Pengaruh Orientasi Serat Gelas Woven dan Durasi Perlakuan Panas terhadap Sifat Tarik, Tekuk, dan Impak Komposit Laminate Bermatrik Polimer = The Effect of Woven Glass Fiber Orientation and Duration of Heat Treatment to Tensile, Bending, and Impact Characteristic of Laminate Composite with Polymer Matrix

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Abstrak

Salah satu jenis material yang dewasa ini cukup populer dan berkembang adalah material komposit polimer berpenguat serat gelas (Glass Fiber Reinforced Polymer - GFRP), hal ini dikarenakan nilai ekonomis serta sifat mekanik yang baik yang mampu dihasilkan oleh material komposit tersebut. Ada banyak faktor yang dapat mempengaruhi sifat/ karakteristik material komposit GFRP, diantaranya adalah arah orientasi serat gelas serta perlakuan panas.

Penelitian ini membahas mengenai pengaruh orientasi serat gelas woven dan durasi perlakuan panas terhadap sifat/ karakteristik material komposit GFRP. Komposit GFRP yang diorientasikan arah seratnya dimanufaktur dengan menggunakan metode hand lay-up. Spesimen komposit GFRP selanjutnya dikenakan perlakuan panas dan dilakukan pengujian berupa pengujian tarik, tekuk, dan impak, serta dilakukan pengamatan tampilan perpatahan terhadap spesimen uji tarik yang memiliki nilai pengujian tertinggi dan terendah.

Dari hasil penelitian yang dilakukan, diperoleh kesimpulan bahwa orientasi serat gelas woven berpengaruh signifikan terhadap sifat tarik dan impak material dan berpengaruh kurang signifikan terhadap sifat tekuk komposit GFRP. Orientasi serat [00 or 900]s pada material komposit GFRP menghasilkan nilai karakteristik tertinggi bila dibandingkan dengan orientasi serat [00 or 900] / [450] dan 450]s. Sedangkan durasi perlakuan panas, tidak memberikan pengaruh terhadap sifat tarik, tekuk, dan impak dari material komposit GFRP.

.....One type of materials that is currently quite popular and evolve is a glass fiber reinforced polymer composite material (GFRP). This is due to the economic value and good mechanical properties that can be produced by the composite material. There are many factors that can affect the nature/ characteristics of GFRP composite materials, including the orientation of glass fiber and heat treatment.

This study discusses the influence of woven glass fiber orientation and the duration of heat treatment on the properties/ characteristics of GFRP composite materials. The fiber-oriented GFRP composites were manufactured using the hand lay-up method. GFRP composite specimens subsequently subjected to heat treatment and carried out tests in the form of tensile, bending, impact, and also observation of fracture appearance of tensile test specimens which had the highest and lowest test values.

From the results of the research conducted, it was concluded that the orientation of woven glass fibers had a significant effect on the tensile and impact properties of the material and had a less significant effect on the bending properties of the GFRP composite. The fiber orientation of [00 or 900]s in the GFRP composite material produces the highest characteristic values when compared to the fiber orientation [00 or 900] / [450] and [450]s. While the duration of heat treatment does not affect the tensile, bending and impact properties of the GFRP composite material.