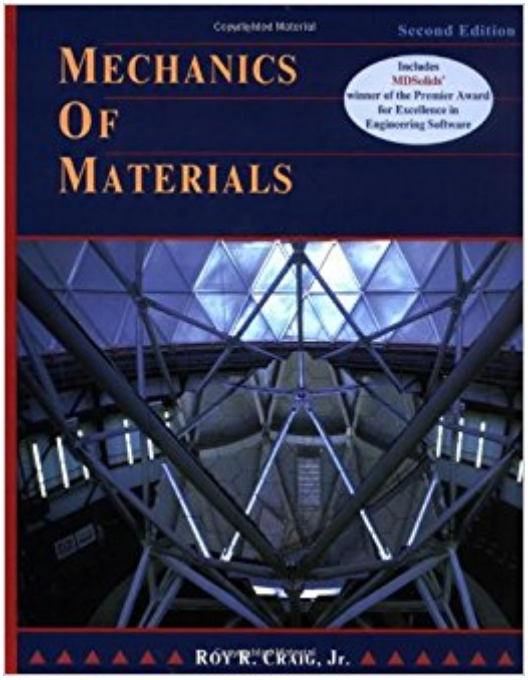
Mechanics Of Materials, 2nd Edition



Synopsis

The revision of this successful mechanics of materials text continues to feature a strong emphasis on the basics - equilibrium, force-temperature-deformation behavior of materials and geometry of deformation

Book Information

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Customer Reviews

FOCUS ON THE BASICS... AND BRING CRITICAL SKILLS INTO FOCUS! By emphasizing the three key concepts of mechanics of solids (Equilibrium, Force-Temperature-Deformation Behavior of Materials, and Geometry of Deformation), this new Second Edition helps readers improve their problem-solving skills. They'll discover how these fundamental concepts underlie all of the applications presented, and they'll learn how to identify the equations needed to solve various problems. And with the addition of detailed example problems integrated throughout the chapters, readers learn how to organize their solutions and think like practicing engineers. The MDSolids software included with the text also adds to the development of readers' skills. This CD-ROM helps them confirm solutions obtained by hand calculation, view sketches and graphs that illustrate how members deform and how stresses are distributed, and search through extensive help files to find solution procedures and tips. An additional 90 examples problems are provided on the software that are similar to the ones presented in the book. Key Features of the Second Edition A Strong emphasis is placed on the basics to help readers gain a better understanding of the material and enhance their problem-solving skills. A four-step problem-solving procedure is introduced that

includes Plan the Solution and Review the Solution se4ctions. This procedure helps readers determine how to solve a problem and check the solution for accuracy. Thirty computer exercises are included in the text. Twenty of these exercises encourage readers to use application software (FORTRAN,C, spreadsheet program, MathCAD, MATLAB and more) to solve problems. Ten of the exercises are specifically designed for MDSolids solutions. Readers will gain an appreciation of this software as they solve complex problems that involve several stages.

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Possibly the best mechanics of materials book out there -- it stresses very important concepts and derives them all from basic principles in a very theoretical manner. It even points out information in footnotes regarding origins of some of the concepts and shows the limitations inherent in some of the formulations. Example problems are clearly worked out and actually teach concepts instead of simply providing the instructor with a ready source of busywork. Deriving a parametric equation that demonstrates mathematically why the neutral axis has the highest shear stress is the kind of problem that should be in every book but sadly isn’t, and engineering education suffers as a result. Nice job, Dr. Craig.

This book is excellent. I was educated as a nuclear engineer, but seem to constantly be drawn into mechanical problems in the power plant. I bought this book to teach myself mechanics of materials so I could develop a finite element analysis program to analyze turbine generator component stress’ and strains.The book is well organized and well written. The examples are good, and the homework problems are hard enough to make you think.My only suggestion, for other non-mechanical engineers who buy this book to learn this material, is that you also have a engineering statics book available for reference when solving the homework problems in chapter one and two.

