

INTISARI

Pengecoran beton yang baik dilakukan secara menerus agar terbentuk struktur beton yang monolit. Pada pelaksanaan pengecoran di lapangan terdapat hal yang membuat pengecoran terpaksa tidak dapat dilanjutkan, seperti keterbatasan kapasitas produksi *batching plant*, keterbatasan material, keterbatasan jumlah pekerja, dan terputusnya akses menuju lokasi proyek. Rentang waktu pelaksanaan cor sambungan beton setelah pengecoran pertama dapat berbeda-beda. Oleh karena itu, perlu diketahui pengaruh umur beton lama saat disambung dengan beton baru pada kekuatan balok. Tujuan dari penelitian ini adalah untuk mengetahui perbedaan kekuatan balok yang disambung dengan variasi umur beton lama.

Penelitian ini dilakukan dengan membuat balok beton ($150 \times 150 \times 600 \text{ mm}^3$) yang dicor secara bertahap. Tahap pertama sepanjang $\frac{1}{4}$ bentang, kemudian disambung dengan beton baru setelah beton lama berumur 1, 3, 7, 14, dan 28 hari dengan menggunakan *bonding agent* merek Sikacim *Bonding Adhesive*. Pengujian balok mengikuti SNI 4433 : 2011, diuji setelah beton baru berumur 28 hari. Balok tanpa sambungan juga dibuat sebagai pembanding. Untuk mengetahui mutu beton, dibuat silinder beton $\varnothing 100 \text{ mm}$ tinggi 200 mm yang diuji pada umur 28 hari, sesuai dengan SNI 1974 : 2011. Beton dibuat dengan menggunakan pasir dari Sungai Progo, agregat kasar dari Clereng - Kulon Progo dan semen PCC merek Tiga Roda, serta air dari Laboratorium Bahan Bangunan DTSL, FT, UGM.

Hasil penelitian menunjukkan bahwa nilai rata-rata kuat tekan beton pada umur 28 hari sebesar 23,16 MPa (beton lama) dan 23,84 MPa (beton baru). Hasil uji kuat lentur balok yang disambung dengan variasi umur beton lama 1, 3, 7, 14, dan 28 hari didapat nilai sebesar 1,17 MPa, 0,98 MPa, 1,17 MPa, 0,91 MPa, dan 0,96 MPa, sedangkan balok tanpa sambungan sebesar 2,67 MPa. Lendutan terbesar terjadi pada sambungan balok umur 1 hari, yaitu sebesar 1,0 mm, sedangkan balok tanpa sambungan 1,3 mm. Koefisien korelasi antara kuat lentur dan tekan α sebesar 0,55 (balok tanpa sambungan) dan 0,247 (balok sambungan), lebih rendah dari SNI maupun ACI. Berdasarkan hasil regresi logaritmik dapat disimpulkan bahwa semakin lama umur beton saat disambung, kekuatan sambungan semakin rendah dan nilai kuat lentur akan semakin menurun.

Kata Kunci: beton, umur beton lama, kuat tekan, kuat lentur

ABSTRACT

Concrete should be cast continuously to form a monolithic concrete structure. There are limitations in the field that do not allow concrete casting to be done continuously, such as limited batching plant production capacity, materials, number of workers, and isolated access to project site. The time span of new concrete casting after first concrete casting can be different each project. Therefore, it is necessary to know the effect of old concrete age when connected to new concrete on concrete beam strength. The purpose of this study was to determine the difference in the strength of jointed concrete beams with the old concrete age variations.

This research was conducted by making concrete beams (150x150x600 mm³) which were cast in stages. The first stage is along ¼ span, then it is connected to new concrete after the old concrete reached the age of 1, 3, 7, 14, and 28 days using Sikacim Bonding Adhesive as bonding agent. The flexural test of beams follows SNI 4433 : 2011, tested after the new concrete reached the age of 28 days. Concrete beams without joint were also made for comparison. To determine the quality of the concrete, concrete cylinder Ø100 mm with 200 mm height were made which were tested at the age of 28 days, according to SNI 1974 : 2011. Concrete was made using fine aggregate from the Progo River, coarse aggregate from Clereng - Kulon Progo, Tiga Roda's PCC cement, water from DTSL Building Materials Laboratory, FT, UGM.

The results showed that the average compressive strength of concrete at 28 days was 23.16 MPa (old concrete) and 23.84 MPa (new concrete). The results of the flexural strength test of beams that are connected when the old concrete reach the age of 1, 3, 7, 14, and 28 days were 1.17 MPa, 0.98 MPa, 1.17 MPa, 0.91 MPa, and 0.96. MPa, while the beam without joint was 2.67 MPa. The largest deflection occurred at beam that was connected when the old concrete reached the age of 1 day, which was 1.0 mm, while the beam without joint was 1.3 mm. The correlation coefficient between flexural strength and compressive strength α is 0.55 (beam without joint) and 0.247 (beam with joint), lower than SNI and ACI standard. Based on the logarithmic regression results, it can be concluded that the older of the concrete when it is joined, the joint strength will be lower and the flexural strength value will be lower.

Keywords: concrete, old concrete's age, compressive strength, flexural strength