

## ABSTRACT

Indonesia is one of the countries in Asia with a high rate of motorcycle usage. Traffic accident data from 2014 shows that 72% of road traffic accidents involved motorcycles. One of the key factors contributing to accidents is brake failure. The main component in this system is the brake pad. Brake pads are generally made from asbestos, but their use has negative impacts on the environment and health. This study aims to determine the characteristics of brake pads made from water hyacinth and glass waste with an epoxy resin matrix. The composite was made with variations in the ratio of water hyacinth fiber and glass powder within a total filler fraction of 30%, while epoxy resin was used at 70%. Five formulations were used with the following ratios of water hyacinth to glass: F1 (30%:0%), F2 (20%:10%), F3 (10%:20%), F4 (15%:15%), and F5 (0%:30%). The formed brake pads were tested for density, heat resistance, microstructural characterization, wear resistance, and impact toughness. The physical properties of the brake pads were evaluated through density tests, heat resistance tests, and microstructural characterization. Meanwhile, the mechanical properties were assessed through wear resistance and impact toughness tests. The results of the study showed that the best composition was obtained in the F1 formulation, which had a density of 1.153 g/cm<sup>3</sup>, a wear rate of 0.0087 mm<sup>3</sup>/kg·m, and an impact toughness of 0.02 kJ/m<sup>2</sup>. Additionally, the heat resistance test showed that the F1 sample remained stable at 360°C for one hour, experiencing only a change in color after heating.

**Keywords:** composite, brake pad, water hyacinth fiber, glass waste, epoxy resin.