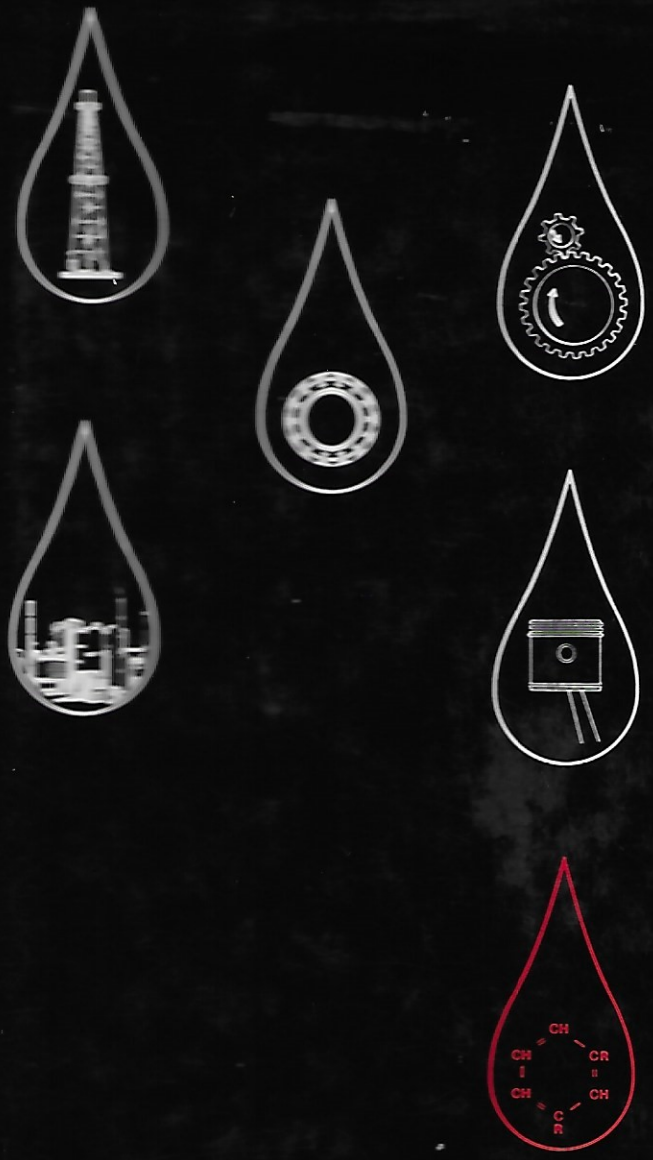
WILLS

Lubrication Fundamentals

Mobil

DEKKER



Mobil

Lubrication Fundamentals

J. GEORGE WILLS

About the author . . .

...J. GEORGE WILLS is Chief Technical Editor of Mobil Oil Corporation. He received his B.Ch.E. (1939) from the Polytechnic Institute of Brooklyn. In addition, he studied graphic arts at Pratt Institute, philosophy at St. John's University, and languages at Fordham University. For the past 29 years, Mr. Wills has been writing and publishing articles on the design and operation of nuclear and industrial facilities. Mr. Wills' research interests include the study of plant operation in the field of heavy chemicals, naturally derived and synthetically produced oils, corrosion prevention, and lubricant conservation and pollution control. Mr. Wills has won numerous

(continued on back flap)

(continued from front flap)

awards and distinctions for his articles on atomic power and lubrication. Prior to his affiliation with Mobil Oil Corporation, he was a research engineer with National Lead Company, and publication manager for Vitro Corporation of America.

He is a charter member of the Society for Technical Communications — served as chairman of New York Chapter — and a member of the American Society of Lubrication Engineers — served as Chairman of Committee on Lubrication Conservation and Pollution Control.

Printed in
the United States
of America

ISBN: 0-8247-6976-7

Lubrication Fundamentals

J. GEORGE WILLS
Mobil Oil Corporation

MARCEL DEKKER, INC.
New York and Basel

Wills, J. George
Lubrication fundamentals.
(Mechanical engineering: 3)
Includes index.
I. Lubrication and lubricants.
I. Title II. Series.
TJ1075.W57 621.8'9 80-14095
ISBN 0-8247-6976-7

Marcel Dekker, Inc., 270 Madison Avenue, New York, New York 10016

10 9 8 7 6

Printed in the United States of America

Preface

Our modern world of machines moves on lubricating films, and everyone, whether knowingly or not, has an interest in lubrication. Sewing machines, vacuum cleaners, or clothes washers could not run without proper lubrication. Millions of automobiles, transporting people and goods, would never get out of the garage without automotive oils and greases. Complex equipment—to make cloth, process food from the field for the consumer, and produce electric energy for the many comforts we enjoy today—can operate only because there are lubricants formulated to satisfy the operating requirements.

Intricate machines spin and weave textiles; huge rolling mills turn out metal sheets; metal-working machines make intricate metal parts with extreme precision; special machines manufacture cement, rubber, and plastics—all these machines are continually being improved to reduce operating costs and speed up production.

The increased efficiency and complexity of modern machines often require improved lubricants to perform under much more severe operating conditions. The machine builder, the user, and the lubricant supplier cooperate in determining the requirements, and the researcher and the refiner

work together to develop new and better lubricants to meet the changing needs of our ever more complex world.

This book was written for those who desire a fundamental knowledge of lubricants and lubrication, especially those concerned with the operation and maintenance of machines.

Chapter 1 presents an historical introduction to the field of lubrication. The next three chapters discuss lubricating oils and greases, and the new field of synthetic lubricants. Chapters 5 and 6 concern the machine elements that require lubrication and the methods of application. Chapters 7 through 14 examine various specific applications of lubricants—internal combustion engines, stationary gas, steam, and hydraulic turbines, nuclear power plants, automotive chassis components and power transmissions, and compressors. Finally, Chapter 15 details the proper handling, storing, and dispensing of lubricants, and the last chapter discusses in-plant conservation methods.

For those who would like to examine any of these subjects further, a list of related Mobil publications is provided at the end of most chapters.

J. George Wills

Contents

Lubrication Fundamentals

J. GEORGE WILLS

About the book . . .

...LUBRICATION FUNDAMENTALS is a basic textbook and practical engineering reference work for all those concerned with the operation and maintenance of machines. This book bridges the gap between the highly technical literature and the operating and maintenance manuals by presenting a comprehensive and detailed account of the entire technology of lubrication. The book contains discussions of the basic products, the machine elements that require lubrication, the methods of application, the specific machinery lubricated, the handling and storing of lubricants, and the conservation of lubricants. Every chapter also discusses the need for lubrication, the factors affecting lubrication, and lubricant selection. There is a chapter on the new field of synthetic lubricants as well.

LUBRICATION FUNDAMENTALS is profusely illustrated with over 300 diagrams, graphs, tables, and pictures, many of which are in two colors. This book will be of great assistance to those who need to understand the technology of lubrication and to those who need to make use of it, including engineering students, machine designers, lubrication engineers, machinery operators, plant maintenance personnel, purchasing managers, and machinery and lubricants marketers.

MARCEL DEKKER, INC. New York • Basel