

Committee Report: JCI-TC134A

Technical Committee on Systematization of Electrochemical Measurement based on Physicochemical Theory

委員会報告：JCI-TC134A

物理化学的解釈に基づく電気化学的計測手法の体系化に関する研究委員会

Toshinobu YAMAGUCHI, Dr. Eng.: Kagoshima University

山口 明伸, 博士 (工学) : 鹿児島大学

Yoshitaka KATO, Dr. Eng.: Tokyo University of Science

加藤 佳孝, 博士 (工学) : 東京理科大学

Shinichi MIYAZATO, Dr. Eng.: Kanazawa Institute of Technology

宮里 心一, 博士 (工学) : 金沢工業大学

Manabu KANEMATSU, Dr. Eng.: Tokyo University of Science

兼松 学, 博士 (工学) : 東京理科大学

Hiroshi MINAGAWA, Dr. Eng.: Tohoku University

皆川 浩, 博士 (工学) : 東北大学

Hiroyuki KOBAYASHI, Dr. Eng.: Nakabohtec Corrosion Protecting Co., Ltd.

小林 浩之, 博士 (工学) : ナカボーテック

Makoto YAMAMOTO, Dr. Eng.: Sumitomo Osaka Cement Co., Ltd.

山本 誠, 博士 (工学) : 住友大阪セメント

Contact: jci-web@jci-net.or.jp

Keywords: electrochemistry, corrosion of steel, concrete cover, protection performance, measurement technology, systematization

Abstract

The technical committee on systematization of electrochemical measurement based on physicochemical theory aims to 1) systematically organize the physicochemical theories to be considered while applying electrochemical measurement methods of various kinds on a concrete structure, and 2) summarize references useful for actual application such as knowhow for executing highly reliable measurement and methods of interpreting the acquired data. This report summarizes the basics of electrochemistry in concrete engineering, overviews electrochemical methods used for evaluating performances and physical properties and their mechanisms, and summarizes the physical properties of concrete based on electrochemical property values, electrochemical diagnosis of corrosion of steel in concrete, measurements in actual structures and specimens, and electrochemical methods for preventing corrosion.

1. Introduction

In Japan, social infrastructures have been actively maintained and operated even before the ceiling collapse of Sasago Tunnel in December 2012, but the accident certainly triggered off further activation of maintenance activities. Recent actions of the Ministry of Land, Infrastructure, Transport and Tourism are summarized in Table-1, including the registration system of private sector qualifications, which aims for sound execution of maintenance works. Concrete

structures play an important role in construction of social infrastructures; and thus Japan Concrete Institute also started the qualification system for “Authorized concrete diagnosis & maintenance engineer” in 2001. A concrete structure may undergo diverse kinds of damage and deformation; and an inspection method appropriate to the purpose needs to be used for diagnosing a concrete structure. Various kinds of inspection methods have been proposed and.....