

Contents

Preface	vii
SIEGSMUND, S., WEISS, T. & VOLLBRECHT, A. Natural stone, weathering phenomena, conservation strategies and case studies: introduction	1
Weathering of natural building stones	
ONDRASINA, J., KIRCHNER, D. & SIEGSMUND, S. Freeze–thaw cycles and their influence on marble deterioration: a long-term experiment	9
THOMACHOT, C. & JEANNETTE, D. Evolution of the petrophysical properties of two types of Alsatian sandstone subjected to simulated freeze–thaw conditions	19
CASSAR, J. Deterioration of the Globigerina Limestone of the Maltese Islands	33
Weathering processes	
DOEHNE, E. Salt weathering: a selective review	51
ZEISIG, A., SIEGSMUND, S. & WEISS, T. Thermal expansion and its control on the durability of marbles	65
MALAGA-STARZEC, K., LINDQVIST, J. E. & SCHOUBENBORG, B. Experimental study on the variation in porosity of marble as a function of temperature	81
WEISS, T., SIEGSMUND, S. & FULLER, E. R. Thermal stresses and microcracking in calcite and dolomite marbles via finite element modelling	89
Fabric dependence of physical properties	
WEBER, J. & LEPPER, J. Depositional environment and diagenesis as controlling factors for petro-physical properties and weathering resistance of siliciclastic dimension stones: integrative case study on the ‘Wesersandstein’ (northern Germany, Middle Buntsandstein)	103
STROHMEYER, D. & SIEGSMUND, S. Anisotropic technical properties of building stones and their development due to fabric changes	115
SIEGSMUND, S., VOLLBRECHT, A. & HULKA, C. The anisotropy of itacolumite flexibility	137
WEISS, T., RASOLOFOSON, P. N. J. & SIEGSMUND, S. Ultrasonic wave velocities as a diagnostic tool for the quality assessment of marble	149
MIDDENDORF, B. Physico-mechanical and microstructural characteristics of historic and restoration mortars based on gypsum: current knowledge and perspective	165
Biodeterioration	
POHL, W. & SCHNEIDER, J. Impact of endolithic biofilms on carbonate rock surfaces	177
SCHLAVON, N. Biodeterioration of calcareous and granite building stones in urban environments	195
HOPPERT, M., BERKER, R., FLIES, C., KÄMPER, M., POHL, W., SCHNEIDER, J. & STRÖBEL, S. Biofilms and their extracellular environment on geomaterial: methods for investigation down to nanometer scale	207

Quality assessment and conservation of stones

FITZNER, B., HEINRICHS, K. & LA BOUCHARDIERE, D. Limestone weathering on historical monuments in Cairo, Egypt	217
ALVAREZ DE BUERGO, M. & FORT GONZÁLEZ, R. Characterizing the construction materials of a historic building and evaluating possible preservation treatments for restoration purposes	241
RUEDRICH, J., WEISS, T. & SIEGSMUND, S. Thermal behaviour of weathered and consolidated marbles	255
MATIAS, J. M. S. & ALVES, C. A. S. The influence of petrographic, architectural and environmental factors in decay patterns and durability of granite stones in Braga monuments (NW Portugal)	273
MICHALSKI, S., GÖTZE, J., SIEDEL, H., MAGNUS, M. & HEIMANN, R. B. Investigations into provenance and properties of ancient building sandstones of the Zittau/Görlitz region (Upper Lusatia, Eastern Saxony, Germany)	283
KOCH, A. & SIEGSMUND, S. Bowing of marble panels: on-site damage analysis from the Oeconomicum Building at Göttingen (Germany)	299
SAHLIN, T., STIGH, J. & SCHOENBORG, B. Bending strength properties of untreated and impregnated igneous, sedimentary and metamorphic dimension stones of different thickness	315
Environmental conditions	
LEFÈVRE, R. A. & AUSSET, P. Atmospheric pollution and building materials: stone and glass	329
SMITH, B. J., TURKINGTON, A. V., WARKE, P. A., BASHEER, P. A. M., MCALISTER, J. J., MENEELY, J. & CURRAN, J. M. Modelling the rapid retreat of building sandstones: a case study from a polluted maritime environment	347
TÖRÖK, Á. Oolitic limestone in a polluted atmospheric environment in Budapest: weathering phenomena and alterations in physical properties	363
FASSINA, V., FAVARO, M. & NACCARI, A. Principal decay patterns on Venetian monuments	381
CHAROLA, A. E. & WARE, R. Acid deposition and the deterioration of stone: a brief review of a broad topic	393
VILES, H. A. Implications of future climate change for stone deterioration	407
KLEMM, W. & SIEDEL, H. Evaluation of the origin of sulphate compounds in building stone by sulphur isotope ratio	419
SCHAFFER, M. & STIEGER, M. A rapid method for the determination of cation exchange capacities of sandstones: preliminary data	431
Index	441