Lean Manufacturing

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Materials Forming, Machining and Tribology

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Modern Manufacturing Engineering

Springer

Preface

Nowadays, Manufacturing Engineering is defined as a discipline "which involves the ability to plan the processes and practices of manufacturing and to research and develop systems, processes, machines, tools and equipment for producing quality products". Manufacturing is the "art" of transformation of materials into products. Fundamental subjects of manufacturing engineering include: materials technology, forming and sheet metal working, traditional and non-traditional machining, joining and assembly processes, automation and manufacturing systems, green and lean manufacturing, etc.

The purpose of this book is to present a collection of examples illustrating research in "Modern Manufacturing Engineering". Chapter 1 of the book provides submicro- and nanostructuring of materials by severe plastic deformation. Chapter 2 is dedicated to cross rolling (a metal forming process). Chapter 3 describes a finite element method in machining processes. Chapter 4 contains information about machining and machining modelling of metal matrix composites. Chapter 5 contains information about intelligent CNC tool path optimization for sculptured surface machining through virus-evolutionary genetic algorithm. Chapter 6 is dedicated to friction stir welding: (scope and recent developments). Chapter 7 describes innovative joining technologies based on tube. Chapter 8 contains information about lean manufacturing. Chapter 9 provides object-based final-year project (designing and manufacturing a quick stop device). Finally, Chap. 10 is dedicated to quantifying quality of learning during teaching an undergraduate unit (manufacturing processes).

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 manufacturing and related industries. The scientific interest in this book is evident for many important centres of research, laboratories and universities as well as industry. Therefore, it is hoped this book will inspire and enthuse others to undertake research in manufacturing engineering.

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Aveiro, Portugal J. Paulo Davim
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