

# Kajian karakteristik fisik dan mekanik Batu Bata tanpa pembakaran dengan campuran Tanah Lempung Pasir Semen Air dan Serabut Kelapa panjang 2 5 centimeter dengan variasi 2 4 dan 6 dari massa semen = physical and mechanical characteristics study of unfired bricks made from a mixture of clay sand cement water and 2 5 centimeters length coconut fibers with the variation 2 4 and 6 of cement mass

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## Abstrak

Penelitian ini dilakukan untuk mengkaji karakteristik fisik dan mekanik batu bata tanpa dibakar dengan campuran tanah lempung, pasir, semen, air dan serabut kelapa yang disimpan di ruangan penyimpanan bata yang berbeda. Penelitian ini berbasis teknologi tepat guna dan semua bahan dan peralatan yang digunakan adalah yang mudah didapat, serta siapa saja dengan bantuan pemandu (guide) bisa mengerjakannya. Sebelum mempersiapkan campuran pembuatan bata, serabut kelapa yang digunakan pada penelitian ini melewati proses treatment terlebih dahulu. Rata-rata, serabut kelapa dipotong menjadi 2,5 cm dan digunakan sebanyak 2%, 4% dan 6% dari massa semen (massa pengikatnya).

Bata tanpa dibakar pada penelitian ini dibagi menjadi dua jenis bata, yaitu bata BM (bata yang disimpan di ruangan terbuka, tanpa adanya dinding penyekat dan hanya dilindungi dengan atap) dan bata BP (bata yang disimpan di ruangan tertutup dengan sedikit jendela terbuka). Penentuan formula campuran yang berbasis tanah kering dalam penelitian ini telah melewati proses trial and error terlebih dahulu dan komposisi campuran 30% tanah, 55% pasir, 15% semen dan 12,5% air dipilih menjadi formula acuan untuk pembuatan batu bata tanpa dibakar. Karakteristik fisik yang diselidiki pada penelitian ini meliputi; pengujian daya serap (absorption), kadar air (water content), massa jenis (density) dan susut (shrinkage) bata, sedangkan untuk pengujian karakteristik mekanik bata meliputi; kuat tekan (compressive strength) bata dan kuat lentur (modulus of rupture) bata.

Hasil penelitian yang dilakukan selama 90 hari menunjukkan bahwa nilai absorpsi pada bata BP dan bata BM mengalami peningkatan seiring dengan bertambahnya umur bata, sedangkan nilai kadar air menunjukkan penurunan seiring dengan bertambahnya umur bata. Pada umur 90 hari, bata BP menunjukkan performa kuat tekan dan kuat lentur yang lebih baik dibandingkan dengan bata BM. Anomali yang terdapat di dalam penelitian ini disarankan menjadi bahan pertimbangan untuk perbaikan pada penelitian selanjutnya. Secara umum, hasil dari penelitian ini menunjukkan bahwa moisture dan cara pencetakan bata mempengaruhi respon yang diberikan oleh masing-masing bata.

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This study was conducted to assess the physical and mechanical characteristics of unfired bricks were made with a mixture of clay, sand, cement, water and coconut fibers, and were stored in a different storage room. The study was based on low technology approach where all of the materials and equipments used in this research are easily procured as well as anyone can make those bricks only with little help from someone who has many experiences on bricks. Before preparing the mixture, coconut fibers which are used in this

study went through a treatment process. In average, the fibers were cut into 2,5 cm length and proportional 2%, 4% and 6% from the mass of cement (binder).

Unfired bricks in this study were grouped into two types of brick, namely BM bricks (stored in opened room without any wall or just covered with roof) and BP bricks (stored in a close room with little window opening). Based on dry soil mass formulation and through a trial and error process, a composition of 30% soil, 55% sand, 15% cement and 12.5% water has been chosen as the reference formula for making unfired bricks. Physical characteristics of the bricks were obtained by means of; absorption, water content, density and shrinkage testing, while, mechanical characteristics were covered through its compressive and flexural strength (modulus of rupture).

Results of the experiments which were conducted up to 90 days showed that the average absorption of BP bricks and BM bricks increased in accordance with ages, while the water content exhibited the decreasing rate. At the age of 90 days, BP bricks showed better results in strength and flexural performance than those of BM bricks. Anomalies which were appeared in this study are suggested to be considered for future studies. In general, the results of this study indicate that the moisture and the way the bricks were made will affect the physical and mechanical characteristics of each individual brick.