



# 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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(Photo by Chattanooga News-Free Press)

## Southern City Sees Green as New Bridge Takes Shape

Residents of Chattanooga, Tennessee have colorful evidence of a first-class new bridge that's going to speed traffic from the city's downtown business center to residential neighborhoods to the north. That is the green epoxy coated reinforcing steel being installed on this span.

This big project, a half mile crossing over the Tennessee river, will provide 8-lanes of smooth, lasting reinforced concrete roadway. The Tennessee Highway Department specified fusion bonded coated rebar for this vital link to provide longest possible service life. Department officials, with the public's interest in mind, opted for the insurance against corrosion-induced deck failures provided by this modern coating system.

## FBCA Meets ASCE At San Francisco

The American Society of Civil Engineers, 10,000 strong, will convene in San Francisco October 1-5. This is a major meeting with an important structural conference to take place concurrently. FBCA will exhibit at the exposition, setting up an "Information Center" to provide the latest information on the fusion bonded epoxy-coating system. Complimentary tickets for the exhibits (value \$5.00) are available by contacting FBCA. Plan to stop by Booth 161 - it will be staffed by corrosion prevention experts. Ask time/place of the FBCA Hospitality Suite where you can see the videotape on the Wisconsin I-90/94 project reported on this page.

## 32 Mile Long "Open House" Shows Off Wisconsin DOT's Advanced Highway Technology



Traffic continued in 2 lanes while new 3rd lane and reconstructed dual lanes were done. Epoxy-coated rebar is in place on right inside lane.

### Epoxy-Coated Rebar All The Way

There was a lot of extra traffic on Interstate 90/94 between Madison and Portage, Wisconsin on July 11. On that date, over 500 federal, state and county highway officials, members of the press, manufacturers representatives and others gathered to get a first hand report and look at a \$70 million project that is attracting international attention. The day started with a presentation by Wisconsin Department of Transportation engineers to explain the thought process that went into the selection of the reconstruction method for this highly travelled highway. Visitors were then provided design and construction insights. After viewing a 1/2 hour videotape, "Designing for Quality", groups moved out to the construction site for first-hand observation of this unique, cost-effective pavement system.

### Old concrete pavement - New concrete aggregate.

Here they saw the 23 year old concrete pavement in one section being torn up and hauled away for crushing, sizing and recycling as aggregate for the new continuously reinforced concrete pavement (CRCP) which was being slipformed in another section.

**Epoxy-coated reinforcement specified.** Wisely DOT design officials were not chancing future road problems with reuse of the old salt-saturated concrete. They specified fusion bonded epoxy-coating for all of the 1,540 tons of reinforcing steel to be used in this 200 lane mile project. Wisconsin prides itself on maintaining ice and snow free driving conditions. This has required heavy salting over the 23 winters since this interstate was constructed. This caused a level of chloride penetration in the old concrete that, when used as aggregate, could spell corrosion trouble for unprotected steel. Hence, the sure easy solution - epoxy coat the rebar. All of it!



Spreading concrete over grade. Epoxy coated rebar was set on bar chairs for close placement control.

Continued on page 2, col. 3

## 70% Price Reduction In Face of 70% Inflation: Epoxy Coated Rebar's 10-Year Record



H. Blair Trimble

Epoxy coating rebar to protect against corrosion is a uniquely modern process. In the last issue I related its short history — how it so rapidly gained recognition and accreditation by important authorities, the Federal Highway Administration, the American Concrete Institute, most states and the Canadian Provincial Ministry of Transportation. All this in a mere 10 years.

The fusion bonded epoxy coating system provides a practical cost-effective method of solving the serious deterioration problem of concrete bridge deck and other structural elements subject to chloride contamination. By virtue of the greatly extended life expectancy of epoxy protected structures, its modest extra cost pays rich dividends.

