



# USE AND INSTALLATION Of Epoxy-Coated Reinforcing Bars



**Epoxy-coated reinforcing steel has been used during the past 37 years to reduce the amount of expensive and disruptive repairs to concrete structures caused by corrosion. These bars represent 10 – 15 percent of all steel reinforcing and proper use and handling of these bars during the construction process will optimize the corrosion-free life of concrete structures. In addition, efficient handling will reduce the amount of costly touch-up work required prior to concrete placement. This document outlines use, handling and repair of epoxy-coated bars during the installation process.**

## INTRODUCTION

Epoxy-coated reinforcing (ECR) steel was first used in 1973 on the Schuylkill Bridge near Philadelphia, Pa., as a method to reduce the corrosion damage to bridge structures. Since then, the material has been used in over 65,000 bridges nationwide covering an area of 700,000,000 sq. ft. Structures built with ECR have longer lives than structures built with black steel.

Epoxy-coated reinforcing steel can be used almost anywhere corrosion may cause damage. While the product is most commonly used on bridges, it can also be used in continuous reinforced concrete pavement, parking garages, piers and docks, water towers, columns and parapets.

As with any material used on the job site, appropriate handling of the epoxy-coated reinforcing steel is required. These steps are essential for reducing damage to the bars that would reduce the effectiveness of the coating to perform and provide long-term corrosion protection.

## MANUFACTURE

The manufacture of the majority of epoxy-coated reinforcing steel is covered in **ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars**. This specification requires that suppliers of coated bars take steps to properly prepare the bars prior to coating, that contaminants are not present, and that the coatings are fully cross-linked and bonded to the bar.

The product may also be manufactured to **ASTM A884 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement** or **ASTM A934 Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars**.



Photos (above and right) courtesy of FIGG, photographer Tim Davis.



# JOB SITE HANDLING

**Fabrication and Handling of Epoxy-Coated Steel Reinforcement** is covered in **ASTM D3962** *Standard Specification for Fabrication and Job Site Handling of Epoxy-Coated Steel Reinforcing Bars*. Job site handling is also covered in the Appendices of **ASTM A775** and **ASTM A934** and is described below.



## Storage

- Store bar bundles on suitable material, such as timber cribbing.
- Space the timber cribbing to minimize sagging.
- If the bars are to be exposed outdoors for more than 30 days, they should be covered with a suitable opaque material that minimizes condensation.
- Store coated and uncoated bars separately.



## Cutting

- Power shears or chop saws should be used to cut bars.
- **DO NOT** flame cut bars.



## Loading and Securing

- Secure the load using nylon or protective strapping that is padded.



## Lifting

- Bars should be lifted using a spreader bar or strongback with multiple pick-up points to minimize sag that may cause coating damage.
- Nylon or padded slings should be used to lift bars.
- **DO NOT** use bare chains or cables to lift bars.
- Unload as close as possible to the point of concrete placement.

## Bar Supports & Tie Wire

- Use bar supports coated with non-conductive material or plastic bar supports.
- Use coated tie wire.



## Bar Placement

- Lift and set bars into place.
- **DO NOT** drag bars.
- Bars with more than 2% damage may be rejected.



## Field Repair Patching

- Inspect bars after bending and repair any cracks with patching material.
- All damage (cut ends, cracks and abrasions) should be patched.
- Use a two-part epoxy repair material, approved by the coating manufacturer. (Follow manufacturer's directions.)
- Bars with more than 5% patching may be rejected.



## Traffic

- Minimize traffic over placed bars.

## Concrete Placement

- Avoid traffic and concrete hoses on placed Epoxy-Coated Steel Reinforcing Bars.
- Consider runway if necessary.

## Concrete Vibration

- Use plastic headed vibrator to consolidate concrete.



## CERTIFICATION AND QUALITY

In 1991, CRSI (Concrete Reinforcing Steel Institute) initiated a voluntary certification program for the manufacture of Epoxy-Coated Steel Reinforcing Bars. This program significantly improved product quality.

Developed to provide an independent certification, the program outlines the basic requirements for a quality control program to ensure that a plant and its employees are trained, equipped and capable of producing fusion bonded Epoxy-Coated Steel Reinforcing Bars in conformance with the latest industry standards and recommendations. The Program certifies the manufacturing process and is not a guarantee of product quality. It is intended to supplement, not to replace the acceptance testing of materials. Many State Departments of Transportation require that bars are manufactured under this CRSI certification program.

The purpose of the voluntary certification program is:

- To ensure that coating applicator plants have the capabilities and quality control procedures in place to ensure a high level of excellence in materials produced and delivered to the job site.
- To assist plant management in achieving a high level of excellence in the plant and its operations.
- To provide recognition to plants which demonstrate a high degree of excellence.



CERTIFIED PLANT

## HISTORY

### The Epoxy Interest Group

Since 1973, the use of epoxy-coated reinforcing bars has continued to grow. In response to this growth, in 1982 the industry formed the Fusion Bonded Coaters Association (FBCA) in 1982. FBCA published the first edition of Anti-Corrosion Times in August 1983.

In 1985, the FBCA merged with the Concrete Reinforcing Steel Institute (CRSI). Founded in 1924, CRSI stands as the authoritative resource for information related to steel reinforced concrete construction. CRSI members are manufacturers, fabricators and placers of steel reinforcing bar and related products, as well as professionals who are involved in the research, design and construction of reinforced concrete.

In March 2008, a new group was formed within CRSI. The Epoxy Interest Group (EIG) of CRSI operates within the charter of CRSI, but promotes and markets epoxy-coated bars and is able to create awareness and interest in epoxy-coated reinforcing steel and its important benefits for transportation agencies, engineering specifiers and contractors.

### Our Mission

To promote the use and advance the quality of Epoxy-Coated Steel Reinforcing Bars.

## BENEFITS

### Epoxy-Coated Steel Reinforcing Bars

- Excellent Corrosion Protection.
- More than 37 Years of Experience.
- Extended Service Life.
- Cost Effective Life-Cycle.
- Nationwide Availability.
- CRSI Certified Plants.
- Sustainable.

