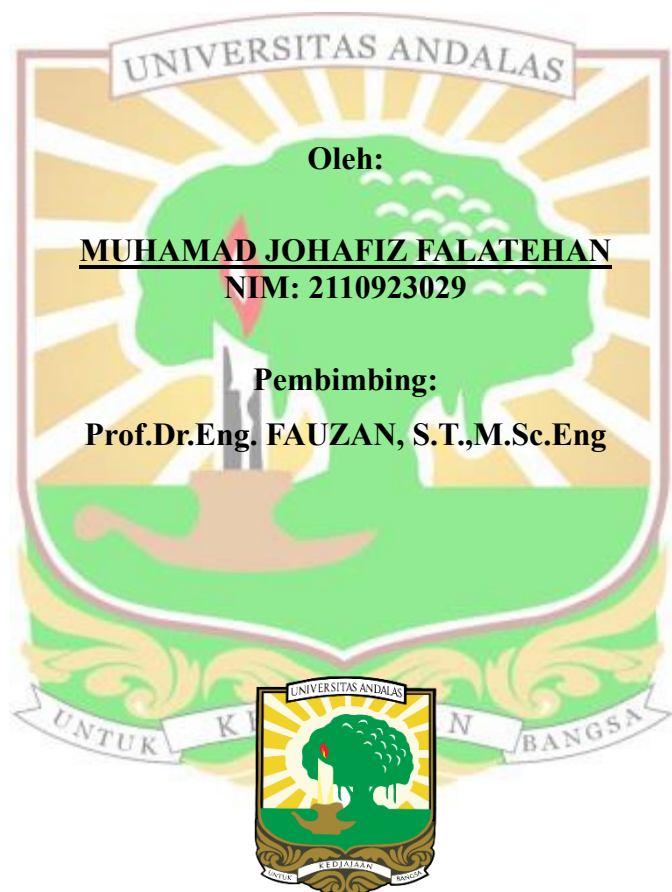


STUDI EKSPERIMENTAL PENGARUH SFWT TERHADAP KEKUATAN CAMPURAN BETON HESSCC (*HIGH EARLY STRENGTH SELF-COMPACTING CONCRETE*)

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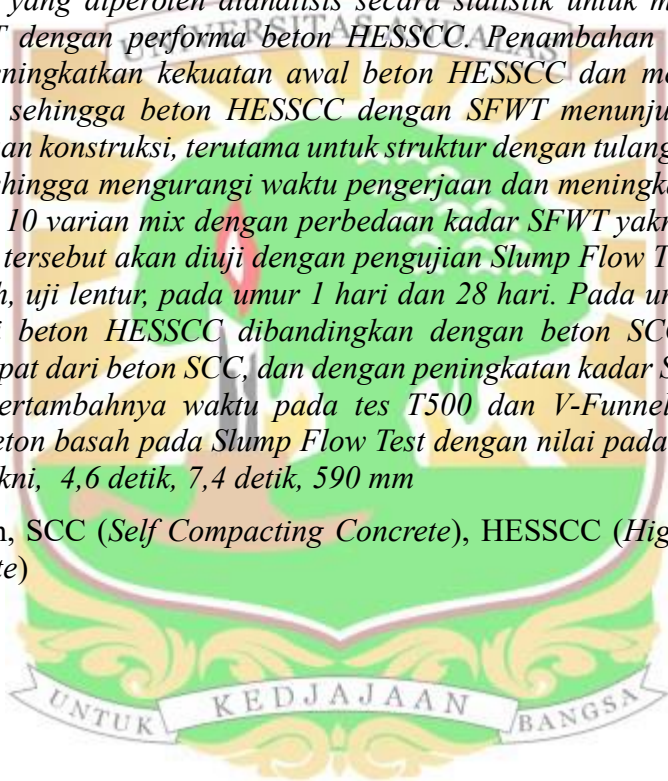
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ABSTRAK

