PENGARUH PEMANFAATAN KOMPOSIT SBE-SEMEN HASIL PRAKONDISI SEBAGAI MATERIAL SUBSTITUSI PARSIAL SEMEN TERHADAP KUAT TEKAN DAN SUSUT BETON

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh pemanfaatan komposit Spent Bleaching Earth (SBE)–semen hasil prakondisi sebagai material substitusi parsial semen terhadap kuat tekan dan susut beton, serta menentukan persentase substitusi yang memberikan hasil optimum. SBE disaring menggunakan ayakan No. 200 kemudian dicampurkan dengan semen pada variasi substitusi 5%, 7,5%, 10%, dan 12,5%. Penelitian dilakukan secara eksperimental menggunakan beton normal sebagai pembanding. Pengujian kuat tekan dilakukan pada umur 7 hari dan 28 hari menggunakan benda uji silinder, sedangkan pengujian susut dilakukan hingga umur 72 jam. Data dianalisis menggunakan statistik deskriptif, uji normalitas, korelasi Pearson, dan regresi linear sederhana dengan bantuan IBM SPSS Statistics.

Hasil penelitian menunjukkan bahwa variasi 5% SBE menghasilkan kuat tekan terbaik di antara seluruh variasi komposit, yaitu sebesar 31,50 MPa pada umur 7 hari dan 20,30 MPa pada umur 28 hari, sedangkan beton normal menghasilkan kuat tekan tertinggi pada umur 28 hari sebesar 28,33 MPa. Analisis statistik menunjukkan bahwa persentase SBE tidak berpengaruh signifikan terhadap kuat tekan beton umur 7 hari, tetapi berpengaruh negatif dan signifikan terhadap kuat tekan umur 28 hari. Pada pengujian susut, variasi 7,5% SBE menghasilkan nilai susut tertinggi sebesar 0,222 pada umur 72 jam, dan persentase SBE memiliki hubungan positif serta signifikan terhadap susut beton. Secara keseluruhan, variasi 5% SBE merupakan variasi optimum di antara seluruh campuran komposit SBE–semen yang diteliti.

Kata kunci: *Spent Bleaching Earth* (SBE), komposit SBE–semen, substitusi parsial semen, kuat tekan beton, susut beton.

THE EFFECT OF PRECONDITIONED SBE-CEMENT COMPOSITE AS A PARTIAL CEMENT SUBSTITUTE ON THE COMPRESSIVE STRENGTH AND SHRINKAGE OF CONCRETE

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ABSTRACT

This study aims to analyze the effect of utilizing preconditioned Spent Bleaching Earth (SBE)–cement composite as a partial cement replacement material on the compressive strength and shrinkage of concrete, as well as to determine the optimum substitution percentage. The SBE was first sieved using a No. 200 sieve and then mixed with cement at substitution levels of 5%, 7.5%, 10%, and 12.5%. The research employed an experimental method using normal concrete as the control mixture. Compressive strength tests were conducted on cylindrical specimens at the ages of 7 and 28 days, while shrinkage tests were carried out by observing the length changes of the specimens up to 72 hours. The data were analyzed using descriptive statistics, normality tests, Pearson correlation, and simple linear regression with the aid of IBM SPSS Statistics.

The results showed that the 5% SBE mixture produced the highest compressive strength among all composite variations, reaching 31.50 MPa at 7 days and 20.30 MPa at 28 days, while normal concrete achieved the highest compressive strength at 28 days, with an average value of 28.33 MPa. Statistical analysis indicated that the SBE percentage had no significant effect on the compressive strength of concrete at 7 days but had a significant negative effect at 28 days. In the shrinkage test, the 7.5% SBE mixture exhibited the highest shrinkage value of 0.222 after 72 hours, and the SBE percentage showed a positive and significant relationship with concrete shrinkage. Overall, the 5% SBE mixture was identified as the optimum substitution level among all preconditioned SBE–cement composite mixtures investigated.

Keywords*: Spent Bleaching Earth (SBE), SBE–cement composite, partial cement replacement, compressive strength, concrete shrinkage.*