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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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LEAVE IT TO EPOXY-COATED REBAR TO KEEP THE SIGNALS STRAIGHT IN AIRPORT TOWER

Completed control tower with spiraling CN Tower at right in background.

Used to reduce radio frequency interference

Toronto's Island Airport, Canada's third busiest, keeps getting busier. The growing popularity of commuter flights from this STOL (Short Take Off and Landing) airport dictated the need for a modern control tower.

The new equipment going into the tower is very sophisticated. All the equipment must be shielded against radio frequency interference. Any bimetallic or ungrounded systems will pick up unwanted signals and considering the proximity to the CN TOWER (world's tallest free standing structure), the problem is substantial.

According to a Transport Canada research study, any corrosion of the metal will form a diode which will also pick up intruding radio signals.

For this reason, the main structural component of the tower is reinforced concrete and all the rebar is epoxy coated to insulate the steel. All other metal used in the construction is grounded to deep,end-bearing steel pipe piles. Concrete grade beams,

continued on page 2

Project Director and CEO Margret Augustine and co-architect Phil Hawes with model of solar powered Biosphere II.

Manned space base to get feasibility test in Arizona desert

8 pioneers to live in self-sufficient greenhouse-like structure for 2 years.

Rising from the Sonora Desert near Oracle, Arizona is a strange looking structure that's destined for a vital role in our space future.

It's Biosphere II, a sprawling $30 million greenhouse-like building that will have a complete, self-contained ecosystem. It's designed to support eight pioneers in a closed environment to measure the feasibility of permanent manned space stations and posts on other planets. There will be miniature oceans, rain forests, marshlands, deserts and an "urban city"—all in a huge airtight structure of glass and steel.

Before the eight volunteers are sealed in the 98,000 square foot structure, the biosphere will have been stocked with more than 4,000 species of plants, hundreds of varieties of fish and insects, birds, flocks of chickens for eggs and meat; even some goats for milk. There's also a 5-story "urban city" with apartments, communications and computers, libraries and recreation facilities. Full closure is planned for December, 1989.

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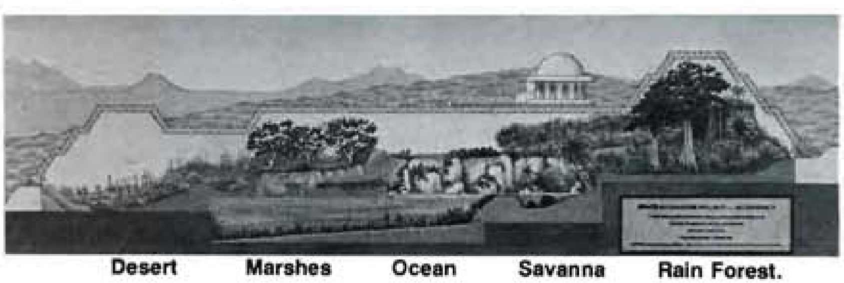


Desert Marshes Ocean Savanna Rain Forest.

Chicago soars to another R/C record

World's tallest concrete building starts up by going down

Chicago was home to the first "skyscraper" in 1864. Ever since, the Chicago style of high-rise construction has been setting the pace.

Time after time it has captured the honors for tallest reinforced concrete structures—the Executive House Hotel at 39 stories built in 1959; famed Marina City with its innovative twin circular towers at 61 stories also built in 1959; Water Tower Place that tips its top 859 feet above Michigan Avenue, built in 1976.

Now, it's happening again. In a big way! The 311 South Wacker Drive building across from the Sears Tower, is on its way to breaking more records;

• It will be the world's tallest reinforced concrete building—959 feet! It will have 65 stories totaling 13 million square feet in the office tower and multi-level underground parking.

• It will capitalize on the highest strength concrete put into a commercial high-rise structure—12,000 psi. A total of 110,000 cubic yards.

• It will boast a record construction time—just 32 months from start to completion.

Starts up by going top/down

To save time and cost, the contractor decided on the top/down method of constructing the three levels below grade. The ground floor was poured at parking level 1. Then they excavated down to P-2 level, placed the Grade 75 epoxy-coated rebar for this slab. Then the process was repeated down to the P-3 level.

The developers, Lincoln Property Company, Dallas, looking forward to a long future of maintenance freedom in the critical parking levels, approved the engineer's recommendation for epoxy-coated rebar. All concerned were convinced it's the most cost-effective method of protecting against corrosion that could result from tracked in salt-laden slush common to Chicago's long winters.

