Studi Sifat Mekanis Beton dengan Substitusi Parsial Expanded Polystyrene Daur Ulang Menggunakan Digital Image Correlation Analysis = Mechanical Properties Studies of Concrete with Recycled Expanded Polystyrene as Partial Substitution using Digital Image Correlation Analysis

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Abstrak

Penggunaan Expanded Polystyrene (EPS) daur ulang sebagai agregat dalam pembuatan beton ringan akan membuka potensi penanganan sampah EPS. Campuran beton dan mortar kemudian dilakukan substitusi menggunakan EPS sebesar 15%, 20%, dan 25% dari volume beton pada agregat. Sampel uji yang digunakan berupa beton silinder 15x30cm dan kubus 15x15x15cm serta mortar berupa kubus 5x5x5cm. Hasil penelitian yang didapat menunjukkan penambahan kadar EPS daur ulang mereduksi kuat tekan yang diiringi dengan penurunan berat isi beton dan mortar. Melalui pengujian menggunakan instrument strain gauge, didapatkan modulus elastisitas beton menurun dengan penambahan kadar persentase EPS daur ulang. Digital Image Correlation Analysis (DIC) menunjukkan bahwa nilai stiffness dan poisson ratio beton menurun dengan penambahan kadar persentase EPS daur ulang. Selain itu, nilai stiffness dan poisson ratio yang didapat menggunakan DIC analysis dipengaruhi oleh faktor bentuk dan dimensi dari benda uji.
..... The use of recycled Expanded Polystyrene (EPS) as an aggregate in lightweight concrete will open up the potential for handling EPS waste. The mixture of concrete and mortar was then substituted using EPS of 15%, 20%, and 25% of the concrete volume in the aggregate; the test samples were used in the form of cylindrical concrete 15x30cm and cubes 15x15x15cm and mortar in the form of cubes 5x5x5cm. The results showed that the addition of recycled EPS content reduced the compressive strength, accompanied by a decrease in the density of concrete and mortar. Through testing using a strain gauge instrument, it was found that the modulus of elasticity of concrete decreased with the addition of recycled EPS percentage levels. Digital Image Correlation Analysis (DIC) showed that the stiffness and poisson ratio of concrete decreased with the addition of recycled EPS percentage. In addition, the stiffness and poisson ratio values obtained using DIC analysis are influenced by the shape and dimensions of the test object.