

Independent Study Title Performance Comparison Between Diesel Blending Refined Palm Oil and Diesel Blending Fuel Oil Additive for Diesel Generator

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ABSTRACT

The purpose of this independent study was to search for a renewable fuel for diesel generator . The study was divided into two steps . The first step , we compared the key performances between diesel blending refined palm oil and diesel blending fuel oil additive which the experiment was conducted in laboratory scale . After that , the selected fuel from the first step and pure diesel was used in the real electrical generator . Finally we make the decision base on economic analysis. The results were as followed :

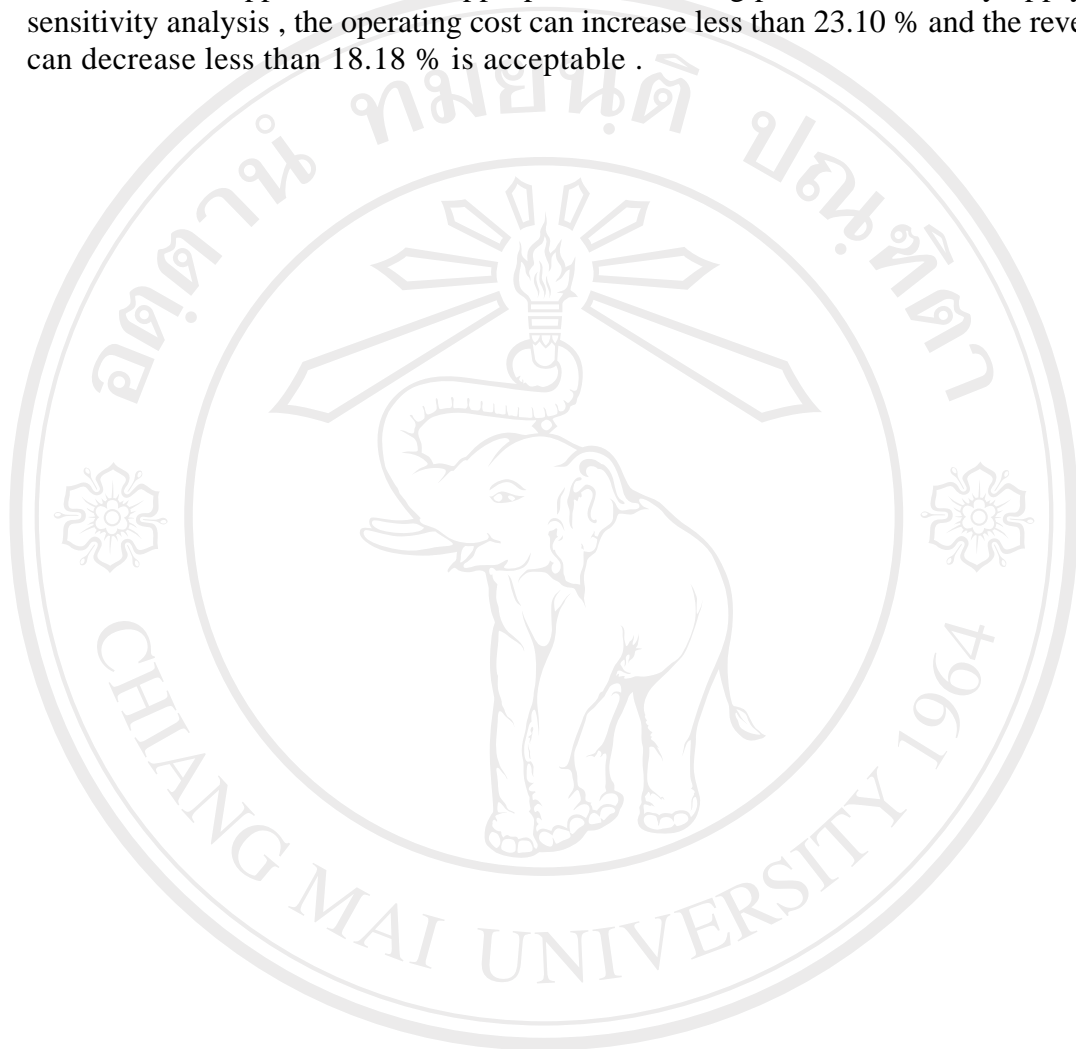
In the laboratory test , we used diesel generator Ford model 2711E 25 kW operated with constant speed of 1,500 rpm and constant load 60 % for 200 hours . In term of key performances show that the specific fuel consumption when using diesel blending refined palm oil (RBD 70 %) more than using pure diesel 16.77 % and when using the diesel blending fuel oil additive 800 ppm were better than pure diesel 7.43 % . In addition , when operated the diesel generator with using diesel blending refined palm oil (RBD 70 %) were found residue cabon and gum in the cylinder , injector's head , intake valves and combustion chamber which reduced the combustion efficiency and cause of cylinder ring broken . The fuel filter were clogged sooner than using pure diesel . Therefore , this study selected the diesel blending fuel oil additive 800 ppm in real electrical generator .

In real electrical generator we used diesel generator Cummins model VT 1710 GC 335 kW operated with constant speed of 1,500 rpm and varies load for 16 hours . In term of key performances showed the specific fuel consumption when using diesel blending fuel oil additive 800 ppm less than when using pure diesel 15.80 % .

The economic analysis were case of real electrical generator . The analysis defined diesel generator operated 7,500 hours in 15 years project plan . The net present value (NPV) when using pure diesel was 71,131,980.00 Baht and benefit/cost ratio (B/C ratio) was 1.10 . And when using diesel blending fuel oil additive 800 ppm the

net present value (NPV) was 141,382,084.83 Baht and benefit/cost ratio (B/C ratio) was 1.23 .

We concluded from this independent study that using the diesel blending fuel oil additive 800 ppm was more appropriate than using pure diesel and by applying sensitivity analysis , the operating cost can increase less than 23.10 % and the revenue can decrease less than 18.18 % is acceptable .



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