Book Review: Tribology of Metal Cutting by Viktor P. Astakhov

Reviewed by J. Paulo Davim

Department of Mechanical Engineering,
University of Aveiro,
Campus Santiago, 3810-193 Aveiro, Portugal
E-mail: pdavim@ua.pt

Published 2006 by Elsevier, UK, 425pp.
ISBN: 978-0-444-52881-0 (Hardcover)

Keywords: book review

Reference to this book review should be made as follows: Davim, J.P. (2009) 'Tribology of Metal Cutting by: Viktor P. Astakhov', *Int. J. Machining and Machinability of Materials*, Vol. 5, Nos. 2/3, pp.367–368.

Biographical notes: J. Paulo Davim received his PhD in Mechanical Engineering from University of Porto in 1997 and the Aggregation from University of Coimbra in 2005. Between 1986–1996, he was a Lecturer in University of Porto. Currently, he is Aggregate Professor in Department of Mechanical Engineering of the University of Aveiro and Head of MACTRIB – Machining and Tribology Research Group. He has more than 22 years of teaching and research experience in machining, tribology and manufacturing processes. He is the Editor of three international journals, Guest Editor, Editorial Board Member, Reviewer and Scientific Advisor for many international journals and conferences. He has also published more than 250 articles in SCI journals and conferences.

Tribology is formally defined as the 'science and technology of interacting surfaces in relative motion and of related subjects and practices'. It includes the research and application of principles of friction, wear and lubrication. Second, according to the author of this book, 'metal cutting tribology is a branch of applied tribology dealing with the whole collection of processes (mechanical, thermal chemical, etc.) at the tool-chip, too-workpiece and chip-workpiece interfaces from a unified viewpoint of energy transformations'.

The present book explains the tribology of metal cutting with innovation and is based on wide experience of the author in research, practical application and teaching of this area. This book covers some topics which are not found in tribology texts emphasising the role of the design experiments in metal cutting.

In order to cover tribology of metal cutting, this book contains six chapters and two appendixes.

Chapter 1 provides the generalised model of chip formation. This chapter conclude that any evolution in tribology of metal cutting cannot be achieved if the single-shear plane model is the base of this theory. It reveals also the influence of various important factors on the chip structure and thus the tribological conditions. Chapter 2 clarifies the

energy aspects of metal cutting tribology. Tribology of the tool-chip and tool-workpiece interfaces is analysed in Chapter 3. Chapter 4 provides information on cutting tool wear, tool life and physical resource. Design of experiments in metal cutting tests is described in detail in Chapter 5. Finally, Chapter 6 discusses the improvement of tribological conditions. In the appendix, the author presents basic definitions and cutting tool geometry (Appendix A) and experimental determination of the chip compression ratio (Appendix B).

This book can be used for final undergraduate engineering course (for example, manufacturing, mechanical, materials, etc) or as a subject on tribology and manufacturing at the postgraduate level. Also, this book can serve as a useful reference for academics, manufacturing and tribology researchers, mechanical, manufacturing and materials engineers and professionals in related industries with metal cutting.