

Preface

This book aims to strengthen the knowledge base dealing with materials in historic structures, their properties, technology of use and conservation, and their performance in transforming the environment. Many of the papers in this volume were presented during the European Geosciences Union General Assembly (sessions: GMPV10 “Challenges to historical materials in urban/anthropic environments”, and ERE10 “Natural stone resources for historical monuments”) held in Vienna, Austria (2006, 2007 and 2008). In addition to these a number of invited contributions have been chosen to fill gaps in the coverage of the meetings’ original aims.

The book consists of 17 chapters dealing with inorganic construction materials used in historic structures such as adobe, stone, brick, binders, concrete and plasters. The aims of the editors were to select contributions describing various materials and not to restrict the book to one specific historic material. The idea behind this approach was that at most historic sites a great variety of materials are used; and so a variety of approaches are needed to understand the present state and future changes in the materials. The authors are leading experts from various backgrounds in the fields of architecture, civil engineering, geology, materials and conservation science. This multi-disciplinary approach allowed for the coverage of historic materials from various aspects.

The Part I of the book deals with earth as the most ubiquitous and versatile building material. One paper focuses on a UNESCO World Heritage Site in earthen architecture built by the Arabs: the Alhambra in Granada, Spain. The other two papers focus on brick; and a description is given of its manufacturing processes and properties. A case study from a World Heritage Site in Vietnam draws attention to the wide-range of uses of this historic material.

The Part II deals with natural stone. Natural stone was a particularly important construction material used for numerous locally and globally well-known monuments. The papers on this historical construction material cover a wide geographical range throughout Europe and provide examples of various techniques used in diagnostic studies.

The Part III covers binders, concrete and the combination of different techniques; it provides some of the innovative aspects of the book: the view on the evolution of the binder based materials from Roman times till the present; opus caementicium and

the combination of this technique with brick and stone; pre-Portland cement mortars like pozzolan and lime mortars; Roman cement; and finally early reinforced concrete.

The closing group of papers deals with the engineering approach needed to monitor and reduce the seismic hazards for historic structures and masonry buildings using innovative techniques such as that of Fibre Reinforced Polymers (FRP).

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