

# Experimental Investigation of a Diesel Engine Using Waste Plastic Oil Blends



A. M. Norkhizan, A. F. Yusop, and M. A. Hamidi

**Abstract** Plastic have now become essential materials in the present world and implimentation in the industrial field is persistently rising. The aim of this project is to investigate the effects of waste plastic oil on engine performance and pollutant emissions. The engine test was conducted under constant engine speed of 1800 RPM and varies engine load of 20%, 40% and 60% respectively. The performances of engine were analyzed in term of brake power (BP), brake specific fuel consumption (BSFC) and brake thermal efficiency (BTE). The effect of WPO on brake power was only dominant during low and medium engine load condition. WPO can reduce the BSFC of diesel engine except for high load condition. In addition, the formation of  $\text{NO}_x$  and CO for WPO fuel blends were greater than D100 under all engine load conditions. Therefore, in conclusion, the implementation of WPO in diesel engine can improve engine performance but limit its effectiveness in terms of pollutant emissions.

**Keywords** Waste plastic oil · Diesel engine · Performance · Emission

## 1 Introduction

Increasing world population cause high plastics demand especially for household applications. It is about 299 million tons of plastic produced in year 2013 that is 4% higher than year 2012. In the meantime, it causes the growth of plastic waste. In year 2013, 33 million tons of plastic waste was reported in US. In Europe, 38% of the plastic waste still finally ended up to the landfill which taking a large space, 26% were recycled and 36% were used for energy recovery. Billions of years may require for the plastic to be degrade on its own. Therefore, the disposal of plastic would cause serious environmental issue. The demand for plastic will be quadruple by year 2050 that expected to be around 1400 million tonnes [1]. These waste plastics can be

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