



No stronger name in corrosion protection

## THE ECONOMICS OF MATCOR CP

### STEEL-IN-CONCRETE CATHODIC PROTECTION

Corrosion of reinforcing steel is the most frequently encountered cause of damage to concrete, accounting for an estimated 90% of all repairs. Yet, when engineers consider and design concrete repairs, many do not address the cause of the damage, i.e. corrosion, and only patch and repair the concrete itself. Patch and repair jobs are costly and do not effectively stop or even slow down the corrosion to damage cycle.

There are many arguments against the continued use of the patch and repair method to repair concrete structures:

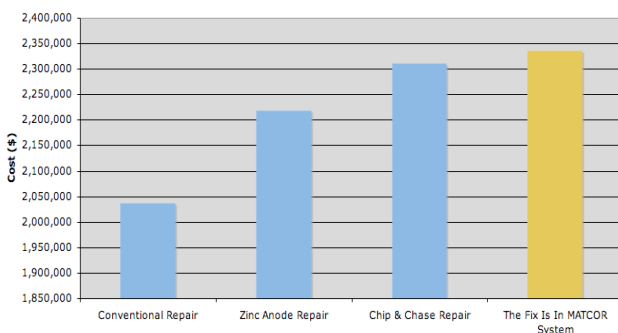
- Cost: Both initial and long term. The root of the problem is not addressed.
- Disruption: Invasive repair cycles disrupt the use and enjoyment of the structure or property.
- Devaluation: Decreased property value due to chronic, extensive repairs.

The economics of MATCOR cathodic protection come in several forms. The biggest return for the consumer is the complete cessation of the repair cycle.

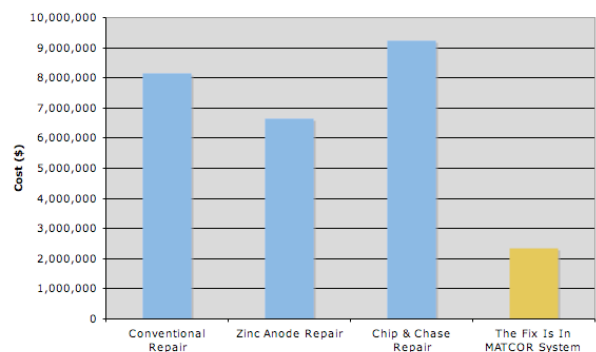
The costly repair cycle caused by corrosion damage is relentless. The corrosion process accelerates over the years and time between repairs is exponentially reduced after each cycle. While it may take ten years for the first major repair, the next necessary repair will be in five to seven years if cathodic protection is not used.

The best time to put in the MATCOR cathodic protection is during initial construction, however the ten-year repair phase is a good secondary choice. Of course, cathodic protection can be installed at any time.

#### TYPICAL FIRST CONDO REPAIR PROJECT



#### ANNUAL COST OVER 20 YEARS FACTORING REPAIR LIFE CYCLE



Cathodic protection is extremely economical when structural life cycles are evaluated. The following is an example of a typical line item bid for a condominium repair project.

**PROJECT DESCRIPTION:**

The structure is typical concrete balcony and walk project in Florida. The structural engineer has specified conventional concrete repair utilizing corrosion inhibitors and zinc anodes in the repaired concrete. (The zinc anodes do nothing to stop the corrosion in contaminated concrete.)

**SPECIFICS:**

- Project Size: 30,000 ft<sup>2</sup>
- Number of Units: 120
- Balcony Size: 250 ft<sup>2</sup>
- Stacks: 12
- Floors: 10

**ECONOMIC COMPARISON:**

Conventional Restoration Versus Restoration With Cathodic Protection for a TYPICAL CONDOMINIUM BALCONY FIRST REPAIR PROJECT

