



Introduction to Composite Materials Design, Second Edition

By Ever J. Barbero

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Presenting a wealth of completely revised examples and new information, **Introduction to Composite Materials Design, Second Edition** greatly improves on the bestselling first edition. It incorporates state-of-the-art advances in knowledge and design methods that have taken place over the last 10 years, yet maintains the distinguishing features and vital content of the original.

New material in this second edition:

1. Introduces new background topics, including design for reliability and fracture mechanics
2. Revises and updates information on polymer matrices, modern fibers (e.g., carbon nanotubes, Basalt, Vectran) and fiber forms such as textiles/fabrics
3. Includes new information on Vacuum Assisted Resin Transfer Molding (VARTM)
4. Incorporates major advances in prediction of unidirectional-lamina properties
5. Reworks sections on material failure, including the most advanced prediction and design methodologies, such as *in situ* strength and Mohr-Coulomb criterion, etc.
6. Covers all aspects of preliminary design, relegating finite element analysis to a separate textbook

7. Discusses methodology used to perform damage mechanics analysis of laminated composites accounting for the main damage modes: longitudinal tension, longitudinal compression, transverse tension, in-plane shear, and transverse compression
8. Presents in-depth analysis of composites reinforced with plain, twill, and satin weaves, as well as with random fiber reinforcements
9. Expands the analysis of thin walled beams with newly developed examples and MATLAB® code
10. Addresses external strengthening of reinforced-concrete beams, columns, and structural members subjected to both axial and bending loads

The author distributes 78 fully developed examples throughout the book to illustrate the application of presented analysis techniques and design methodology, making this textbook ideally suited for self-study. Requiring no more than senior undergraduate-level understanding of math and mechanics, it remains an invaluable tool for students in the engineering disciplines, as well as for self-studying, practicing engineers.

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Editorial Review

From the Author

Design with composite materials is often conducted in a two-step process: "preliminary design" and "detailed analysis". The former is covered by "Introduction to Composite Materials Design-2nd edition" and the free online software cadec-online.com is helpful for that as well. In large aerospace companies, once preliminary design is done, the project is handed over to the "detailed analysis" team, but most often than not the whole process is done by the same person or same team. Detailed analysis is covered by my twin boons: "Finite Element Analysis of Composites Materials" Using Abaqus and Using ANSYS, both 2nd Edition. These books cover all "mechanics" aspects of the design including deformation and strength. Other topics might be relevant depending on the application are covered in "Multifunctional Composites".

About the Author

Ever J. Barbero, BSME, BSEE, Ph.D., is a Fellow of ASME and SAMPE, and professor of Mechanical and Aerospace Engineering at West Virginia University. He is recognized internationally for his work on material models for composite materials. He is the author of a related textbook, *Finite Element Analysis of Composite Materials*, two patents, and more than 100 peer-reviewed publications.

Users Review

From reader reviews:

David Goodspeed:

Have you spare time for a day? What do you do when you have more or little spare time? Sure, you can choose the suitable activity regarding spend your time. Any person spent their very own spare time to take a walk, shopping, or went to often the Mall. How about open as well as read a book allowed Introduction to Composite Materials Design, Second Edition? Maybe it is to be best activity for you. You understand beside you can spend your time together with your favorite's book, you can cleverer than before. Do you agree with its opinion or you have various other opinion?

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