

ANTI-CORROSION TIMES

REPORTING ON INDUSTRY NEWS, NOTEWORTHY APPLICATIONS & NEW DEVELOPMENTS ON FUSION BONDED EPOXY COATINGS FOR CORROSION PROTECTION OF REINFORCING STEEL

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Steel Specialties of Jackson, Mississippi produced the special epoxy-coated spirals.

ANTI-CORROSION TIMES

is a publication of the Concrete Reinforcing Steel Institute, a not-for-profit trade association providing valuable resources for the design and construction of quality cast-in-place reinforced concrete. Published biannually, the Anti-Corrosion Times is produced to help specifiers, engineers, architects, fabricators and end-users receive the most recent information about how and where epoxy-coated reinforcing steel is used, recent technical changes and information resources. Send any questions or comments regarding the Anti-Corrosion Times to John M. Prentice, Manager of Corrosion Protection at CRSI.

▶ New Bridge Under Construction Doubles as Hurricane Evacuation Route

■ Three years to completion

In January of 2001, construction began on a new causeway and bridge across the Cape Fear River near Wilmington, North Carolina.

At a cost of over \$84 million, the bridge was designed to improve hurricane evacuation time from the Outer Banks of North Carolina as an important consideration. Projected to open in December 2004 the 1.5 mile long concrete causeway and bridge contains large portions of cast-in-place reinforced concrete. Pre-cast panels, post-tensioning and prestressed girders are also part of the final structure.

The main span of the bridge is 464 feet long with a total of 60 columns for the

entire structure. However in order to support the 8 foot diameter columns it is necessary to construct four cast-in-place piles and a pile cap for each column. These 4 foot diameter piles are 85-90 feet deep and are also constructed with continuous epoxy-coated reinforcing steel spirals and coated straight bar. Obviously, it is important that the foundation is resistant to corrosion because of the tidal nature of the water being spanned. Because of the location and projected life of the structure, it is necessary to use the highest quality material available. The continuous spirals are manufactured in Jackson, Mississippi; the straight longitudinal epoxy-coated bars in Knoxville, Tennessee.

continued on next page

▶ **New Hurricane Evacuation Bridge . . . continued from page 1**



A cap covers the columns and joins them together. Girders are placed on the capped columns. Pre-cast panels and cast-in-place concrete are used for the bridge deck. Approaches use pre-stressed concrete girders and the main span of the bridge is post-tensioned.

Structurally, the continuous spirals are used to provide the round shape and support for the straight bars. In addition, the process used to manufacture the continuous epoxy-coated spiral is viewed as unique. During the manufacturing process a por-



tion of the 4,000 pound coil of bar is temporarily straightened, cleaned by shot blasting, heated, electrostatically epoxy-coated, cured, quenched, cooled and then bent to the specified diameter. Quality control procedures used for the product throughout manufacturing and delivered to the job site are in accordance with the CRSI program. This manufacturer is one of the newest members of the voluntary CRSI Epoxy Coating Plant Certification Program. As of May 2002, more than twenty-four truckloads of spirals were delivered to this project. This bridge deck used 7,250 tons of epoxy-coated rebar; 2,576 tons of epoxy-coated rebar were used in the substructure along with 25,562 cubic yards of concrete. ♦



Owner

North Carolina
Department of Transportation

Epoxy Coating & Fabrication

Steel Specialties of Mississippi,
Jackson, MS
Ameristeel,
Knoxville, TN

Contractor

GFL Construction Corporation

▶ **CRSI Epoxy Coating Plant Certification Continues to Grow**

Since its inception over ten years ago, the voluntary Epoxy Coating Plant Certification Program has grown to include most epoxy coating manufacturing plants in the U.S. and Canada.

Scott Humphreys, Certification Program Administrator at CRSI and John Prentice, Manager of Corrosion Protection at CRSI, announced in early 2002 the addition of five new member plants.

Interest in the voluntary program continues to grow because many state and province transportation agencies only use material manufactured by certified plants. In addition, the program has helped raise the product quality standard. This has resulted in an improved product that is the preferred choice to combat corrosion of steel reinforcement.

Epoxy-coated steel reinforcing bar was originally used for bridge decks where heavy use of de-icing salts is the norm. In recent years it has been specified for many other uses, in a variety of projects where concrete is exposed to the elements.

The certification program continues to change as the industry changes. Manufacturing improvements have led to stricter AASHTO and ASTM specifications with these guidelines becoming the norm. Overseen by an independent inspection agency, the pro-

The five newest members of the CRSI Epoxy Coating Plant Certification Program.

American Highway Technology
Riverbank, California

Rebar Coating and Fabrication
Dupont, Colorado

Toltec Steel Services, Inc.
Kankakee, Illinois

ABC Coating of Minnesota
Roseville, Minnesota

Steel Specialties of Mississippi
Jackson, Mississippi

gram has helped the epoxy coating industry reach new levels of quality and consistency.

