ANTI-CORROSION TIMES

REPORTING ON INDUSTY NEWS, NOTEWORTHY APPLICATIONS & NEW DEVELOPMENTS ON FUSION BONDED EPOXY COATINGS FOR CORROSION PROTECTION ON STEEL REBAR.

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CRSI Epoxy Certification Program a proven success

Developed over a 2-year period by the CRSI Epoxy Coating Technical Committee and instituted in 1991, this Epoxy Coating Plant Certification Program benefits both the epoxy coating industry and end users. It's designed to establish a high level of quality in the manufacturing of epoxy coated reinforcing steel bars and provide an independent certification of the plant and its personnel.

The CRSI Fusion Bonded Epoxy Coating Applicator Plant Certification Program is voluntary and open to all plants that apply fusion bonded epoxy coatings to reinforcing bars.

Independent Inspection

Certification is established and maintained through a qualified independent testing agency. Inspections are currently performed by Wiss, Janney, Elstner Associates (WJE) of Northbrook, Illinois.

Stringent Standards

The program defines and outlines the necessary training, equipment and product specifications that ensure the final epoxy-coated product conforms with the latest industry standards and recommendations. Overall, the program enhances an owner's acceptance testing but does not replace it. It acts as a valuable supplement to standard specifications and strives to develop a consistent quality level, often exceeding minimum acceptance levels. The program is not a product guarantee.

Specific procedures and related technical criteria are the basis of the CRSI Epoxy Coating Plant Certification Program. Areas evaluated for certification include:

1. Quality control policies and procedures, including plant requirements and inspector guidelines;
2. Handling and storage of uncoated and coated reinforcing steel bars;
3. Surface preparation: blast cleaning, anchor profile, abrasive contamination and gradation;
4. Heating of bar surface;
5. Storage and handling of powder: powder temperature, shelf life and powder certification;
6. Powder application: cleaning/ coating application interval, spray application and air supply;
7. Curing;
8. Continuity of coating, holiday testing;
9. Thickness measurement;
10. Adhesion testing including bend tests.

Specific quality criteria are outlined for each of these items in the program.

Acceptance Grows

Since its inception in 1991, approximately two-thirds, (twenty-three) of all North American epoxy coating plants have been certified. In addition, nine state Departments of Transportation now require CRSI Certification for epoxy rebar suppliers. Other state DOTs and specifying agencies have the program under consideration. WJE reports that participating plants have shown a continual and dramatic improvement in quality since the program's implementation. Federal Highway Administration process reviews have noted "significant difference in quality" between certified plants and plants not participating in the program.

Quality Coating = Corrosion Protection

CRSI's successful certification program continues to be refined as continuing new research and technical criteria progresses.

For additional information on plant certification, contact Theodore L. Neff, P.E, Administrator of the program at CRSI.

New series from CRSI . . . two research reports from contributing agencies.

West Virginia DOT Bridge Deck Report now available

This materials inspection report is provided by the West Virginia Department of Transportation Division of Highways. It focuses on West Virginia's initial efforts in the early 1970s to use epoxy-coated reinforcement in bridge decks. During this period, epoxy-coated reinforcement was one of the more popular construction methods used to minimize the corrosion damage incurred in bridges that were previously built with bare or uncoated reinforcing steel.

For this investigative study, a total of 33 bridge decks were monitored and data compiled. Twelve bridges used epoxy-coated reinforcing steel. All outperformed those using plain steel bar by dramatically reducing delamination on bridge decks and increasing the useful life of the decks.

These findings are significant because all thirty-three decks were built at approximatly the same time, in the same area and have similar traffic loads and climatic exposure factors. As a result, a direct comparison of corrosion protection is available after almost 20 years of service.

Contact CRSI for your copy of Research Series-1, Evaluation of Bridge Decks Using Epoxy-Coated Reinforcement.

