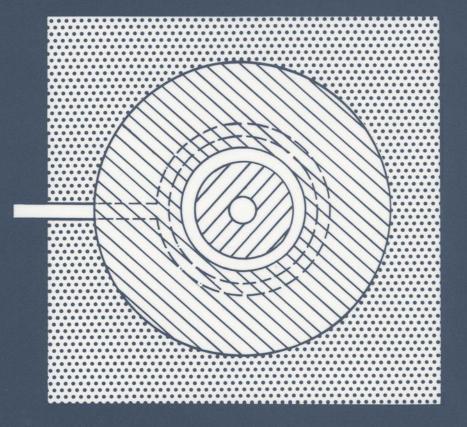
Corrosion Rates of STEEL in CONCRETE



Berke/Chaker/Whiting, editors



STP 1065

Corrosion Rates of Steel in Concrete

Neal S. Berke, Victor Chaker, and David Whiting, editors



Library of Congress Cataloging-in-Publication Data

Corrosion rates of steel in concrete/Neal S Berke, Victor Chaker, and David Whiting, editors

(STP 1065)

Proceedings of a symposium held in Baltimore, Md, June 29, 1988 and sponsored by the ASTM Committee G-1 on Corrosion of Metals and others

Includes bibliographical references

"ASTM publication code number (PCN) 04-010650-07"—T p verso

ISBN 0-8031-1458-3

1 Reinforcing bars—Corrosion—Congresses 2 Chlorides—Congresses I Berke, Neal Steven, 1952— II Chaker, Victor III Whiting, D (David) IV American Society for Testing and Materials Committee G-1 on Corrosion of Metals V Series ASTM special technical publication, 1065

ŤA445 5 C69 1990

620 1'723---dc20

90-509

CIP

Copyright © by American Society for Testing and Materials 1990

NOTE

The Society is not responsible, as a body, for the statements and opinions advanced in this publication

Peer Review Policy

Each paper published in this volume was evaluated by three peer reviewers. The authors addressed all of the reviewers' comments to the satisfaction of both the technical editor(s) and the ASTM Committee on Publications

The quality of the papers in this publication reflects not only the obvious efforts of the authors and the technical editor(s), but also the work of these peer reviewers. The ASTM Committee on Publications acknowledges with appreciation their dedication and contribution of time and effort on behalf of ASTM.

Foreword

The symposium on Corrosion Rates of Steel in Concrete was held in Baltimore, Maryland, on 29 June 1988 The symposium was sponsored by ASTM Committee G01 on Corrosion of Metals and ASTM Committee C09 on Concrete and Concrete Aggregates and its Subcommittees C09 03 08 on Admixtures and C09 03 15 on Concrete's Resistance to Its Environment Neal S Berke, W R Grace and Company, Victor Chaker, Port Authority of New York and New Jersey, and David Whiting, Construction Technology Laboratories, Presided as symposium cochairmen and are editors of this publication

Contents

Overview	J
The Threshold Concentration of Chloride in Concrete for the Initiation of Reinforcement Corrosion—C M HANSSON AND B SØRENSEN	3
Influence of Blast Furnace Slags on the Corrosion Rate of Steel in Concrete— C VALENTINI, L BERARDO, AND I ALANIS	17
An Initial Effort to Use the Corrosion Rate Measurements for Estimating Rebar Durability—C ANDRADE, M C ALONSO, AND J A GONZALEZ	29
Comparison of the Polarization Resistance Technique to the Macrocell Corrosion Technique—N S BERKE, D F SHEN, AND K M SUNDBERG	38
Corrosion Rate Determination on Repaired Reinforced Concrete Specimens— H G WHEAT	52
Corrosion Measurements of Reinforcing Steel in Partially Submerged Concrete Slabs—A. AGUILAR, A. A. SAGUÉS, AND R. G. POWERS	66
Measuring the Rate of Corrosion of Steel in Concrete—E. ESCALANTE AND S ITO	86
Corrosion Monitoring for Reinforcing Bars in Concrete—K MATSUOKA, H KIHIRA, S ITO, AND T MURATA	103
Study of the Corrosion of Concrete Reinforcement by Electrochemical Impedance Measurement—L. LEMOINE, F WENGER, AND J. GALLAND	118
Quantitative Measurement of the Corrosion Rate Using a Small Counter Electrode in the Boundary of Passive and Corroded Zones of a Long Concrete Beam—C ANDRADE, A. MACIAS, S FELIU, M. L ESCUDERO, AND J A GONZÁLEZ	134
Potential Mapping and Corrosion of Steel in Concrete—B ELSENER AND H BOHNI	143
The Use of a Potential Wheel to Survey Reinforced Concrete Structures— J P BROOMFIELD, P E. LANGFORD, AND A. J EWINS	157
Mechanisms of Corrosion of Steel in Concrete—B BORGARD, C WARREN, S. SOMAYAJI, AND R HEIDERSBACH	174
Author Index	189
Subject Index	191