PREDICTING HEAT FLUX IN PALM KERNEL SHELL REINFORCED BRAKE LINING USING MATLAB PDE TOOLBOX

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ABSTRACT

Frictional heat generated during braking application might lead to damaging effects such as thermal cracks, vibration, premature wear and brake fade. The brake material must be able to undergo high thermal stresses generated during repetitive braking. High amount of heat from braking must be absorbed and dissipated timeously to avoid damaging effects. The desire to improve the heat flow quality of organic based friction lining is motivated by the development of such lining using 0.212, 0.300, 0.425 and 0.850 mm grain sizes of pulverised palm kernel shell. Needed properties of such lining to be used in a derived partial differential equation were determined and the PDE Toolbox of Matlab used to analyse the heat flow in the samples. $S_{0.300}$ exhibited a high heat flux ($3.5 \times 10^8$ W/m$^2$) showing it releases heat faster than its counterparts whose heat flux are in the same range of $2.5 \times 10^8$ W/m$^2$. Intense heat flow through the brake system causes cooling which is necessary for components preservation.

KEYWORDS: Palm Kernel Shell, Friction Lining, Heat Flux & Matlab PDE Toolbox

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