ANALYSIS OF THE EFFECT OF SOAKING HUMAN HAIR FIBERS IN KOH (POTASSIUM HYDROXIDE) SOLUTION ON TENSILE STRENGTH AND IMPACT STRENGTH

Ir. Dwi Djoko Suranto, M.T. *Chief Conselor*

Rangga Destra Pratama Putra

Study Program of Automotive Engineering
Departement of Engineering

ABSTRACT

This study aims to analyze the effect of soaking human hair fiber waste in a 5% KOH (Potassium Hydroxide) solution on the tensile strength and impact strength of epoxy-matrix composites. Human hair waste is used as a fiber reinforcement because it has a high keratin content and is difficult to decompose, making it a potential environmentally friendly alternative material. The research method used was an experiment with varying soaking times of 30 minutes and 60 minutes and varying fiber weight fractions of 5%, 7.5%, and 10% using the hand lay-up method. Tensile testing was conducted using the ASTM D638 Type I standard, and impact testing was conducted using the ASTM D5942-96 Charpy method. The results showed that alkalization treatment and variations in fiber weight fraction affected the mechanical properties of the composite. The highest tensile strength was achieved after a 60-minute immersion with a 7.5% weight fraction (48.62 N/mm²), while the highest impact strength was achieved after a 30-minute immersion with a 10% weight fraction (0.185 J/mm²). This study demonstrated that KOH treatment can increase fiber and matrix adhesion to a certain extent, thus human hair waste composites have the potential to be developed as alternative natural fiber-based materials.

Keywords : *composite, human hair fiber, KOH, alkalization, tensile test, impact test.*