ABSTRAK

Nur Akhyar Hasanah, NIM 4212540005 (2026). Analisis Uji Mekanis Beton dengan Penambahan Abu Cangkang Kerang Lokan dan *Silica Fume*.

Peningkatan kebutuhan pembangunan infrastruktur mendorong penggunaan beton secara masif, namun produksi semen Portland sebagai bahan utama beton berkontribusi terhadap emisi karbon dan eksploitasi sumber daya alam. Oleh karena itu, diperlukan alternatif bahan tambah yang lebih ramah lingkungan tanpa mengurangi mutu beton. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan abu cangkang kerang lokan dan *silica fume* terhadap nilai *slump* dan kuat tekan beton, serta menentukan variasi campuran yang menghasilkan kuat tekan optimum. Metode penelitian yang digunakan adalah eksperimen laboratorium dengan benda uji berbentuk silinder berdiameter 15 cm dan tinggi 30 cm. Variasi campuran terdiri atas 0%, 8%, 9%, dan 10% dari total berat semen, dengan pengujian *slump* beton segar dan pengujian kuat tekan pada umur 28 hari. Hasil penelitian menunjukkan bahwa penambahan abu cangkang kerang lokan dan *silica fume* menurunkan nilai *slump* dari 12 cm pada beton normal menjadi 9 cm pada seluruh variasi campuran, namun masih berada dalam rentang standar yang dipersyaratkan. Pada pengujian kuat tekan, beton normal menghasilkan kuat tekan sebesar 24,25 MPa, sedangkan variasi 8%, 9%, dan 10% masing-masing menghasilkan kuat tekan 17,53 MPa, 21,94 MPa, dan 16,13 MPa. Nilai kuat tekan optimum diperoleh pada variasi 9% dan memenuhi standar mutu beton struktural. Kesimpulan utama penelitian ini menunjukkan bahwa kombinasi abu cangkang kerang lokan dan *silica fume* berpengaruh signifikan terhadap sifat mekanik beton, dengan variasi 9% sebagai komposisi yang paling efektif. Hasil penelitian ini berimplikasi pada pengembangan beton berkelanjutan dengan pemanfaatan limbah sebagai bahan tambah alternatif.

Kata Kunci: Beton, abu cangkang kerang lokan, *silica fume*, kuat tekan, *slump*.

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ABSTRACT

Nur Akhyar Hasanah, NIM 4212540005 (2026). ***Mechanical Test Analysis of Concrete with the Addition of Lokan Shell Ash and Silica Fume*****.**

The increasing demand for infrastructure development has led to extensive use of concrete, while the production of Portland cement significantly contributes to carbon emissions and natural resource depletion. Therefore, the utilization of environmentally friendly supplementary materials is required to improve concrete sustainability without reducing its mechanical performance. This study aims to evaluate the effect of lokan shell ash and silica fume addition on the slump value and compressive strength of concrete, as well as to determine the optimum mixture variation. An experimental laboratory method was applied using cylindrical concrete specimens with a diameter of 15 cm and a height of 30 cm. The mixture variations consisted of 0%, 8%, 9%, and 10% of the total cement weight. Slump tests were conducted on fresh concrete, while compressive strength tests were performed at the age of 28 days. The results indicate that the addition of lokan shell ash and silica fume reduced the slump value from 12 cm in normal concrete to 9 cm in all modified mixtures, although the values still met the standard workability requirements. The compressive strength test results showed that normal concrete achieved a strength of 24.25 MPa, while the mixtures with 8%, 9%, and 10% additives resulted in strengths of 17.53 MPa, 21.94 MPa, and 16.13 MPa, respectively. The optimum compressive strength was obtained at the 9% variation, which satisfied the minimum structural concrete standard. The main conclusion of this study confirms that the combined use of lokan shell ash and silica fume significantly influences the mechanical properties of concrete, with the 9% variation providing the most favorable performance. These findings imply that waste-based materials can be effectively utilized as sustainable supplementary materials in concrete production.

Keywords: *Concrete, lokan shell ash, silica fume, compressive strength, slump*.

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