

Wear of Advanced Materials

Edited by
J. Paulo Davim

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Preface

In general, we currently define wear as the “progressive loss of material from the operating surface of a body occurring as a result of relative motion at the surface”. Wear is related to surface interactions, and more specifically to the form of contact due to relative motion. It is important to distinguish between mechanical wear and other processes with similar outcomes. For example, the current definition does not include:

- impact wear, where there is no relative motion;
- cavitation, where the counterbody is a fluid;
- corrosion, where the damage is due to chemical rather than mechanical action.

The progressive loss of material from surface is rarely catastrophic but it does reduce the operating efficiency of equipment, components and structures.

The purpose of this book is to present a collection of examples illustrating the state-of-the-art and research developments into the wear of advanced materials in several applications.

Chapter 1 presents tribological aspects of carbon fabric-reinforced polymer composites.

Chapter 2 covers the adhesive wear characteristics of the natural fibers of reinforced composites.

Chapter 3 contains information on resistance to cavitation (material selection).

Chapter 4 is dedicated to the cavitation of biofuel applied in the injection nozzles of diesel engines.

Finally, in Chapter 5, the wear and corrosion damage of medical-grade metals and alloys is presented.

The present book can be used as a research book for a final undergraduate engineering course (for example into materials, mechanics, etc.) or as the focus of the effect of wear on advanced materials at the postgraduate level. This book can serve also as a useful reference for academics, biomaterials researchers, mechanical and materials engineers, professionals in related spheres working with tribology and advanced materials. The interest in and the use of the topics covered in this book is evident for many important centers of research, laboratories and universities throughout the world. Therefore, it is hoped that this book will encourage and enthuse others to carry out research in this important field of science and engineering.

I would like to pass on my gratitude to ISTE-Wiley for this opportunity to expand the knowledge of others through the use of this book and I thank them for their professional support. Finally, I would like to thank all of the authors who worked on the various chapters for their work on this project.

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