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Machining of Titanium Alloys

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Preface

Currently, titanium alloys are in important group of engineering materials due to their excellent combination of strength and fracture toughness as well as low density and very good corrosion resistance. These materials have received special attention recently due to their wide range of applications in aerospace, aircraft, automotive, chemical, and biomedical industries. However, these expansive materials present poor machinability because of their low thermal conductivity and high chemical reactivity with cutting tool materials.

The purpose of this book is to present a collection of examples illustrating research in machining of titanium alloys. Chapter 1 of the book provides machinability and machining of titanium alloys (a review). Chapter 2 is dedicated to cutting tool materials and tool wear. Chapter 3 described mechanics of titanium machining. Chapter 4 contains information on analysis of physical cutting mechanisms and their effects on the tool wear and chip formation process when machining aeronautical titanium alloys: Ti-6Al-4V and Ti-55531. Chapter 5 is dedicated to green machining of Ti-6Al-4V under minimum quantity lubrication (MQL) condition. Finally, Chap. 6 is dedicated to ultrasonic-assisted machining of titanium.

This book can be used as a research book for final undergraduate engineering course or as a topic on manufacturing engineering at the postgraduate level. Also, this book can serve as a useful reference for academics, researchers, mechanical, manufacturing, industrial and materials engineers, professionals in machining technology and related industries. The interest of scientific in this book is evident for many important centers of the research, laboratories, and universities as well as industry. Therefore, it is hoped this book will inspire and enthuse others to undertake research in machining technology.

The Editor acknowledges Springer for this opportunity and for their enthusiastic and professional support. Finally, I would like to thank all the chapter authors for their availability for this work.

Aveiro, Portugal, May 2014

J. Paulo Davim

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