CRC HANDBOOK of LUBRICATION
(Theory and Practice of Tribology)

Volume II
Theory & Design

Editor

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PREFACE—VOLUME II

Volume II of the Handbook of Lubrication (Tribology) provides coverage of basic theory involved in friction, wear, and lubrication; characteristics and application practices for lubricants; and design principles for lubricated machine elements such as bearings, gears, couplings, and seals.

Among significant developments covered in Volume II are new understandings of boundary lubrication and wear; new elastohydrodynamic theory for rolling bearings, gears, and cams; extension of hydrodynamic analysis to high-speed operation in the turbulent regime and to dynamic response; and distinctive trends in the use of oils, greases, solid lubricants, additives, and synthetics.

This volume is intended to be used as a companion to Volume I with its coverage of theory and design. While construction equipment is covered in Volume I, for instance, companion coverages on the properties of oils and greases, design of bearings and gears, and lubrication fundamentals appear in Volume II.

The Society of Tribologists and Lubrication Engineers has sponsored the development of the Handbook of Lubrication. STLE Technical Committees and Industry Councils provided technical review, and the Handbook Advisory Committee oversaw the myriad day-to-day activities in producing the Handbook. Much of the original plan for Volume II was developed by Dr. P. M. Ku as the initial chairman of the Handbook Advisory Committee until his untimely death.

It is hoped that the Handbook will aid in achieving more effective lubrication, in control of friction and wear, and as another step to improve understanding of the complex factors involved in tribology.

E. R. BOOSER
EDITOR
THE EDITOR

Dr. E. Richard Booser has been a leader in the field of lubrication and tribology for the past 30 years. He completed his academic training in Chemical Engineering at The Pennsylvania State University in 1948 following research studies on composition, oxidation mechanisms, additives, and refining procedures for petroleum lubricants. Since that time, he has been employed by the General Electric Co. in development work on the lubrication of steam and gas turbines, electric motors and generators, nuclear plant equipment, jet engines, aircraft accessories, and household appliances.

His current assignment is Manager of the Systems Engineering Subsection in the General Electric Turbine Technology Laboratory in Schenectady, N.Y., and he has served as leader of the Company Center of Research on Bearings and Rotor Dynamics.

He has published 60 papers covering oil oxidation, grease life in ball bearings, turbulence in high-speed oil-film bearings, selection of bearing materials, design of circulating oil systems, electric motor lubrication, and lubrication of nuclear plants. Co-author of the McGraw-Hill book Bearing Design and Application, he organized and taught bearing and lubrication courses for 400 engineers over the past 10 years.

Elected President of the Society of Tribologists and Lubrication Engineers (formerly the American Society for Lubrication Engineers) in 1956, he served the Society as Chairman of various activities: Lubrication Fundamentals Committee, General Technical Committee, Awards Committee, Fellows Committee, and two local sections. He is also a member of the American Chemical Society, American Society of Mechanical Engineers, Sigma Xi, and is a registered professional engineer in New York State.

Dr. Booser draws on worldwide associations, and particularly on the resources and members of the Society of Tribologists and Lubrication Engineers, to organize this Handbook. It is a compilation by 80 authors of developments and practices in the emerging fields of tribology: the science of friction, wear, and lubrication.
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