

to design unilateral laminates and cross ply sandwich lay-ups of various kinds is explained, and the analysis of thin-walled composite beams concludes the chapter.

Section B5, 'Structural and Loading Discontinuities', represents a big step-up from simple engineering theory and provides an excellent introduction to axial constraint, one important observation being that the zero warping axis and the shear centre focus are not one and the same. Shear lag, another form of load diffusion, is also clearly explained.

Readers will know by now that closed tubes are far better suited to carrying torsion than are open section tubes (Is, channels, Zees Tees, etc.). It is, however, important to note that when the ends of short lengths of open tubes are fully built in (as in undercarriage bays), significant torques may be transmitted (see Fig 27.12).

Chapter 28, 'Wing Problems', confirms that the wings of aircraft are not rigid but may flex considerably under aerodynamic loads (due to gusts for example). Problems considered include torsional divergence of a swept wing, control effectiveness, aileron reversal and flutter.

Finally, an Appendix, which describes the design of a section of rear fuselage, brings this fifth edition to a close.

Lecturers who adopt this text may apply to the publishers at: www.textbookselsevier.com, for a full set of solutions and electronic figures.

All who have learned from this iconic book in the past 40 years will surely hold Megson's work in high regard; essential reading for all serious students new to the subject.

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Aeronautical Applications of Non-destructive Testing

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DEStech Publications, Inc, 439 North Duke Street, Lancaster, PA 17602-4967, USA. 2014. 479pp. Illustrated. \$179.50. ISBN 978-1-60595-120-1.

Non-destructive Testing (NDT) is well-known as an integral part of the through-life operation of all modern aircraft. Indeed, NDT is also interwoven with current design and manufacturing philosophies. I was, therefore, delighted to see that this extremely important topic is now covered by a 477-page book.

Firstly, the book sets the context in which NDT is used by the aerospace industry and explains design philosophies such as the concepts of damage tolerance and inspection intervals. This is important as it explains why NDT is needed and how it fits into the aerospace industry.

The book then goes on to delve into the core NDT methods, such as ultrasonics, thermography and eddy currents. This is a daunting breadth of subject matter, as NDT

is very much an interdisciplinary subject. It means that these technique chapters can only really serve as introductions to these topics which each warrant books in their own right. Understandably then, some technical subtleties and things like new techniques are glossed over. However, the really nice aspects of these chapters are the real-world practical examples, which come from the author's own experience. I can see these examples being of significant use to readers who already have an NDT background in a different sector. They would also be useful for engineering students or practicing engineers who need to understand this application.

Having viewed NDT from a technique perspective, the book then changes tack and considers two particular aerospace application challenges: detection of corrosion in aluminium structures and the inspection of composite materials. The book then concludes with a comprehensive chapter describing how the performance of NDT is measured, a critical yet overlooked subject that is very clearly described here.

In summary, this is a welcome book on NDT in aerospace. It is jam-packed with numerous real-world examples and has nice chapters that consider the big picture of why NDT is performed.

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Elements of Propulsion: Gas Turbines and Rockets – Second edition

**J. D. Mattingly
 and K. M. Boyer**

American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191–4344, USA. 2016. Distributed by Transatlantic Publishers Group, 97 Greenham Road London N10 1LN. 948pp. Illustrated. £96. (20% discount available to RAeS members on request; email: mark.chaloner@tpgltd.co.uk Tel: 020–8815 5994) ISBN 978-1-624103-71-1.

Elements of Propulsion is an excellent textbook for any general undergraduate-level aerospace propulsion course. There is an extremely useful introduction to the area covering the breath of propulsion technologies from small and large civil aviation engines to rocket technology. In addition, the key thermofluids fundamentals are covered in two introductory chapters.