Architects: Kohn Pederson Fox Associates, PC, New York and Harwood K. Smith & Partners, Dallas, a joint venture.

Structural Engineers: Brockette/Davis/Drake, Inc., Dallas and Chris P. Stephanos Associates, Chicago.

Contractors: J. A. Jones Construction Co., Charlotte, NC and Harbour Contractors, Co., Chicago.

(Photos courtesy Robert Jorgensen, Erico Products Inc.)

Threaded taper epoxy-coated rebar being installed in epoxy-coated Lenton couplers cast in columns for girder connection at P-2 garage level.

Epoxy-coated rebar cage that will become a girder at P-2 level.

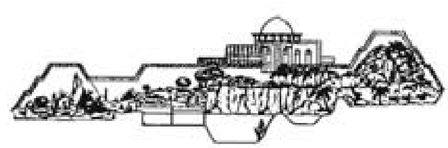
Forming the central core. All rebar is epoxy coated.

Airport *continued from page 1*

connected to the piles, support the octagonal center core which supports the control tower. Modern construction techniques produce Happy Landings!

Owner: Transport Canada
Architect: Parkin Partnership
Engineer: Carruthers and Wallace
Contractor: Mitchell Construction
(Photos and data courtesy Reinforcing Steel Institute of Ontario)

Biosphere *continued from page 1*



To protect the large amounts of reinforced concrete that form the 35-foot deep salt water ocean and sprawling marsh areas, the engineers wisely specified that all reinforcing steel be epoxy coated. This measure insures against rebar corrosion and possible future maintenance problems.

Biosphere II (earth is biosphere I) is largely financed by Edward P. Bass, Texas entrepreneur. The Environmental Research Laboratory, University of Arizona is the primary scientific contractor for the project.

Decrunching auto congestion at world's busiest airport

Sweeping around Terminal 2, work progresses on schedule

Epoxy-coated rebar figures in Chicago's O'Hare 4-lane upper roadway expansion

For O'Hare Airport to move out 40 million passengers a year means it has to move millions of cars through its roadway system. That was the problem—and that's why the City of Chicago is hard at work on an overall $1.4 billion project to be ready for 1995 when it's expected 80 million passengers and over 900,000 flights will crowd this sprawling facility.

One of the most critical needs was to speed vehicle flow to and through the four departure terminals. Early in 1987, the City of Chicago embarked on a rush project to widen the upper roadway from four to eight lanes. This would allow cars to move to the individual terminals to drop off travelers without having to double and triple park and back up traffic—especially at peak holiday travel periods.

Corrosion problems designed out—epoxy-coated rebar in.

In planning the wide roadway extension, Alfred Benesch and Company, the City's design and construction management team, made sure there would not be any future traffic interruptions due to corrosion problems. They specified epoxy-coating for all the Grade 60 reinforcing steel used in the piers and deck.

The fast-track project was put on a tight schedule with completion required before the start of O'Hare's busiest season beginning with the 1987 Thanksgiving holiday. Contractor for this expansion job is Kenny Construction Co. Gerry Piaskomski is consultant to the owner, the Chicago Airport Authority and also field project engineer.

Passing Terminal 3, installation of the epoxy-coated rebar is nearly complete; ready for deck construction.

After passing Terminal 4, the new extension splits off from the existing roadway to descend to grade for the trip out of the airport.

The widely spaced and graceful piers with cantilevered roadway make an attractive addition to O'Hare's transportation facilities.

Historic concrete light house rehabbed to keep the light shining for Delaware Bay ships

Ships on their way to Wilmington and Philadelphia enter Delaware Bay from the Atlantic Ocean and sail past Cape May. Inside the bay, it's "ships beware". Smack in the middle is a hazardous reef that, in America's early days, took heavy tolls in shipwrecks.

In 1912, the Brandywine Shoal Lighthouse was constructed atop the shoal and shipping became a great deal safer. Unfortunately, over the years, the historic concrete structure had deteriorated severely in the harsh marine environment. In 1982, plans for a major renovation were made and repairs started.

These repairs consisted of reinforcement of the caisson, replacement of the first level brackets and overhang structural deck, replacement of the veranda columns, cornice and roof, installation of a shear collar below the watchroom. Project specifications included a comprehensive section on demolition and removal with emphasis on deteriorated concrete.

