CLEANING STONE AND MASONRY

A symposium sponsored by
ASTM Committee E-6
on Performance of
Building Constructions
Louisville, KY, 18 April 1983

ASTM SPECIAL TECHNICAL PUBLICATION 935
James R. Clifton, National Bureau of Standards editor

ASTM Publication Code Number (PCN)
04-935000-10

1916 Race Street, Philadelphia, PA 19103
Foreword

This publication, *Cleaning Stone and Masonry*, contains papers presented at the symposium on The Cleaning of Stone and Other Masonry, which was held in Louisville, Kentucky, on 18 April 1983. The event was sponsored by ASTM Committee E-6 on Performance of Building Constructions. Seymour Lewin, New York University, presided as chairman of the symposium, and James R. Clifton, National Bureau of Standards, served as editor of this publication.
Related
ASTM Publications

Masonry: Research, Application, and Problems, STP 871 (1985), 04-871000-07

Masonry: Materials, Properties, and Performance, STP 778 (1982), 04-778000-07
A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

ASTM Committee on Publications
ASTM Editorial Staff

Helen P. Mahy
Janet R. Schroeder
Kathleen A. Greene
William T. Benzing
Contents

Introduction ix

SELECTION OF CLEANING METHODS AND MATERIALS

Cleaning Efflorescences from Masonry — K. Lal Gauri, George C. Holdren, and Willard C. Vaughan 3

Performance Tests for Graffiti Removers — James R. Clifton and McClure Godette 14

Masonry Cleaning — The State of the Art — David W. Boyer 25

Criteria for Selection of a Most Appropriate Cleaning Method — Larry D. Jones 52

HISTORIC STRUCTURES

Chemical Cleaning of Historic Structures — A Practical Approach — Thomas H. Rudder 71

Cleaning the Masonry Interiors of Public Buildings — J. Walter Roth 83

Cleaning and Waterproofing of Historic Masonry Buildings — Robert C. Mack 96

CASE STUDY

A Case Study of the Cleaning and Conservation of Marble at the Schenectady, New York, City Hall — John G. Waite and Roger J. Cheng 107

DETERMINING THE EFFECTS OF CLEANING

A Macrostereogrammetric Technique for Measuring Surface Erosion Losses on Stone — Erhard M. Winkler 153

SUMMARY

Summary 165
<table>
<thead>
<tr>
<th>Indexes</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author Index</td>
<td>171</td>
</tr>
<tr>
<td>Subject Index</td>
<td>173</td>
</tr>
</tbody>
</table>
Introduction

Cleaning is an important process in the preservation and restoration of historic stone and masonry monuments and buildings. In addition, cleaning can have an important role in rehabilitation and repair projects by allowing inspection of the surface conditions before decisions are made on the extent of needed repairs. While often the main purpose of cleaning is to improve the aesthetic appearance of masonry, cleaning can also significantly increase the life of the masonry by the removal of deleterious surface deposits. However, the use of improper cleaning materials and practices can cause serious damage to masonry. A need, therefore, exists for standard test methods and performance criteria to form a technical basis for selecting effective but safe cleaning materials and processes. This need has become more urgent during the past two decades as growing levels of air pollution have resulted in increased accumulation of surface deposits containing acidic materials.

This volume contains papers presented at the ASTM symposium on The Cleaning of Stone and Other Masonry, sponsored by ASTM Committee E-6 on Performance of Building Constructions. The symposium was organized to disseminate information on the state of the art of cleaning materials and practices and on current research. Hopefully, dissemination of this information will result in more effective cleaning programs for stone and masonry.

James R. Clifton
National Bureau of Standards, Gaithersburg, MD 20899; editor.