

Customized Products Manufacturing

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Preface

People need for good, reliable and affordable products is obvious for the times we are living. There are times of crises, both political and economical so, new ways of moving forward are being searched.

One, maybe not the most important but relevant enough, is that of offering onto the market customized products, meaning those products fitted for a certain requirement expressed by customer. There are many types of manufacturing techniques for the customized products, depending on product's final use – in industry or as consumer goods.

This book is aimed to be a relevant presentation of some important aspects related to customized products manufacturing, such as:

- Product - life cycle, design, manufacturing, development;
- Customized product and customized manufacturing;
- Specification processes and configuration system;
- Rapid prototyping processes and rapid manufacturing;
- CNC machining, laser micro-machining and sub-surface engraving;
- Holography and holograms;
- Plastics forming;
- Gifts, gadgets and items manufacturing.

For all of the above mentioned, there should be evidenced the importance of computer, even if it is software or internet, in establishing the manufacturer – customer interaction and in developing new, sophisticated but, reliable and useful manufacturing technologies.

The book can be an interesting reference for students – in product design and manufacturing courses but, it can also be of interest for designers and engineers – working in industrial companies or in small workshops.

I am grateful to my family and to all the people who helped and supported me in writing this book.

February, 2011

Mihaela Iliescu

Foreword

The ability to design, develop and manufacture marketable products is a major instrument for modern economic prosperity. The near collapse of the global financial organisations in recent years showed the folly of relying on the service industries (financial, insurance, etc) as the main means of generating a country's income. Moreover, with the increases in the environmental and monetary costs of transport, the need for production and supply of manufactured goods, 'locally', is becoming more and more prominent. These, with the increasing appetite of today's markets for newer and better performing products, combined with the crucial requirement for reducing the environmental costs of manufacturing, as well as the international competition pressures for lower prices, underlines the need for continual improvement and updating of education and staff development material in the area of product design and manufacture. The text that follows is one such source of knowledge, information and data.

The book begins, in chapter 1, with a good description of product life cycle, and of product design and manufacture and product development activities. The various stages of product design and realisation are shown and described, clearly. This chapter also gives a good overview of the families and types of materials available to product designers and manufacturers. In chapter 2, concepts of customised product design and manufacture are introduced in the context of the new trends in customer taste and expectations; their relationship with marketing and the effects on cost are discussed. The process of drawing specifications is covered in chapters 3 and 4. Here, a very logical and disciplined process for developing and arriving at a product specification is described, developed and discussed. The chapters cover all the aspects, including those relating to cost, thoroughly and methodically. In chapter 5, the various technologies and processes of rapid prototyping are reviewed in detail and discussed. The review is thorough and covers both historical and contemporary techniques with numerous examples of polymer based components and products. Chapter 6 covers modern CNC machining, micromachining and micro-welding. Here, aspects of sub-surface processes are also covered. The chapter includes many good examples of both metallic and polymer components. The processes of producing holograms are described in chapter 7, where both historical and new developments are reviewed and explained with typical examples. Chapter 8 is on manufacturing of polymer components, covering industrial production processes for both thermoplastics and thermosets; the common processes are reviewed and described, clearly. Also, a simulation of mould filling and temperature profiles in the injection moulding process, using a computer software, is presented. In chapters 9 and 10, examples of customised products and customised manufacturing are described and discussed, and examples of analysis of some of the operating parameters such as force and deformations during the machining operation are shown.

The book is very well illustrated with clear diagrams and photographs, and also supported with numerous references and website sources.

Dr Eng Iliescu's book is a welcomed publication in the area of modern design and manufacture and should make a very valuable addition to the reading list for students on product design, engineering and manufacturing courses, as well as a good source of support material for design and manufacturing industries.

*Professor Kamran Tabeshfar, MPhil, PhD, CEng, MIMMM, FRSA
February 2011*

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