PAPWORTHS CONSTRUCTION TESTING EQUIPMENT

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CorroMap – Half-cell Potential & Corrosion Rate Measurement

Introduction

The CorroMap provides easy to use half-cell potential measurement with many user-friendly features. The CorroMap is a rapid, non-destructive technique for the evaluation of reinforcement half-cell potentials and corrosion rates. It maps the contour plots of half cell potential and resistance in colour on the screen and for transfer to PC.

The CorroMap is a lightweight system with rechargeable batteries for optimum portability and is designed to be operated by one man. It offers reliable evaluation of reinforcement corrosion also in wet, carbonated or inhibitor treated concrete so that the Half-cell potential and electrical resistance to the cover layer are given.
The system will also take galvanostatic pulse measurements which are an indication of the rate of corrosion of the reinforcing steel.

Kit

The equipment comes with a Lightweight electrode and a hand held computer pre-installed with easy to operate software. A durable steel ring for applying the current field to the reinforcement allows for measurements possible on uneven and curved surfaces with a replaceable sponge.
The system also includes a variety of connections and cables to make obtaining reinforcement contact as simple as possible.

Applications

The CorroMap is typically used in connection with:

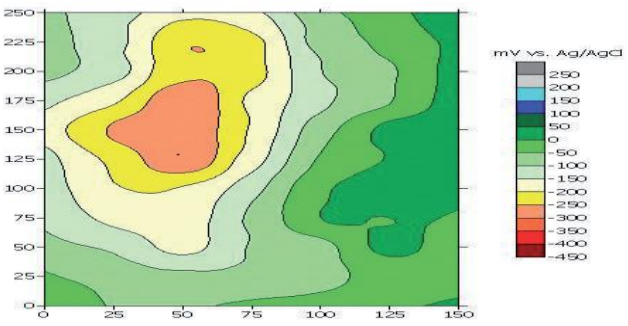
- Swimming pools.
- Bridges.
- Balconies.
- Parking houses
- Concrete structures in a marine environment

Features

- New handheld Psion work about PC with Windows CE 5.0 and colour Touch Screen.
- Protected against dust, rain and snow (IP65).
- Up to 2400 automated measurements, one-man operated with “auto trigger” and “auto increment” options.
- Can measure related values of electrochemical potential and resistance.
- System can be purchased with or without corrosion rate measurement

Benefits

- On site graphic display – in colour.
- Each colour represents a measurement interval for potential and resistance.
- Zoom function of detail area with display of measurement values.
- Measurement results in Excel-format are easily transferred to PC for further processing and presentation.



Contour plot from half-potential measurements carried out on a concrete deck in swimming pool.

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Measuring the Corrosion Rate

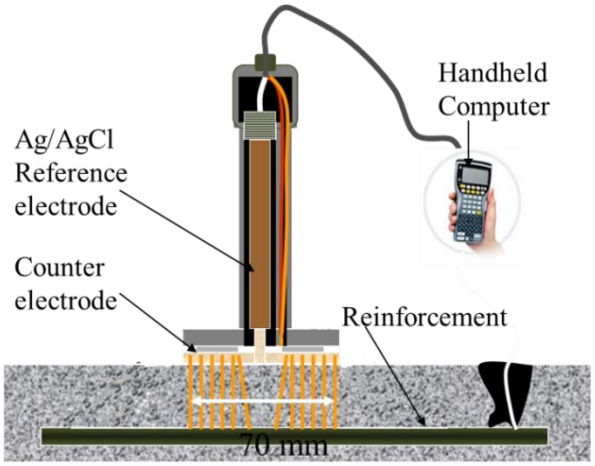


Diagram of electrode and system connections

The CorroMap uses a galvanostatic pulse principle to establish the corrosion current and therefore the corrosion rate of reinforcing steel.

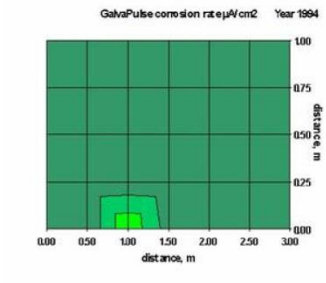
The Corromap works by inducing a short duration anodic current pulse into the reinforcement galvanostatically from a counter electrode placed on the concrete surface together with a reference electrode.

By utilizing the ohmic resistance (electrical resistance), the DC polarisation resistance over time, and the applied current, the corrosion current can be estimated with the Stern Geary equation.

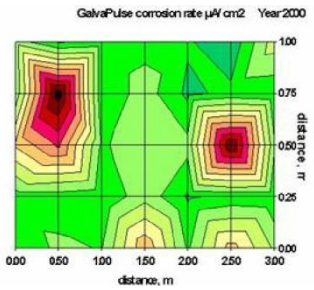
Example: Highway Bridge Pillar

A highway bridge pillar has been monitored since 1994 with a galvanostatic pulse system to evaluate the different stages of corrosion over time.

The two images below show the development in the corrosion rate from 1994 to 2000.

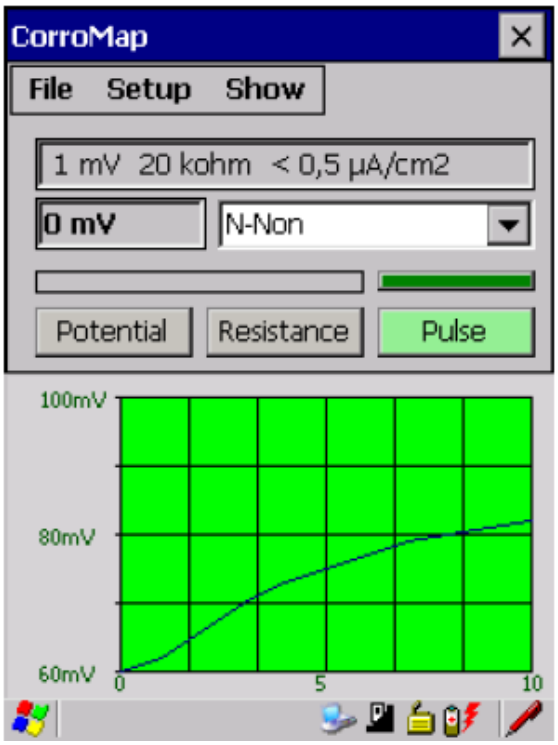


1994 Data



2000 Data

Software



CorroMap software during Pulse collection

The included software for the PISON workabout Pro^3 is used to set up mapping parameters and record resistance, half-potential and corrosion rate data.

This system allows a grid of any size to be established, a data collection procedure defined and data quality parameters set below which information will not be recorded. Data is exportable to excel format.

About PCTE

PCTE have over 30 years experience in the measurement and testing of concrete. With experience in research, consulting and construction they are able to assist you in reviewing the issues and developing solutions. PCTE can provide more than just the equipment. They can provide leading technical support for your business.