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**Foundation Technologies, Inc.®**

### INTRODUCTION

The Copper Mine discussed in this case study utilizes an electrowinning process to extract high end copper from iron-ore. The electrolyte that is used to extract the copper is highly corrosive and acidic. Over 260 electrolytic tanks that hold the electrolyte are supported by concrete beams and columns in the basement of the SX/EW plant. The columns are reinforced with #6 steel bar spaced 12-inch on center around the circumference of the column.

### PROBLEM

During a plant survey, extensive corrosion to both reinforced concrete columns and beams was noted. The problem stems from electrolyte attack of steel re-bar. As the tanks overflow electrolyte floods the basement and pools at the base of the columns. The electrolyte also leaks through the floor of the tanks and pools in the concrete beams. Over time the steel reinforcement will lose 50% to 75% of its strength causing risk of structural failure. At this facility, the electrolyte penetrated deep within the pores of the concrete surface of both the columns and the beams.

### INSTALLATION

The columns were first abrasive blasted to remove loose particles and clean the substrate down to rough aggregate to thoroughly clean all contaminants out of the concrete substrate. The steel rebar were also cleaned and treated to prevent further corrosion. Next, a quick set 6000-psi grout was used to resurface the columns back to their original shape. After surface preparation and patching, the columns were primed with 10 mils of the HJ3 PC-100 Primer Coat. Then one layer of HJ3's s-glass fabric was saturated with SR-400 Saturating Resin and wrapped around the columns. A final coat of HJ3 HCRC- 511 Epoxy Novolac was installed over the HJ3 reinforcing system.

### CONCLUSION

In total over 20 columns and beams were repaired and strengthened with the HJ3 Composite System. The total installation resulted in 75% to 80% cost savings over the traditional steel and concrete repair. The main advantages of the HJ3 Carbon Composite System were as follows:

- 10 x Tensile Strength of Steel
- Chemical Resistance to Electrolyte
- 3-Year Warranty
- No Downtime Costs
- 75% to 80% Cost Savings over alternative repairs



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