

The Mechanical Properties of Ferrocement Mortar with Waste Plastic Fibers at Elevated Temperatures

Farah A. Al-Fahdawi, Abdulkader Ismail Al-Hadithi , Jamal A. Al-Asafi

The main aim of the current research was to investigate the behavior of ferrocement mortar reinforced with waste plastic fibers at elevated temperatures. The use of PET residues in ferrocement mortar at normal temperatures could be a viable option. However, the utilization of PET-containing ferrocement mortar in high-temperature applications requires more research. In this study, one reference mix was made along with 3 other mixes containing Polyethylene Terephthalate (PET) fiber by volumetric ratios of 0.5, 0.75, and 1%. Compressive and flexural strength tests were performed on the samples before and after being exposed to elevated temperatures. Each batch of ferrocement mortar samples was heated to the requisite temperature for roughly 60 minutes, then was progressively cooled to room temperature before being tested. The compressive and flexural strengths of some samples were evaluated at room temperature (25°C). Other samples were evaluated after being exposed to high temperatures in an electric furnace (100°C, 200°C, 400°C, and 600°C). Both compressive and flexural strengths were found to be significantly reduced after being exposed to a temperature greater than 400°C. Results proved that the addition of 0.75% PET was determined as the optimum percentage that enhanced the mechanical properties of the produced ferrocement mortar at 25°C. At 200°C, the ferrocement mortar samples retained their original color. As a result of the combustion of PET fibers, black spots formed on the top surfaces of the tested specimens that were heated to 400°C.