STUDIES IN THE RECLAMATION OF LUBE OILS

ABSTRACT

The subject matter of the present thesis has been embodied in five chapters. The experimental work carried out on the reclamation of four used lubricating oils namely engine, gear, compressor and hydraulic oils have been described in Chapter - 3. The results obtained after the characterization of used and reclaimed lubricating oils have been discussed in Chapter - 4. The tables and figures related to each chapter have also been depicted at the suitable places of each chapter.

The first chapter on Introduction introduces regeneration of used lubricating oils, scope of recycling, sources of used oils, contaminants of used oils, example of used oils, recycling methods, additives for lubricating oils and environmental effects of used oils. This chapter finally highlights the aims and objectives of the present work which have been executed on reclamation of engine, gear, compressor and hydraulic oils followed by blending of suitable additives to the respective base stocks prepared.

The second chapter, namely Literature Review, provides up to date information related to developments in the field of reclamation of used lubricating oils. The available literature has been described under regeneration of used lubricating oils. Regeneration of used lubricating oils has been subdivided into centrifugal separation, magnetic separation, vacuum dehydration / distillation, acid refining and solvent refining.

The third chapter is Materials and Methods, divided into three main headings, namely Experimental Methods, Reclamation of used lubricating oils, Equipments used
in Reclamation of used lubricating oils. The raw materials required for experiments have described first. The first heading is for the Experimental methods involved during the physico-chemical characterization of the used lubricating oils, i.e. flash point, ash content, viscosity, viscosity index, pour point, colour, total acidity, inorganic acidity, saponification value and corrosion copper strip test. The second heading is for the Reclamation of used lubricating oils and third heading is for equipments used in reclamation of used lubricating oils.

The fourth chapter is **Results and Discussion** divided into five main headings, namely Characteristics of used lubricating oils, Dehydration of used lubricating oils, Solvent treatment of dehydrated oils, Clay treatment of solvent treated oils and additive blending on the characteristics of refined base stocks. Each main heading is subdivided into four parts and work on each of the four oils i.e., engine, gear, compressor and hydraulic oils related to the main heading has been described in this chapter.

After the characterization of used engine, gear, compressor and hydraulic oils, different samples of refined base stocks were prepared. The conditions of refining process were set up as described in third chapter, depending on the various characteristics of the used lubricating oils. Different samples of base stocks obtained from refining of various used lubricating oils were characterized for different properties, i.e. colour, viscosity, flash point, pour point, ash content, inorganic acidity, total acidity, saponification value and copper strip corrosion. The properties of base stocks were compared with that of used lubricating oils from which these were prepared.
The fifth chapter is that of Conclusion and Recommendation, which lists the outcome of the entire experimental work carried out during the course of the present research work. Analyzing the overall properties of the finished lubricating oils, prepared in the present work, it can be said that these finished oils are suitable for use in various specific fields of lubricants such as in engines, in gear boxes, in compressors and in hydraulic systems. Lastly, the Bibliography, Appendix and List of Papers Published have been given.