

1. Record Nr.	UNINA9910816329603321
Autore	Childs Peter R. N
Titolo	Mechanical design // Peter R.N. Childs
Pubbl/distr/stampa	Oxford, : Butterworth-Heinemann, 2004
ISBN	1-281-00287-9 9786611002879 0-08-047342-3
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (373 p.)
Disciplina	620.0042
Soggetti	Mechanical engineering Engineering design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Previous ed. : London : Arnold, 1998.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	front cover; copyright; table of contents; front matter; Preface; About the author; Acknowledgements; body; 1 Design; 1.1 Introduction; 1.2 The design process; 1.2.1 Case study; 1.3 Total design; 1.4 Product design specification; 1.5 Conceptual design; 1.5.1 Boundary shifting; 1.5.2 Brain-storming; 1.5.3 Morphological analysis; 1.5.4 Function trees; 1.6 The technology base; 1.7 Conclusions; 2 Mechanical engineering; 2.1 Introduction; 2.2 Thermodynamics; 2.2.1 Fluid mechanics; 2.2.2 Heat transfer; 2.3 Mechanics; 2.4 Materials; 2.4.1 Metals; 2.4.2 Polymers and elastomers 2.4.3 Ceramics and glasses 2.4.4 Composites; 2.5 Conclusions; 3 Machine elements; 3.1 Introduction; 3.2 Tribology; 3.3 Bearings; 3.4 Gears, belts and chains; 3.5 Seals; 3.6 Clutches and brakes; 3.7 Springs; 3.8 Fasteners; 3.9 Enclosures; 3.10 Conclusions; 4 Bearings; 4.1 Introduction; 4.2 Sliding bearings; 4.2.1 Lubricants; 4.2.2 Design of boundary lubricated bearings; 4.2.3 Design of full film hydrodynamic bearings; 4.2.4 Alternative method for the design of full film hydrodynamic bearings; 4.3 Rolling contact bearings; 4.3.1 Bearing life and selection; 4.3.2 Bearing installation 4.4 Conclusions 5 Shafts; 5.1 Introduction; 5.2 Shaft-hub connection; 5.3 Shaft-shaft connection - couplings; 5.4 Critical speeds and shaft deflection; 5.4.1 Macaulay's method for calculating the deflection of

beams; 5.4.2 Castigliano's theorem for calculating shaft deflections; 5.5 ASME design code for transmission shafting; 5.6 Conclusions; 6 Gears; 6.1 Introduction; 6.2 Construction of gear tooth profiles; 6.3 Gear trains; 6.3.1 Manually shifted automotive transmissions; 6.3.2 Epicyclic gear trains; 6.4 Tooth systems; 6.5 Force analysis; 6.5.1 Introduction to gear stresses  
6.5.2 Bending stresses  
6.6 Simple gear selection procedure; 6.7 Conclusions; 7 Detailed gear stressing; 7.1 Introduction; 7.2 Wear failure; 7.3 AGMA equations for bending and contact stress; 7.4 Gear selection procedure; 7.5 Conclusions; 8 Belts and chain drives; 8.1 Introduction; 8.2 Belt drives; 8.2.1 Belt selection; 8.3 Chain drives; 8.3.1 Roller chain selection; 8.4 Conclusions; 9 Seals; 9.1 Introduction; 9.2 Static seals; 9.2.1 Elastomeric seal rings; 9.2.2 Gaskets; 9.2.3 Foodstuffs containers; 9.3 Dynamics seals; 9.3.1 Seals for rotating machinery  
9.3.2 Seals for reciprocating components  
9.4 Conclusions; 10 Clutches and brakes; 10.1 Introduction; 10.2 Clutches; 10.2.1 Design of disc clutches; 10.3 Brakes; 10.3.1 Disc brakes; 10.3.2 Drum brakes; 10.3.3 Short shoe external drum brakes; 10.3.4 Long shoe external drum brakes; 10.3.5 Long shoe internal drum brakes; 10.3.6 Band brakes; 10.4 Conclusions; 11 Springs; 11.1 Introduction; 11.2 Helical compression springs; 11.3 Helical extension springs; 11.4 Helical torsion springs; 11.5 Leaf springs; 11.6 Belleville spring washers; 11.7 Conclusions; 12 Fastening and power screws  
12.1 Introduction to permanent and non-permanent fastening

---

## Sommario/riassunto

This book introduces the subject of total design, and introduces the design and selection of various common mechanical engineering components and machine elements. These provide "building blocks", with which the engineer can practice his or her art. The approach adopted for defining design follows that developed by the SEED (Sharing Experience in Engineering Design) programme where design is viewed as "the total activity necessary to provide a product or process to meet a market need." Within this framework the book concentrates on developing detailed mechanical design skills in the

---