
Preface

Machining is the broad term used to describe the removal of material from a workpiece and is one of the most important manufacturing processes. Parts manufactured by other processes often require further operations before the product is ready for application. Machining operations can be applied to work metallic and non-metallic materials such as polymers, wood, ceramics, composites and exotic materials.

M. E. Merchant has written “*Today in industrialized countries, the cost of machining amounts to more than 15% of the value of all manufactured products in those countries.*” For this reason and others, machining as part of manufacturing science and technology is very important for modern manufacturing industries.

This book aims to provide the fundamentals and the recent advances in machining for modern manufacturing engineering.

The first three chapters of the book provide the fundamentals of machining with special emphasis on three important aspects: metal cutting mechanics (finite element modelling), tools (geometry and material) and workpiece surface integrity.

The remaining chapters of the book are dedicated to recent advances in machining, namely, machining of hard material, machining of particulate-reinforced metal matrix composites, drilling polymeric matrix composites, ecological machining (near-dry machining), sculptured surface machining, grinding technology and new grinding wheels, micro- and nanomachining, advanced (non-traditional) machining processes and intelligent machining (computational methods and optimization).

The present book can be used as a textbook for a final undergraduate engineering course or for a course on machining at the postgraduate level. However, in general, this textbook can be used for teaching modern manufacturing engineering. It can also serve as a useful reference for academics, manufacturing and materials researchers, manufacturing and mechanical engineers, and professionals in machining and related industries. The scientific interest of this book is evident from the many important centres of research, laboratories and universities in the

world working in this area. Therefore, it is hoped that this book will inspire and entuse further research in this field of science and technology.

I would like to thank Springer for the opportunity to publish this book and for their competent and professional support. Finally, I would like to thank all the chapter authors for making their work availability for this book.

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