Care and Repair of Advanced Composites – Second edition.

K.B. Armstrong *et al*

SAE International, 400 Commonwealth Drive, Warrendale, PA, USA. 15096-0001. 2005. 639pp. Illustrated. $89.95. ISBN 0-7680-1062-4.

Serious consideration of repair and maintenance is vital to full and economic utilisation of advanced structures, so this book of over 600 pages will be of great use and interest to everyone involved in such aspects of high performance fibre-reinforced plastics. Parts of it should also be required reading for all practising and budding designers of structures fabricated from such materials; if repair is not considered at the initial design stage then an irreparable structure could easily be produced. It is unlikely to be of direct interest to research workers, but could be useful background reading for students studying advanced composites.

The book is a considerable improvement on the first edition, of which it is an enlarged and updated version. It is well illustrated and replete with relevant data and, give or take the occasional confusion with units and typographical error, is an excellent text. The contents are based on the many years of practical experience of the authors and members of an IATA Task Force, and the Commercial Aircraft Composite Repair Committee which followed it.

There are 17 chapters, each with a comprehensive bibliography, and a full index. Following an Introductory chapter, there follows background chapters on materials, handling and storage, manufacturing techniques, and design criteria. The core issue of repair is treated in the remaining chapters. Safety measures and the working environment are dealt with, then damage and repair assessment, source documents, repair method selection and repair techniques. After these come chapters on mechanical fastening, documentation, equipment and hand tools, tooling and mould making and metal bonding.

The penultimate chapter describes many generic damage/repair problems, based on actual cases, which have been brought about by poor initial design. This chapter is a "must" for all designers of advanced composite structures. The final chapter, of over 100 pages, presents a wide ranging treatment of the design of repairs, and includes appropriate stress analysis methods for both bonded and mechanically fastened repairs. The book is strongly recommended.

Professor Frank L. Matthews, CEng, FRAeS

A Modern Course in Aeroelasticity – Fourth edition

Edited by E.H. Dowell *et al*

Kluwer Academic Publishers, Dordrecht. 2004. Distributed by Springer-Verlag, Tiergartenstrasse 17, D-69121 Heidelberg, Germany. 746pp. Illustrated. £105.50. ISBN 1-4020-2039-2.

A Modern Course in Aeroelasticity is a classic text on many aspects of the subject of aeroelasticity. In recent years it was impossible to obtain this book so it is great to see it back on sale in its fourth revised and enlarged edition. As the work is well known in the aeroelastic community, this review will concentrate on the new material. There are four completely new chapters dealing with the most recent advances in the field.

Chapter 9 discusses modern methods for the modelling of fluid-structure interaction, mostly computational fluid dynamics techniques. The chapter is essentially a review paper. Some key methodologies are introduced and sample results are reported, mostly for aerofoils and a delta wing. The chapter is of most value when seen as a snapshot of research in this field.

Chapter 11 deals with nonlinear aeroelasticity and is based on a review paper. It contains some good general discussion of phenomena such as limit cycle oscillations. Sources of nonlinearity are explored and examples are given. The chapter is a very good introduction and a substantial bibliographical source.

Chapter 12 is on aeroservoelasticity and concentrates on active flutter suppression, a field of research that has seen substantial activity in recent. This chapter is the best of the new material in the book because it combines a presentation of the state of the art with two very detailed examples. Theoretical modelling and control law design is validated by experimental results for both examples.

Chapter 13 deals with aeroelasticity in turbomachinery in the presence of nonlinear flows. Linearization approaches are presented and the handling of unsteady flows in the frequency domain is discussed. As the aerodynamic forces are calculated from CFD methods, there are no paradigmatic examples here but the general methodology is well presented.

Finally, Chapter 6 on aeroelasticity in civil engineering has been substantially revised. While the established parts of the book are suitable for readers of all levels, the new material is mostly addressed to research engineers, both in academia and in industry. It will serve as a good introduction to the selected areas of research and as an extensive source of bibliographical information.

Dr G. Dimitriadis

Aircraft Design – a Conceptual Approach – Fourth edition; and RDS-Student: Software for Aircraft Design, Sizing and Performance

D.P. Raymer

American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2006. 838pp; 72pp. Illustrated. $109.95 (AIAA members), $148.95 (non-members). ISBN 1-56347-829-3; ISBN 1-56347-831-5.

The Education Series of textbooks produced by 'the cousins' – the American Institute of Aeronautics and Astronautics (AIAA) – is renowned for products of high quality. The present book is the latest edition of *Aircraft Design* by Daniel Raymer who, formerly of Lockheed Aeronautical Systems, Burbank, California, is now with the Conceptual Research Corporation, Playa del Rey, California. The first edition appeared in 1989.

The fourth edition has substantially the same format but has been expanded, and is usefully accompanied by an RDS-Student software package and disk, comprising what is described as a "sophisticated yet friendly" aircraft design and analysis computer program. The aim is the analysis of both new and derivative aircraft, making it a flexible tool, not only for teaching students, but also as a compendium for those with more experience.

The author has provided a broad range of designs. It includes a homebuilt light racing aeroplane with design calculations set out as one might on the back of an envelope, showing the more traditional fundamental technique of the design process. He also casts his net wide to more advanced civil and military multi-engine layouts, including tailless and three surface, and forward-swept.

The author discusses the relative merits of different arrangements and types of powerplant, including also rocket and hydrogen propulsion. He considers various configurations for extremes of flight, with a brief introduction to helicopters, and hybrid air-

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