



Comparative analyses of the physical properties of repair mortar used in Hungarian limestone monuments

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Repair mortars used in the restoration practice of Hungarian limestone monuments were tested under laboratory conditions. Cubic and rectangular prism specimens were prepared from repair mortars. The comparative analyses included water absorption, pore-size distribution, micro-fabric analyses and strength tests such as uniaxial compressive strength and flexural strength. All parameters were measured after 3, 7, 14, 28 and 90 days of casting. Durability analyses were performed by using water and freeze-thaw cycles, as well as exposure to salts. Water saturated samples showed rapid material loss after 25 standardized freeze-thaw cycles meanwhile samples with smaller water content (undersaturated samples) seems to preserve their strength even after 100 cycles. The composition and the binder aggregate ratio also influence the strength and durability of mortars. According to the tests the limestone aggregate content decreases more the compressive strength, than the flexural strength of the studied mixtures of repair mortars. Water saturated samples that contain 50% of limestone aggregate has 50% are more sensitive to loss of strength than air-dry ones. Pore-size distribution seems to be one of the key controlling factors of mortar durability. The tests have also proved that there are marked differences in between the mechanical properties of repair mortars and Hungarian porous limestones. These studies have also pointed out the importance of compatibility between repair mortars and limestone and the difficulties in finding proper restoration materials.