

INTISARI

Aspek struktural merupakan penopang utama dalam dunia konstruksi bangunan, dan beton adalah salah satu material yang sering digunakan untuk tujuan ini. Beton merupakan campuran dari beberapa material, termasuk semen, agregat kasar, agregat halus, dan air, serta aditif atau admixture. Beton mudah dibentuk sesuai kebutuhan, memiliki kuat tekan yang baik, dan perawatannya lebih mudah dibandingkan material lain seperti kayu dan baja. Namun, beton memiliki beberapa kelemahan, termasuk kuat tarik dan lentur yang rendah serta sifat yang getas. Oleh karena itu, beton sering dikombinasikan dengan baja tulangan, yang dikenal sebagai beton bertulang. Meskipun demikian, beton bertulang tetap memiliki kelemahan, seperti adanya retakan kecil searah melintang pada bagian yang menerima gaya tarik, yang dapat mempengaruhi ketahanan struktur bangunan.

Penelitian ini menganalisis pengaruh penambahan serat paku kayu dengan variasi panjang dan sudut tekuk 90° terhadap sifat mekanik beton normal. Metodologi penelitian mencakup persiapan lokasi, alat dan bahan, serta prosedur atau tahapan penelitian mulai dari persiapan hingga kesimpulan akhir yang dirangkum dalam bagan alir secara sistematis. Pengujian dilakukan pada benda uji silinder dan balok untuk menentukan kuat tekan, kuat tarik belah, dan kuat lentur beton.

Hasil penelitian menunjukkan bahwa penambahan serat paku kayu dengan variasi panjang dan sudut tekuk 90° meningkatkan nilai kuat tekan sebesar 49,74%, kuat tarik belah sebesar 59,34%, dan kuat lentur sebesar 51,11% dibandingkan dengan beton normal. Penambahan serat paku kayu yang ditekuk 90° dan ukuran paku 2 inch memberikan hasil paling optimal dalam peningkatan seluruh nilai kekuatan beton.

Kata Kunci: Beton, Serat Paku Kayu, Kuat Tekan, Kuat Tarik Belah, Kuat Lentur, Beton Bertulang

ABSTRACT

The structural aspect is the main support in the world of building construction, and concrete is one of the materials that is often used for this purpose. Concrete is a mixture of several materials, including cement, coarse aggregate, fine aggregate, and water, as well as additives or admixtures. Concrete is easy to shape as needed, has good compressive strength, and is easier to maintain than other materials such as wood and steel. However, concrete has several disadvantages, including low tensile and flexural strength and brittle properties. Therefore, concrete is often combined with reinforcing steel, which is known as reinforced concrete. However, reinforced concrete still has weaknesses, such as the presence of small transverse cracks in the part that receives tensile force, which can affect the durability of the building structure.

This study analyzes the effect of adding wood nail fibers with a variation in length and bending angle of 90° on the mechanical properties of normal concrete. The research methodology includes the preparation of locations, tools and materials, as well as research procedures or stages starting from preparation to final conclusions summarized in a systematic flow chart. Tests are performed on cylindrical and beam test pieces to determine the compressive strength, tensile strength, and bending strength of concrete.

The results showed that the addition of wood nail fibers with a variation in length and bending angle of 90° increased the compressive strength value by 49.74%, tensile strength by 59.34%, and bending strength by 51.11% compared to normal concrete. The addition of 90° bent wood nail grain and a 2 inch nail size provide the most optimal results in increasing the overall strength value of concrete.

Keywords: Concrete, Wood Nail Fiber, Compressive Strength, Tensile Strength, Bending Strength, Reinforced Concrete