

INTISARI

Perkembangan material maju saat ini telah mengalami berbagai kendala seperti penyediaannya yang terbatas, tingginya biaya produksi, dampak penggunaannya pada lingkungan, dan limbahnya yang sulit terdegradasi oleh alam. Oleh karena itu diperlukan suatu material baru yang dapat dibuat sesuai dengan kebutuhan seperti komposit. Penelitian ini bertujuan untuk mengetahui pengaruh variasi lapisan serat gelas terhadap karakteristik tekan dan dampak komposit *hybrid* serat ijuk acak/serat gelas anyam bermatrik epoksi.

Pembuatan komposit *hybrid* serat ijuk acak/serat gelas anyam bermatrik epoksi dicetak dengan metode *press mold*. Spesimen uji dibuat dengan standar ASTM D3410 untuk spesimen tekan dan ASTM D256 untuk spesimen dampak. Perbandingan fraksi volume serat 0,40 dengan lima variasi lapisan serat gelas yaitu: tanpa lapis, lapis 1, lapis 2, lapis 3, lapis 4 dan variasi pengujian tekan dan dampak.

Dari hasil pengujian tekan didapatkan bahwa Kuat tekan terbesar diperoleh pada variasi dengan 4 lapisan serat gelas yaitu sebesar 29,796 MPa dan kuat tekan terkecil diperoleh pada lapisan serat gelas tanpa lapis yaitu sebesar 18,861 MPa, regangan tekan terbesar diperoleh variasi lapisan serat dengan 1 lapisan serat gelas yaitu sebesar 0,464 mm/mm dan regangan tekan terkecil diperoleh pada lapisan serat gelas tanpa lapis yaitu sebesar 0,311 mm/mm, modulus elastisitas terbesar diperoleh pada variasi dengan 4 lapisan serat gelas yaitu sebesar 2875,55 MPa dan modulus elastisitas terkecil diperoleh pada variasi tanpa lapisan serat gelas yaitu sebesar 915,015 MPa. Sedangkan dari pengujian dampak didapatkan hasil Ketangguhan dampak terbesar diperoleh pada variasi dengan 3 lapisan serat gelas yaitu sebesar 0,1008 J/mm² dan kemudian menurun pada variasi dengan 4 lapisan serat gelas yaitu sebesar 0,882 J/mm². Ketangguhan dampak komposit optimum pada 3 lapisan serat gelas.

Kata kunci : Komposit *hybrid*, serat ijuk aren, serat gelas anyam, variasi lapisan.

ABSTRACT

The application of advanced materials has been facing many problems, as follows limitation at supplies, high cost manufacturing, environment impact and difficult to decompose. Therefore, it need new materials that can be made in accordance with the requirement. The aims of this study is to determine the number of glass fiber layers on compressive and impact properties of randomly oriented palm fiber /wofen glassfiber hybrid-reinforced epoxy of composites.

The hybrid composition of random *ijuk* and woven glass fiber reinforced epoxy matrix was produced by press mold technique. The test specimen was made according to the ASTM D3410 standard for compressive and ASTM D256 standard for impact specimens. The fiber volume fraction ratio was 0.40 with five glass fiber layer variations, including: zero-layered, 1-layered, 2-layered, 3-layered, and 4-layered of glass fiber for both compressive and impact test.

The highest compressive strength was obtained at the 4-layered glass fiber variation, which is 29,796 MPa, while the lowest compressive strength was found at the zero-layered glass fiber variation, which is 18,861 MPa. The highest compressive strain was found at the 1-layered fiber glass variation, which is 0,464 mm/mm, while the lowest one is 0,311 mm/mm as found at the zero-layered variation. The highest compressive elastic modulus was obtained on the 4-layered glass fiber variation, which is 2875,55 MPa, while the lowest one was found on the zero-layered glass fiber variation, which is 915,015 MPa. From the impact test, it is shown that the glass fiber variation tends to improve the impact toughness. The highest impact toughness was found at the 3-layered fiber glass variation, which is 0,1008 J/mm² but it goes down to 0,882 J/mm² at the 4-layered fiber glass variation. This is proving that the optimum composite impact toughness was obtained on the 3-layered fiber glass.

Key Words: Hybrid Composite, randomly oriented palm fiber , Woven Glass Fiber, Layered Variation, Compressive test, Impact test.