

***EFFECT OF TEMPERING TEMPERATURE VARIATION  
ON HARDNESS AND WEAR RATE OF POLYMER  
MATRIX COMPOSITE BRAKE LININGS***

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**ABSTRACT**

*Brake pads are the most important part of a motor vehicle's braking system. Its function is to stop the rotation of the disc or drum connected to the wheel. The manufacturer's standard brake pads generally use asbestos fiber as the main component. However, this causes asbestos powder to be released every time braking is performed. This asbestos powder is not environmentally friendly and can pollute the surrounding air, which in turn can harm human respiratory health. After realizing the dangers posed by asbestos materials, efforts were made to create new brake linings made from composite materials. This research uses an experimental method by varying the tempering temperature in the manufacturing process. It is hoped that the test results will achieve a level of quality similar to the standards applied to manufactured brake linings and to minimize excess friction during braking. Brake lining type A has the highest average hardness value of 66.6 HD, which is closest to the hardness of the manufacturer's brake lining. On the other hand, brake lining type C has the lowest average hardness value of 57.6 HD. Type A brake lining specimens have a wear rate that is closest to the wear rate of the manufacturer's brake lining. From the discussion, it can be concluded that the higher the tempering temperature used in composite manufacturing will have an impact on reducing the wear rate due to the high tempering temperature.*

**Keyword:** *Brake pads, tempering, hardness test, wear rate, coconut shell charcoal, aluminum powder, polyurethane.*