Summary

The 25 papers that are included in this STP provide a representative cross section of the recent international interest and activity in corrosion of materials in atmospheric environments. The subject matter of the individual papers lend themselves to categorization in the areas of

- materials performance,
- environment characterization, and
- test methods.

The principal focus of each paper dictated the broad category into which it has been placed. However, many papers include information on all three categories of materials performance, environment characterizations, and test methodologies. The reader therefore is encouraged to survey all groups of papers in the search for information on a particular subject category.

Materials Performance

The papers on characterization and documentation of materials performance encompass most major structural or architectural metals used in atmospheric applications. Articles by Shastry et al. and Raman deal with performance of weathering steels in a variety of atmospheric environments and discuss environmental conditions under which varying degrees of corrosion performance have been noted. Cleary summarizes results of industrial atmospheric tests to assess the benefits of a chromate passivation treatment on performance of Al-Zn coated sheet steel.

Three papers deal with performance of stainless steel alloys including one by Johnson et al. summarizing corrosion behavior of several alloys in various environmental applications. The paper by Baker and Lee reports results of a long-term marine atmosphere test of several stainless steels conducted by ASTM at several of its standard atmospheric test sites. Ito et al. summarize a test program on stainless steels that characterizes materials performance and environmental effects, outlines a new laboratory test method, and summarizes results of an alloy development program.

Materials performance in specific applications are presented in papers by Eiselstein and Caligiuri on high carbon steel in bridge suspension cables, Fishman on performance of architectural copper after up to 100-years exposure at Yale University, and Lee et al. on several materials used in telecommunications hardware in Canada.

The final group of materials performance papers include one by Baker and Morton on marine atmospheric exposures of eight classes of metals for periods from 23 to over 45 years. The paper by Baboian and Haynes summarizes results of 15-year tests at several test locations documenting behavior of a wide range of clad metal combinations. Dean and Anthony report on corrosion behavior of several wrought aluminum alloys exposed in an unstressed condition at three test sites for 10 years. The paper by Shaw and Aylor summarizes marine atmospheric test results for a variety of metallic, ceramic, and metallic/ceramic coatings on aluminum and steel alloys.

Environment Characterizations

A group of eight papers principally focus on assessing the effects of environmental factors on performance of materials and on the general characterization of relative environment corrosivi-

ties. Cramer et al. summarize results of a test program within the National Acid Precipitation Assessment Program to measure the corrosion behavior of structural metals and the incremental effects of acidic deposition. The paper by Vrobel and Knotkova describes a system of classifying relative corrosivity of geographic locations within Czechoslovakia for the purpose of enhancing service lives of structures and products. Kucera et al. also describe a system of classifying corrosivity of atmospheres based on tests at a number of sites in Scandinavia.

Haynie describes the results of a field study on galvanized steel performance in which environmental monitoring data provides a basis for characterizing relative environmental "cause" and corrosion "effect." In a similar vein, Franey summarizes laboratory tests in which effects of specific atmospheric trace gases are assessed on corrosion behavior of copper and copper alloys.

The paper by Knotkova and Tu reports laboratory test results designed to assess the combined effects of industrial and marine environments on corrosion. Duncan and Ballance also report on effects of marine atmospheres in their field studies designed to determine the extent of sea-salt influence on corrosion at sites inland from the coast. The paper by Graedel addresses the basic understandings of atmospheric chemistries and the potential effects of various environmental parameters on corrosion.

Test Methods

Methods for assessing corrosion behavior of materials are the principal focus of the final group of papers in this STP. Spence describes results of a test methodology designed to establish the relative effects of dry and wet deposition on corrosion of structural materials. Agarwala summarizes a corrosion monitoring test method for determining the corrosivity of naval environments. Ito et al. report on a test method to measure the relative protectiveness of rust films on weathering steel structures. The paper by Schubert describes the results of test using an accelerated test method designed to control and monitor critical parameters.

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