Stone Cleaning of Heritage Buildings in Mumbai

A Handbook

M M R H C S

MUMBAI METROPOLITION REGION HERITAGE CONSERVATION SOCIETY

Information

Prepared by

Architectural Conservation Cell,
Research and Consultancy Directorate,
The Associated Cement Companies Ltd.

Published By

MMR-Heritage Conservation Society

FIRST PUBLISHED, 2002

ISBN 00-00000-00-0

PRICE: RS 000/-

This publication is based on the
MMR-Heritage Conservation Society
PROJECT REPORT ON STONE
CLEANING OF HERITAGE BUILDINGS

FOR FURTHER INFORMATION
CONTACT:
Heritage Conservation Committee, MCGM, Fort, Mumbai 400 001
Director, Engineering Services, MCGM, Mumbai

Printed By:

CONTENTS

Acknowledgements

Foreword

Preface

I Building Stones of Mumbai
• Mumbai: historical and architectural context
• Building stones of Mumbai

II Mechanisms of soiling and decay of stone surfaces
• Behaviour of stone building facades
• Soiling pattern
• The surface chemistry of soiling
• Stone decay

III Stone Cleaning
• Choice of cleaning technique
• Survey of the building
• Cleaning methods
• Post cleaning treatment and maintenance
• Conclusion

IV Impact of Cleaning Building Facades
• Effect of cleaning on the historic fabric
• Conservation and planning considerations in stone cleaning
• To clean or not to clean
• Health and safety
• Future directions

Appendices
I Meteorological and air pollution data of Mumbai
II Case studies to illustrate the issues relating to stone cleaning
Case study 1: Cleaning of a portion of the New Empire building (Kurla basalt and limestone) stone facade
Case study 2: Cleaning of Bombay House (Malad stone and limestone)

ACKNOWLEDGEMENTS

We would like to thank Ajit Warty, Commissioner, MMRDA and G. S. Pantbalekundri, special officer of Mumbai Metropolitan Region–Heritage Conservation Society, inviting us to work on the subject. We are grateful to Mr.Rahul Mehrotra, Architect & Ms.Vimal Shah, Governors of the MMR- Heritage Society for their valuable inputs and encouragement.

We are indebted to Dr Maureen Young, Masonry Conservation Research Group of Robert Gordon University, Aberdeen and Dr David Watt of De Montfort University, Leicester for their useful comments and guidance. We would also like to thank B.S. Rawat of the Geological Survey of India (GSI) and Dr Jain of National Laboratory for Conservation of Cultural Property (NRLCCP) for expert guidance in their respective fields.

The work is based on fieldwork and research conducted by Architectural Conservation Cell of The Associated Cement Companies Limited. This project was conceived and co-ordinated by Ravindra Gundu Rao, Manager, Architectural Conservation Cell. The research, compilation and synthesis of the handbook was undertaken by Ravindra Gundu Rao and Sanskriti Rawat, both conservation architects. Dr. S. K. Jatty provided the geological input and assisted in the analysis and testing of the samples. The documentation and fieldwork was carried out by Sanskriti Rawat, Sharmila Naik and Ramesh Bhole. Rochana provided the visual input and the design of the book was done by Ulhas Fernandes and Charles Trott, Ramesh Bhole and Nilesh Thakkar of ACC-Conservation Cell have provided valuable inputs to the publication in many ways.

The personnel of the Library Information Services of the ACC-RCD provided assistance in literature survey. The Research and Development Division of ACC-RCD conducted analysis of the samples.

Finally, credit is due to the editorial team consisting of consulting editor,Jehangir Merwanji, Ravindra Gundu Rao, Sanskriti Rawat,and Sharmila Naik for their efforts. Credits are due for Mr.L. Dwarkanath, Prof. of English, University Of Mysore for final editing and proof reading.

April 2000

FOREWORD

Bombay was originally a cluster of seven islands inhabited by fishermen – **Smaller Colaba, Colaba, Mazagaon, Worli, Matunga, Mahim and Salsette.** These islands were originally part of the Mauryan Empire under Ashoka. They were later ruled by Hindu dynasties till 1348 AD when the Muslims from Gujarat attacked and captured it. In 1534 a treaty between the ruling sultan and the Portuguese saw the islands pass into Portuguese hands, who later presented them to the British as a dowry for Charles II when he married princess Catherine of Braganza in May 1662. The islands were taken over by the East India Company in 1668 and within a period of 250 years Bombay was transformed from a group of fishermen's islands into 'Urbs Prima in Indis'.

During colonial rule, the city grew to be a major urban commercial centre with an overwhelming collection of some of the finest Gothic Revival buildings. It was the wealth of the city, an enlightened patronage and an enthusiastic government that created the right environment conducive to innovation and change (Davies, 1985). This was also made possible by the availability of good building materials and skilled workmen well trained in western architectural details. Light-coloured durable stones were quarried from Salsette island and the railways assisted in cheap and fast transport from outside Bombay of softer stone for carving. The Bombay School of Art provided a steady supply of local skilled craftsmen who translated the grand colonial dreams into reality.

Each period in the evolution of Bombay – a humble fishermen's settlement, a port town, trading city of traditional *waada*s, a manufacturing giant metropolis– resulted in its own architectural expressions using the unique requirements and cultural styles of the period, and more significantly the materials and techniques that were available at that time. The present urban landscape of the southern and central part of the city, now called Mumbai, is composed of stately stone buildings, particularly in the Fort area, the mill area of Parel and a few other religious and public buildings in other areas.

The colonial architecture of Bombay is the legacy of the British Empire, consisting of buildings essentially European in design and vocabulary, but utilising indigenous craftsmen and materials for construction. The architectural history of the British in India has been described as one of constant search for the 'Imperial Architectural Style',

PREFACE

This publication is specifically written for scientific cleaning of heritage buildings of Mumbai and is part of the activities of the Heritage Grants Scheme of the Mumbai Metropolitan Region–Heritage Conservation Committee. It describes the weathering mechanisms of the building stones of Mumbai and their soiling patterns. It will serve as a reference book for professionals, decision-makers and owners to develop an understanding of the nature of the soiling mechanisms and their subsequent cleaning techniques. The main purpose is to equip the readers with the requisite information to make an informed decision regarding the appropriate cleaning system. The publication aims to explore the use of stone cleaning in urban conservation and to keep the argument on the debate alive — whether to clean a stone building or not.

The conservation principle in cleaning is that, while bringing back the original splendour of the building, it shall not damage the original fabric of the building. Thus the basic principle of cleaning is that the most gentle technique with the least possible degree of intervention should be attempted. Cleaning methods differ widely in their ability to remove the soiling, as well as to cause damage. Different types of soiling differ widely in their tenacity and ability to damage the substrate. In principle, the more tenacious the soiling, the more aggressive is the method of cleaning and higher is the possibility of damage to the fabric. For effective cleaning it is better to use a combination of cleaning techniques as historic buildings have a range of materials, detailing and different kinds of soiling. This has to be done under the strict supervision of specialists. It must also be remembered that it is not a one off solution to conservation, nor is it the solution for a better environmental control.

Stone cleaning is a useful strategy as it provides an opportunity to get a closer look at the building and solve critical problems at that time.