

Introduction

The purpose of this symposium is to review some of the current problems being encountered in turbine lubricating oil systems and to present information on corrective actions which might be taken for improving performance and reliability of turbine lubricating oils and systems.

Although the performance of Navy and commercial turbine oils in marine service has proven generally satisfactory, operational and maintenance problems occasionally were being encountered. In 1964 it was decided that a Special Study Group should be formed to evaluate these problems. The function of the Study Group was "to consider the interactions of lubricating oils with system design, materials of construction, operation, and maintenance." In the first meetings of the group it became apparent that the most serious problems being encountered were related to contamination. Bearing and gear wear, bearing failures, malfunction of hydraulic controls, and some coupling problems were being encountered. The initial efforts of the group therefore were directed toward obtaining information, defining the problems, and investigating the adequacy of practices for the control of contamination.

Considerable information related to contamination and contamination control in turbine lubricating oil systems had been obtained, and in June 1966 Technical Division C decided to sponsor a symposium to disseminate this information. The papers presented clearly demonstrate that contamination in turbine lubricating oil systems is a very real problem. It will be seen that contamination and contamination control is directly related to system design and the interrelationships of system materials, fluids, and environment.

Cleaning and flushing of lubricating oil systems is of prime importance if adequate system cleanliness levels are to be achieved. The requirements and procedures for obtaining this goal in heavy duty gas turbines will be discussed. Achieving and maintaining low contamination levels in marine steam turbines are discussed in a paper on the use of vapor space inhibitors in cleaning oil and lubricating oil to control rusting in the vapor spaces of marine steam turbines. Environmental evaluations and requirements for these oils are presented. A serious consequence of contamination in steam turbine lubricating oil systems is covered in depth in two papers on an unusual and severe type of bearing failure designated as "machining" or "wire-wool" failures. Interactions of oil and metals play an important role, and causes, mechanism, and remedies are discussed. Lastly, a new concept based on electro-hydraulics has

been developed for controlling speeds and pressures of steam turbines. The high pressures of these systems have made the use of fire-resistant hydraulic fluids highly desirable. A very timely paper on fluids, interactions with system materials, and problems closes this symposium.

The papers presented at this symposium show that significant progress has been made in recognizing and handling problems related to contamination, and guide lines have been established for effective contamination control. Other problems related to the performance of oils including liquid phase rusting, high temperature oxidation stability, sludge deposition in couplings and foaming, and air entrainment will be investigated by the Study Group. When sufficient information has been compiled from field and laboratory investigations, the information will be presented in a future symposium.

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