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Effectiveness of Electrochemical Chloride Extraction For the Iowa Avenue Pedestrian Bridge	Final Report July 2003 – July 2004

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8. ABSTRACT

The main objective of this study is to determine the effectiveness of the Electrochemical Chloride Extraction (ECE) technique on a bridge deck with very high concentrations of chloride. This ECE technique was used during the summer of 2003 to reverse the effects of corrosion, which had occurred in the reinforcing steel embedded in the pedestrian bridge deck over Highway 6, along Iowa Avenue, in Iowa City, Iowa, USA. First, the half cell potential was measured to determine the existing corrosion level in the field. The half-cell potential values were in the indecisive range of corrosion (between -200 mV and -350 mV). The ECE technique was then applied to remove the chloride from the bridge deck. The chloride content in the deck was significantly reduced from 25 lb/cy to 4.96 lb/cy in 8 weeks. Concrete cores obtained from the deck were measured for their compressive strengths and there was no reduction in strength due to the ECE technique. Laboratory tests were also performed to demonstrate the effectiveness of the ECE process. In order to simulate the corrosion in the bridge deck, two reinforced slabs and 12 reinforced beams were prepared. First, the half-cell potentials were measured from the test specimens and they all ranged below -200 mV. Upon introduction of 3% salt solution, the potential reached up to -500 mV. This potential was maintained while a salt solution was being added for six months. The ECE technique was then applied to the test specimens in order to remove the chloride from them. Half-cell potential was measured to determine if the ECE technique can effectively reduce the level of corrosion.

9. KEY WORDS	10. NO. OF PAGES
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