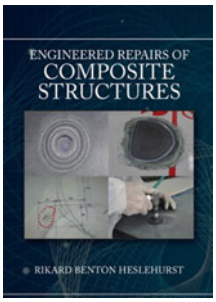

Engineered Repairs of Composite Structures

R. B. Heslehurst

CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742, USA. 2019. Distributed by Taylor & Francis Group, 2 Park Square, Milton Park, Abingdon OX14 4RN, UK. xxv; 191 pp. Illustrated. £96. (20% discount available to RAeS members via www.crcpress.com using AKQ07 promotion code). ISBN 978-1-4987-2626-9

This book has successfully attained a well-organised structure, beginning with fundamental principles and basic definitions of (polymer) composite materials and structures in chapter 1, covering the challenges associated with their performance (mainly in aerospace applications) including service-induced defects. The definition has then been narrowed down to the most common defects that are critical for high-performance structures such as the primary structure of aircraft. Aligned with this, the context of non-conformity in composite defects has appropriately and concisely been addressed.

The author has then smoothly moved on to a comprehensive review of the existing industrialised and regulated Non-Destructive Inspection (NDI) techniques for detection of the mentioned defects in aerospace composites. Furthermore, in chapter 3, some uncertainties associated with technician skills in conducting NDI have been brought up as key to ensuring reliable detection and decision-making on the overall extent of the damage, which paves the way for material removal and repair patch design further down the process line of repair, described later in the book.

Another aspect to make readers believe that the book possesses a concise and clever structure is that, prior to the provision of repair schemes, the readers' attention has been drawn to an informative, elaborative and academic chapter (chapter 4) on reasoning why the upcoming repair scheme chapter has been introduced: effects arising from stress discontinuity due to service damage, which consequently affects the load-carrying capacity of a structure. Chapter 4 transfers the required underlying mechanistic knowledge on this matter to the readers, enabling critical thinking. Therefore, the book will not only satisfy industry's needs for robust details on how to carry out a reliable repair process cycle, but it may be looked at as an advanced textbook for academic training. One may prefer to study chapter 6 before chapter 5, to acquire the principal knowledge on composite joining methods, irrespective of their application in composite repair. As such, chapter 6, though comprehensive, would have been more powerful if it covered challenges with the control of variabilities associated with adhesive bonding processes for bonded repair, a growing and persistent concern resulting from the occurrence of deficiencies at the interface of

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adhesive and adherends, i.e. so-called weak and kissing bonds (or tight disbands), which cannot be reliably observed using any existing NDI technique.

This is followed by chapter 8, where this challenge could have been further elaborated. However, chapter 8 will be especially value for European industries (both manufacturers and MROs) in the sense that it addresses honeycomb composite repair. Personally, I would wish to see more on existing challenges with aviation regulations for permit-to-fly and ongoing intense standardisation, especially from the bonded repair regulatory perspective, and referring to some CACRC documented regulations, CS25 and AMC20-29 specifications for repair materials and processes.

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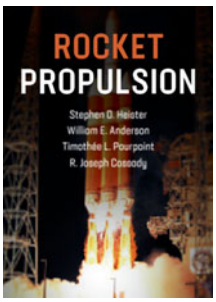

Rocket Propulsion

S. Heister *et al.*

Cambridge University Press, University Printing House, Shaftesbury Road, Cambridge CB2 8BS, UK. 2019. xiii; 574 pp. Illustrated. £54.99. ISBN 978-1-108-42227-7.

Rocket Propulsion by Heister *et al.* provides comprehensive coverage of the core aspects of chemical (solid and liquid) rocket motor design. The textbook also refers to unsteady analysis and its complexities and importance for safe system design. The text makes good use of relevant examples and case studies, which help to ground much of the theoretical analysis presented.

While this is primarily a textbook on chemical rocket propulsion systems, there is a brief chapter on electric propulsion (EP). This chapter gives a good overview of the types of EP systems and their basic operating principles. It would have been nice to see some more introductory material on basic methods for mission analysis for EP systems here, but as EP is not the main focus of the text, this omission is understandable.

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