two-Year Term

REGION III: Carol Molnau, Minnesota, One-Year Term
Debra L. Miller, Kansas, Two-Year Term

REGION IV: Victor M. Mendez, Arizona, One-Year Term
vacant, Two-Year Term

Nonvoting Members

Immediate Past President: Harold E. Linnenkohl, Georgia

AASHTO Executive Director: John Horsley, Washington, DC

AASHTO HIGHWAY SUBCOMMITTEE ON BRIDGES AND STRUCTURES 2006

Malcolm T. Kerley, Virginia *Chair*

James A. Moore, New Hampshire *Vice Chair*

M. Myint Lwin, Federal Highway Administration, *Secretary*

Firas I. Sheikh Ibrahim, Federal Highway Administration, *Assistant Secretary*

ALABAMA, William F. Conway, John F. Black,
George H. Connor

ALASKA, Richard A. Pratt

ARIZONA, Jean A. Nehme

ARKANSAS, Phil Brand

CALIFORNIA, Kevin Thompson, Susan Hida, Barton
Newton

COLORADO, Mark A. Leonard, Michael G. Salamon

CONNECTICUT, Gary J. Abramowicz, Julie F.
Georges

DELAWARE, Jiten K. Soneji, Barry A. Benton

DISTRICT OF COLUMBIA, Donald Cooney

FLORIDA, William N. Nickas, Marcus Ansley, Andre
Pavlov

GEORGIA, Paul V. Liles, Jr., Brian Summers

HAWAII, Paul T. Santo

IDAHO, Matthew M. Farrar

ILLINOIS, Ralph E. Anderson, Thomas J. Domagalski

INDIANA, Anne M. Rearick

IOWA, Norman L. McDonald

KANSAS, Kenneth F. Hurst, James J. Brennan, Loren
R. Risch

KENTUCKY, Allen Frank

LOUISIANA, Hossein Ghara, Tony M. Ducote

MAINE, James E. Tukey, Jeffrey S. Folsom

MARYLAND, Earle S. Freedman, Robert J. Healy

MASSACHUSETTS, Alexander K. Bardow

MICHIGAN, Steve P. Beck, Raja T. Jildeh

MINNESOTA, Daniel L. Dorgan, Kevin Western

MISSISSIPPI, Mitchell K. Carr, B. Keith Carr

MISSOURI, Shyam Gupta, Paul Kelly, Paul Porter

MONTANA, Kent M. Barnes

NEBRASKA, Lyman D. Freemon, Mark Ahlman,
Hussam Fallaha

NEVADA, William C. Crawford, Jr.

NEW HAMPSHIRE, James A. Moore, Mark W.
Richardson, David L. Scott

NEW JERSEY, Harry A. Capers, Jr., Richard W.
Dunne

NEW MEXICO, Jimmy D. Camp

NEW YORK, George A. Christian, Donald F. Dwyer,
Arthur P. Yannotti

NORTH CAROLINA, Greg R. Perfetti

NORTH DAKOTA, Terrence R. Udland

OHIO, Timothy J. Keller, Jawdat Siddiqi

OKLAHOMA, Robert J. Rusch, Gregory D. Allen

OREGON, Bruce V. Johnson

PENNSYLVANIA, Thomas P. Macioce, Harold C.
Rogers, Jr.

PUERTO RICO, Jaime Cabré

RHODE ISLAND, David Fish

SOUTH CAROLINA, Barry W. Bowers, Jeff
Sizemore

SOUTH DAKOTA, John C. Cole

TENNESSEE, Edward P. Wasserman

TEXAS, William R. Cox, David P. Hohmann, Ronald
D. Medlock

U.S. DOT, M. Myint Lwin, Firas I. Sheikh Ibrahim,
Hala Elgaaly

UTAH, Todd Jensen

VERMONT, William Michael Hedges

VIRGINIA, George M. Clendenin, Prasad L.
Nallapaneni, Julius F. J. Volgyi, Jr.

