

INTISARI

DESAIN CAMPURAN OPTIMUM BETON RINGAN (*LIGHTWEIGHT FOAM CONCRETE*) DENGAN BAHAN TAMBAHAN *SILICA FUME* DAN BUBUK KAPUR MENGGUNAKAN METODE TAGUCHI

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Saat ini, permintaan dari dunia konstruksi terhadap material bangunan yang memiliki kualitas tinggi meningkat. Terutama terhadap konstruksi beton khususnya beton ringan juga dituntut untuk memiliki kuat tekan tinggi. Berbagai faktor mempengaruhi kualitas beton termasuk diantaranya adalah komposisi material penyusun beton. Berbagai campuran tambahan biasa dilakukan untuk meningkatkan kuat tekan beton non-struktural. Dalam penelitian ini digunakan bahan tambahan silika fume dan bubuk kapur dengan maksud mengurangi penggunaan semen. Sedangkan metode yang digunakan adalah Metode Taguchi, dimana metode ini merupakan usaha untuk meningkatkan kualitas suatu produk dengan optimalisasi desain produk untuk mendapatkan hasil yang sesuai dengan target dan memiliki variasi yang minimum.

Penelitian ini bertujuan untuk mengetahui proporsi campuran maksimum *lightweight foam concrete* yang ditinjau dari segi kuat tekan, porositas, dan berat jenis. Benda uji pada penelitian berupa benda uji berbentuk kubus berukuran 50 mm x 50 mm x 50 mm yang digunakan untuk pengujian kuat tekan, porositas dan, berat jenis. Terdapat 16 mix design dimana setiap mix design memiliki 5 benda uji.

Dari hasil penelitian didapatkan campuran optimum berdasarkan kuat tekan yaitu 260 kg semen, 300 kg pasir, 160 liter air, 60 kg *silica fume*, 80 kg bubuk kapur, 400 liter *foam*, dan 2 kg *superplasticizer*. Sedangkan campuran optimum berdasarkan porositas hampir sama dengan kuat tekan, hanya yang membedakan adalah kebutuhan air sebanyak 180 kg. Selain itu, campuran optimum berdasarkan berat jenis yaitu 320 kg semen, 100 kg pasir, 180 liter air, 40 kg *silica fume*, 40 kg bubuk kapur, 700 liter *foam*, dan 2 kg *superplasticizer*. Campuran optimum tersebut berdasarkan kebutuhan 1 m³.

Kata kunci : beton ringan, kuat tekan, porositas, berat jenis, Metode Taguchi.

ABSTRACT

OPTIMUM MIXTURE DESIGN OF LIGHTWEIGHT FOAM CONCRETE WITH ADDITIONAL SILICA FUME AND MILL USING TAGUCHI METHOD

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Nowadays, construction fields are demanded to have building materials which have great qualities increased. Especially for concrete such as non-structural concrete is being asked to have high compression strength. Various factors influence concrete's compression strength such as material composition. Kind of admixture are used to increase non-structural concrete's compression strength. In this research use silica fume and mill as admixture to decrease cement needed. Meanwhile, method used is Taguchi Method. Taguchi method is an effort to rise qualities, with optimizing product design for getting result that is suitable with target and has minimum variability value.

This research aims to obtain maximum mixture of lightweight foam concrete which is observed based on compression strength, porosity, and density. Sample that is used in this research, are cube with 50 mm x 50 mm x 50 mm size. Those are used to test compression strength, porosity, and density. There are 16 mix design where each mix design have 5 samples.

The result of this research were obtained maximum mixture based on compression strength that were 260 kg cement, 300 kg sand, 160 litre water, 60 kg silica fume, 80 kg mill, 400 litre foam, and 2 kg superplasticizer. Whereas, maximum mixture based on porosity were similar with compression strength. The differences were only water needed as much as 180 kg. Besides, maximum mixture based on density were 320 kg cement, 100 kg sand, 180 litre water, 40 kg silica fume, 40 kg mill, 700 litre foam, and 2 kg superplasticizer. Those were for 1 m³ needed.

Keywords : *Lightweight foam concrete, compression strength, porosity, density, Taguchi Method.*