Corrosion is responsible for an enormous economic drain in the industrialized nations of the world. The National Bureau of Standards (NBS) estimates that the economic loss in both direct and indirect costs caused by corrosion in 1985 alone amounted to $167 billion. Direct costs include replacement of equipment and the application of corrosion prevention methods (for example, cathodic protection, protective coatings, and so forth); while indirect costs are associated with loss of product, plant shutdown or reduced efficiency, and failure of components and equipment. The NBS further estimate that 15%, or $25 billion, of these losses are avoidable by using the best currently available practices.

It should be noted that not included in the above estimates are other costs associated with corrosion related failures: losses, such as those resulting in injury to employees, hazards to the general public as a result of spills and leaks, the real although unmeasurable hardships that come about from forced plant shutdowns, and the like. Some of these losses could also be avoided with good practices.

In an effort to mitigate these indirect costs, ASTM Committees E-7 on Nondestructive Testing and G-1 on Corrosion of Metals jointly sponsored a three-day symposium in May 1984 in Montreal, Canada, where selected authors were invited to present papers that represented the state of the art in corrosion monitoring techniques. Through these 39 presentations and the 34 papers included in this STP, it is anticipated that the plant operator will have a better knowledge of the latest corrosion detection and monitoring techniques.

If more detailed information regarding the forms of corrosion is needed to supplement this volume, it is suggested that the reader refer to the following:


In addition, the following ASTM publications may be of interest:

- STP 624—*Nondestructive Testing Standards—A Review*
- STP 697—*Acoustic Emission Monitoring of Pressurized Systems*
- STP 727—*Electrochemical Corrosion Testing*
- STP 767—*Atmospheric Corrosion of Metals*
It should be noted that ASTM Committees E-7 and G-1 are concerned with the development of voluntary consensus standards, the promotion of knowledge, and the stimulation and sponsorship of research in the areas of nondestructive testing and corrosion of metals, respectively. Within these committees reside the recognized experts of their respective technical communities of nondestructive testing and corrosion of metals.

The standard test methods developed within ASTM are by design rigorously detailed, precise, and of the highest technical quality. These standards are recognized internationally and remain current since they must be regularly revised to reflect technological advances and demands of changing markets. The benefits of using ASTM standards are widely recognized, and include eliminating the need to develop individual specifications and test methods, while providing a common means of agreement between plant owners or operators and contractors. Standards are thus used to obtain and compare results, which can be considered uniform and reproducible. They may further be used to judge what is acceptable and what is not.

ASTM Committees E-7 and G-1 are comprised of people who have a common interest in promulgating the aforementioned benefits of committee participation. Membership is open to anyone who has expertise in any particular area of nondestructive testing or corrosion of metals.

Although the symposium has covered numerous applications of nondestructive testing and electrochemical techniques of monitoring corrosion, the reader is encouraged to search the literature for additional areas of application of these techniques. ASTM, the American Society for Nondestructive Testing (ASNT), the National Association of Corrosion Engineers (NACE), and the American Society of Metals (ASM) are excellent sources for this information.

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