BOOK REVIEW

Statics and Strength of Materials, Second Edition

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REFERENCE: Morrow, H. W., *Statics and Strength of Materials, Second Edition*, Regents/Prentice Hall, Englewood Cliffs, NJ, 1993, ISBN: 0-13-845835-9, 557 pages.

The second edition of this book, which comes twelve years after the release of the first, mainly targets engineering technology and non-engineering university students with no calculus requirements, as the author states. However, the book may also serve as a reference for courses in materials and materials testing as well as machine and structural design. Two new chapters have been included in this edition: Concurrent Forces in Space (under the Statics branch) and Bolted, Riveted, and Welded Structural Connections (under the Strength of Materials branch). In addition to many changes and improvements throughout all the chapters of the book, this edition contains three new sections: Power Transmission, Flange Couplings (under the chapter named Shear Stresses and Strains; Torsion), and Design of Beams for Strength (under the chapter named Bending and Shearing Stresses in Beams). However, the new chapter Concurrent Forces in Space seems to be very short (it may be described as the five-example and fourteen-problem chapter) and needs to be critically examined.

The book contains 18 chapters covering the principles of both Statics and Strength of Materials in about 560 pages, with a nice hard cover. The author uses short, direct, and clear sentences supported by expressive visual aids and examples. The organization of the book is neat and well-developed. One of the strongest points of this book is the simplicity in describing each section with the enhancement of many supportive examples. Also, about 800 problems are included throughout, in ascending order of difficulty, to help students promote creativity in solving real life problems with more understanding. However, the author seems to concentrate more on giving examples (about 170 examples are included which occupy about two thirds of the total number of pages) than on giving details of the concepts behind these examples which may suggest the book as a guide to solving problems in Statics and Strength of Materials. This may be attributed to his intention to direct this book to a specific audience with a practical orientation.

Chapters 1 through 9 cover the following topics in Statics: the basic concepts of trigonometry; resultant of both concurrent and nonconcurrent forces in a plane; equilibrium of both concurrent forces in a plane and a rigid body; force analysis of structure and machines; concurrent forces in space; friction; and center of gravity, centroids, and moments of inertia of areas. Chapters 10 through 18 cover the following topics in Strength of Materials: internal reactions-stress for axial loads; strain for axial loads (Hook's Law); shear stresses and strains-torsion; shear forces and bending moments in beams; bending and shearing stresses in beams; deflection of beams due to bending; combined stresses-Mohr's Circle; columns; and bolted, riveted, and welded structural connections. The reviewer suggests an additional chapter to cover the concepts of plane strain, principal strains, Mohr's circle for strain, maximum shear strain, etc. This chapter might follow the chapter named Combined Stresses-Mohr's Circle.

Although the present book is quite effective, a few modifications could be made to make the book better. One of these changes is in Chapter 1 where the author has devoted about five pages to address the two systems of units and how to convert from one system to the other. Introducing these two systems in a few words and constructing a general table for conversion factors clearer than tables 1.1 and A.2 (this table might include length, mass, stress, torque, power, etc.) would benefit the readers more. This conversion table might also be inserted in the beginning or at the end of the book to serve readers as a quick reference. Also, Figures 5.9 and 5.10 should be within section 5.5, as they were in the first edition, to make it easy for the reader to follow.

There are minor errors throughout the book such as those on page 143 (specifically in Equation 7.3 and in the second line above Fig. 7.2) where (AC^2) and (y_A) should appear instead of (AB^2) and (y_B), respectively. Some numerical errors occur such as the value of (X_B) in example 7.1 (page 144) and some key answers for the even problems. The author has also included "bearing stress" in the subtitle of section 10.7 and kept the same introduction as in the first edition, about normal and shear stresses, without adding "bearing stress" to it, although he has substituted one of the previous examples with a new one to include the concept of how to calculate the bearing stress. The values of Poisson's ratio for different materials, which were included in Table A.11 in the previous edition, have been dropped in the present one. These values need to be added to the present table since the author refers to them on page 270.

I personally believe that this book, with some modification to its present design and contents, will be one of the better ones available in the field of Statics and Strength of Materials for industrial and engineering technology students, as well as for non-engineering university students. I recommend teaching staff working in this field to consider this book as one of their choices to serve as a textbook for their students.