WASHINGTON, Jugesh Kapur, Tony M. Allen, Bijan
Khaleghi

WEST VIRGINIA, Gregory Bailey, James W. Sothen

WISCONSIN, Finn Hubbard

WYOMING, Gregg C. Fredrick, Keith R. Fulton

ALBERTA, Tom Loo

NEW BRUNSWICK, Doug Noble

NOVA SCOTIA, Mark Pertus

ONTARIO, Bala Tharmabala

SASKATCHEWAN, Howard Yea

GOLDEN GATE BRIDGE, Kary H. Witt

N.J. TURNPIKE AUTHORITY, Richard J. Raczynski

N.Y. STATE BRIDGE AUTHORITY, William J.
Moreau

PENN. TURNPIKE COMMISSION, Gary L.
Graham

**SURFACE DEPLOYMENT AND DISTRIBUTION
COMMAND TRANSPORTATION**

ENGINEERING AGENCY, Robert D. Franz

U.S. ARMY CORPS OF ENGINEERS -

DEPARTMENT OF THE ARMY, Paul C. T. Tan

U.S. COAST GUARD, Nick E. Mpras, Jacob Patnaik

U.S. DEPARTMENT OF AGRICULTURE -

FOREST SERVICE, Rosana Barkawi

Table of Contents

Introduction.....	1
Section 1 Definitions	2
1.1 Applicator (“Shop”).....	2
1.2 Breaking the Corner (Corner Chamfering).....	2
1.3 Checking.....	2
1.4 Conformance Certification.....	2
1.5 Corner	3
1.6 Edge	3
1.7 Edge Grinding (Edge Conditioning).....	3
1.8 Fastener.....	3
1.9 Faying Surfaces	3
1.10 Limited Access Areas	3
1.11 Mud Cracking	4
1.12 Qualified Product.....	4
1.13 Sharp.....	4
1.14 Spot Priming	4
1.15 Stripe Coat	4
1.16 Visible Coating Defects	4
1.17 Weld Spatter, Tight.....	4
Section 2 Reference Standards	5
2.1 American Association of State Highway and Transportation Officials (AASHTO).....	5
2.2 American Society for Testing and Materials (ASTM).....	5
2.3 SSPC: The Society for Protective Coatings.....	5
2.4 Research Council on Structural Connections (RCSC).....	6
2.5 American Institute for Steel Construction (AISC).....	6
2.6 Related Reference Documents	6
Section 3 General.....	7
3.1 Qualification	7
3.2 Quality Control	7
3.3 Written Procedures	7
3.4 Miscellaneous	7
3.5 Protective Coating System.....	8
3.6 Coating Repairs.....	8
3.7 Paint Storage.....	9
3.8 Steel Storage After Painting	9
3.9 Final Acceptance.....	9
Section 4 Material Acceptance	10
4.1 Paint.....	10
4.2 Abrasive Media Condition.....	10

Guide Specification for Application of Coating Systems with Zinc-Rich Primers to Steel Bridges

Section 5 Surface Preparation..... 11

5.1 Material Anomalies..... 11

5.2 Pre-Cleaning 11

5.3 Abrasive Blast Cleaning 12

5.4 Bolts (Fasteners).. 12

Section 6 Paint Application 15

6.1 General..... 15

6.2 Coatings on Faying Surfaces 16

6.3 Intermediate and Topcoat 16

Introduction

This guide represents a consensus on best industry practice for shop application of zinc rich primers to previously uncoated bridge steel and includes the proper preparation of the steel surfaces and the mixing, application, and cure of coatings. To simplify the application parameters for a system based on zinc-rich primers on new steel bridges, a series of charts have been developed. These charts provide a convenient summary listing the detailed requirements for surface preparation, environmental conditions, coating application, curing, and verification testing. The guide addresses a three-coat system consisting of primer, intermediate coat, and topcoat, but is appropriate for application of a two-coat system or primer only.

Environmental, containment, and safety issues referenced herein are outside the scope of this guide and should be addressed in other documents.

This guide uses mandatory (imperative) language to assist owners and specifiers with development of contract language.

Section 1 Definitions

1.1 Applicator ("Shop")

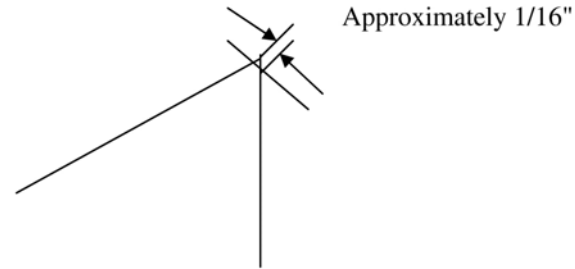
Person or contractor who applies a coating.

1.2 Breaking the Corner (Corner Chamfering)

A process by which a sharp corner is flattened by passing a grinder or other suitable device along the corner, normally in a single pass.

Commentary:

The breaking (flattening) of a sharp corner is sketched below:



Care should be taken to ensure that no new sharp edges are raised by the grinding.

Extensive testing has proven shop grinding of corners is unnecessary for improving coating coverage and corrosion protection when using ethyl silicate inorganic zinc-rich primer systems with minimum zinc loading of 83%. Limited testing has also shown that while organic zinc-rich materials sometimes tend to draw thin on square corners, they cover well on corners that are merely flattened ("breaking the edge"). Therefore, when organic zinc-rich materials are applied to corners that have been "cut" (sawed, burned, or sheared), the corners must either be "broken" or stripe coated per SSPC-PA 1, Section 6.6, "Striping."

1.3 Checking

The fine cracking that develops in paint films during prolonged curing and/or weathering that does not penetrate to the underlying surface. ASTM D 660 is the "Standard Test Method for Evaluating Degree of Checking of Exterior Paints."

1.4 Conformance Certification

A verification issued by the coating manufacturer confirming that a particular batch of product was produced in accordance with the

manufacturer's standard. This standard of performance for the product must have previously been approved or accepted by the Owner.

1.5 Corner

The intersection of two surfaces.

1.6 Edge

An exposed, through-thickness surface of a plate or rolled shape, for example the as-rolled side face of a beam flange, channel flange or angle leg, or as a result of thermal cutting, sawing, or shearing. Edges may be planar or rounded, and either perpendicular or skewed to adjacent faces.

1.7 Edge Grinding (Edge Conditioning)

Very shallow grinding or other pre-blast cleaning preparation of thermal cut edges (TCEs) to remove a thin, hardened layer left by resolidification. It does not include grinding required by the D1.5 Bridge Welding Code or ASTM A 6 to remove cutting, handling or material anomalies.

Commentary:

Edge grinding can be used to remove martensite, a hardened form of steel that may occur due to rapid resolidification following thermal cutting. This layer is typically very thin, about 0.01" to 0.02" (0.25 to 0.50 mm) thick, and is dependent upon the steel's chemistry and thickness. Light grinding is generally sufficient to remove this material, and is only necessary if the hardness interferes with achieving the desired profile during blast cleaning. The presence of martensite and/or the small grooves normally left by thermal cutting are not a fatigue or stress concentration problem.

1.8 Fastener

A mechanical device used to attach two or more items together; e.g., a bolt, nut and washer.

1.9 Faying Surfaces

Contacting surfaces where joints in steel structures are fastened together, formed, for example, by fastening devices.

1.10 Limited Access Areas

Partially or completely enclosed surfaces, the majority of which are not visible without the use of special devices such as mirrors, and not readily accessible for coating by routine methods.