A field exposure test to evaluate the performance of marine reinforced concrete structures was recently conducted by the Department of the Navy. The test findings were presented at The International Conference on Corrosion and Corrosion Protection of Steel in Concrete at the University of Sheffield, England during July 1994. Prepared by Douglas Burke, at the National Facilities Engineering Service Center (NFESC) the report, *"Performance of Epoxy-Coated Rebar, Galvanized Rebar, and Plain Rebar with Calcium Nitrite in a Marine Environment,"* will be published as a Naval Technical Report.

Navy conducts field test on rebar in marine environment

The tested materials, epoxy-coated rebar, zinc-coated (galvanized) rebar, plain uncoated rebar and plain rebar coated with calcium nitrite were evaluated concurrently in a field exposure program in Key West, Florida.

The specimens, 6 inches (15cm) in diameter by 24 inches (60cm) in length, were suspended in a marine intertidal zone for 76 months. During the 76-month exposure period, the test site was visited four times. Barrier coatings of the epoxy-coated rebar were undamaged to maximize performance. Calcium nitrite admixture was used in combination with plain rebar. It was also tested as a pretreatment for plain rebar. Damage-free epoxy-coated rebar performed better than all others, followed by galvanized rebar, plain rebar with calcium nitrite admixture, plain rebar and lastly plain rebar with the calcium nitrite pretreatment.

In the '70s, epoxy powders for fusion-bonded epoxy-coated steel reinforcement were targeted for the top deck of salted bridges in cold climates. In time, its use expanded to include marine structures in subtropical climates. A marine environment is one of the most severe exposures. Once corrosion begins, the rate of corrosion in subtropical temperatures is much greater than colder regions.

To be fully effective, epoxy coating must have minimal damage. The six specimens used exceeded the ASTM specification A 775 and typical construction practices:

1) they contained no visible damage

2) the rebar was protected from unnecessary exposure to weather, salt spray and sunlight prior to use and the coating was not damaged when the rebar was placed into the concrete

3) post-fabricated rebar not used.

continued on page 4.

Alsea Bay Bridge

The Alsea Bay Bridge in Waldport, Oregon was erected in 1936. Over the years the bridge had deteriorated from the salt air and salt water. It also had substandard traffic widths and insufficient load carrying capacity. The original landmark bridge reflected the charm and scenic beauty of its seaside surroundings. The new design had to match this charm.

Concrete construction using epoxy-coated reinforcing was chosen because it allowed the engineers to meet the challenges of construction—aesthetics complimentary to the region, sensitive marine environmental issues and exceptional corrosion protection. Concrete also proved to be the most economical construction method.

The design versatility of concrete permitted new components to meet the aesthetic requirements dictated by the historic tied arches of the original bridge. Y-shaped pieces created a more contemporary form of the original deck arches. The post tensioned concrete box girder approaches of the new bridge extend to a majestic 450-foot center span arch. The overall length of the concrete deck extends 2910 feet.

To successfully withstand the harsh salt water environment and provide protection against corrosion, 8,400,000 pounds of epoxy-coated rebar were used.

The Alsea Bay Bridge was designed and engineered by HNTB of Bellevue, Washington for the Oregon Department of Transportation. The general contractor was the General Construction Company of Seattle.

2500 tons of epoxy-coated rebar used for tunnel at Salt Lake City Airport

Because of increasing air traffic at the Salt Lake City International Airport, the Airport Authority began construction on a new runway, 16R-34L, in June 1994. To accommodate airport workers, a new employee entrance was necessary. In order to facilitate this vehicular traffic, a tunnel under the runway was planned and is now under construction.

HNTB Architects of Bellevue, Washington reviewed and designed the tunnel project. Including the approach slabs on each end of the structure, the completed tunnel will extend to over 1500 feet long. Cast-in-place reinforced concrete was chosen for the project because of the fast-track completion schedule of 180 days.

