

CRC HANDBOOK *of* LUBRICATION

(Theory and Practice of Tribology)

Volume II Theory & Design

Editor

E. Richard Booser, Ph.D.

Senior Engineer
Electromechanical Systems Engineering
Turbine Technology Laboratory
General Electric Company
Schenectady, New York



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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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CONTRIBUTORS

Frederick T. Barwell, Ph.D.

Emeritus Professor
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and
Honorary Professorial Fellow
(Formerly Department Head)
Department of Mechanical Engineering
University College of Swansea
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E. O. Bennett, Ph.D.

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Department of Biology
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Professor
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Tribology Branch
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Power Transmission Division
Koppers Company, Inc.
Baltimore, Maryland

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Professor
Department of Mechanical Engineering
Technological Institute
Northwestern University
Evanston, Illinois

Horst Czichos, Ph.D.

Director and Professor
Department of "Special Fields
of Materials Testing"
Bundesanstalt für Materialprüfung
(Federal Institute for Materials Research
and Testing)
Berlin-Dahlem, West Germany

A. O. DeHart

Fluid Mechanics Department
GM Research Laboratories
GM Technical Center
Warren, Michigan

William J. Derner

Consultant
Mechanical Power Transmission
Indianapolis, Indiana

Norman S. Eiss, Jr., Ph.D.

Professor
Department of Mechanical Engineering
Virginia Polytechnic Institute and State
University
Blacksburg, Virginia

Richard C. Elwell

Engineer — Development
Turbine Technology Laboratory
General Electric Company
Schenectady, New York

Richard S. Fein, Ph.D.

Consultant
Poughkeepsie, New York
Formerly Senior Research Associate
Texaco Inc.
Beacon, New York

Gregory Foltz

Specialist
Cimcool Technical Services
Products Division
Cincinnati Milacron
Cincinnati, Ohio

Edward J. Gesdorf

Consultant
Farval Lubricating Systems
Farval Division
Cleveland Gear Company
Cleveland, Ohio

Howard N. Kaufman

Fellow Engineer
Tribology and Experimental Mechanics
Section
Mechanics Department
Westinghouse Research and Development
Center
Pittsburgh, Pennsylvania

Ralph Kelly

Manager New Products
Cimcool Marketing Development
Products Division
Cincinnati Milacron
Cincinnati, Ohio

Elmer E. Klaus, Ph.D. (Retired)

Professor Emeritus
Fenske Faculty Fellow
Department of Chemical Engineering
Pennsylvania State University
University Park, Pennsylvania

John K. Lancaster, Ph.D.

Head
Materials and Structures Department
Royal Aircraft Establishment
Farnborough, Hants, U.K.

K. C. Ludema, Ph.D.

Professor
Department of Mechanical Engineers
University of Michigan
Ann Arbor, Michigan

S. Frank Murray

Senior Research Engineer
Department of Mechanical Engineering
Rensselaer Polytechnic Institute
Troy, New York

James A. O'Brien

Manager, Planning
Amoco Petroleum Additives Company
Clayton, Missouri

Eugene E. Pfaffenberger, P.E.

Manager
Engineering Analysis
Link-Belt Bearing Division
PT Components, Inc.
Indianapolis, Indiana

Ernest Rabinowicz, Ph.D.

Professor
Department of Mechanical Engineering
M.I.T.
Cambridge, Massachusetts

John L. Radovich

Senior Product Designer
Gear Division
Staff Lubrication Engineer
Farrel Company
Emhart Machinery Group
Ansonia, Connecticut

Albert A. Raimondi, Ph.D.

Manager
Tribology and Experimental Mechanics
Westinghouse R & D Center
Pittsburgh, Pennsylvania

Carleton N. Rowe, Ph.D.

Research Associate
Mobil Research and Development
Corporation
Paulsboro, New Jersey

Irwin W. Ruge (Retired)

Product Manager
Marketing Technical Services
Union Oil Company of California
Schaumburg, Illinois

John A. Schey, Ph.D.

Professor
Department of Mechanical Engineering
University of Waterloo
Waterloo, Ontario, Canada

Milton C. Shaw, Sc.D.

Professor
Department of Mechanical and Aerospace
Engineering
Arizona State University
Tempe, Arizona

Henry J. Sneek, Ph.D.

Professor
Department of Mechanical Engineering
Rensselaer Polytechnic Institute
Troy, New York

William K. Stair

Director
Engineering Experiment Station
and

Associate Dean
College of Engineering
University of Tennessee
Knoxville, Tennessee

Andras Z. Szeri, Ph.D.

Consultant
Westinghouse Research Laboratories
and

Professor
Department of Mechanical Engineering
University of Pittsburgh
Pittsburgh, Pennsylvania

Elmer J. Tewksbury, Ph.D. (Retired)

Professor
Department of Chemical Engineering
Pennsylvania State University
University Park, Pennsylvania

Arthur J. Twidale

Managing Director
Denco Farval Limited
Hereford, England

John H. Vohr, Ph.D.

Senior Engineer
Turbine Technology Laboratory
General Electric Company
Schenectady, New York

D. F. Wilcock, D.E.S.

President
Tribolock, Inc.
Schenectady, New York

Desmond C. J. Williams

Director
Denco Farval Limited
Hereford, England

J. Brian P. Williamson, Ph.D.

Scientific Consultant
Williamson Interface Limited
Malvern, England

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Application and Maintenance

Applications
Industrial Lubrication Practices
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Volume II
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Design Principles