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anti-corrosion times

Reporting on industry news, noteworthy applications and new developments of the fusion bonded coating system for corrosion prevention.

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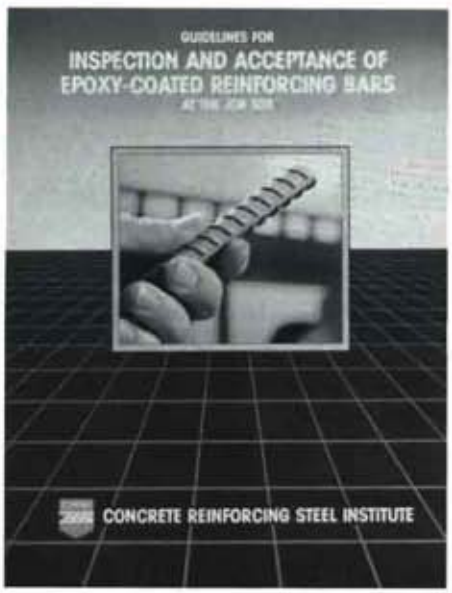
FIELD INSPECTION GUIDE FOR EPOXY-COATED REBARS



This new 12-page, full color illustrated manual serves as a tool for determining the physical condition of the rebar coating, with emphasis on acceptance of the epoxy-coated bars and repair of damaged coating at the jobsite. Color photos and charts clearly define the limits of acceptable damage. Recommended construction practices and tips are provided on the handling, storage, placing, field bending, cutting and splicing of coated rebars.

The manual was developed for use by project engineers, field inspectors, contractors, ironworkers and others involved in the inspection and construction of reinforced concrete structures.

Priced at $8.00 per copy plus shipping, the manual is obtained from the CRSI Distribution Center, P.O. Box 100125, Roswell, GA 30075. For credit card orders, call 1-800-848-0773. In Georgia, 404-442-8631. For further ordering information and a free descriptive brochure, contact Concrete Reinforcing Steel Institute, 933 N. Plum Grove Road, Schaumburg, IL 60173 or call 312-490-1700.

The elegant new 1,620 room Chicago Hilton and Towers after total modernization and addition of parking/fitness center facility (not shown).

State-of-the-art-garage for Chicago's rehabbed Hilton sports roof-top fitness center

Epoxy-coated rebar specified to defy city's tough winters

When Chicago's huge Hilton Hotel shut down for $91 million worth of renovation, a new adjoining parking structure had to rise at the same time.

No ordinary garage, this one. The 8-story reinforced concrete structure included an enclosed fitness center and large swimming pool with running track on the roof. Below street level was a new exhibition area for the hotel.

The architect for the renovation and garage, Solomon, Cordwell & Buenz, Chicago and structural engineer, Chris P. Stefhanos & Associates, Oak Lawn, IL had their work cut out for them. This had to be a sound, sensible structure that would defy Chicago's long destructive winters—with their frequent freeze-thaw cycles and heavy usage of deicing salts.

Future corrosion problems could not be tolerated for this multi-use parking structure. To guard against future maintenance costs and inconveniences, the designers specified that Grade 60 reinforcing steel be epoxy coated for ramp and deck construction on all seven parking levels. This entailed only a small premium for long-term corrosion protection.

All concrete was pumped for the 8-story garage.

Street level of the garage. Grade 60 epoxy-coated steel was specified for the parking ramps, and decks on all seven of the parking levels.

Brand new 166-year old lighthouse

Storm destroyed tower rebuilt with epoxy-coated muscle

In 1984, a rubblestone lighthouse that had warned ships away from the windswept dunes of Nantucket Island since 1816, finally gave way to the eroding shoreline and breaking waves of the Atlantic and collapsed into a heap.

The heritage-proud people of this quaint Long Island Sound island didn't want a new tower of fiberglass or other material that would be out of character with this historic setting. With the help of Senator Edward M. Kennedy, Massachusetts, the Coast Guard decided to replicate the original structure.

The structural engineer, Ganteaume & McMullen, Inc., Boston designed the new lighthouse to withstand 130-mile an hour winds and 15-foot breaking waves in the worst possible storm in 500 years. Because the shore is constantly eroding, the Coast Guard expects the ocean to isolate the new tower in 100 years.

