ANALISIS PENGARUH CAMPURAN *POLYESTER* DAN *VINYLESTER* TERHADAP SIFAT MEKANIK DAN SIFAT FISIK PADA MATRIK BAHAN KOMPOSIT

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh campuran resin *polyester* dan resin *vinylester* terhadap sifat mekanik dan sifat fisik matriks bahan komposit. Penelitian menggunakan metode eksperimen dengan proses pembuatan spesimen menggunakan metode *casting*. Variasi komposisi resin yang digunakan terdiri atas 100% *polyester* : 0% *vinylester*, 70% *polyester* : 30% *vinylester,* 50% *polyester* : 50% *vinylester,* dan 30% *polyester* : 70% *vinylester.* Pengujian sifat mekanik dilakukan menggunakan uji *impact* metode Charpy berdasarkan standar ASTM D6110, sedangkan sifat fisik diamati menggunakan Scanning Electron Microscope (SEM). Hasil penelitian menunjukkan bahwa variasi komposisi resin memengaruhi nilai *impact* matriks komposit. Nilai rata-rata *impact* tertinggi diperoleh pada variasi 30% *polyester* : 70% *vinylester* sebesar 0,155 J/mm², sedangkan nilai terendah diperoleh pada variasi 100% *polyester* : 0% *vinylester* sebesar 0,008 J/mm². Hasil pengamatan SEM menunjukkan adanya *microcrack*, *void*, dan permukaan patahan yang tidak rata. Berdasarkan hasil penelitian dapat disimpulkan bahwa peningkatan kandungan resin *vinylester* mampu meningkatkan ketangguhan matriks komposit terhadap beban *impact* . Variasi 30% *polyester* : 70% *vinylester* merupakan komposisi terbaik karena menghasilkan nilai *impact* tertinggi.

Kata kunci: Komposit, resin *polyester* , *vinylester*, uji *impact* Charpy, ASTM D6110, SEM.

ANALYSIS OF THE EFFECT OF POLYESTER AND VINYLESTER MIXTURE ON THE MECHANICAL AND PHYSICAL PROPERTIES OF COMPOSITE MATRIX

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ABSTRACT

This study aims to determine the effect of blending polyester resin and vinyl ester resin on the mechanical and physical properties of a composite matrix. An experimental method was employed, with specimens fabricated using the casting technique. The resin composition variations tested were 100% polyester : 0% vinyl ester, 70% polyester : 30% vinyl ester, 50% polyester : 50% vinyl ester, and 30% polyester : 70% vinyl ester. Mechanical properties were evaluated using the Charpy impact test in accordance with ASTM D6110 standards, while physical properties were examined using a Scanning Electron Microscope (SEM). The results indicate that resin composition variations influence the impact value of the composite matrix. The highest average impact value (0.155 J/mm²) was obtained with the 30% polyester : 70% vinyl ester variation, whereas the lowest value (0.008 J/mm²) was observed with the 100% polyester : 0% vinyl ester variation. SEM observations revealed the presence of microcracks, voids, and uneven fracture surfaces. In conclusion, increasing the vinyl ester resin content enhances the composite matrix's toughness against impact loads. The 30% polyester : 70% vinyl ester variation represents the optimal composition, as it yielded the highest impact value.

Keywords: *Composite, polyester resin, vinyl ester, Charpy impact test, ASTM D6110, SEM.*