### Higher demand, lower cost

Though initial price of a corrosion prevention system is not the sole measure for life-cycle cost, it is often cited as a basis for comparison among competitive systems. It is for this reason that I wish to point out the price-competitive developments of the epoxy-coated rebar industry

Over the past decade, the cost of the epoxy system has steadily trended downwards. Thanks to a combination of high volume, technological and productivity advancements and increased plant capacity, user costs today are 70% lower than they were in 1974-75. Moreover, this 10 year phenomenon prevailed in defiance of an inflation rate of *more than 70%* for the same period

In 1974-75 epoxy-coated rebars were more than double the cost of uncoated bars. My own records date back only to 1979. In that year, an analysis of five Tennessee highway jobs shows epoxy-coated rebars were 62% higher in cost than uncoated bars. In 1981 the differential was down to 38%.

In 1984, the difference is 28%. The June '84 issue of *ENGINEERING NEWS-RECORD* published figures for a highway project in Montana which revealed the epoxy-coated rebar price was only 24% higher than the uncoated product.

Now, epoxy is not only a front-runner among other protective systems from the standpoint of sheer performance reliability, it is also among the *least costly* on a "first-cost" basis. Interestingly, this dramatic price reduction came about through innovation and competition within the epoxy-coating industry. Competitive pressure from other systems for new construction applications was virtually non-existent.

"Open House" — continued from page 1

### CRCP proved superior.

Open house attendees also saw a dramatic demonstration of the economic value of continuously reinforced concrete pavement. When this interstate route was constructed of mesh and 9 inch concrete, the state included four miles of 8 inch thick continuously reinforced concrete as a comparative test.



While the entire 32 mile pavement suffered nearly 100% joint and intermediate crack failure, the 4 mile CRCP test section had absolutely no problems and *continues in excellent condition*. No problems in spite of the hammering of 14 million 18 kip equivalent axle loads over 23 years in all temperature extremes. That's performance — and that's why Wisconsin is going to CRCP for this major reconstruction project. It's also why CRCP with epoxy-coated reinforcing steel is in its plans for other highway reconstruction jobs coming up.

### U.S. BUSIEST?

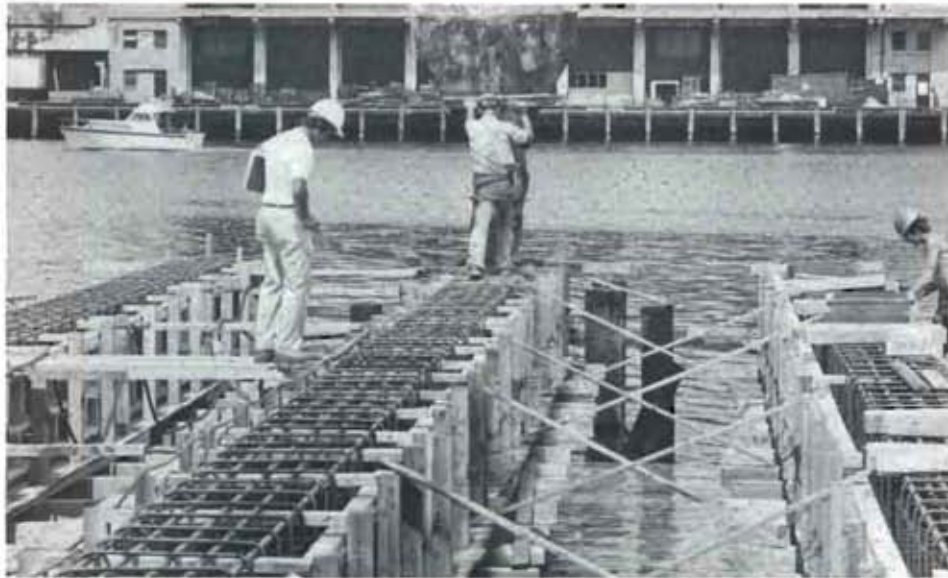
**"TRUCK ALLEY" Indiana  
I-80 Gets 7 Redecked  
Bridges — all Epoxy-Coated**

Lake Michigan looks like a giant pickle with Indiana bordering its south end. This squeezes a lot of traffic from neighboring Illinois and Michigan onto its I-80 route — the Borman expressway — which runs east and west at the bottom of the lake.

