

Book Review

Mechanical Tribology: Materials, Characterization and Applications

Edited by George Totten, G.E. Totten & Associates, LLC, Seattle, Wash., and Hong Liang, University of Alaska, Fairbanks, Alaska. Published by Marcel Dekker, Inc., 2004, hard cover, 496 pages.

Reviewer:
Dr. Robert M. Gresham,
Contributing Editor

Once again Drs. George Totten and Hong Liang, well-known STLE members, have collaborated to create a valuable industry book—*Mechanical Tribology: Materials, Characterization and Applications*. Like their other book, *Surface Modifications and Mechanisms: Friction, Stress and Reaction Engineering*, this new book provides an integration of our current understanding of surface and material characterization with tribological application technology. *Mechanical Tribology* is logically laid out and, considering the subject matter, easy-to-read and assimilate. The chapters are written by a team of 31 recognized experts in the field, backed up by extensive references for more in-depth study.

Mechanical Tribology is divided into two major parts. The first, “Material and Tribological Characterization,” describes the latest surface characterization methodologies, emphasizing the chemical and physical structure of surfaces. This section goes on to provide an in-depth discussion of the surface properties and tribology of plastics. Additionally, there is a chapter dealing with the macro- and micromechanical properties of ceramics. These are two materials that have at best received insufficient treatment in readily accessible literature.

Part One goes on to cover various methodologies for examining the lubrication and wear process. These include characterizing scuffing and seizure processes, wear mechanisms and wear mapping, and the measurement of thin-film lubrication. These chapters are invaluable to the student wanting to truly understand the nature

of these processes vs. some of the somewhat simplified descriptions more commonly found.

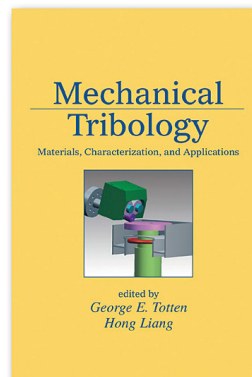
The second part, “Tribological Applications,” covers selected characterization methodologies pertinent to specific application areas not well covered in general literature. These include metal cutting, metal forming, textile manufacturing, biotribology and biocompatibility of metals and alloys.

Finally, there is a chapter on a subject new to me, epilaminar barrier films, which prevent oil from spreading and creeping in lubrication applications. The idea here is that very small mechanical devices, such as watch bearings and various fine instruments, need to be lubricated with an extremely small amount of lubricant, often for the life of the mechanism.

In such cases, the lubricant may have to be confined carefully to avoid deterioration of nearby components. Generally, this can be accomplished by inherently non-spreading lubricants, lubricants made non-spreading by use of special additives or special surface treatments of the substrate that result in preventing migration of the lubricant. Fascinating stuff!

This is a book that, of course, will be of great use to material scientists, tribologists and mechanical and lubrication engineers. Furthermore, this is a book that could also be used as a textbook for advanced undergraduate and graduate students of tribology.

For more information about this book, visit the STLE Web site www.stle.org. <<



This new book provides an integration of our current understanding of surface and material characterization with tribological application technology.



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