

Effect of thermal cycling on the durability of concrete made from local materials in the Arabian Gulf countries

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Abstract: This paper presents results of a study on the effect of heating/cooling cycles on the durability of concrete made from available limestone aggregates in the Arabian Gulf countries. The coefficients of thermal expansion of three different limestone rocks, mortar and concrete were determined. Specimens of limestone rocks, mortar and concrete were heated in a temperature controlled oven to 80°C for 24 hours and then cooled in the oven to room temperature for another 24 hours. After 30, 60 and 90 cycles, specimens were tested for compressive and flexural strengths, pulse velocity and permeability. The test results indicate that the experimentally determined values of the coefficient of thermal expansion vary from 5.07 to $9.99 \times 10^{-6}/^{\circ}\text{C}$ and that the limestone rocks tested are thermally anisotropic.