

PENGARUH AIR PAYAU TERHADAP KUAT TEKAN BETON

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ABSTRAK

Beton merupakan material utama dalam konstruksi yang memiliki kekuatan tinggi terhadap beban tekan. Namun, pada wilayah pesisir atau muara sungai, beton sering terpapar air payau yang mengandung ion klorida (Cl^-) dan sulfat (SO_4^{2-}) bersifat korosif dan dapat menurunkan kualitas beton. Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan air payau terhadap kuat tekan beton, baik sebagai air pencampur maupun media perawatan (*curing*).

Penelitian dilakukan secara eksperimental di Laboratorium Teknik Sipil Universitas Batanghari dengan mutu beton rencana $f_c' = 20$ MPa dan benda uji silinder berukuran 15×30 cm. Tiga jenis perlakuan digunakan, yaitu beton normal (BN), beton normal rendaman air payau (BNP), dan beton campuran serta rendaman air payau (BPP). Pengujian kuat tekan dilakukan pada umur 7, 14, dan 28 hari.

Hasil pengujian menunjukkan bahwa penggunaan air payau menurunkan kuat tekan beton. Nilai kuat tekan rata-rata umur 28 hari adalah 24,5 MPa (BN), 19,4 MPa (BNP), dan 17,2 MPa (BPP). Penurunan ini disebabkan oleh kandungan

ion klorida dan sulfat yang mengganggu proses hidrasi semen dan memperbesar porositas beton.

Kesimpulannya, air payau tidak direkomendasikan sebagai air pencampur maupun perawatan beton karena menyebabkan penurunan mutu dan durabilitas. Untuk daerah pesisir, disarankan penggunaan bahan tambahan seperti *pozzolan* atau *admixture* guna menekan efek negatif air payau.

Kata kunci: Air payau, kuat tekan beton, perawatan beton, ion klorida, ion sulfat



Abstract

Concrete is the main material in construction that has high strength against compressive loads. However, in coastal areas or river estuaries, concrete is often exposed to brackish water that contains chloride (Cl^-) and sulfate (SO_4^{2-}) ions that are corrosive and can degrade the quality of concrete. This study aims to determine the effect of brackish water use on the compressive strength of concrete, both as a mixing water and a treatment medium (curing).

The research was conducted experimentally at the Civil Engineering Laboratory, Batanghari University with the quality of the planned concrete $f_c' = 20$ MPa and the cylindrical test piece measuring 15×30 cm. Three types of treatment are used, namely normal concrete (BN), normal brackish water immersion concrete (BNP), and mixed concrete and brackish water immersion (BPP). Compressive strength testing was performed at 7, 14, and 28 days of age.

The test results showed that the use of brackish water lowered the compressive strength of concrete. The mean compressive strength values of 28 days of age were 24.5 MPa (BN), 19.4 MPa (BNP), and 17.2 MPa (BPP). This decrease is caused by the content of chloride and sulfate ions that interfere with the cement hydration process and increase the porosity of concrete.

In conclusion, brackish water is not recommended as mixing water or concrete treatment because it causes a decrease in quality and durability. For coastal areas, the use of additional ingredients such as pozzolan or admixture is recommended to suppress the negative effects of brackish water.

Keywords: Brackish water, compressive strength of concrete, concrete treatment, chloride ion, sulfate ion

