Pengaruh clay dan kondisi pencampuran terhadap sifat anti bakar dan mekanik komposit unsaturated polyester serat kaca dengan metode vacuum bagging. = The Effect of clay and mixing conditions to fire resistant and mechanical property of unsaturated polyester glass fibre composites by a vacuum bagging method

Dean Ande Priyani, author

Abstrak

Komposit serat kaca yang diperkuat dengan bahan polimer Glasss Fibre Reinforced Polymer GFRP memiliki kekurangan yaitu kurang tahan terhadap api. Penggunaan clay dapat meningkatkan sifat tahan api terhadap GFRP. Akan tetapi, diperlukan pencampuran yang baik agar clay dapat terdispersi dengan baik. Penelitian ini bertujuan untuk mengetahui pengaruh clay dan kondisi pencampuran terhadap sifat anti bakar, kuat impak, dan modulus lengkung komposit GFRP/clay. Polimer Unsaturated polyester UP , serat kaca, dan 3-Aminopropyltriethoxysilane masing-masing digunakan sebagai matriks, penguat, dan compatibilizer untuk membuat komposit. Unsaturated polyester-clay-silane dicampur menggunakan magnetic stirrer dengan variasi kecepatan dan waktu pencampuran. Komposit unsaturated polyester-serat kaca-clay-silane difabrikasi menggunakan metode vacuum bagging. Variasi clay yang digunakan adalah 1 wt. , 2wt. , dan 3 wt.. Variasi kecepatan rotasi dan waktu pencampuran masing-masing 100,150, 200 rpm dan 60, 90, dan 120 menit. Komposit UP ndash; serat kaca digunakan sebagai bahan pembanding.
Hasil penelitian menunjukkan bahwa komposit dengan kandungan clay 1wt tidak terbakar dengan nilai laju bakar sebesar 0 mm/min. Tidak terdapat perubahan variabel yang signifikan pada kuat impak dengan mekanisme berbeda seperti shear dan difusi yang bekerja bersamaan saat mendispersikan clay. Nilai modulus lengkung optimum dimiliki oleh komposit dengan komposisi clay 1 wt _200 rpm_60 menit sebesar 10 0.4 GPa , yang mengalami kenaikan 20 dibandingkan dengan UP ndash; serat kaca.
<hr>Glass fibre reinforced polymer GFRP composites have a weakness in fire resistant property. The addition of clay can improve the fire resistant property of GFRP. However, a good mixing is needed to disperse the clay. This research aims to observe the effect of clay and mixing conditions on fire resistance, impact strength, and flexural modulus of GFRP clay composites. Unsaturated polyester UP , glass fiber and 3 Aminopropyltriethoxysilane respectively were used as a matrix, a reinforcement and a compatibilizer respectively to build the composites. Unsaturated polyester clay silane were mixed using a magnetic stirrer with a variation of rotation speed and mixing duration. The composites were fabricated using a vacuum bagging method. The composition of clay was varied from 1, 2, and 3 wt. The rotation speed and mixing time were varied at 100, 150, 200 rpm and 60, 90, and 120 minutes, respectively. UP glass fiber was used as a comparison material.
The results showed that composites with 1 wt clay content was not burned with the buring rate value of 0 mm min. There were no significant effects of variables on impact strength in between the boundaries that attributed to different mechanisms such as shear and diffusion that worked together to disperse the clay. The optimum flexural modulus was found in the 1 wt clay 200 rpm 60 minute composites with a value of 10 0.4 GPa in which 20 higher compared to the UP glass fibre composites.