LABORATORY PREPARATION OF WHITE CEMENT AND ITS ANALYSIS

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ABSTRACT

This research is to prepare white cement using chemical to find out the best composition.

4 main compounds of chemical for producing white cement are CaO, SiO_2, Al_2O_3 and Fe_2O_3 with 65.68%, 22.71%, 5.47% and 0.33% respectively. The tests that have been done are loss of ignition, free lime and x-ray fluorescence test, for chemical test while for the physical tests are sieve residue, setting time, soundness and fineness test. The soundness test showed no expansion happen while the loss of ignition, free lime, residue and setting time tests showed a higher values than the ordinary white Portland cement. The value for fineness test were 280, 330 and 390 m^2/kg were within the ASTM range (200 - 600 m^2/kg) and Malaysia Standard Speciation but still not suitable for commercial use. Test results indicated that the cement sample should be prepared finer, heating at higher temperature (1280°C-1540°C) and storage properly before testing.

ABSTRAK

Kajian ini dijalankan untuk menyediakan simen putih menggunakan bahan kimia bagi mendapatkan komposisi yang terbaik. Empat bahan kimia utama yang diperlukan untuk menghasilkan simen putih adalah CaO, SiO_2, Al_2O_3 dan Fe_2O_3 dengan komposisi bagi tiap-tiap bahan kimia adalah 65.68%, 22.71%, 5.47% dan 0.33%. Ujian-ujian yang telah dilakukan ke atas sampel ialah ujian kehilangan jisim sampel (loss of ignition), ujian kapur bebas (free lime) dan analisa komposisi sampel (x-ray fluorescence) bagi ujian sifat kimia dan ujian penentuan sifat fizik yang dilakukan adalah ujian baki ayakan (sieve ayakan), masa pemejalan (setting time),pengembangan atau pengecutan (soundness), dan ujian kehalusan saiz partikel (fineness). Ujian 'soundness' menunjukkan tiada pengembangan berlaku sementara itu bagi ujian kapur bebas, kehilangan jisim sampel, masa pemejalan dan baki ayakan menunjukkan peratusan yang lebih tinggi berbanding peratusan bagi simen putih biasa. Nilai bagi ujian kehalusan adalah 280, 330 dan 390 m^2/kg dan nilai ini berada dalam piawaian ASTM iaitu 200 hingga 600 m^2/kg serta Spesifikasi Piawaian Malaysia tetapi tidak sesuai untuk kegunaan komersil. Keputusan ujian menunjukkan bahawa sampel mesti disediakan lebih halus, dibakar pada suhu yang lebih tinggi (1280°C-1540°C) dan disimpan dengan elok sebelum melakukan ujian ke atas sampel.