

## **PEMANFAATAN ABU SERABUT KELAPA (ASK) PADA BETON (KAJIAN PADA KUAT TEKAN, PERMEABILITAS DAN DURABILITAS)**

### **INTISARI**

Bahan limbah sering dimanfaatkan sebagai bahan substitusi pada beton. Salah satunya yaitu abu serabut kelapa. Bahan ini banyak terdapat di Indonesia, tetapi keuntungannya belum banyak dibicarakan dibandingkan dengan bahan beton yang lain. Pada penelitian ini menggunakan abu serabut kelapa (ASK) yang dibakar sampai suhu  $700^{\circ}\text{C}$  selama 2 jam. ASK ini disubstitusikan kedalam campuran beton sebesar 0%, 10%, 15%, 20%, 25% dari berat semen. Benda uji berupa silinder dengan diameter 150 mm dan tinggi 300 mm yang digunakan untuk melihat kuat tekan beton pada umur 7, 14, 28, 56, 90 hari. Silinder beton digunakan untuk melihat pengaruh pada beton setelah direndam larutan sulfat ( $\text{MgSO}_4$ ) pada umur 90 hari yang dicelupkan setelah umur 28 hari. Kubus berukuran 150 mm x 150 mm x 150 mm untuk uji serapan setelah umur 28 hari.

Dari uji *X-Ray Deffraction* diketahui ASK mengandung bahan pozzolan berupa silika aktif atau amorf. Uji *Atomic Absorbtion Spectrofotometry* menunjukan ASK mengandung 42,98% silika. Pada silinder ASK-20% menunjukan kenaikan kuat tekan sebesar 6,13% dan 10,14% dibandingkan ASK-0% pada umur 28 dan 90 hari. Benda uji ASK-20% menyerap air sebesar 1,29% dan 3,43%, lebih kecil dibandingkan ASK-0% yang besarnya 1,60% dan 4,90% setelah dicelupkan selama 10 menit dan 24 jam. Kedalaman penetrasi air pada benda uji ASK-25% sebesar 42,15 mm dan 55,83 mm lebih kecil dibandingkan ASK-0% yang besarnya 58,57 mm dan 80,77 mm. Pengujian ini diberi tekanan 1 bar selama 48 jam dan 3 bar selama 24 jam. Sisa kuat tekan benda uji ASK-20% setelah direndam larutan sulfat ( $\text{MgSO}_4$ ) 5% pada umur 90 hari adalah 93,27% lebih tinggi dibandingkan dengan ASK-0% yang sisa kuat tekannya 91,01%.

Kata kunci : abu serabut kelapa, pozzolan, silika amorf, larutan sulfat dan kuat tekan

***THE USE OF COCONUT FIBRE ASH ON CONCRETE  
(A CASE STUDY ON THE COMPRESSIVE STRENGTH , PERMEABILITY AND  
DURABILITY)***

***ABSTRACT***

*Certain pollutant materials are often used for material substitution of concrete. One of them is coconut fibre ash. This material is available anywhere in Indonesia but their advantages have not been discussed as often as other concrete materials. This research employed coconut fibre ash (CFA) which initially been burned out at about 700<sup>0</sup>C for two hours. This was substituted into concrete mix at 0%, 10%, 15%, 20% and 25% by weight of cement. Concrete cylinders having 150 mm diameter and 300 mm high were used for monitoring the compressive strength at the age of 7, 14, 28, 56, 90 days. Concrete cylinders were also employed to investigate the resistance of concrete after being soaked in sulphate solution (MgSO<sub>4</sub>) for 90 days. The immersion was done after 28 days of age. Concrete cubes having 150 mm x 150 mm x 150 mm were used for absorption test after 28 days of age.*

*From the X-Ray Diffraction test, the CFA contains pozzolanic material in term of active silica or amorphous. The Atomic Absorbtion Spectrophotometry test also indicates that the CFA contains of 42,98% silica. The cylinders with 20% CFA shows an increase of compressive strength of about 6,13% and 10,14% in comparison to the 0% CFA at 28 and 90 days of age. The sample with 20% CFA absorbes water of 1,29% and 3,43%, this is still smaller than that with 0% CFA, which absorbes water of 1,60% and 4,90% after respectively 10 minutes and 24 hours of immersion. The depth of penetration of water for sample with 25% CFA is 42,15mm to 55,83 mm, and this is still smaller than that with 0% CFA which is 58,57 mm to 80,77 mm. This experiment was done under pressures of 1 bar for 48 hours and 3 bar for 24 hours. The residual compressive strength of sample with 20% CFA, after being soaked in the 5% sulphate solution (MgSO<sub>4</sub>) for 90 days, is of 93,27% higher than that with 0% CFA which is 91,01%..*

***Key words:*** coconut fibre ash, pozzolan, amorph silica, sulphate solution, and compressive strength.