



**NRC-CNRC**

*Institute for  
Research in  
Construction*

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## *Permanent Reference Electrode Test*

### *Objective*

To determine the failure mechanism and proper use of permanent reference electrodes with buried and submerged structures, by evaluating commercially available electrode samples for long-term stability and accuracy.

### *Background*

Permanent reference electrodes are commonly used to measure the corrosion potential and hence the severity of steel corrosion in inaccessible locations such as buried pipelines, under pavement, or in concrete. However, there is limited information about their performance in various environmental conditions such as fresh or salt water, or how they are affected by cyclic variations in temperature, moisture and acidity.

### *Statement of Work*

- Testing of commercially available reference electrodes in environments that cycle through various humidity conditions, and through temperatures between ambient and freezing.
- Testing of the electrodes in solutions with high levels of chlorides, with high levels of acidity, and with high levels of alkalinity.
- Long-term field-testing of electrodes buried in low resistivity de-aerated clay and high-resistivity aerated sand.

### *Expected Outcomes*

Analysis of the failure mechanisms of reference electrodes that are exposed to various environmental conditions, as well as recommendations on how to use them effectively and how to predict their service life.

### *Partners*

Correng Consulting Service Inc.

### *Start/Expected Completion Dates*

This project began in 2000 and will be completed in 2006.

### *Project Manager*

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For more information, see [http://irc.nrc-cnrc.gc.ca/ui/cs/electrode\\_e.html](http://irc.nrc-cnrc.gc.ca/ui/cs/electrode_e.html)

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*Reference electrodes are tested in high resistivity sand box*



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