

# Properties of Eco-Friendly Concrete Contained Limestone and Ceramic Tiles Waste Exposed To High Temperature

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## Abstract

In this recent work, ceramic tiles wastes (CW) were utilized as coarse aggregates in different weight fraction ratios starting with 10% till 100% at an increment of 10% in production of normal concrete. Also, 5% of cement weight was substituted via using limestone powder (LP). Slump value, fresh and dry density, absorption ratio and compressive and splitting tensile strengths were tested at 25 °C. As well, dry density and compressive and splitting tensile strengths were found after exposing the specimens to three target temperatures (200, 400 and 600) °C for 2 h. The results indicated that the usage of CW led to enhancing compressive and splitting tensile strengths at room temperature and the maximum increases in these strengths for 60% of CW, which were 164% and 128%, respectively, compared with normal concrete without CW and LP. The usage of CW enhances behavior of mixes exposed to high temperatures. The maximum remaining compressive strength ratios of tested series exposed to 200 °C and 400 °C were 0.882 and 0.804, respectively, for mixes made by using 50% of CW, and the maximum residual compressive strength ratio for series exposed to 600 °C was 0.780 for mix containing 70% of CW. Maximum remaining splitting tensile strength ratios of three series exposed to (200, 400 and 600) °C were 0.969, 0.895 and 0.836, respectively, for mix containing 70% of CW. The obtained results can give indication of producing environmental concrete with enhanced mechanical properties via using ceramic waste