1. Record Nr. UNINA9911006704203321

Autore	Samuel A. E (Andrew E.), <1931->
Titolo	Introduction to engineering design : modelling, synthesis and problem solving strategies / / Andrew Samuel, John Weir
Pubbl/distr/stampa	Oxford ; ; Boston, : Butterworth-Heinemann, 1999
ISBN	1-281-79590-9 9786611795900 0-08-050914-2 0-585-47066-9
Descrizione fisica	1 online resource (425 p.)
Altri autori (Persone)	WeirJohn (John Gerard)
Disciplina	620.0042 620/.0042 21
Soggetti	Engineering design Industrial design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Introduction to Engineering Design: Modelling, Synthesis and Problem Solving Strategies; Copyright Page; CONTENTS; Acknowledgement; Commonly used symbols and design terminology; Preface : The need for this book; PART 1: MODELLING AND SYNTHESIS; Chapter 1. Introducing modelling and synthesis for structural integrity; 1.1 Structural integrity and the nature of failure; 1.2 Units, estimation and things we expect you to know; Case example 1.1: Dolphin enclosure; Case example 1.2: A Christmas tale; 1.3 Structural distillation; Case example 1.3: Pliers; Case example 1.4: Multigrips Case example 1.5: Paper clipCase example 1.6: Scissors; 1.4 Assignment on Structural distillation; 1.5 Solutions to exercises; 1.6 Assignment in modelling: Rural power distribution system; Chapter 2. Design against failure; 2.1 Introducing engineering materials and modes of failure; 2.2 Material selection; 2.3 Design for static loading, introducing failure predictors and factors of safety; 2.4 Assignment in design for structural integrity :Airline service table; 2.5 Design for dynamic loading (fatigue); 2.6 Assignment on design to resist fatigue failure; 2.7 Design for contact loading

2.8 Chapter SummaryChapter 3. Design synthesis of some generic engineering components; 3.1 Shafts: bending and torsion; 3.2 Assignment on shaft design; 3.3 Mechanical springs: bending and torsion; 3.4 Columns: axial loading and static instability; 3.5 Assignment on column design; 3.6 Pressure vessels: internal pressure; 3.7 Assignment on pressure vessel design; Chapter 4. Design of mechanical connections; 4.1 The nature of mechanical connections; 4.2 Bolted joints and screws: design for clamping contact; 4.3 Pinned joints and shear connectors; 4.4 Welded joints
4.5 Assignment on bolted and welded jointsChapter 5. Review: Structural integrity of engineering systems; 5.1 Designing engineering systems: the 'big picture'; 5.2 Some 'radical new theories' in engineering design; 5.3 Review questions; 5.4 Design assignments; 5.5 Some cautionary notes; PART 2: PROBLEM SOLVING STRATEGIES: AN ENGINEERING CULTURE; Chapter 6. The evolution of problems; 6.1 Cultural development of the designer; 6.2 Design problem solving; 6.3 Evolution and enformulation of design problems; Case example 6.1: Level crossing problem; Case example 6.2: Portable water heater
6.4 The design process6.5 Generating ideas (solutions); 6.6 Generic barriers to idea generation; 6.7 Evaluating designs and decision support systems; Case example 6.3: Site for a power station; 6.8 Decision making strategies; Case example 6.4: Design of a washing machine; Case example 6.5: proposal for a new processing plant; Case example 6.6: Automobile horn; Case example 6.7: Electric power distribution; Case example 6.8: Wind load on chimney; Case example 6.9: Heat-exchanger design; 6.9 Assignment on problem evolution and enformulation: Bicycle Security
6.10 A brief note about technical reporting

Sommario/riassunto

Introduction to Engineering Design is a completely novel text covering the basic elements of engineering design for structural integrity. Some of the most important concepts that students must grasp are those relating to 'design thinking' and reasoning, and not just those that relate to simple theoretical and analytical approaches. This is what will enable them to get to grips with *practical* design problems, and the starting point is thinking about problems in a 'deconstructionist' sense. By analysing design problems as sophisticated systems made up of simpler constituents, and evol