

RECLAMATION OF USED LUBRICATING OILS

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Abstract

An experimental analysis was carried out by treatment of used hydraulic oil with various concentrations of fullers' earth and the results obtained were compared with fresh oil. Properties tested for include viscosity, specific gravity, absorbance and wear metals. The results obtained showed an improvement in the depleted quality of oil; in particular the viscosity falls within $\pm 15\%$ tolerance of the fresh oil value as recommended by ASTM standards. It is recommended that the reclaimed oil obtained should be re-blended with additive or fresh oil in a pre-determined ratio using ASTM blending chart for further enhancement of additive content. It is concluded that reclamation of used oil is an environmentally friendly way of dispersing waste oils which can serve as a waste to wealth method.

Key words: reclamation; absorbance; ASTM; kinematic viscosity; additive; organometallic compounds; Spectrophotometer; infra-red spectrum; transmittance; frequency; wear metals analysis.

1. Introduction

1.1 Background

The quality of the environment has been adversely affected by the activities of the petroleum industry right from the exploration, drilling, transportation and processing to storage and after use. Hence, the industry discharges waste which comes in gaseous, liquid or solid form into the environment; thus threatening the health of the population and in the long run affecting farmland and water bodies.

In Nigeria, an average of about 300 million liters of lubricating oils is consumed annually with a market potential of 5% annual growth rate. The potential waste oil level is about 80% of the annual consumption and thus the environment is prone to about 240 million liters of used lubricating which requires management and control.

It is also observed that the awareness for waste oil management and its investment potentials are not well accepted and inculcated; rather it is seen as an anti-economic issue and a necessary debt to be paid for industrialization of urban centers. In some cases, it is due to lack of adequate information on cost effective methods of oil management, for example in Canada approximately about 1 billion liters of lubricating oils are sold annually but only about 200 million liters are recovered, in other words more than half is wasted and disposed to the environment ^[2].

In Nigeria, despite the increase in the presence of Lube oil blending plants (both foreign and local companies), It is quite disappointing to know that the level of recycling oil is low and thus cannot meet up with the requirement of waste oil management as stipulated by the Federal Environmental Protection Agency (FEPA) that: "No oil in any form shall be discharged into public drains, rivers, lakes, seas or underground injection without permit issued by the agency or any organization so designated by FEPA" ^[2].

Hence it would be a worthwhile investment opportunity to establish oil reclamation plants for commercial purposes all over the country due to the increasing cost of local production and a high import value of new lubricating oils, so that in the long run not only would the environment be safe of pollution but also the overall petroleum reserves would be conserved and there would also be some economic values added through sales of such products via export.

In use, lubricating oils become dirty and contaminated with materials such as organometallic compounds particularly zinc dithiophosphate, other metals, fines, water (as a water-in-oil emulsion), and sludge, that make them useless and harmful; hence requires disposing and draining off or replacement with fresh oil.