For a complete list of CRSI Certified Epoxy Coating Plants, contact Scott Humphreys at CRSI or go to the CRSI website at www.crsi.org/epoxy. ♦



► ***The San Mateo Bridge: largest epoxy-coated rebar project ever completed in California***

The California Department of Transportation (CALTRANS) is in the midst of an aggressive program of bridge/tunnel construction and seismic retrofit work in the San Francisco Bay Area. These projects include: the San Mateo Bridge, which is featured in this article, as well as, New and Old Benicia Bridge, New and Old Carquinez Bridge, Bay Bridge, Posey Tunnel, Sonoma Creek Bridge, and Richmond-San Rafael Bridge. These projects all require epoxy-coated reinforcing steel to increase the service life of these structures.

■ **Heavy traffic volume increases**

The San Mateo Bridge was the longest bridge in the world when it was completed in 1929, as a two-lane bridge with just a 35 ft. elevation. A 1967 expansion of the bridge added another lane to each side. Throughout the '80's and '90's, traffic volume on the San Mateo Bridge grew to an average of 72,000 vehicles per day. By 2010, it is estimated that the daily

volume will be 95,000 vehicles. To handle this volume, CALTRANS began a construction project in 2000 to build a new parallel bridge on the north side of the existing bridge to serve the westbound traffic with three lanes and shoulders. The existing structure will be widened to three lanes and shoulders as well, and be used to serve the eastbound traffic. Upon completion the final structures will then provide a total of six (6) lanes. CALTRANS' goal is a 100-year life span for the new parallel bridge. This enormous project will take 2 ½ years to complete.

■ **Tons of epoxy-coated rebar**

The San Mateo Bridge project is the largest epoxy-coating project ever bid in California and needs approximately 27,000,000 pounds of epoxy-coated steel reinforcing bars meeting the ASTM A934 specification. Reinforcing steel bars coated to this specification are coated after fabrication, unlike the more common A775 specification, which applies to bars

coated before fabrication.

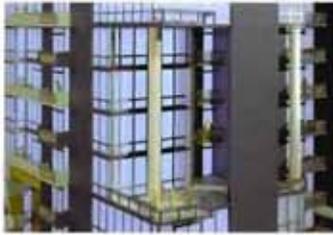
The four primary components: piles, girders, bent caps and deck slabs will utilize steel reinforcing bars. Pilings for the bridge are driven 20 feet into the ground in the shallow water of the San Francisco Bay. Bent (end) caps span a pair of pilings, girders rest on the bent caps and deck plates form the driving surface.

■ **Additional Benefits**

Work on the San Mateo Bridge began in January 2000. At a cost of \$190 million the project included widening the bridge, including a new span, the addition of a lane and two emergency shoulders in each direction. This will improve the flow of traffic on a bridge that has become increasingly important in the area's economy because of its proximity to several key cities and airports

In addition, the approaches and the high-rise portion of the existing bridge will undergo renovations to improve the struc-

continued on next page



Parking garage, balconies and terraces, all areas exposed to weather and de-icing salts, were specified with epoxy-coated reinforcement to extend service life.

▶ **Multi-Use Condo Building in Chicago Specified Epoxy-Coated Rebar**

Cast-in-place reinforced concrete was the material of choice when designing the new 39-story luxury condominium development in downtown Chicago. This multi-use building includes two hundred and thirty-seven, 1 to 3 bedroom luxury condos, retail space and a five story parking facility. Construction began in June 2001; completion is slated for November 2002.

Chosen for its durability and strength, this reinforced concrete structure used a total of 940 tons of epoxy-coated rebar in the parking garage, balconies and terraces.

The parking garage footprint equals two city blocks. Seven hundred parking spaces are planned for five levels with one level below ground. Condos have balconies; units on the 36th floor have a terrace. As the name implies, there is a skybridge on floors 14 thru 37 connecting the

two towers. Elevators are only in one tower; access to the other tower is across the skybridge.

Epoxy-coated rebar was chosen for all areas exposed to de-icing salts and outside elements to prolong service life and minimize maintenance. ♦

- Owner**
One North LLC, Chicago, IL
- Contractor**
Walsh Construction,
Chicago, IL
- Epoxy-Coater**
Toltec Steel Services, Inc.,
Kankakee, IL
- Architect**
Ralph Johnson,
Perkins & Will, Chicago, IL



▶ **San Mateo Bridge** ... continued from page 3

ture's ability to resist the effects of an earthquake. The new bridge will be built to be earthquake resistant.

In order to complete this project on time the coater, the contractor and CALTRANS put together an efficient program that is working well for everyone. ♦

- Owner**
California Department of
Transportation (CALTRANS)
- Contractor**
Beatty Construction, Inc.,
San Mateo, CA
- Pre-Cast Contractor**
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Petaluma, CA
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