Pengaruh kekasaran dan pelapisan zinc phosphate pada substrat serta ketebalan adhesive terhadap ketahanan delaminasi komposit laminat karet alam dan baja karbon rendah = The effect of surface roughness zinc phosphate coating on substrate and thickness of adhesive to delamination resistance of laminat composite natural rubber and low carbon steel

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Abstrak

[Penelitian ini bertujuan untuk mengetahui pengaruh kekasaran, proses phosphating, serta ketebalan adhesive bonding terhadap ketahanan delaminasi komposit laminat. Variasi kekasaran substrat, yaitu pada rentang 5-8 μm dan 10-13 μm, variasi terhadap proses phosphating, yaitu ada yang melalui proses phosphating dan ada yang tidak, serta variasi ketebalan adhesive baik primer ataupun topcoat dengan rentang 1-5 μm, 6-10 μm, serta 11-15 μm. Pembentukan komposit laminat ini dilakukan melalui proses transfer moulding pada suhu 160 C selama 450 detik. Komposit laminat yang sudah terbentuk kemudian diuji peel-off untuk mengetahui kekuatan delaminasinya lalu dikarakterisasi dengan SEM-EDX. Hasil menunjukan bahwa kekasaran permukaan, lapisan zinc phosphate, serta ketebalan adhesive bonding mempengaruhi ketahanan delaminasi komposit laminat yang diinterpretasikan dengan kekuatan ikat antarlapisan dan visual delaminasi. Kekasaran optimum terjadi pada rentang 10-13 μm dengan kekuatan ikat 179,68 N dan visual delaminasi R-R sebanyak 35%. Adanya lapisan zinc phosphate memberikan nilai kekuatan ikat optimum sebesar 157,38 N dan visual delaminasi R-R sebanyak 50%. Ketebalan adhesive primer optimum terjadi pada rentang 1-5 μm dengan kekuatan ikat 163,35 N dan visual delaminasi R-R sebanyak 50%. Ketebalan adhesive topcoat optimum terjadi pada rentang 6-10 μm dengan kekuatan ikat sebesar 154,65 N dan visual delaminasi R-R sebanyak 41,6%.;This study aims to determine the effect of roughness, phosphating process, and the thickness of the adhesive bonding into delamination resistance of laminate composite. Variation of the substrate roughness are 5-8 μm and 10-13 μm. Some substrates are coated by zinc phosphate and other substrate are uncoated. Variations of the thickness of adhesive primer and adhesive topcoat are in a range of 1-5 μm, 6-10 μm, and 11-15 μm. The process of forming the laminate composite occurs through transfer molding process at 1600C in 450 seconds. Laminate composite that has been formed then tested by peel-off test to determine the strength of delamination. Visual of delamination was characterized by SEM-EDX. The results showed that the optimum surface roughness occurs in the range of 10-13 μm with bonding strength 179.68 N and 35% of R-R visual. The coated substrate has a higher bonding strength compared to uncoated substrate, which is 157.38 N and 50% of R-R visual. The optimum thickness of adhesive primer occurs in the range of 1-5 μm with bonding strength is 163.35 N and 50% of R-R visual. While the optimum thickness of adhesive topcoat occurs in the range of 6-10 μm with a bonding strength is 154.65 N and 41,6% of R-R visual;This study aims to determine the effect of roughness, phosphating process, and the thickness of the adhesive bonding into delamination resistance of laminate composite. Variation of the substrate roughness are 5-8 μm and 10-13 μm. Some substrates are coated by zinc phosphate and other substrate are uncoated. Variations of the thickness of adhesive primer and adhesive

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