High Early Strength Self-Compacting Concrete (HESCC) merupakan jenis beton SCC yang memiliki kemampuan plastisitas tinggi dan mudah mengalir karena beratnya sendiri, serta mampu mencapai kekuatan awal yang tinggi, sehingga sangat cocok digunakan untuk struktur yang sulit dilakukan pemadatan manual akibat tulangan sangat rapat, bentuk bekisting yang tidak memungkinkan, atau kondisi medan lokasi proyek yang terbatas; namun pertanyaan utama yang muncul adalah bagaimana penambahan Steel Fiber Waste Tyre (SFWT) dengan kadar tertentu dapat meningkatkan kekuatan campuran beton HESCC serta menjaga ketahanannya terhadap segregasi. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan SFWT dengan variasi kadar tertentu terhadap kekuatan awal dan ketahanan terhadap segregasi pada beton HESCC. Penelitian dilakukan melalui pembuatan campuran beton HESCC dengan berbagai variasi kadar SFWT, kemudian pengujian dilakukan untuk mengukur kekuatan awal beton, plastisitas, kemampuan aliran, serta ketahanan terhadap segregasi, dan data yang diperoleh dianalisis secara statistik untuk menentukan hubungan antara kadar SFWT dengan performa beton HESCC. Penambahan SFWT dengan kadar tertentu terbukti meningkatkan kekuatan awal beton HESCC dan menjaga ketahanannya terhadap segregasi, sehingga beton HESCC dengan SFWT menunjukkan efisiensi dalam pelaksanaan pekerjaan konstruksi, terutama untuk struktur dengan tulangan rapat atau kondisi medan yang sulit, sehingga mengurangi waktu pengerjaan dan meningkatkan efisiensi proyek secara keseluruhan. 10 varian mix dengan perbedaan kadar SFWT yakni; 0%, 0,5%, 1%, 1,5%, 2%, spesimen tersebut akan diuji dengan pengujian Slump Flow Test, V-Funnel Test, uji tekan, uji tarik belah, uji lentur, pada umur 1 hari dan 28 hari. Pada umur 1 hari kuat tekan dan kuat tarik dari beton HESCC dibandingkan dengan beton SCC meningkat dengan peningkatan 2 kali lipat dari beton SCC, dan dengan peningkatan kadar SFWT pada campuran maka didapatkan bertambahnya waktu pada tes T500 dan V-Funnel Test, serta semakin kecilnya diameter beton basah pada Slump Flow Test dengan nilai pada beton HESCC pada varian SFWT 2% yakni, 4,6 detik, 7,4 detik, 590 mm

Kata Kunci : Beton, SCC (Self Compacting Concrete), HESCC (High Early Strength Self Compacting Concrete)



ABSTRACT

High Early Strength Self-Compacting Concrete (HESCC) is a type of SCC characterized by high plasticity and the ability to flow under its own weight while also achieving high early strength. This makes it highly suitable for structures where manual compaction is difficult due to heavily congested reinforcement, complex formwork shapes, or restricted project site conditions. However, the main question arises regarding how the addition of Steel Fiber Waste Tyre (SFWT) at specific proportions can enhance the strength of the HESCC mixture while maintaining its segregation resistance. This research aims to analyze the effect of adding varying proportions of SFWT on the early strength and segregation resistance of HESCC. The study was conducted by preparing HESCC mixtures with various SFWT contents. Subsequently, tests were performed to measure the concrete's early strength, plasticity, flowability, and segregation resistance. The obtained data were statistically analyzed to determine the relationship between the SFWT content and HESCC performance. The addition of SFWT at specific proportions was proven to improve the early strength of HESCC and maintain its segregation resistance. Consequently, HESCC incorporating SFWT demonstrates efficiency in construction execution, particularly for structures with congested reinforcement or challenging terrain, thereby reducing construction time and enhancing overall project efficiency. 10 mix variants were prepared with different SFWT contents, namely 0%, 0.5%, 1%, 1.5%, and 2%. The specimens were subjected to Slump Flow, V-Funnel, compressive strength, split tensile strength, and flexural strength tests at the ages of 1 day and 28 days. At 1 day of age, the compressive and tensile strengths of HESCC exhibited a twofold increase compared to conventional SCC. Furthermore, increasing the SFWT content in the mixture resulted in longer flow times in the T500 and V-Funnel tests, as well as a smaller fresh concrete diameter in the Slump Flow test. Specifically, for the HESCC variant with 2% SFWT, the recorded values were 4.6 seconds, 7.4 seconds, and 590 mm, respectively.

Keywords: Concrete, SCC (Self Compacting Concrete), HESCC (High Early Strength Self Compacting Concrete)

