Studi mengenai pengaruh umur terhadap korelasi kuat tekan dan cepat rambat gelombang ultrasonik pada beton ops dan silica fume dengan metode digital correlation analysis = Study on the effect of age on the correlation of compressive strength and ultrasonic wave propagation speed in ops concrete and silica fume using digital correlation analysis method.

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Abstrak

Salah satu pemanfaatan limbah kelapa sawit adalah dengan penggunaan cangkang kelapa sawit sebagai pengganti batu pecah dalam campuran beton. Penulis akan meneliti korelasi kuat tekan beton cangkang sawit dengan bahan pengganti semen berupa silica fume menggunakan metode destructive test dan non-destructive test yaitu ultrasonic pulse velocity (UPV). Penelitian dilakukan menggunakan benda uji sebanyak 16 kubus 15x15x15 cm dan 4 balok 15x15x60 cm. Pada umur beton 7, 14, dan 28 hari, benda uji kubus akan diuji tekan mengunakan compressive strength test machine serta pengujian DIC pada hari ke 28. Pengujian DIC dilakukan menggunakan kamera digital dan kemudian hasilnya akan diolah menggunakan softwareMATLAB dengan compiler Ncorr. Benda uji balok akan diuji menggunakan metode UPV untuk mengetahui cepat rambat gelombang ultrasonic pada setiap jam selama 24 jam pertama dan dilanjutkan sehari sekali sampai hari ke-28. Hasil pengujian UPV adalah hubungan logaritmik antara cepat rambat gelombang ultrasonic dengan umur beton dengan koefisien determinasi R2rata-rata = 0.85. Hubungan antara kuat tekan beton dengan cepat rambat gelombang ultrasonic menghasilkan persamaan Fc’ = 1,6237e7693xdengan R2= 0,5423. Hasil dari pengujian DIC berupa data dan diagram pergerakan deformasi yang kemudian diolah menjadi nilai stiffness dan poisson ratio.

.....One way to overcome the increasing of oil palm waste is to intensify the use of palm oil waste as coarse aggregate for concrete mix. The author will examine the correlation of compressive strength of palm shells concrete with cement replacements in the form of silica fume using the common destructive test and also non-destructive test methods, known as ultrasonic pulse velocity (UPV). The study is going to be conducted using 16 cube specimens of 15x15x15 cm and 4 beam specimens of 15x15x60 cm. At the age of 7, 14, and 28 days, cube specimens will be tested using compressive strength test machine and also DIC test on the 28thday. The DIC testing has been done using a Fuji Film XA-3 digital camera and the result was processed using MATLAB software with the addition of Ncorr compiler. Meanwhile, the beam specimens will be tested using UPV method that will occur every hour for the first 24 hour and will continue every day on the following days until the concrete reaches 28 days. The result of the UPV test is a logarithmic relationship between ultrasonic pulse velocity and concrete age with the average of coefficient of determination R2= 0.85. The relationship between the compressive concrete strength and ultrasonic pulse velocity produces the equation Fc’ = 1.6237e7693x with R2= 0.5423. The result of the DIC test are data and diagram of concrete displacement which then will be used to calculate stiffness and poissonratio of the concrete tested.