

Producing of eco-friendly lightweight concrete using waste polystyrene particles as aggregates with adding waste plastic

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This research includes studying the possibility of producing a new kind of No-fines concrete by replacing granules of coarse aggregates with grains results from the fragmentation of industrial waste of polystyrene. This replacing were with different volumetric proportions of coarse aggregate, and theses volumetric ratios were equal to (5%, 10%, 15% and 25%). Waste plastic fibers (WPFs) resulting from cutting of soft drinks bottles were added for strengthening this new kind of concrete. Mixing ratio was equal to (1:5) (cement: coarse aggregate) by weight. One reference mix was produced for comparative purpose. Compressive strength, flexural strength and density tests were conducted, it was examined three samples of each examination and taking the average.

Compressive strength values of the new sustainable concrete were ranged from 10 MPa to 12.4 MPa at age of test equal to 28 days, while the average value of the density of this concrete at the same age reaches 1930 kg/m³. This average value of modulus of rupture was equal to 2.36 MPa at 28-day age test.