

OPTIMALISASI PEMBUATAN BETON RINGAN MENGGUNAKAN METODE TAGUCHI DENGAN PENAMBAHAN *SILICA FUME*

INTISARI

Oleh : Fajar Purwanto

Beton ringan adalah beton yang memiliki berat jenis lebih ringan dari pada bata pada umumnya. Beton ringan dibedakan menjadi 2 (dua) macam: *Autoclaved Aerated Concrete (AAC)* dan *Cellular Lightweight Concrete (CLC)*. Penelitian ini dititik beratkan pada nilai kuat tekan beton optimum, porositas minimum dan berat jenis yang rendah dari variasi *mix design* yang dibuat.

Beton ringan yang di pakai dalam penelitian ini dengan jenis CLC (*Cellular Lightweight Concrete*) dengan bahan penyusun yang meliputi air, pasir, semen *silica fume*, *bubble* dan *superplacitizer*. Metode yang digunakan adalah metode Taguchi dengan penetapan 4 bahan 3 variasi. *Water/cement* (w/c): 0,40; 0,45; 0,50, *Sand/Cement* (s/c): 0,25; 0,50; 0,75 , *Foam(bubble)* 40%, 50%, 60% (%):, *Silica Fume/ Cement* (%):0,1000; 0,1500; 0,200 ,*Superplasticizer* (%): 0.05. Pengujian yang dilakukan yaitu uji kuat tekan ,porositas dan uji berat jenis.

Hasil penelitian berdasarkan nilai kuat tekan yang optimum *mix design* 6 dengan nilai rata-rata kuat tekan $3,4 \text{ N/mm}^2$, nilai porositas minimum *mix design* 2 dengan nilai rata-rata porositas 16,70 %, dan nilai berat jenis minimum *mix design* 5 dengan nilai rata-rata berat jenis 545.60 kg/m^3 . Setelah menggunakan menggunakan Metode Taguchi di dapatkan komposisi campuran untuk kuat tekan maksimum adalah *Water/cement* (w/c): 0,45, *Sand/Cement* (s/c): 0,75 , *Foam(bubble)* 40% (%):, *Silica Fume/ Cement* (%) : 0,1500, untuk komposisi porositas minimum *Water/cement* (w/c): 0,40 *Sand/Cement* (s/c): 0,75 , *Foam(bubble)* 50 (%):, *Silica Fume/ Cement* (%):0,200 sedangkan untuk berat jenis minimum adalah *Water/cement* (w/c): 0,40, *Sand/Cement* (s/c): 0,25, *Foam(bubble)* 60% (%):, *Silica Fume/ Cement* (%):0,1000.

OPTIMALIZATION USING LIGHTWEIGHT CONCRETE MAKING TAGUCHI METHOD WITH ADDITION OF SILICA FUME

ABSTRACT

By : Fajar Purwanto

Lightweight concrete is concrete that has a specific gravity lighter than a brick in general . Lightweight concrete is divided into two (2) types : autoclaved Aerated Concrete (AAC) and Cellular Lightweight Concrete (CLC) . This research emphasis on optimum value of concrete compressive strength , minimum porosity and density that is lower than the variation mix design are made .

Lightweight concrete in use in this study with the type of CLC (Cellular Lightweight Concrete) the constituent material which includes water , sand , cement silica fume , bubble and superplacitizer . The method used is the Taguchi method with determination 4 3 material variations . Water / cement (w / c) : 0.40 ; 0.45 ; 0.50 , Sand / Cement (s / c) : 0.25 ; 0.50 ; 0.75 , Foam (bubble) 40 % , 50 % , 60 % (%) : , Silica Fume / Cement (%) : 0.1000 ; 0.1500 ; 0.200 , superplasticizer (%) : 0:05 . Tests were performed that test compressive strength, porosity and density test.

The results based on the value of the compressive strength of the optimum mix design 6 with an average value of compressive strength of 3.4 N / mm² , minimum porosity value mix design 2 with an average porosity of 16.70 % , and the value of the minimum specific weight mix design 5 with an average density of 545.60 kg / m³ . After using using the Taguchi method in the composition of the mixture to get the maximum compressive strength is Water / cement (w / c) : 0.45 , Sand / Cement (s / c) : 0.75 , Foam (bubble) 40 % (%) : , Silica Fume / cement (%) : 0.1500 , for a minimum porosity composition Water / cement (w / c) : 0.40 Sand / cement (s / c) : 0.75 , Foam (bubble) 50 (%) : , Silica Fume / cement (%) : 0.200 whereas the minimum specific weight is water / cement (w / c) : 0,40 , Sand / cement (s / c) : 0.25 , Foam (bubble) 60 % (%) : , Silica Fume / Cement (%) : 0.1000.