

Effect of Expanded Polystyrene Foam Aggregate on Strength and Shrinkage Characteristics of Foamed Concrete

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A study has been undertaken to assess some characteristics of foamed concrete, with a given density of 1200 kg/m³, made with expanded polystyrene foam aggregate (EPS). In addition, EPS particles were thermally treated to produce modified expanded polystyrene foam aggregate (MEPS). Thermally treating approach was applied as an effective method to enhance strength of expanded polystyrene foam particles leading to enhance the properties of produced concrete. To investigate the effect of foam presence, normal concrete mix was designed and compared with foamed concrete mix produced with the same mortar content. Properties such as compressive strength, tensile strength and drying shrinkage were assessed. It was found that adding recycled expanded polystyrene foam (EPS) as aggregates helped in slightly enhancing both the strength and shrinkage of foamed concrete. However, thermally treated of EPS to produce MEPS particles resulted in increasing the compressive and tensile strengths by about 68% and 79%, respectively; and reducing the shrinkage by about 52% of that of conventional foamed concrete mix, without EPS. In addition, adding polystyrene aggregates in both states (EPS and MEPS) slightly reduced the spread diameter.