To keep over 125,000 cars and trucks daily moving through this region's severe winters, called for heavy salting. This kind of ice control naturally has taken its toll on the seven bridges in the 5 mile stretch linking the Indiana Turnpike with the Illinois Tollway. Constructed before the availability of epoxy coated reinforcing steel for the prevention of corrosion related bridge deck breakups, this time Indiana is solving the problem for good. Over 750 tons of fusion bonded epoxy coated rebar are going into this major reconstruction project



## Coast to Coast, it's Epoxy-Coated Rebar for Concrete Marine Installations:



### BOSTON TAPS GROWING CONTAINER TRADE WITH \$17 MILLION CORROSION-PROTECTED WHARF

Through American ports flow an estimated \$457 billion in import and export trade. Surprising to many, foreign cargo-tonnage has grown 50% since 1975.

Boston is capitalizing on this upward trend with a recently completed reconstructed 1,000 foot wharf at its Castle Island Marine Facility. The Massachusetts Port Authority, in designing this special container ship installation, looked to the future and specified fusion bonded

epoxy-coated reinforcing steel for the top layers to prevent corrosion caused by road salt and salt spray

#### 350 Tons of Epoxy-Coated Rebar

Over 8,100 cubic yards of 5,000 psi concrete went into the wharf's construction. Of the 700 tons of steel reinforcing steel, half was epoxy-coated. The rebuilt terminal is expected to have a long service life — with piers and terminal set for 40 years minimum.

### SAN FRANCISCO SAFEGUARDS GROWING YACHT FLEET WITH EPOXY PROTECTED BREAKWATER



Over 350 yachts now have a snug, safe harbor for home with the completion of a 1,800 foot long marina breakwater in Oakland Bay

This installation replaces a floating breakwater that blew away in a severe storm. 350 yachts represent a whale of dollar total. So when the Pier 39 owner decided on a permanent breakwater installation, consulting engineer, Len H. Teasley, San Jose, California, came up with a unique, cost-efficient concept.

The design utilized precast sheet and batter piles, tied in place with heavily reinforced, cast-in-place concrete pile caps. To reduce weight and concrete totals, large voids formed by styrofoam blocks, were cast in the pile caps. All grade 60 reinforcing steel, 265 sections, 40-foot long, was fusion bonded, epoxy-coated to provide "life insurance" against corrosion. Now, it's clear-sailing ahead for Pier 39 Marina. That's for sure.