1. Emphasis on fundamentals - slower-paced in the beginning where engineering books should be. 2. Does not waste space on advanced topics such as thick,curved beams, etc. 3. Exception to 2 (above): Gives a brief introduction to the finite element method which is vital to today's stress engineer. Includes a 4-page insert of photos of FEM models. 4. Does not use complicated matrix and tensor notation. 5. Uses concepts of equilibrium. stress-strain, and geometric compatibility where possible. 6. Provides a systematic, 4-step, problem-solving procedure which includes a review of the solution (something many engineers don't do enough) 7. Comprehensive discussion of strain. 8. Numerous examples and HW problems. 9. Comes with a CD-ROM containing an award-winning program called MDSolids which has numerous modules for problem solving of beams, trusses, Mohr's circle, properties, etc. It is the most user-friendly software I have ever used, and I have used a lot of software over 30 years. The CD has built-in examples for learning the material, but the modules also allow you to input your own problems. For example, the Beam Module allows you to break up a beam into up to 10 finite elements with generic loads on each element. Output values are tabulated and plotted for shear, moment, slope, and deflection.An added feature is that you can import values from one module into another. For example, you can use the Properties Module to calculate area and moments of inertia, and then import those values into the Beam Module. The CD alone is worth the price of the book.

I became familiar with this outstanding text when my son took a strength of materials course at the University of Texas at Austin. As a Professional Structural Engineer, I understood the importance of this course in the engineering curriculum. Also, I know from experience that many good students have trouble mastering the material. So I bought a copy so I could help my son by telephone. I am familiar with all the major texts in this subject including the classic book by Gere and Timoshenko and the popular text by Beer and Johnston.I was immediately impressed with the Craig book. The text has clear discussions and explanations and a masterful emphasis on the three fundamentals of structural mechanics: equilibrium, material behavior and geometry of deformation. For my money it is head and shoulders above the Gere and Timoshenko and the Beer and Johnston texts. Not that they are bad books; but the Craig book is a much better book. The Beer and Johnston text is largely a cookbook approach. The emphasis is on learning specific methods to solve specific types of problems. The Gere and Timoshenko text is a virtual strength of materials encyclopedia. No book in this field has a more thorough discussion of beams. But what students (and practicing engineers) need most is where the Craig text has no peer: 1)clear, simple explanations with an emphasis on equilibrium, material behavior, and geometry of deformation and 2)a rational and logical problem

solving procedure that shows students how practicing engineers approach real-world problems. A student who learns the material in this book will have solid basis for becoming a competent engineer and for more advanced work in structural mechanics.Some of the strengths of this text include:1. A graphic-based menu-driven computer program that includes for modules for beams, section properties, solution of simultaneous linear algebraic equations, plotting shear and moment diagrams, and plotting of Mohr's circles for stress and strain. The output from one module can be imported to the other modules. This is very user-friendly software. It can be used to solve homework problems and for carrying out iterative design solutions.2. Emphasis on a rational and logical four-step problem-solving procedure including flow charts. The procedure includes planning the solution as well as reviewing the solution for reasonableness. Making these two steps an ingrained habit is essential to being a competent and proficient structural engineer.3. Repeated emphasis on the three fundamental concepts of structural mechanics: equilibrium, deformation behavior of materials, and geometry of deformation. Part of becoming a competent engineer is making these three concepts second nature and learning to apply them in a skillful manner.4. The use of force-method and displacement-method concepts; understanding these concepts is essential in more advanced work in structural mechanics.5. All of the traditional mechanics of materials subjects are covered including what I consider the best, most through discussion of strain found in any of the popular texts on this subject. The discussion of strain includes a thorough explanation of the concept of deformation diagrams and strain-displacement analysis.6. An introductory chapter that reviews the concept of static equilibrium and relates it to the equilibrium of deformable bodies.7. A superior discussion of stress concentrations and failure theories.8. Exceptionally clear discussions of stress and strain in beams.9. The illustrations in the Craig text are clearly superior to the illustrations in the competitive texts.10. Appendix A includes a valuable discussion of the use of power series approximation formulas. The approximations are useful in strain-displacement analysis because they allow the reduction of complex, nonlinear strain-displacement equations to linear, small-displacement forms.11. The Craig book comes across to me as a book written by someone who passionately cares about his subject and really wants his students to understand the subject. Not just to learn enough problem solutions to pass the course. I get the impression that this book was a labor of love by the author. If an engineering student can pick up on that he has to believe that this is an important subject to master, not just to pass. The writing in the competitive texts comes across as somewhat stale. Maybe they have been through so many editions they just are not fresh and have become another job for the authors.

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