The new lighthouse is a reinforced concrete structure using the same rubblestone facing of the original tower for much of the new exterior. The lighthouse tower, a 60-foot high hollow shaft, tapers from 24 feet in diameter to 12 feet. The contractor, Hydro-Dredge Corp., New Bedford, Massachusetts cast the tower in four lifts using a climbing formwork system. With salt water close by on one side, brackish water not far underneath and the constant corrosive attack of salt-laden air, it was naturally prudent to specify epoxy-coated rebar for this vital life-protecting structure. It is sound engineering practice to protect against future corrosion problems by using epoxy-coated reinforcing steel.

Original cobblestone was replaced around slipformed concrete shaft. All rebar is epoxy-coated.

New York City riverfront where garbage barges are loaded.

New York City garbage goes for ocean voyage

Marine transfer stations and concrete loading ramps rehabbed using epoxy-coated rebar

It's a dirty, demanding job; but it has to be done—the dumping of collected New York City garbage into barges for trips far out to sea and disposal.

New York City is rehabilitating its 91st Street and North Shore transfer stations to keep the garbage going. Ramps leading to loading hoppers at the side of the river carry 36 ton loaded garbage trucks over the FDR Drive.

Because of the congested riverfront site, precast concrete box sections are used to form the ramp. The sections measure 50 feet long, 4 feet wide and 27 inches deep. Several of the sections are tied together to form the finished ramp roadway.

It's a tough, corrosive environment—dripping garbage on one hand and saline river water on the other. That 's why consulting engineers, Amman & Whitney, New York City specified that Grade 60 epoxy-coated steel be used for reinforcement. The 50-foot long sections were manufactured under factory controlled conditions at the Blackeslee Prestressed Plant in Branford, Connecticut and trucked 50 miles to the transfer station site.

Doing the job right, the New York City Department of Sanitation can look to long time future service from the new ramps—and a continued, steady flow of garbage to sea.

Hi-tech concrete pavement utilizes hi-tech corrosion protection

There's a new day dawning for concrete highways and streets. Always the most cost effective and lasting, concrete had one big drawback—curing time. It required days after placing before it would carry traffic.

Now, the picture is changing thanks to "Fast Track" concrete pavement. This new development combines the swift, mechanized paving speed provided by slip-form paving machines with a new fast-setting concrete. Amazingly, concrete placed today can be open to traffic tomorrow. Next day service, if you please!

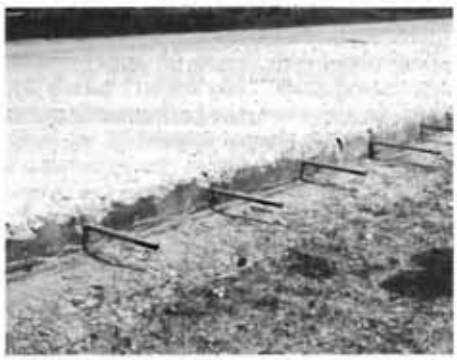
Iowa demonstration project

In July last year, the first full scale "Fast Track" concrete resurfacing on U.S. highway 71 near Storm Lake, Iowa impressed road officials for its successful results. In just 12 hours after placing, concrete reached 2,500 psi in compression—ready for traffic.

Epoxy-coated rebars in picture

Before overlaying old, worn pavement with the fast-setting concrete, certain cracks and joints are reinforced with epoxy-coated rebar. This procedure should prevent reflective cracking of the new concrete. Epoxy coating was also used to coat the tie-bars in the widened sections. Epoxy-coating the reinforcing steel protects it from future corrosion which otherwise could lead to concrete spalling and break up.

Epoxy-coated rebars are recessed into patched joints of old pavement as load transfers and to prevent later cracking in the concrete overlay.



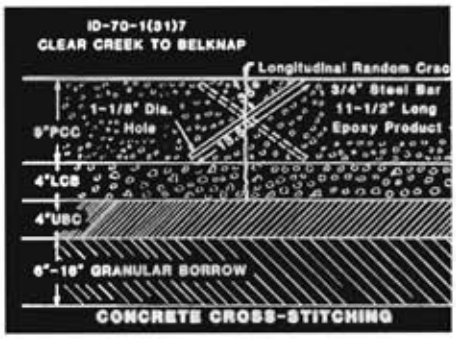
The old pavement was widened at the same time as overlay was put down. To tie the widened section into the old pavement, epoxy-coated rebars were inserted in drilled holes as show.

New A/V presentation on epoxy-coated rebar

An audio/visual presentation covering the subject of "Proper Handling, Storage and Placement of Epoxy-Coated Rebars at the Jobsite" has been produced by Concrete Reinforcing Steel Institute.

