

**PROPERTIES OF EMPTY FRUIT BUNCHES ASH (EFBash) CONCRETE**



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**En Mohd Amizan Mohamed @ Arifin**

Fakulti Kejuruteraan Awam  
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Y. Brs. Profesor./Tuan/Puan

**KELULUSAN PERMOHONAN DANA KECEMERLANGAN 05/2011**

Tajuk Projek : Properties Of Empty Fruit Bunches Ash (EFBash) Concrete  
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Dengan hormatnya perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan pihak Universiti telah meluluskan cadangan penyelidikan Y. Brs Profesor/tuan/puan untuk membiayai projek penyelidikan di bawah Dana Kecemerlangan UiTM.

3. Bagi pihak Universiti kami mengucapkan tahniah kepada Y. Brs. Profesor/tuan/puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyiapkan projek ini dengan cemerlang.

4. Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dari peruntukan yang diterima.

Peringkat Pertama	20%
Peringkat Kedua	40%
Peringkat Ketiga	40%

5. Untuk tujuan mengemaskini, pihak Y. Brs. Profesor/tuan/puan adalah diminta untuk melengkapkan semula kertas cadangan penyelidikan sekiranya perlu, mengisi borang setuju terima projek penyelidikan dan menyusun perancangan semula bajet yang baru seperti yang diluluskan. Sila lihat lampiran bagi tatacara tambahan untuk pengurusan projek.

Sekian, harap maklum.

**“SELAMAT MENJALANKAN PENYELIDIKAN DENGAN JAYANYA”**

Yang benar



**MUSTAFAR KAMAL HAMZAH**  
Ketua Penyelidikan (Sains dan Teknologi)

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## **5. Report**

### **5.1 Proposed Executive Summary**

Agricultural waste material that available to be used as a cement replacement in concrete mix is called Supplementary Cement Materials (SCM). One of the agricultural wastes that has potential to be used is the Empty Fruit Bunches (EFB). The EFBash offers advantages as SCM because it can prevent the environmental degradation and pollution. This ash will be tested with X- Ray Fluorescence Spectrophotometer (XRF) test to determine its chemical composition. The effects of using different percentages of EFBash replacement its compressive strength and durability will also be determined. For this research, the percentages of replacement of EFBash employed to cement (by weight) are 5%, 10%, 15%, 20% and 30%. The EFBash concrete of Grade 30 with 0.5, 0.55, 0.6 and 0.65 w/c ratios will be tested on its compressive strength and durability performance, i.e. by conducting compression test, permeability test and water absorption tests. The data will be taken from different ages i.e. 7, 14, 28, 60, 90 and 120 days. From this research, the optimum mix in achieving compressive strength and also the durability of EFBash concrete will be determined.

## 5.2 Enhanced Executive Summary

The benefits of Empty Fruit Bunch (EFB) as the partial cement replacement has been well established. For instance, the usage of EFB as cement replacement material not only harmless to the environment, but it also helps to preserve the natural resources. Besides, due to the high composition of Potassium, EFB can also be use as a fertilizer. EFB has been chosen based on its environmental-friendly characteristics and high in availability. In this paper, the EFB were incinerated using the Ferrocement Furnace to form Empty Fruit Bunch ash (EFBash). The percentage replacements of EFBash were 0% (control), 5%, 10%, 15%, 20% and 30%. The superplasticizers (SP) were added to the concrete mix according to certain specifications. It will be added to the concrete mix with EFBash as the pozzolanic ash in order to improve its workability. The concrete cube specimens were tested for compressive strength for the ages of 7, 14, 28, 60 and 90 days and its permeability against chloride ion for the ages of 30, 60 and 90 days by conducting Rapid Chloride Permeability Test. The result shows that the 5% EFBash concrete cube specimens gained the most optimum compressive strength compared to the other percentages of EFBash concrete cube specimens while 20% of EFBash replacement in concrete cube specimens gained the most optimum permeability compared to the other percentages of EFBash concrete cube specimens which mean the 20% of EFBash produce higher durability than other replacement specimens.