



NRC-CNRC

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Research in
Construction

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Galvanic Coupling Between Stainless Steel and Carbon Steel Reinforcements in Concrete Structures

Objectives

To quantify the extent and rate of galvanic corrosion between stainless steel and carbon steel in reinforced concrete structures.

Background

Conventional carbon steel reinforcement used in concrete structures is susceptible to corrosion, particularly in areas exposed to de-icing salts. Replacing carbon steel with stainless steel would significantly reduce the reinforcement corrosion and extend the service life of concrete structures; however, the initial costs of these structures could be very high. It has been suggested that the carbon reinforcing steel be replaced only in areas at high risk of corrosion. However, concern about the risk of galvanic corrosion between the two different metals has prevented the adoption of such a design solution.

Statement of Work

Various experiments were conducted to investigate the effects of coupling carbon steel and stainless steel in the presence of sodium chlorides, simulating severe field conditions.

Results

The judicious use of stainless steel with carbon steel in the high-corrosion-risk areas of a concrete structure can be a cost-effective option for reducing corrosion and may greatly extend the service life of concrete structures.

Outcomes

Full results were released in a scientific paper "Galvanic coupling between carbon steel and stainless steel reinforcements," which is available on the IRC Web site.

Partners

Valbruna Canada Inc, the City of Ottawa, Ministère des Transports du Québec, Alberta Infrastructure, and the Nickel Institute.

Start/Expected Completion Dates

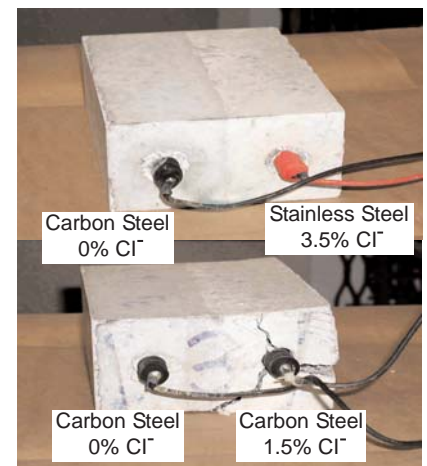
This project began in 2001 and was completed in 2005.

Project Manager

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For more information, see http://irc.nrc-cnrc.gc.ca/ui/cs/galvanic_e.html

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Stainless steel coupled with carbon steel improves the performance of concrete specimens



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