

ABSTRAK

Pengaruh Penggantian Sebagian Semen Portland dengan Kalsium Karbonat (CaCO_3) dan Penggunaan Superplastizer Consol P213 ESP Terhadap Desain Campuran Beton Dengan $f_c' 25$ MPA

Penelitian ini bertujuan untuk mengevaluasi pengaruh penggantian sebagian semen Portland dengan Kalsium Karbonat (CaCO_3) serta penggunaan superplastizer jenis Consol P213 ESP terhadap mutu beton dengan target kuat tekan $f_c' 25$ MPa. Metode penelitian dilakukan dengan merancang campuran beton menggunakan variasi kadar kalsium karbonat sebesar 0%, 4%, dan 6% dari berat semen, serta penambahan superplasticizer sesuai dosis yang direkomendasikan. Benda uji yang digunakan berupa silinder beton dengan dimensi $\varnothing 15 \times 30$ cm dan dilakukan pengujian kuat tekan pada umur 7 dan 14 hari.

Hasil pengujian menunjukkan bahwa penggunaan kalsium karbonat dalam batas tertentu mampu meningkatkan kuat tekan beton awal dan memperbaiki kohesi antar material. Penambahan superplasticizer juga terbukti mampu menurunkan kebutuhan air tanpa mengurangi workability beton secara signifikan. Dari hasil penelitian disimpulkan bahwa kombinasi CaCO_3 dan superplasticizer dapat digunakan sebagai alternatif material dalam perencanaan beton struktural yang efisien dan ramah lingkungan.

Kata Kunci: Kalsium Karbonat, Superplasticizer, Consol P213 ESP, Kuat Tekan, Beton $f_c' 25$ Mpa

ABSTRACT

The Effect of Partial Replacement of Portland Cement with Calcium Carbonate (CaCO_3) and the Use of Consol P213 ESP Superplasticizer on the Design of Concrete Mix with $f_c' 25 \text{ Mpa}$

This research aims to evaluate the effect of partially replacing Portland cement with Calcium Carbonate (CaCO_3) and the use of Consol P213 ESP superplasticizer on concrete mix design targeting a compressive strength of $f_c' 25 \text{ MPa}$. The study involves concrete mix designs with varying proportions of calcium carbonate at 0%, 4%, and 6% by cement weight, along with the addition of superplasticizer in recommended dosages. Concrete specimens used were cylindrical in shape with dimensions $\varnothing 15 \times 30 \text{ cm}$, tested for compressive strength at the age of 7 and 14 days.

The test results showed that calcium carbonate, within certain limits, can improve early compressive strength and enhance material cohesion. Additionally, the superplasticizer effectively reduced water demand without significantly compromising the concrete's workability. It is concluded that the combination of CaCO_3 and superplasticizer serves as a viable alternative material in efficient and eco-friendly structural concrete design.

Keywords: Calcium Carbonate, Superplasticizer, Consol P213 ESP, Compressive Strength, Concrete $f_c' 25 \text{ Mpa}$