ABSTRAK

Yusnal Roni Ilham, Hasibuan NIM 5213250017 : Pengaruh Penambahan Serat Baja Terhadap Kuat Lentur dan Susut pada Beton Ringan yang Mengandung Serbuk Kaca

Beton ringan merupakan material konstruksi yang memiliki berat jenis lebih rendah dibandingkan beton normal, sehingga mampu mengurangi beban struktur. Namun, beton ringan memiliki kelemahan utama berupa kuat lentur yang relatif rendah serta kecenderungan mengalami susut yang lebih besar, yang dapat menyebabkan retak dan menurunkan kinerja struktural. Penelitian ini bertujuan untuk mengetahui pengaruh penambahan serat baja terhadap kuat lentur dan susut beton ringan yang mengandung serbuk kaca, serta menentukan variasi serat baja yang paling optimum. Pada penelitian ini digunakan beton ringan dengan agregat kasar batu apung dan serbuk kaca sebesar 12% sebagai substitusi sebagian agregat halus. Serat baja ditambahkan dengan variasi 0%, 2%, 4%, dan 6% dari volume beton. Perencanaan campuran beton mengacu pada standar ACI 211.2-98. Pengujian yang dilakukan meliputi uji kuat lentur dan uji susut beton pada umur 28 hari, dengan seluruh proses pengujian dilakukan dalam kondisi laboratorium yang terkontrol. Hasil penelitian menunjukkan bahwa penambahan serat baja memberikan pengaruh signifikan terhadap peningkatan kuat lentur beton ringan dan penurunan nilai susut. Nilai kuat lentur meningkat seiring bertambahnya kadar serat baja, sedangkan nilai susut mengalami penurunan. Variasi serat baja 6% menunjukkan hasil kuat lentur tertinggi dan nilai susut terendah dibandingkan variasi lainnya. Dengan demikian, penambahan serat baja pada beton ringan yang mengandung serbuk kaca terbukti efektif dalam meningkatkan kinerja mekanik dan ketahanan terhadap susut, sehingga berpotensi diaplikasikan sebagai material beton ringan struktural yang lebih baik.

Kata kunci: **beton ringan, serat baja, serbuk kaca, kuat lentur, susut.**

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ABSTRACT

Yusnal Roni Ilham Hasibuan,NIM 5213250017 : The Effect of Adding Steel Fiber on Flexural Strength and Shringkage in Lightweight Concrete Containing Glass Powder.

Lightweight concrete is a construction material with a lower density than normal concrete, which contributes to reducing structural dead load. However, lightweight concrete generally has lower flexural strength and higher shrinkage, which may lead to cracking and reduced structural performance. This study aims to investigate the effect of steel fiber addition on the flexural strength and shrinkage of lightweight concrete containing glass powder, as well as to determine the optimum percentage of steel fiber. In this study, lightweight concrete was produced using pumice stone as lightweight coarse aggregate and glass powder as a partial replacement of fine aggregate at a proportion of 12%. Steel fibers were added at variations of 0%, 2%, 4%, and 6% by volume of concrete. The concrete mix design was prepared based on ACI 211.2-98 standards. The experimental program included flexural strength and shrinkage tests conducted at the age of 28 days under controlled laboratory conditions. The results indicate that the addition of steel fibers significantly improves the flexural strength and reduces the shrinkage of lightweight concrete. The flexural strength increased with higher steel fiber content, while shrinkage values decreased accordingly. The concrete mixture with 6% steel fiber exhibited the highest flexural strength and the lowest shrinkage among all variations. It can be concluded that the incorporation of steel fibers in lightweight concrete containing glass powder effectively enhances mechanical performance and shrinkage resistance, making it suitable for structural lightweight concrete applications.

Keywords: lightweight concrete, steel fiber, glass powder, flexural strength, shrinkage.

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