

# SIFAT-SIFAT TEKNIS BETON NORMAL DENGAN PASIR ASAL KALIPASIR DAN BATU PECAH ASAL KAJEN, TEGAL

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## INTISARI

Bahan beton yang terdiri dari semen Portland, pasir, kerikil/batu pecah dan air banyak digunakan pada bidang konstruksi bangunan. Dengan adanya otonomi daerah dewasa ini, pemanfaatan bahan bangunan lokal terus dikaji dan dikembangkan sebagai sumber daya daerah setempat. Pemanfaatan potensi alam berupa pasir asal Kalipasir dan batu pecah asal Kajen sangat mendukung pembangunan gedung pada umumnya dan pembuatan beton pada khususnya. Tujuan penelitian ini untuk mengetahui sifat-sifat pasir asal Kalipasir dan batu pecah asal Kajen, juga untuk mengetahui perbandingan campuran yang tepat dalam pembuatan beton normal yang memiliki kuat tekan cukup tinggi dan kededapan air yang memenuhi syarat SK SNI S-360-1990-03 sehingga dapat menjadi acuan dalam pembuatan beton di daerah Kotamadya Tegal, Jawa Tengah.

Penelitian ini menggunakan semen Portland jenis I merk Gresik, pasir asal Kalipasir, batu pecah asal Kajen dengan ukuran maksimal 30 mm, dengan fas 0.45 , 0.50, 0.55 , 0.60 , 0.65 dan dengan nilai slump 5-7 cm, 9-11 cm, 13-15 cm.

Dari hasil pemeriksaan sifat-sifat pasir asal Kalipasir diperoleh berat jenis 2.428 gr/cm<sup>3</sup>, kandungan lumpur 3.25 %, daya serap air 5.643 %, modulus halus butir 2.91, menurut SK SNI T-1 5-1990-03 pasir masuk daerah II (pasir agak kasar) dan dapat dipakai sebagai bahan susun beton. Dari hasil pemeriksaan sifat-sifat batu pecah asal Kajen diperoleh berat jenis 2.597 gr/cm<sup>3</sup>, daya serap air 2.594 %, modulus halus butir 6.84, ketahanan aus 23.8 % menurut SII 0052-80 batu pecah tersebut dapat untuk pembuatan beton dengan kuat tekan di atas 20 MPa. Hasil uji kuat tekan beton pada umur 28 hari antara 23.21 MPa - 39.62 MPa. Rasio kuat tekan beton 7, 14, 28 hari adalah 0.68 , 0.78 , 1. Besar serapan air pada beton antara 0.95 % - 2.21 % pada pengujian 10 menit, dan 2.54 % - 5.3 % pada pengujian 24 jam. Semua benda uji beton memenuhi syarat batas pengukuran kededapan beton untuk air normal (SK SNI S-36-1990-03) yaitu resapan air sebesar 2.5 /o terhadap berat beton kering oven untuk perendaman 10 menit dan 6.5 % untuk perendaman 24 jam. Modulus Elastisitas beton antara 20769 MPa - 27395 MPa.

**Kata kunci :** Beton Normal, Pasir, Batu Pecah, Kuat Tekan

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# **TECHNICAL CHARACTERISTIC OF NORMAL CONCRETE WITH SAND FROM KALIPASIR AND CRASHED STONE FROM KAJEN, TEGAL**

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## **ABSTRACT**

Concrete material consisted of Portland cement, sand, gravel/crashed stone and plenty of water used in structure construction. Recently, by the existence of regional autonomy, the advantageous of local structural material has been learned and developed as local structural resources. In general, the resource advantageous as sand from Kalipasir and crushed stone from Kajen, supports the development of building and especially for production of concrete. The research was aimed to know the characteristics of sand from Kalipasir and crushed stone from Kajen, and to know how the proper mix comparison in producing normal concrete whose high compressive strength and the impermeability which fulfills the condition of SK SNI S-36-1990-03, moreover it can be a reference of concrete production in Tegal City, Central Java.

This research used Gresik Portland cemen type I, sand from Kalipasir, crushed stone of Kajen with maximum size 30 mm, with fas 0.45, 0.5, 0.55, 0.6, 0.65 and slum value 5 - 7 cm, 9 - 11 cm, 13-15 cm.

From the research result about characteristics of the sand from Kalipasir, it was found that the specific gravity was equal to 2.428 3 the content of mud was equal to 3.25 %, water absorption capacity was equal to 5.643 %, refinement modulus of grain was equal to 2.91, based on SK SNI T-15-1990-03 the sand was categorized in the area II (rather harsh sand) and could be used as compile concrete materials. From the research result about the characteristics of crashed stone from Kajen, it was found that the specific gravity was equal 2.597 gr/cm<sup>3</sup>, water absorption capacity was equal to 2.594 % (<), refinement modulus of grain was equal to 6.84, threadbare resilience 23.8 %, based on SII 0052-80 the crushed stone could be used as the concrete material with compressive strength more than 20 MPa. The test result of concrete compressive strength 28 days age was between 23.21 MPa - 39.62 MPa. The ratio of concrete compressive strength 7,14, 28 days age was 0.68, 0.78, 1. The amount of water absorption of the concrete was between 0.95 %-2.21% in 10 minutes test, and 2.54 % - 5.3 % in 24 hours test. All of the samples were fulfill the condition of concrete impermeability measurement for normal water (SK SNI S-36-1990-03) that was water infiltration which was equal to 2.5 % toward the weight of oven dried concrete for 10 minutes submerging and 6.5 %/a for 24 hours submerging. Modulus of elasticity of concrete were between 20769 MPa - 27395 MPa.

Keywords : Normal concrete. Sand, Crashed Stone, Compressive Strength