

Composite Materials and Structural Analysis

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MV Learning, 3 Henrietta St., London WC2E 8LU, UK. 2016. 300pp. Illustrated. £21.95. ISBN 978-81-309-2808-1.

This book covers some aspects of the micromechanics and structural behaviour of laminated composites. Chapters 1 to 7 introduce the basics, including characterisation and response of composite materials. Analysis of composite beams is covered in Chapter 8 and comparison of thin plate theory with higher order deformation theories is presented in Chapter 9. Chapters 10 and 11 deal with short fibre composites and the optimisation of composite laminates for vibration, buckling and structural weight. Manufacturing techniques are covered in Chapter 12 and experimental characterisation of composite properties in Chapter 13.

The book is intended to serve the requirements of undergraduate and postgraduate courses, as well as practising engineers. Worked examples are provided and exercise problems are given at the end of each chapter.

Subjects such as micromechanics and laminate analysis are well covered but I am not sure that this book will add to those already available in composites. The presentation of higher order theory is interesting and illustrates the significance of through-thickness flexibility in laminated material. However, the observation is not backed up by consideration of through-thickness failure mechanisms and the example problems provided throughout the book are very specific, making it difficult to distil fundamental understanding of structural performance.

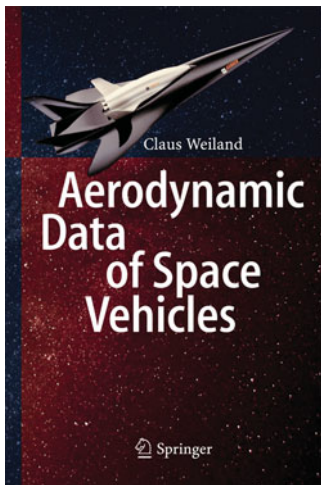
In my opinion, the book does not fulfil the requirements of the aerospace engineering community by addressing the challenges facing composite manufacturing at the current stage of its development. These challenges include a need for a broad understanding of finite element theories and modelling procedures for composites applied to complex 3D shapes with variable laminate thickness. They also include the influence of production rate and quality control on structural performance.

Although the presentation of theory is reasonably clear, the book contains some typographical and grammatical errors and the clarity of illustration, tabular data, and equations could be improved. Example problems are highly idealised and do not relate to realistic applications. This is particularly evident in the structural optimisation section for which laminate design rules and

manufacturing constraints are completely ignored.

The book may be useful to some undergraduate programmes, but its usefulness in postgraduate and engineering practice may be limited.

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Aerodynamic Data of Space Vehicles

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ISBN 978-3-6425-4167-4.*

Another good technical book in this series published by Springer. This book will be of particular interest of those who are involved or interested in high-performance space vehicles, re-entry systems and re-useable launch vehicles. Contained

within this book is a technical review of a number of these vehicles: Apollo, Soyuz, cone-derived re-entry vehicles and vehicle concepts such as the X-34, X-33 and Hermes. These vehicle concepts are presented and discussed and are divided into three categories with explanations and definitions given for each type – non-winged (capsules, probes, cones and biconics), winged re-entry and finally cruise/acceleration configurations.

The context of the high-speed nature of the vehicles under consideration is included and is combined with an example derivation of an aerodynamic model and the subsequent generation of aerodynamic databases. The aerodynamic data is presented in both graphical form and includes results from Computational Fluid Dynamics (CFD), coefficient plots, along with well-presented Computer Aided Design (CAD) images.

The reference lists at the end of each chapter are extensive and provide the reader with ample opportunity to explore each vehicle further if needed.

One non-technical comment to be made is that apart from three brief references to HOTOL in the main text of the book the UK contribution is practically neglected. From someone who has an active interest in high-speed space vehicle design, this is a little disappointing. However, this may not be the fault of the author. This issue aside this book would make a useful addition to any technical library being a useful source for vehicle design and for the validation and verification of high-speed CFD simulations.

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