Available as sound slide show or VHS video cassette, it discusses and shows how to protect the epoxy-coatings from damage due to accident or excessively rough handling on the job. The presentation shows how small amounts of damage to the coating can be repaired. Color photos illustrate the various degrees of damage that are acceptable when recommended touch-up repairs are made.

Information on the loan or purchase of this CRSI-ECC audio/visual presentation is available from the Concrete Reinforcing Steel Institute, 933 North Plum Grove Road, Schaumburg, IL 60173. Phone: 312/490-1700.



A stitch in time

Improved concrete pavement patching method uses cross stitching with epoxy-coated rebar

Concrete pavement, under certain conditions, may develop cracks. When this occurs, it's important to prevent the cracks or joints from progressing uncontrolled until they cause delaminations and possible pavement failure.

The Utah Department of Transportation has developed a unique new stitching method of interlocking and tieing cracks to prevent separation and also to reinforce cracks.

As the diagram and photo show, reinforcing bars are inserted in holes drilled at 35º angles from alternate sides of the crack 30-inches apart. Epoxy is then poured in the holes and rebars inserted. To prevent future corrosion problems at the repaired cracks, the rebar is epoxy-coated.

See you there. . .

If you're planning on attending any of these meetings and conferences, we'll be there to greet you—and answer any questions you may have about epoxy-coated reinforcing steel. Plan on a visit.

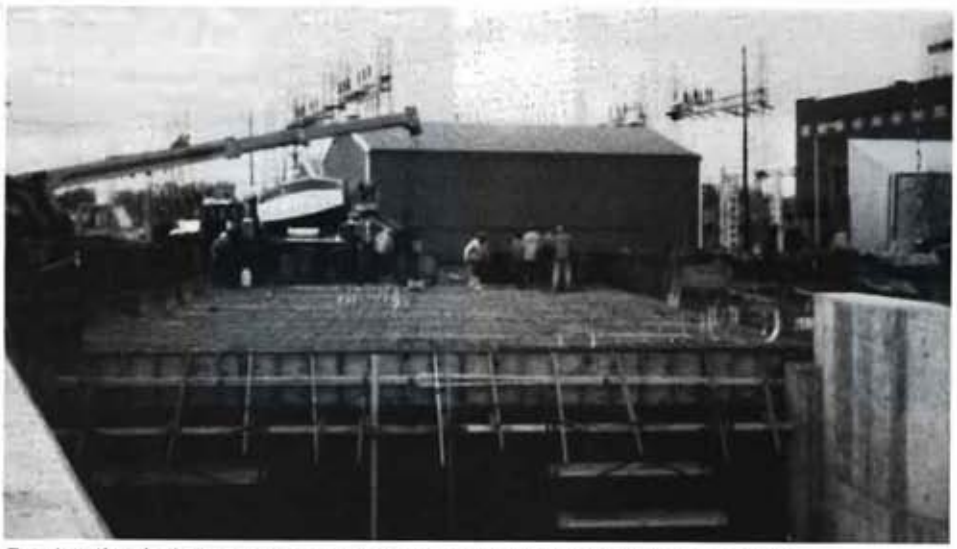
International Bridge Conference, Pittsburgh, PA **June 22-24**

Western Bridge Engineer's Conference, Sacramento, CA **October 6-8**

American Public Works Association APWA), Chicago, IL **September 20-24**

American Society of Civil Engineers, Fall conference, Anaheim, CA **October 26-30**

Polluted runoff water from giant coal pile gets kid-glove treatment



Pouring the deck over the water treatment plant. All rebar is epoxy-coated.

