ANALYSIS OF HARDNESS AND WEAR RATE OF MOTORCYCLE BRAKE PADS COMPOSITES REINFORCED WITH ABACA BANANA MIDRIB FIBER, EGGSHELLS, AND CRAB SHELLS

Mohammad As'ad Hizbullah
Program Study of Automotive Engineering
Department of Engineering

ABSTRACT

This study aims to determine the characteristics of motorcycle brake pads made from composite materials consisting of abaca banana sheath fiber (PP), eggshell (CT), and crab shell (CK) with an epoxy resin matrix. The research was conducted using an experimental method with variations in material composition across four samples. The tests carried out included hardness testing using the Shore Hardness (Durometer) method and wear testing using a pin-on-disc tribometer with the specific wear rate parameter. The results showed that the highest hardness value was found in sample 2 (1PP–2CT–3CK) at 71 HD, while the lowest hardness value was found in sample 4 at 48 HD. In the wear test, the smallest specific wear rate was observed in sample 3 (2PP–3CT–1CK) at 4.08×10^{-4} mm³/N·m, while the largest was found in sample 1 at 9.3×10^{-3} mm³/N·m. Sample 3 brake pads exhibited a wear value close to that of standard brake pads, which was 2.96×10^{-4} mm³/N·m. Based on the results, it can be concluded that variations in material composition significantly affect wear resistance. Sample 3 demonstrated high wear resistance with a low material degradation rate, making it the most promising candidate as an environmentally friendly brake pad to replace asbestos-based materials.

Keyword: Brake pad, composite, abaca fiber, eggshell, crab shell, wear, hardness.