For all slab concrete, a 4,000 psi, 28-day compressive strength was specified. All reinforcing steel used in the restoration, as well as shotcreting mesh, is epoxy coated. This way, the new concrete in the Brandywine Shoal Lighthouse is set to rebuff its hostile environment for decades to come.

Today, astute designers are taking no chances with rebar and concrete deterioration problems. They are specifying the lasting protection provided by epoxy-coating—not only for sea coast installations but also for sewage, chemical, tunnel and other demanding environments.

Duffied Associates were the design engineers. Gredell & Paul were the construction engineers. Both are in Wilmington, Delaware.

NCHRP Report evaluates bridge deck protection systems

The National Cooperative Highway Research Program recently published a report summarizing a study conducted by researchers at Washington State University. The objective of this study was to evaluate the performance of the most commonly used strategies for protecting bridge decks from corrosion.

Information was gathered on the use of salt on bridge decks, on protective strategies for new bridge deck construction, and on the overall performance of those strategies. Next, detailed performance information was collected for the five most commonly used protective strategies: 1) Increased depth of cover, 2) Low slump concrete overlays, 3) Latex-modified concrete overlays, 4) Waterproofing membranes, and 5) Epoxy-coated reinforcement.

In addition, four state transportation departments were interviewed, several bridges were examined qualitatively, and problems and performance of the five strategies were reviewed. The information collected was then analyzed for evidence that a 50-year service life might not be attainable and that use of a particular protective strategy would be more cost-effective than others. Issues needing examination were identified and recommendations were made for guidelines for the design and construction of bridge decks.

The graphs (in the right columns) illustrate some of the data contained in the report. The report can be obtained from the Transportation Research Board, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. Ask for Report 297.

Slipformed concrete parapets add safety to approaches of America's longest concrete span bridge

Reinforced with epoxy-coated rebar to thwart salt-laden atmosphere

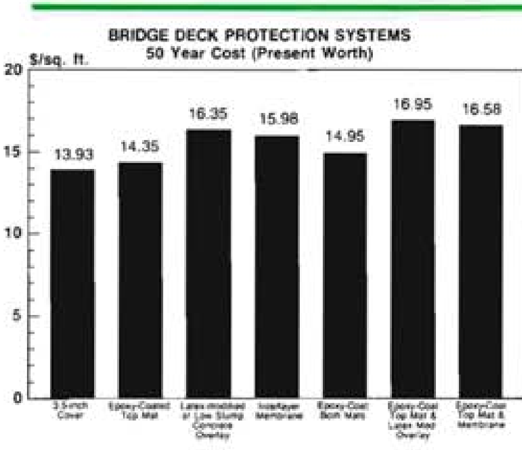
"A triumph of function and beauty" is the way the new Sunshine Skyway Bridge that stretches 4.18 miles across Tampa Bay has been praised.

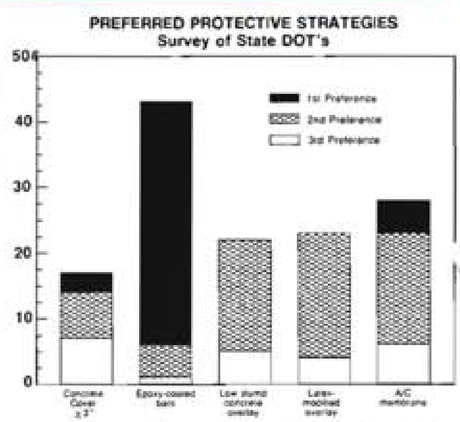
With a vertical clearance of 175 feet and a 1,000 foot horizontal clearance, it's the longest completed concrete cable-stayed span in the hemisphere. On guard to protect the safety of motorists passing over the bridge and on the long approach trestles, are sturdy concrete median and parapet walls.

These, too, are a striking example of practical form and beauty. Slipformed by a Gomaco paver in a continuous operation, the 52,000 lineal feet of barrier wall have a solid foundation. Tied into rebar protruding from the concrete decks is a framework of fabricated reinforcing steel. This provides a strong skeleton for the concrete that's formed around it by the slipform paver.

Any cars or trucks that may accidentally go out of control and impact the barrier walls would be safely deflected. As with all of the structural elements of the bridge, the reinforcing steel in the median and parapet walls is epoxy coated to ward off future corrosion that otherwise could develop in this corrosive application.

Parapet wall construction moves at a continuous rate with concrete fed to the slipform paver. ***(Photos courtesy Figg and Muller Engineers, Inc. and Pary, Inc.)***





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