

ABSTRACT

Quartzite (QS) and Limestone (LS) in the Coastal area of District Pati and Blora have not been utilized optimally as coarse aggregate. The physical properties of coarse aggregate and chemical composition were examined, to be used in obtaining the characteristics of quartzite and limestone coarse aggregate concrete. 18 (eighteen) cylindrical concrete specimens with a coarse aggregate ratio of quartzite 70%:30% limestone under curing conditions, submerged in water at 20°C were carried out for compressive strength test, split tensile strength, and modulus of elasticity. The chemical composition of coarse aggregate CaO and SiO₂ and their relationship to the compressive strength of concrete were evaluated. While Lost In Compressive Strength test carried out on 6 concrete cylinder specimens in an ASR 80°C environment. Replacement of 30% QS coarse aggregate with LS showed compressive strengths of 19.69 Mpa and 29.85 Mpa for w/c ratios of 0.61 and 0.47 respectively. The composition of calcium oxide (CaO) of QS and LS has a value of 49.293% and 54.462%. There is a weak negative relationship between the CaO content of coarse aggregate on the compressive strength and the density of concrete. There was a Loss In Compressive Strength (LICS) of -4.7% and 13.7% for concrete aged 28 days at ASR environmental conditions, indicates an increase in compressive strength of 4.7% for concrete with a w/c ratio of 0.61 and a decrease in compressive strength of 13.7% for concrete with a w/c ratio of 0.47 at 28 days of ASR environment.

Keywords: *Quartzite Coarse Aggregates, Limestone Coarse Aggregates, Concrete Characteristics, ASR, LICS.*

ABSTRAK

Batu kuarsit dan Batu gamping wilayah pesisir Kab. Pati dan Kab. Blora belum dimanfaatkan optimal sebagai agregat kasar[1]. Diteliti sifat fisik agregat kasar serta komposisi kimia, untuk kemudian digunakan dalam mendapatkan karakteristik beton agregat kasar kuarsit dan batu gamping. Pengujian 18 (delapan belas) silinder beton QS 70%:30% LS pada kondisi perawatan terendam air suhu 20°C untuk kuat tekan, kuat tarik belah, dan modulus elastisitas dilaksanakan. Dievaluasi komposisi kimia CaO agregat kasar dan hubungannya dengan kuat tekan beton. Pengujian Lost In Compressive Strength dilakukan atas 6 silinder beton dalam lingkungan ASR 80°C. Penggantian 30% agregat kasar kuarsit (QS) dengan batu gamping (LS) menunjukkan hasil kuat tekan 19.69 Mpa dan 29.85 Mpa untuk w/c rasio 0.61 dan 0.47 secara berurutan. komposisi kimia calcium oxide (CaO) QS dan LS dengan nilai 49.293% dan 54.462%, adapun kandungan SiO₂ diperoleh 2.874% dan 1.517% untuk QS dan LS secara berurutan. Terdapat hubungan negatif lemah antara kandungan CaO agregat kasar terhadap kuat tekan beton dan density beton. Terjadi kehilangan kuat tekan (LICS) sebesar -4.7% pada beton w/c 0.61 dan 13.7% untuk beton w/c 0.47, mengindikasikan terdapat peningkatan kuat tekan 4.7% untuk beton w/c rasio 0.61 dan terjadi penurunan kuat tekan 13.7% untuk beton w/c rasio 0.47 pada umur 28 hari lingkungan ASR.

Kata kunci: Agregat Kasar Kuarsit, Agregat Kasar Batu gamping, Karakteristik Beton, ASR, LICS.