

Optimization On Wear Performance of Waste Cooking Oil As Engine Additive Using RSM (First Order Model)

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ABSTRACT

The purpose of this study is to determine the optimal design parameters and to indicate which of the design parameters that are statistically significant for waste palm oil blended with SAE 40 for obtaining low average wear rate. The tribology performance evaluated using piston ring-liner contact tester. Design of experiment (DOE) constructed using Response Surface Methodology (RSM) between the key process parameters such as rotational speeds (200 RPM to 300 RPM), volume concentration (0% to 10% waste oil) and applied loads (2 kg to 9kg). Analysis of variance (ANOVA) test also carried out to check the adequacy of the developed empirical models. FESEM was used for wear scar analysis and EDX was used to analysis chemical element in oil during sliding contacts. It was perceived that the optimize speed, load and volume composition have significant effect on specific wear rate (WR).

Keywords: Waste Cooking Oil; Wear Rate; Wear Mechanism; Bio-Lubricant.
