

# **BETON NON PASIR DENGAN AGREGAT BATU ALAM SUNGAI LUA (BATU APE) KABUPATEN KEPULAUAN TALAUD SULAWESI UTARA**

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## **INTISARI**

Kegiatan pembangunan prasarana fisik di Kabupaten Kepulauan Talaud menghadapi kendala menyangkut ketersediaan bahan bangunan yang memenuhi persyaratan teknis khususnya agregat kasar. Potensi agregat alami yang banyak terdapat di sungai – sungai, salah satunya adalah Batu Ape yang oleh penduduk setempat hanya digunakan sebagai bahan urugan dan pasangan batu pondasi rumah tinggal. Nilai manfaat dari batu tersebut perlu diteliti lebih lanjut sehingga dapat digunakan sebagai bahan bangunan, dimana pada penelitian ini dimanfaatkan sebagai agregat untuk beton non pasir.

Bahan – bahan yang digunakan pada pembuatan beton non pasir adalah agregat dari batu Ape berukuran 10 – 20 mm hasil pembakaran di dalam tungku pada suhu 600°C selama 30 menit, semen Portland Type I dan air bersih. Nilai fas ditetapkan sebesar 0,4 serta variasi rasio volume campuran semen - agregat ditetapkan 1 : 4, 1 : 6, 1 : 8, 1 : 10 dan 1 : 12. Masing – masing variasi tersebut dibuat sebanyak lima buah silinder ukuran standar (diameter 15 cm dan tinggi 30 cm). Pengujian slam dilakukan untuk mengetahui sifat workability beton segar, pengujian dan pengukuran silinder beton pada umur 28 hari meliputi kuat tekan, modulus elastisitas persentase volume pori serta kepadatan beton.

Sifat – sifat mekanik beton non pasir pada umur 28 hari adalah, kuat tekan berkisar antara 2,47 dan 15,60 MPa, dimana pada rasio volume semen agregat 1 : 4 memiliki kuat tekan tertinggi. Nilai modulus elastisitas bervariasi antara 4243,50 dan 15007,50 MPa. Volume pori berkisar antara 3,07 dan 18,71 % dan kepadatan beton dari 2052 sampai 1705 kg/m<sup>3</sup>. Secara garis besar beton non pasir khususnya pada rasio volume semen – agregat 1 : 4 dapat digunakan sebagai elemen struktur bangunan rumah tinggal yang memikul beban ringan tetapi pada rasio volume semen agregat 1 : 6 memiliki hasil yang paling optimal dan ideal sebagai beton non pasir ditinjau dari segi jumlah penggunaan semen dan volume rongga yang dicapai. Rasio volume semen – agregat 1 : 6 sampai 1 : 12 dapat dimanfaatkan sebagai bahan pembuatan bata beton non pasir pejal dan berlubang mutu I sampai mutu IV.

**Kata kunci : agregat batu Ape, beton non pasir, proporsi campuran ideal.**

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**NO FINES CONCRETE WITH NATURE AGGREGATE OF LUA RIVER (BATU APE)  
TALAUD ISLANDS REGENCY NORTH SULAWESI**

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**ABSTRACT**

*The development activities in Talaud Islands Regency at physic infrastructures sector faces many constraint that concerning with availability of construction material which meets technical clauses especially for coarse aggregate. Natural aggregate potency were found in local rivers, one of them is “Ape Boulder” that by local resident only applied as well as embankment material or foundation stone masonry for housing. Referring to such matter, these studies would tried to find out further benefit value in application as construction material technology, in this case will be tried applied as no fines concrete aggregate.*

*The materials applied for no fines concrete were aggregate “Ape” stone with grain size ranged from 10 - 20 mm where it's result of baking in stove during 30 minutes at temperature 600°C, Portland cement Type I and water. This study assessed aggregate-cements volume by ratios 4, 6, 8, 10 and 12 with water - cement ratio was 0,40 and conducted test to determine the fresh concrete properties were the slump. Every variation would be made in five standard cylinder (diameter 15 cm and height 30 cm). These were complimented by hardened concrete cylinder test and measurement at 28 days including the following : compressive strength, modulus of elasticity, percentage of pore volumes and density.*

*It was found the no fines concrete at 28 day, compressive strength obtained by these mixes ranged from 2,47 And 15,60 MPa, with the aggregate – cement volume ratio of 4 being the strongest. The modulus of elasticity test conducted at the same time found that the sample test varied between 4243,50 and 15007,50 MPa. Pores volume varied between 3,07 % and 18,71 % and concrete density achieved ranging from 2052 and 1705 kg/m<sup>3</sup>. It's conclude that no fines concrete at aggregate – cements volume ratio 4 has meets the purpose of element for housing building structures that bearing light load but aggregate – cement volume ratio 6 has an optimal attainment as no fines concrete because those mixture has high pores volume and consumed more economical cements. Aggregate cements volume ratio 6 until 12 can be exploited as component of holey and solid no fines concrete brick at work quality of I - IV*

*Keywords : aggregate of “batu Ape”, no fines concrete, the optimal mix proportion*