

DETERIORATION PHENOMENA OF BLACK LIMESTONE EXPOSED TO INDOOR ENVIRONMENT

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Owing to its typical colour, black limestone from quarry near Ljubljana was widely used particularly in baroque architecture of Central parts of Slovenia. Since a variety of altars and sculptures are made of abovementioned stone, our study is focused on characterization of deterioration phenomena of this limestone exposed to indoor environment, i.e. churches. As a part of broader conservation - restoration project, in-situ investigation of altar of St. Jacob Church (Ljubljana) by means of monument mapping has pointed out several types of deterioration phenomena, such as flaking, efflorescence, subflorescence, soiling, back weathering, selective weathering and discoloration. Proper knowledge of stone properties and understanding of deterioration factors and processes is necessary for successful maintenance, protection and restoration work. Optical microscopy, scanning electron microscopy with energy dispersive spectrometry, X-ray diffraction, chemical analysis, water absorption, Hg-porosimetry and BET method were used in order to provide a detailed characterization of samples taken from quarry and to characterize deterioration processes according to change of stone properties of monument. One of the main petrographical factors which effect the weathering behaviour of studied limestone are the presence of pyrite, dolomite and discontinuities represent by marlstones, while mechanism of limestone deterioration resulting in calcite and dolomite dissolution, pyrite oxidation an soluble salt crystallization. Results indicate that precipitation of soluble salts (gypsum, pentahydrate, starkeyite, hexahydrate) contribute to extensive limestone deterioration.