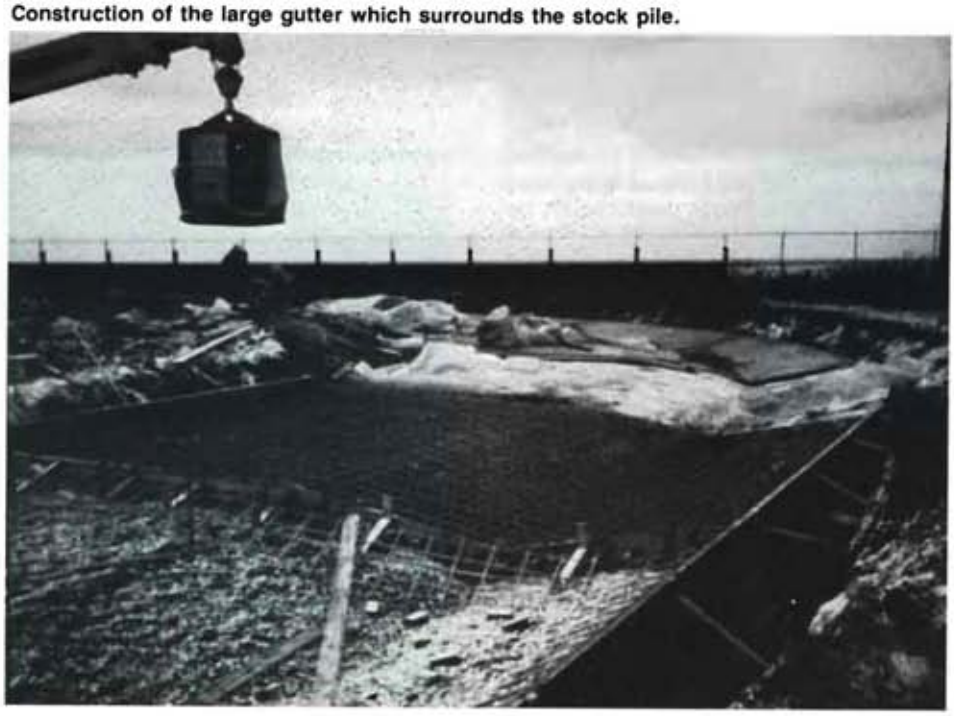
System features epoxy-coating for rebar protection

Just outside of Dunkirk, New York on the shores of Lake Erie, the Niagara Mohawk Power Corp. was expanding its electric power generating capacity. This meant enlarging its coal storage facilities to stockpile greater amounts of the fuel required to fire its steam driven generators.

To prevent rainwater runoff from its mountain of coal that could find its way into Lake Erie, an elaborate water gathering and treatment system was designed by Niagara Mohawk engineers. This involved the construction of wide gutters around the stock pile area. These concrete "roadways" were built with a dip in the center and pitched to feed runoff water into a large concrete water treatment building. Here, a clarifier separates out coal particles in preparation for final treatment and neutralization before the water is discharged into the lake as pure water.

Coal acids, sulphur and other pollutants in the runoff water create a highly corrosive environment for all concrete in the ditch and treatment system. Wisely, the design team specified that all concrete in the gathering gutters and treatment facilities be constructed with Grade 60 epoxy-coated reinforcing steel. They weren't taking any chances with the future performance of this vital pollution-control system.

Construction of the large gutter which surrounds the stock pile.



New TRB report for bridge professionals

Recommends Use of Epoxy-Coating to Reduce and Facilitate Maintenance and Repair of Bridges

The Transportation Research Board recently published a new synthesis report entitled *"Bridge Designs to Reduce and Facilitate Maintenance and Repair."* This report, developed as part of the National Cooperative Highway Research Program (NCHRP), summarizes the state-of-the-art bridge practices and presents information on materials, procedures and methods that will contribute to the design and construction of bridges that are easier to maintain and rehabilitate.

Corrosion protection is a primary concern in order to minimize bridge maintenance, and is one of the principal focuses of the report. The report recommends that all steel components subject to salt intrusion be protected from corrosion to reduce maintenance costs. It goes on to state:

> "Based on present knowledge, the use of epoxy-coated reinforcing steel offers the best and most economical technique to protect concrete from corrosive deterioration. The process of coating the bars has been developed and all states contacted are using epoxy coated bars in bridge decks. Some are specifying only the top layer to be coated, whereas others are requiring all deck steel to be epoxy coated. Protecting all deck steel will prevent corrosion from underneath and will reduce corrosion cells from forming between the steel bars. In addition, all other reinforcing steel exposed to salt intrusion should be epoxy coated. This includes steel in columns, piers, retaining walls, median barriers, and bridge rails."

NCHRP Synthesis 123 addresses many other subject areas as well, and will be of interest to bridge designers, maintenance engineers, and others concerned with selection of materials and design details for bridges. Copies of the report may be obtained from the Transportation Research Board, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

"To reduce concrete deck maintenance, bridge designer should: specify epoxy-coated rebars in decks subjected to salt application. To prevent corrosion cells from forming between top and bottom mats, all reinforcing steel in the deck should be coated. The additional first cost may eliminate high repair costs later." NCHRP Synthesis 123.