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## **Investigation of Addition Different Fibers on the Performance of Cement Mortar**

**Abstract-** This work presents an investigation of possibility incorporate of synthetic fibers (glass, nylon and carbon) at two states (short: 1cm, long: 5cm) effects on the mechanical properties of mortars (cement: sand composition (1:3)). Fibers materials used at different weight percentages ranged of (0, 0.4, 0.8, and 1.2) wt%. Density, water absorption, porosity, thermal conductivity, compressive strength and flexural strength experimentally investigated for mortar specimens after curing for (28 days). The results showed that the incorporation of these fiber materials improvement mechanical and physical tests for all reinforced samples with short and long fibers, and that the highest value of the mechanical and physical properties obtained from long fiber (5cm) reinforced cement samples with (1.2%Nylon), reaching the rate of increase in values of compressive strength by (17.74%), flexural strength by (52.8%), and water absorption by (4.54%), while reaching the rate of decrease in values of density by (5.32%). The higher values for short fiber (1cm) reinforced samples reaching the rate of increase in values of compressive strength by (10.92%), flexural strength by (40.65%), and water absorption by (6.65%), while reaching the rate of decrease in values of density by (8.91%). Results of thermal conductivity test showed decrease in values conductivity for all mortar samples with long short synthetic fibers and that the minimum value of conductivity obtained with (1.2%Carbon), reaching the rate of increase in values of thermal conductivity by (41.84%) for long fiber reinforced samples, while the lowest value for conductivity by (75.98%) for short fiber reinforced samples.

**Keywords-** Cement mortar, thermal conductivity, flexural strength, glass, nylon and carbon fibers.

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