CHAPTER - 5

CONCLUSION AND RECOMMENDATION

The objectives of this experimental research have been achieved to fairly good extent. Some important conclusions have been drawn from the critical analysis of the results obtained for various used lubricating oils.

5.1 USED ENGINE OILS

The experimental study of used engine oil has provided the following inferences.

i) The colour of the used oils was improved from (+2.5 to +5.5) on refining due to the removal of carbonaceous matter, oxidative products and extraneous impurities.

ii) The viscosity of the used oils in increased on refining from 39.0 to 84.5 cst due to the removal of light ends present in used oils.

iii) The flash point of the used oils increased from 140 to 215°C on their refining. It is due to the removal of light ends having lower flash point.

iv) Decrease in ash content from 2.65 to 0.007 % shows the proper refining as the additives and carbon particles present in used oils were removed in refining process.
v) After blending of additives (Molybdenum disulfide and Polyisobutylene) in base stocks, the viscosity and ash content were increased from 10.5 to 14.0°C and from 0.863 to 0.872% respectively. The flash point and pour point were more or less same for finished oils. Total acidity was reduced from 0.026 to 0.018 mg KOH/g of oil which may be due to the alkaline nature of additives.

5.2 USED GEAR OILS

The pertinent findings from the study of used gear oils are as follows:

i) The colour of the used gear oils improved from (+2.5 to +5.0) on refining due to the removal of carbonaceous matter, oxidative products and extraneous impurities.

ii) The viscosity of the used gear oils increased from on refining from 154.4 to 334.0 cst due to the removal of polymerized oils present in used oils and lesser removal of light ends in comparison to that in used engine oils.

iii) There was little increase from 220 to 235°C in flash point of used gear oils on refining which was due to the removal of lower fractions although lesser in comparison to that in used engine oils.

iv) Decrease in ash content from 0.5 to 0.004% shows the proper refining of used gear oils as the additives and carbon particles present in used gear oils were removed in refining process.

v) After blending of additive (Zincdithiophosphate) in base stocks the viscosity and ash content were increased. While the flash point and pour point remained almost unchanged. The Total acidity was
reduced from 0.026 to 0.018 mg KOH/g of oil which may be due to the alkaline nature of additive.

5.3 USED COMPRESSOR OILS

As far as, used compressor oils are concerned, the following inferences were obtained:

i) The colour of the used compressor oils was improved (+1.0 to +3.0) similar to used engine and gear oils.

ii) The viscosity of the used compressor oils increased from on refining from 30.0 to 65.0 cst also like engine and gear oils but to extent as compared to used engine oils.

iii) The little increase in flash point from 164 to 174°C of used compressor oils on refining was observed which is due to the removal of low quantity of lower fraction.

iv) Decrease in ash content from 0.02 to 0.002 % shows the proper refining of used compressor oils as additives and carbon particles present in used compressor oils were removed in refining process.

v) After blending of additives in base stocks the viscosity and ash content were increased. The flash point and pour point were more or less same for finished oils. Total acidity was reduced from 0.028 to 0.022 mg KOH/g which may be due to the alkaline nature of additive.

5.4 USED HYDRAULIC OILS

Some samples of used hydraulic oils were also studied. The following important conclusions are as follows:
i) The colour of the used hydraulic oils was improved on refining from (+1.5 to +2.5).

ii) The viscosity of the used hydraulic oils was increased on refining from 45.5 to 336.0 cst.

iii) The little increase in flash point of used hydraulic oils on refining was observed from 195 to 229°C.

iv) Decrease in ash content from 0.7 to 0.003 % shows the proper refining of used hydraulic oils as additives and carbon particles present in used hydraulic oils were removed in refining process.

v) After blending of additive in base stocks the viscosity of finished oils from H3, H4 and H5 was decreased this may be due to the low viscosity of additive. The flash point and pour point were more or less same for finished oils. Total acidity was reduced which may be due to the alkaline nature of additive.

**RECOMMENDATION**

The following recommendation based upon the conclusions obtained from this experimental study, can be made for further investigations;

1. More properties (like oxidation stability, evaporation loss etc.) and parameters (corrosion and engine wear) should be investigated besides the viscosity, colour, ash content, flash point and total acidity of used lubricating oils.
2. More wide range of lubricants (low, medium and high speed diesel engine oils) should be tested to make the study more acceptable.

3. Due to rapid industrialization worldwide, the new energy options are need of the hour. Hence, scaling up of this study to pilot plant and further commercialization of the project will be right and pertinent solution to the decreasing petrol-eum reserves and degrading environment from health view point as well.