Friction Science and Technology
From Concepts to Applications, Second Edition

Authored by Dr. Peter J. Blau, Oak Ridge National Laboratory, Tennessee, USA,
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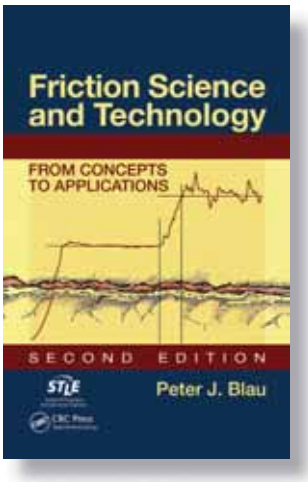

The first edition of *Friction Science and Technology* was published in late 1995. Since that time we've seen many developments in our understanding of friction. Examples include new ASTM standards for friction measurement, laser-dimpled surfaces for friction control, friction of nanocomposites and alloys for lightweight bearings and, most important, leading-edge research on friction at the molecular scale—perhaps the fastest growing aspect of our field.

The second edition begins with a thorough development of the history of thought on the subject of friction, which puts the book in context. This history provides grounding for the main goal of the book—addressing the mechanics, materials and applications-oriented aspects of friction and friction technology. As a result, this book does a fine job of comprehensively covering the subject.

KEY TOPIC AREAS INCLUDE:

- Mechanics-based treatments of friction, including typical problems and equations for estimating the effects of friction in simple machines.
- The wide range of devices crafted to measure the magnitude of friction, some designed to simulate the behavior of engineering tribosystems.
- Modeling of static and kinetic friction.
- The effects of tribosystem variables like load, speed, temperature, surface texture and vibration on frictional behavior, the result of which demonstrates how the same materials can exhibit much different frictional behavior when the contact conditions are changed.
- The response of different types of material combinations to frictional contact.

I think the discussion on the same materials exhibiting different frictional behavior under differing contact conditions is particularly beneficial. So often in the past engineers would look up a material's inherent coefficient of friction in some handbook and apply that to a design—with the totally mystifying result that the friction is much different.

A later chapter deals with run-in processes, which I found interesting as the importance of this is particularly acute in the bearings used in laser targeting and high-resolution photo-imaging devices. Also, there is a useful chapter on lubrication by gases, liquids and solids.

Another interesting chapter, Solid Friction of Materials, covers leather, wood, stone, metals, a variety of alloys, metallic glasses, ceramics, polymers, carbon/diamond-like materials and ice structures, to name just a few.

A unique feature is the inclusion in various chapters of numerous interesting and unusual examples of the application of friction science, proving that tribologists and tribological problems are truly indispensible and multidisciplinary. A few examples highlighting the breadth of these applications are:

- Friction problems in Olympic and other sports
- Coatings for ice-breakers
- Interparticle friction (toners, pills, powders, etc.)
- Cosmetics
- Starting a fire caveman style
- Joint replacement
- Reducing heat in dental root canal tools
- The touch of piano keys
- Human skin friction
- Ship drag
- Earthquakes
- The "bounce" in shampoo.

This aspect of the book alone makes interesting reading for both highly technical people as well as those with more than the usual curiosity for how things work. For more information about ordering this book for your technical library, log on to **www.stle.org**. TLT

Bob Gresham is STLE's director of professional development. You can reach him at ***rgresham@stle.org.***