## Where to call for Epoxy-Coated Rebar Information:

- (1) Applicator Members
- (2) Powder Producer Members

**California, Los Gatos**  
Grocote Corporation (1)  
(408) 354-4222  
Zv. Dagan

**Colorado, Brighton**  
ABC Coating Company, Inc. (1)  
(303) 654-0998  
Gerald Campbell

**Florida, Tampa**  
Florida Steel Corporation (1)  
(813) 621-3511  
Clyde L. Roberts

**Indiana, Carmel**  
American Rebar Coaters (1)  
(317) 844-6044  
L. L. Kubicki

**Indiana, Schererville**  
Midwest Pipe Coating, Inc. (1)  
(219) 372-4564  
Robert D. Theisen

**Indiana, Warsaw**  
Armstrong Products Company (2)  
(219) 267-2226  
Thomas Scalfoloni

**Minnesota, St. Paul**  
JM Company (2)  
(612) 733-1656  
James J. McDermott

**Minnesota, Newport**  
Simsco, Inc. (1)  
(612) 735-9660  
John L. Simmet

**Missouri, St. Louis**  
Carboline Ferro Powder  
Coatings Company (1)  
(314) 644-1000  
Chris Connor

**New York, Glen Head**  
MCP Facilities Corporation (1)  
(516) 676-7811  
Edward W. Gleason

**Oklahoma, Tulsa**  
ABC Coating Company, Inc. (1)  
(918) 585-2582  
Marcelo Acuna

**Oregon, Eugene**  
Dura Coating, Inc. (1)  
(503) 688-2466  
Hal E. Reed

**Pennsylvania, Bethlehem**  
Bethlehem Steel Corporation (1)  
(717) 694-5711  
L. Anthony Maclock

**Tennessee, Knoxville**  
Steel Service Company (1)  
(615) 246-5477  
H. Blair Frouber

**Texas, Waxahachie**  
ABC Coating Company, Inc. (1)  
(214) 937-9841  
Don Benge

**Washington, Auburn**  
ABC Coating Company, Inc. (1)  
(206) 435-1070  
Michael R. Benge

**Washington, Walla Walla**  
Forsell (1)  
(509) 925-4425  
David L. Howe

#### Canadian FBCA Members:

**Alberta, Edmonton**  
Caproco Corrosion Prevention Ltd. (1)  
(403) 668-2678  
Denis Latham

**B. C., Delta**  
Epoxycoated Rebar, Inc.  
(604) 946-1251  
John Harris

**Ontario, London**  
IM Canada, Inc. (2)  
(519) 831-2000  
David H. Wrennes

**Ontario, Scarborough**  
Nanotech Rebar Services (1)  
(416) 291-8100  
Douglas M. Green

**Ontario, Stoney Creek**  
Epoxycoated Rebar, Inc. (1)  
(416) 961-9611  
Brad J. McLachlan

**Quebec, Longueuil**  
Epoxycoated Rebar, Inc.  
(514) 661-2561  
Lou Koffman



(Photo by Minneapolis Star and Tribune)

## EPOXY-COATED REBAR UPDATE PART OF CRSI DESIGN SHORTCUT SEMINARS



Structural engineers in 26 cities across the U.S.A. are attending a new series of design efficiency seminars sponsored by the Concrete Reinforcing Steel Institute (CRSI). They're learning how to minimize reinforced concrete design time and costs while gaining design tips for automatic conformance to the 1983 ACI Building Code requirements. Presented by Paul F. Rice, P.E. and David P. Gustafson, P.E., Ph.D., they discuss "Coated bars — corrosion protection" as an important topic. Seminars broke for August and resume in September at these times and places:

### DATES & PLACES

September 10, Dallas  
 September 12, Houston  
 September 14, Tulsa  
 September 18, New York City  
 September 20, Boston  
 October 2, Nashville  
 October 4, New Orleans  
 October 9, Miami  
 October 11, Tampa

For registration details, phone the Concrete Reinforcing Steel Institute. 312/490-1700.

## BIG ENR CONCRETE SUPPLEMENT PULLS RECORD RESPONSE FOR FBCA

ENGINEERING NEWS-RECORD, in its May 17 issue, carried a special section, "Concrete Today: Markets, Materials, Methods." Read by over 385,000 construction leaders, worldwide, this fact-packed 80 page supplement ranged over concrete's ever widening field of applications. FBCA was there with a full-color ad to report on the value of epoxy coatings for bridge deck restoration. As in the 1983 section, this year's ad is on the way to record setting response — proof of the high interest engineers and contractors have in this effective method of corrosion control.

## Too Much Salt Does Old Parking Garage In

This old-time, two level 865 car parking structure took all the corrosive abuse it could handle. On June 3, 1984, it collapsed from years of attack by Minneapolis' winter deicing program. Chloride tracked in by countless cars finally corroded the

reinforcing steel, causing the spalled concrete structure to collapse. Nobody hurt, but the cars. Today, prudent parking structure designers don't have this worry, thanks to fusion bonded epoxy-coated reinforcing steel.



## New Epoxy-Coated Rebar Report By CRSI

The Concrete Reinforcing Steel Institute (C R S I) has published Engineering Data Report (EDR)

No. 19, "Suggested Project Specifications Provisions for Epoxy-Coated Reinforcing Bars." This report complements EDR No. 14 which presented basic technical information on epoxy-coated reinforcing bars

in Question and Answer format. The new report provides suggested practical and cost-effective end-use provisions for epoxy-coated reinforcing bars. It is anticipated that the suggested provisions can be incorporated essentially verbatim in the project specifications for many types of projects — transportation structures, parking garages, port and marine installations, wastewater treatment plants.

A complimentary copy is included in the issue of Anti-Corrosion Times or is available on request by writing the Fusion Bonded Coaters Association.



### "MUST READING"

FBCA neatly bound packet of informative materials includes FHWA report "Corrosion of Nonspecification Epoxy-coated Rebars in Salty Concrete" color brochure and article reprints of epoxy-coated rebar applications

