

**BEHAVIORAL STUDY OF CONCRETE  
COMPOSITE WITH MIXTURE OF FLY ASH AND  
CONCRETE SLUDGE AGGREGATE**

by

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Report submitted in partial fulfillment  
of the requirements for the degree  
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## **APPROVAL AND DECLARATION SHEET**

**This project report titled behavioral study of concrete composite with mixture of fly ash and concrete sludge aggregate was prepared and submitted by MOHD SHAKIRIM BIN HARITH (Matrix Number:101201663) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement of the Bachelor of Engineering (Building Engineering) in Universiti Malaysia Perlis (UniMAP).**

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## **MENGENAL SIFAT-SIFAT GABUNGAN KONKRIT DENGAN CAMPURAN HABUK DAN AGREGAT YANG DISELAPUTI SISA KONKRIT**

### **ABSTRAK**

Pada hari ini, simen dan batu agregat mendapat permintaan yang tinggi yang menunjukkan peningkatan terutamanya dalam industry pembinaan. Oleh itu, alternatif untuk menggantikan sebahagian daripada simen dan agregat adalah dengan menggunakan habuk dan agregat yang diselaputi sisa konkrit. Dari penyelidikan, habuk dan agregat yang diselaputi sisa konkrit memerlukan ruang tapak pelupusan sedangkan masalah kepadatan penduduk adalah tinggi dan harga yang mahal. Terdapat empat jenis sampel peratusan yang berbeza. Untuk sampel 1, peratusan habuk dan agregat yang diselaputi sisa konkrit adalah 0% dan dikenali sebagai spesimen kawalan. Kemudian, sampel 2 digunakan 15% habuk dan 20% agregat enapcemar. Seterusnya, sampel 3 menggunakan 15% habuk dan 30% agregat enapcemar. Akhir sekali, sampel 4 menggunakan 25% habuk dan 30% agregat enapcemar. Saiz konkrit yang digunakan adalah 150 mm x 150 mm x 150 mm. Ujian yang dilakukan adalah untuk membandingkan sifat kimia, fizikal dan kejuruteraan diantara konkrit biasa dengan konkrit yang diubahsuai. Ujian ketumpatan yang paling tertinggi pada konkrit yang diubahsuai adalah 2360 kg/m<sup>3</sup> untuk 28 hari. Kadar peratusan serapan air yang paling rendah pada konkrit ubahsuai adalah 2.479% untuk 28 hari. Kemudian, ujian kekuatan mampatan juga dilakukan pada konkrit ubahsuai yang mana mampu menerima beban tertinggi iaitu 24.044 MPa dalam 28 hari. Selain itu, ujian kekuatan lentur juga dijalankan pada sampel rasuk yang mana sampel rasuk yang diubahsuai mampu menanggung beban 1.155 MPa. Penggantian terbaik untuk simen dan batu agregat adalah sampel 2.

## ABSTRACT

Nowadays, the high demand of cement and aggregate are an indication of development especially for the construction industry. Thus, the alternative to replace partial replacement of cement and aggregate are by using the fly ash and concrete sludge aggregate. From the research, fly ash and concrete sludge aggregate needs space of landfill to dispose off whereas the population density is high and expensive price. There were four types of different percentage samples were used. For sample 1, percentage replacement of fly ash and concrete sludge aggregate was 0% and was known as a control specimen. Then, sample 2 was used 15% of fly ash and 20% of sludge aggregate. Next, sample 3 was used 15% of fly ash and 30% of sludge aggregate. Lastly, sample 4 was used 25% of fly ash and 30% of sludge aggregate. The concrete specimens' size that had been used is 150 mm x 150 mm x 150 mm in cube mould. The samples were tested to compare chemical, physical and engineering properties between standard concrete and replacement concrete. The highest density for replacement concrete was 2360 kg/m<sup>3</sup>. The lowest percentage of water absorption was 2.479% for 28 days. Then, the compressive strength also was done at replacement concrete which is able to receive higher load with 24.044 MPa for 28 days. On the other hand, the flexural strength test also was done in beam sample which is replacement beam sample able to receive 1.155 MPa of load. The best replacement for cement and aggregate was sample 2.

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