BID ITEM	ESTIMATED QUANTITY	UNIT PRICE	CONVENTIONAL RESTORATION	CONVENTIONAL RESTORATION WITH GALVANIC CP	CONVENTIONAL RESTORATION WITH CHIP & CHASE REQUIRED	CATHODIC PROTECTION RESTORATION
Mobilization/General Conditions	1 EA	40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
Removal of Surface Finishes	30,000 SF	3.00	\$90,000.00	\$90,000.00	\$90,000.00	\$90,000.00
Surface Concrete Repairs	5,700 SF	75.00	\$427,500.00	\$427,500.00	\$534,375.00	\$427,500.00
Edge Concrete Repairs	1,750 SF	160.00	\$280,000.00	\$280,000.00	\$350,000.00	\$280,000.00
Full Depth Concrete Repairs	2,400 SF	125.00	\$300,000.00	\$300,000.00	\$375,000.00	\$300,000.00
Ceiling Concrete Repairs	300 SF	120.00	\$36,000.00	\$36,000.00	\$45,000.00	\$36,000.00
Column/Beam Concrete Repairs	132 CF	400.00	\$52,800.00	\$52,800.00	\$66,000.00	\$52,800.00
Wall Stucco Repairs	175 SF	15.00	\$2,625.00	\$2,625.00	\$3,281.25	\$2,625.00
Door Removal with Enclosure	77 EA	1,200.00	\$92,400.00	\$92,400.00	\$92,400.00	\$92,400.00
Replace Railings	5,000 LF	55.00	\$275,000.00	\$275,000.00	\$275,000.00	\$275,000.00
Paint Building Envelope include stucco / walls/ceilings	LUMP SUM		\$300,000.00	\$300,000.00	\$300,000.00	\$300,000.00
Install Expansion Joint	572 LF	18.00	\$10,296.00	\$10,296.00	\$10,296.00	\$10,296.00
Repair Window Header	20 CF	350.00	\$7,000.00	\$7,000.00	\$7,000.00	\$7,000.00
Repair Window Sill	10 EA	675.00	\$0.00	\$0.00	\$0.00	\$0.00
Rust Spot Repair	125 EA	20.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00
Migrating Corrosion Inhibitor	30,000 SF	2.25	-	\$67,500.00	-	-
Zinc-Puck Anodes-Partial	2,400 EA	48.00	-	\$115,200.00	-	-
Textured Urethane Deck Coating	30,000 SF	4.00	\$120,000.00	\$120,000.00	\$120,000.00	-
Impressed Current Cathodic Protection	30,000 SF	14.00	-	-	-	\$420,000.00

<b>Total Project Cost:</b>	\$2,036,121.00	\$2,218,821.00	\$2,310,852.25	\$2,336,121.00
<b>Expected Life:</b>	5 years	7 years	5 years	20 years
<b>*Average Cost Per Year:</b>	\$ 407,224.20	\$316,974.43	\$462,170.45	\$116,806.05
<b>Total Cost Over 20 Years:</b>	<b>\$8,144,484.00</b>	<b>\$6,656,463.00</b>	<b>\$9,243,409.00</b>	<b>\$2,336,121.00</b>

\*Annual cost based on 20-year service life

## OBSERVATIONS:

The costs listed above do not take into consideration inflation, loss of use, or loss of resale value (Resale value is affected when the property "looks" damaged and in need of repairs, or during actual repairs). The line item bid total illustrates that the cost of the permanent repair of cathodic protection is less per year than repetitive conventional repairs. When all costs are considered, cathodic protection is always the winner.

Please consider that because of their individual small size, the cost per square foot to provide cathodic protection for balconies is much higher than for a large project, such as a parking garage or bridge. However, considering we are comparing the one-time cost of cathodic protection to the first of many repairs, it is economical.

As you can see in the chart many structural engineers in Florida may specify a "chase the rust" repair method. "Chasing" is the act of the contractor chipping away at good concrete until uncovering reinforcing steel with no visible rust on it. There is no need to chip away good concrete when cathodic protection is used, as the entire skeletal reinforcing is protected, thus limiting disruption and providing a lasting fix.

Please contact MATCOR to discuss the specifics of your project.