The Salt Lake City International Airport is within one mile of the Great Salt Lake shoreline. Due to fluctuating water levels and the high concentration of salt in the earth, the design team wanted the best available protection against corrosion. Cast-in-place concrete was the most cost-effective material for the project and epoxy-coated rebar was specified to ensure the needed protection for the high salt concentration and to extend the life cycle of the tunnel. In excess of 2500 tons of epoxy-coated rebar is required to complete the project.

The anticipated completion date of the project is early 1995. Working to meet the projected dates are the general contractor, Gilbert Western Corporation of Salt Lake City and the subcontractor, Masco, Inc. of Centerville, Utah.

16,000,000 pounds of epoxy-coated rebar used in "Operation Kennedy"

Operation Kennedy

Now in the third and final phase, and projected to be completed on-time on October 31, 1994, the 5-year "Operation Kennedy" is the most ambitious and expensive reconstruction project completed by the Illinois Department of Transportation.

During Phase 3, four outbound lanes and all outbound entrance and exit ramps along 7.5 miles of the Kennedy Expressway are being rebuilt. Construction includes drainage systems, bridge decks and concrete barrier walls.

A new life-saving concrete barrier wall replaces old steel guardrails. The concrete barrier walls provide better "vehicle guiding", lower maintenance cost, guide errant vehicles back on the road and protect drivers from headlight glare.

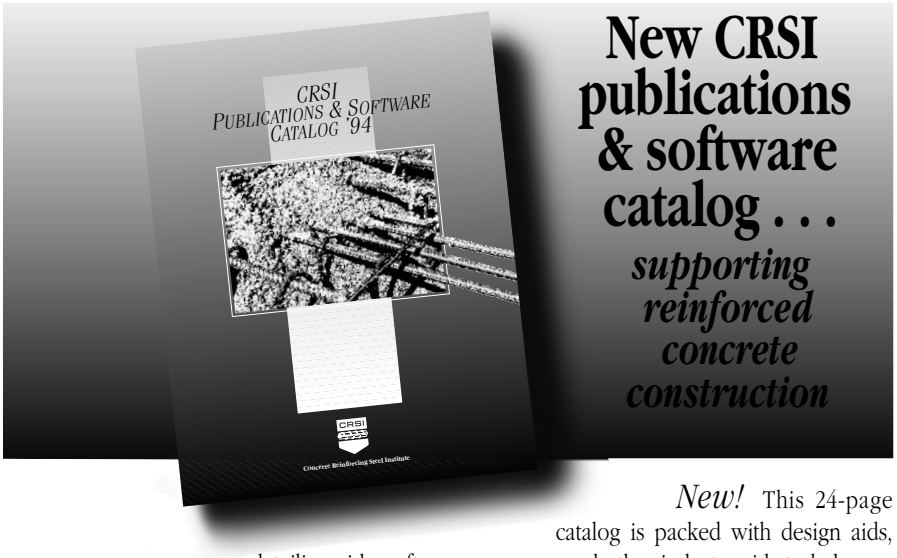
Continuously reinforced concrete pavement allows motorists a smoother, more comfortable ride. Sixteen million pounds of #6 epoxy-coated rebar are being used. Epoxy coating provides the corrosion protection and longer service life to the road's surface.

For more information about this project, contact CRSI and ask for the Fall 1993 Transportation News.

Navy cont.

The study concludes . . . the use of coated or treated rebar extends the performance of concrete by preventing external signs of rebar corrosion compared to concrete with plain rebar.

For complete test findings, contact CRSI for a copy of this report. Also, the article, "Epoxy-Coated Rebar in Marine Concrete," by Douglas F. Burke is in the August-September '94 issue of The Military Engineer.



New! This 24-page catalog is packed with design aids, detailing aids, software programs and other industry aids to help you design and build with reinforced concrete.

Featured are 93 PC software programs for structural engineers from the CRSI software competition collection, the CRSI Handbook in both software and hardbound versions, the Manual of Standard Practice and over 20 additional informative publications and aids. The catalog's order form, toll-free 800 number and fax ordering number allow you to order with ease.

It's FREE! Ask for the CRSI 1994 Publications and Software Catalog.

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