

**PENGARUH PENGgantian SEBAGIAN PASIR DENGAN ABU
TERBANG BERBASIS CEMENTING EFFICIENCY POZOLAN
TERHADAP STRENGTH-WEIGHT RATIO DAN MATERIAL COST-
STRENGTH RATIO BETON**

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ABSTRAK

Tujuan penelitian ini adalah (1) mengetahui pengaruh dari penggantian sebagian pasir dengan abu terbang terhadap *strength-weight ratio* beton dan (2) mengetahui pengaruh dari penggantian sebagian pasir dengan abu terbang terhadap *material cost-strength ratio* beton.

Penelitian ini merupakan eksperimen dengan pendekatan kuantitatif yang dilakukan di laboratorium. Pada penelitian ini penggantian sebagian pasir dengan abu terbang dilakukan sebanyak 0%, 20%, 35%, dan 50% berdasarkan proporsi berat setiap bahan terhadap kebutuhan semen Portland. Beton dengan abu terbang dirancang dengan menerapkan faktor efisiensi pozolan guna mendapatkan kekuatan pengganti dari yang hilang akibat pengurangan kepadatan beton. Pengukuran volume dan berat serta pengujian tekan dilakukan setelah beton berumur 28 hari. *Strength-weight ratio* dipertimbangkan untuk mengukur efisiensi kinerja beton, dimana semakin tinggi nilai *strength-weight ratio* maka kinerja beton semakin efisien. *Material cost-strength ratio* dipertimbangkan untuk mengukur keekonomisan beton, dimana semakin rendah nilai *material cost-strength ratio* maka beton semakin ekonomis.

Hasil penelitian menunjukkan bahwa (1) *strength-weight ratio* beton meningkat yang secara berurutan bernilai 0.018, 0.019, 0.022, dan 0.023 MPa/kg/m³ dan (2) *material cost-strength ratio* beton berkurang yang secara berurutan bernilai Rp. 20320.65, 18791.35, 15675.26, dan 14817.33/m³/MPa.

Kata kunci: abu terbang, faktor efisiensi pozolan, *material cost-strength ratio*, penggantian pasir, *strength-weight ratio*

**THE EFFECT OF SAND PARTIAL REPLACEMENT BY FLY ASH
BASED ON CEMENTING EFFICIENCY OF POZZOLAN TO
STRENGTH-WEIGHT RATIO AND MATERIAL COST-STRENGTH
RATIO OF CONCRETE**

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ABSTRACT

The present research purposes are (1) finding out the effect of sand partial replacement by fly ash to strength-weight ratio of concrete and (2) finding out the effect of sand partial replacement by fly ash to material cost-strength ratio of concrete.

The present research is an experiment with quantitative approach that was done in laboratory. In the present research sand partial replacement by fly ash was done as many as 0%, 20%, 35%, and 50% depends on weight proportion of each material to Portland cement needs. Concrete with fly ash was designed by applying the efficiency factor of pozzolan in order to get a substitute strength of the lost due to the reduction in concrete density. Measurement of volume and weight along with compression test were done after concrete aged to 28 days. Strength-weight ratio was considered to measure the performance efficiency of concrete, whereby the value of strength-weight ratio is greater then the performance of concrete is more efficient Material cost-strength ratio was considered to measure the economy of concrete, whereby the value of material cost-strength ratio is smaller then the concrete is more economical.

The result of research showed that (1) strength-weight ratio of concrete increased which was respectively valued of 0.018, 0.019, 0.022, and 0.023 MPa/kg/m³ and (2) material cost-strength ratio of concrete decreased which was respectively valued of Rp. 20320.65, 18791.35, 15675.26, and 14817.33/m³/MPa.

Keywords: efficiency factor of pozzolan, fly ash, material cost-strength ratio, sand replacement, strength-weight ratio