

Zeitschrift: IABSE reports = Rapports AIPC = IVBH Berichte
Band: 77 (1998)

Artikel: Locating rebar corrosion in concrete walls by potential measurements
Autor: Marquardt, Helmut
DOI: <https://doi.org/10.5169/seals-58183>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 07.02.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>



Locating Rebar Corrosion in Concrete Walls by Potential Measurements

Helmut MARQUARDT

Prof. Dr.-Ing.
FH Nordostniedersachsen
Buxtehude, Germany



Helmut Marquardt, born 1956, received his civil engineering degree and doctor's degree from the Technical University of Berlin, 1983 and 1990 respectively. Since 1993, he is Professor in Buxtehude near Hamburg

Summary

To localize corroding reinforcement in concrete buildings visual or sonic tests are not sufficient, because beginning corrosion cannot be recognized by these methods. By that means it is very likely that some areas starting to corrode will be missed - after a realized repair later damages may result. Therefore it is more useful to determine corrosion areas by electrochemical potential measurements.

Some application limits of the method of potential measurement have been examined. A special equipment has been developed to assess corrosion zones on the surfaces of concrete buildings.

1. Application Limits of Potential Measurements on Concrete Walls

The well-known method of potential mapping of bridges (fig. 1) is not transferable to concrete walls of buildings without problems, because the temperature and moisture of concrete walls is changing in a wide range, the concrete covering differs widely, concrete walls usually are surface finished by coatings or tiles, and often components of galvanized steel are used in concrete walls. Therefore the influences of the following parameters on the potential measurements have been examined:

- temperature and moisture of the concrete,
- thickness of the concrete covering,
- concrete surfaces with or without paints or coatings (fig. 2 and 3),
- components of zinc galvanized steel in concrete.

It could be shown that potential measurements do not depend on the temperature of the concrete but they were only possible between 30 and 90 % relative humidity of the surrounding atmosphere. Thick concrete coverings make it difficult to find small corrosion areas; fair-faced concrete walls coated e.g. with a thin acrylic paint are no problem (fig. 2), but on concrete surfaces with exposed aggregates by washing it is difficult to contact the cement grout (fig. 3). The interpretation of potential measurements in concrete walls with components of zinc galvanized steel is very difficult or impossible.

2. Measuring Equipment and Practical in-situ Tests

Coming from one half cell (cp. fig. 1) a more practical measuring equipment was developed: 6 CSE half cells were assembled in a frame, this enabled only one person to handle the equipment (fig. 4).

3. Conclusions

The reliability of the potential measurement method could be confirmed successfully by practical use on concrete walls.

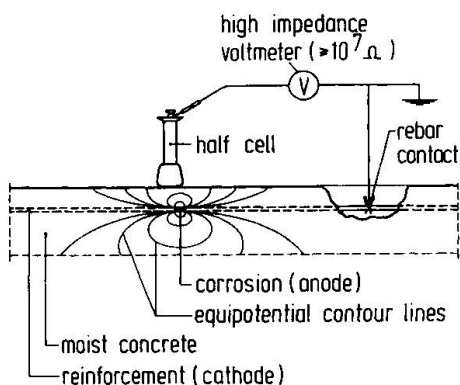


Fig. 1 Scheme for potential measurements with a half cell on the surface of a reinforced concrete member

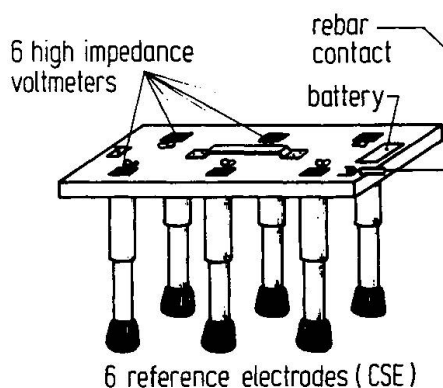


Fig. 4 View of the developed frame with 6 CSE half cells

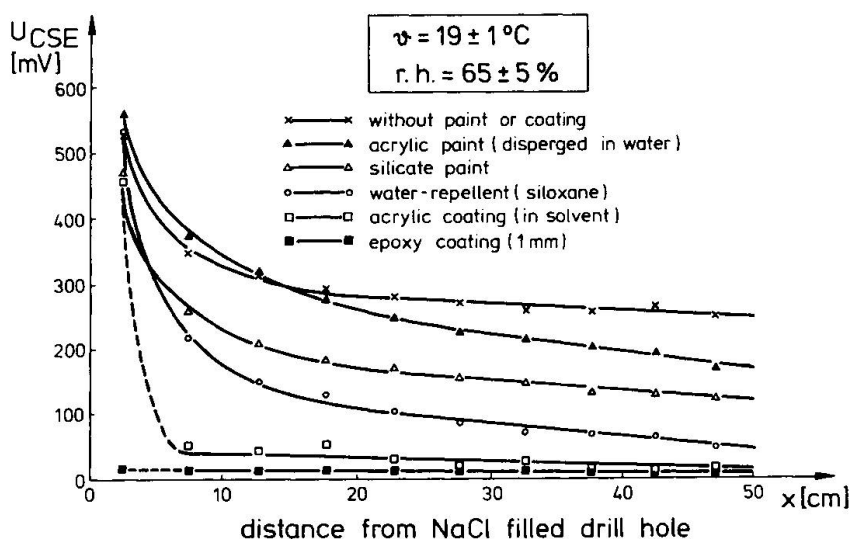


Fig. 2 Dependence of the potential U_{CSE} on the distance x to the NaCl filled drill hole for different paints or coatings on the concrete surface

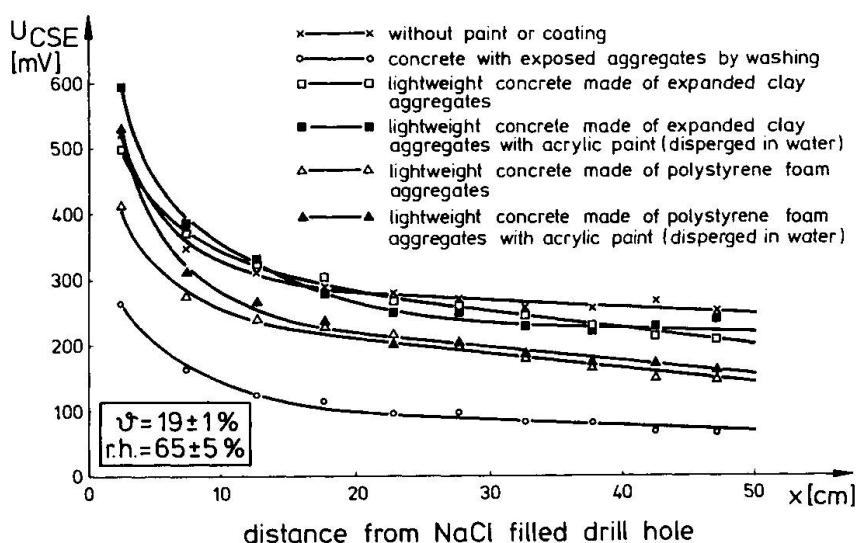


Fig. 3 Dependence of the potential U_{CSE} on the distance x to the NaCl filled drill hole for different lightweight concretes with or without thin acrylic paint