

# Overview

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Steel reinforced concrete is a widely used and durable structural material. The concrete environment protects the steel from direct atmospheric corrosion. However, this protective environment can be compromised due to the ingress or addition of chloride ions, or by carbonation, or both. Indeed, the widespread use of steel reinforced concrete in bridge and parking decks subjected to chloride deicing salts, and the use of reinforced concrete in marine environments has resulted in early need of repair due to reinforcement corrosion. Other failures have occurred in reinforced pipes and other structures where carbonation has reached the reinforcement level. Often the corrosion damage cannot be determined until visible signs of cracking and spalling are evident.

ASTM Committee G01 on Corrosion of Metals is actively involved in the writing and evaluation of test methods related to corrosion of metals. Subcommittee G01.14 on Corrosion of Reinforcing Steel is the committee addressing rebar corrosion. An active goal of Subcommittee G01.14 is to develop test methods that can be used to determine and predict the corrosion rates of steel in concrete. Nondestructive techniques would be quite useful in assessing the condition of reinforced concrete in laboratory and more importantly field conditions. The results could be used to develop maintenance and repair schedules, and to evaluate new corrosion protection methods. The symposium thus provides a useful starting point in the evaluation of test methods to be developed by ASTM.

Realizing that corrosion of steel in concrete is also of interest to ASTM Committee C09 on Concrete and Concrete Aggregates, G01.14 is cooperating closely with subcommittees in C09. This Special Technical Publication (STP) is the result of a joint symposium cosponsored by Subcommittees G01.14, C09.03.08.04 (Corrosion Inhibitors), and C09.03.15 on Methods of Testing the Resistance of Concrete to Its Environment.

This STP contains eleven papers dealing directly with methods of determining corrosion rates of steel in concrete. Several of these papers and the other two papers also address other issues of interest such as chloride ingress, the effects of pozzolans, concrete properties, corrosion inhibitors, different metals and repair techniques, and mechanisms of corrosion. Not all of the methods or mechanisms discussed are universally used or accepted, but they do show the active interest in this area of study, and the diversity of views.

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