MECHANICAL PROPERTIES OF CONCRETE MIXED WITH WASTE GLASS

THESIS

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This is to certify that I am writing this thesis entitled (**MECHANICAL PROPERTIES OF CONCRETE MIXED WITH WASTE GLASS**).

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Abstract

The study of waste glass (WG) concrete mix was done to study mechanical properties of concrete mix with target characteristics strength 30MPa at 28 days age. The laboratory experimental study was conducted at Muhammadiyah University between October and December 2014,to find out the high strength and amount for Waste Glass as fine aggregates replacement in a concrete mix. Also alkali silica reaction (ASR) was determined by expansion test. For mechanical properties compressive strength, flexural strength and modulus of elasticity (MOE) were determined. All measurement was done in accordance to ASTM standard methods. Three sample content types of 10%, 15% and 20% concrete mix containing waste glass and control 0% concrete mix were prepared, casted and cured for 28 days before determination of mechanical properties, and mortar bar were caste and cured for 14 days for ASR determination. Results showed that highest measured characteristics strength was 30.72MPa, for flexural strength was 6.8MPa and for modulus of elasticity was 37.42MPa, and the high expansion test was 28% compared to control concrete mix. For the amount waste glass replacement was determined in relation to high characteristics strength yield which was found at 10% WG replacement. The conclusion reached to this study were; Maximum characteristic strength for glass concrete mix was reached with 10% fine aggregate replaced was 30.72Mpa at 28 days age. While for ASR ,fine aggregate replacement by waste glass showed expansion at all amount replaced.

Abstract

Studi tentang limbah kaca (WG) beton dilakukan untuk mempelajari sifat mekanik beton dengan karakteristik sasaran kekuatan 30MPa pada 28 hari usia. Laboratorium Penelitian eksperimental dilakukan di Universitas Muhammadiyah antara Oktober dan Desember 2014, untuk mengetahui kekuatan tinggi dan jumlah Limbah Kaca sebagai pengganti agregat halus dalam campuran beton. Juga silika reaksi alkali (ASR) ditentukan dengan uji ekspansi. Untuk sifat mekanik kuat tekan, kuat lentur dan modulus elastisitas (MOE) ditentukan. Semua pengukuran dilakukan sesuai dengan metode standar ASTM. Tiga jenis konten sampel dari 10%, 15% dan 20% campuran beton yang mengandung limbah kaca dan kontrol 0% campuran beton siap, dicor dan sembuh selama 28 hari sebelum penentuan sifat mekanik, dan bar mortir yang kasta dan sembuh selama 14 hari untuk Penentuan ASR. Hasil penelitian menunjukkan bahwa kekuatan karakteristik diukur tertinggi adalah 30.72MPa, lentur adalah 6.8MPa dan modulus elastisitas adalah 37.42MPa, dan uji ekspansi tinggi adalah 28% dibandingkan dengan kontrol campuran beton. Untuk penggantian kaca jumlah limbah ditentukan dalam kaitannya dengan hasil kekuatan karakteristik tinggi yang ditemukan pada 10% pengganti WG. Kesimpulan yang dicapai penelitian ini adalah; Kekuatan karakteristik maksimum untuk kaca beton dicapai dengan 10% agregat halus diganti adalah 30.72Mpa pada 28 hari usia. Sedangkan untuk ASR, penggantian agregat halus oleh kaca limbah menunjukkan ekspansi di semua jumlah yang diganti.

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