icing/de-icing of rotor blade leading edges; design mechanism for icing/de-icing rotor blades; reinforced thermoplastic materials; polybutadiene resins; hydrolytic stability; low temperature flexibility; airthane PET-91A based elastomers; thermally conductive Materials. NB: Graphene, a recently developed sheet-like material, one atom thick and easy to work, is not discussed here but is said, by some, to have greater commercial potential than the conventional nanotube.

A study of thermoplastic reinforced carbon for large ground based radomes, forms a fitting end to both the Chapter and the book.

Brief mention has already been made to the occasional mix of nouns and verbs – which by default also appears here and there in this review but the technical content of the book technically supported by over 300 cutting edge references is admirable and cannot be faulted.

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Boundary Layer Analysis – Second edition

J. A. Schetz and R. D. W. Bowersox

American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2011. Distributed by Transatlantic Publishers Group, Unit 242, 235 Earls Court Road, London, SW5 9FE, UK. (Tel: 020-7373 2515; e-mail: richard@tpgltd.co.uk). 652pp. Illustrated. £88 (10% discount available to RAeS members on request). ISBN 978-1-60086-823-8.

Boundary-layer flows occupy a pivotal position in fluid dynamics and the theory and methods for predicting such flows have played a vital role in numerous technological developments. The subject has, right deservingly, been featured prominently in many textbooks and treated exclusively in numerous monographs. Compared with well-known texts, this one differs in its scope and style.

The range of topics addressed in the book is comprehensive, covering incompressible and compressible (sub-, super- and hyper-sonic) flows in two and three dimensions. Real-gas effects, stratification, reactive species and even non-Newtonian fluid are touched, albeit relatively briefly. While laminar boundary layers are discussed in good detail (Chapters 1 to 5), their turbulent counterparts are unmistakenly the main focus (Chapters 7 to 12). Hydrodynamic instability and laminar-turbulent transition are presented, right appropriately, as the book progresses from laminar to turbulent (Chapter 6). Classical boundary layers form the main bulk of the book, but there are brief introductions to inviscid-viscous interactions.

A unique and attractive feature of this book is a clever `fusion' of physics, mathematics, numerics and experimental data. For each major topic, the underlying physics and mathematical description are explained rather thoroughly. Numerical methods for quantitative prediction are then introduced and explained. Relevant experimental data are collected and presented effectively to illustrate the issue concerned and/or to evaluate theoretical/numerical predictions.

The book was written for senior undergraduates or beginning graduates in engineering, who are assumed to be familiar with fundamentals of fluid mechanics and partial differential equations. I think that some preliminary knowledge of turbulence and numerical analysis is also necessary. The presentation of materials is not progressive enough and in several places the gradient from the elementary to advanced is quite steep. Inevitably, the exposition of specialised and advanced topics (e.g. transition and interactive boundary layer theory) has to be sketchy. Useful references are provided for further reading, but they are not as updated as they could have been and some core literature is missed. There is perhaps too much a sense of contentment about the 'success' of turbulence models; personally I would like to see the entire subject being treated a little more critically. Despite these quibbles, I believe that the book has done a very good job in leading engineers to master the practical tools and skills based on solid fundamental understanding. Students, and even experienced researchers, whose interest is in the theoretical side would also find something useful and interesting in this book.

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Introduction to Flight Testing and Applied Aerodynamics

B. W. McCormick

American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2011. Distributed by Transatlantic Publishers Group, Unit 242, 235 Earls Court Road, London, SW5 9FE, UK (Tel: 020-7373 2515; e-mail:-richard@tpgltd.co.uk). 133pp. Illustrated. £38.50. [10% discount available to RAeS members on request]. ISBN 978-1-60086-827-6.

The author's declared aim in this book is "to introduce students to the real world of measuring and predicting airplane performance". It is based on a practical course using light aircraft that he has run over many years at Pennsylvania State University. Dr McCormick is the Boeing Professor Emeritus at Penn State.

This is a slim book of 8 chapters (covering less than 100 pages), 4 appendices and a short list of references. It is highly distilled. Working from fundamentals, the author has woven together theories which the student can use to predict the aircraft's performance and behaviour, and which can be compared with measurements taken from the aircraft in flight. Each piece of theory covered is subsequently applied. The Cessna 172R is used as the example aircraft throughout this book.

In Chapter 1, after introducing the nature of the standard atmosphere and Bernoulli's theorem, the author gives a succinct introduction to vorticity. Airspeed calibration is introduced in Chapter 2. In Chapter 3 the author demonstrates a numerical calculation of speed and distance through the takeoff after introducing each key factor, including the estimation of propeller characteristics from generalised data and measurements of the actual propeller made with a ruler and protractor. Chapter 4 looks at power required and trim and Chapter 5 rate of climb, time to climb and ceilings.

Chapter 6, on stall, approach and landing, contains a highly concentrated introduction to lifting-line analysis of the wing showing how it handles twist and the deployment of flaps. Application of the model to the onset of stall and prediction of the wing's maximum lift coefficient is shown. Chapter 7 covers cruise rate of fuel burn and range and the range-payload curve is derived.

Chapter 8 gives a very succinct introduction to static and dynamic stability and control. It only addresses longitudinal stability, but, rather than giving a more general introduction across all the degrees of freedom, the author has chosen to take a deeper look at the available analyses. He uses these to calculate the Cessna's phugoid.

The bibliography is very short. The first reference is the author's own textbook, *Aerodynamics, Aeronautics and Flight Mechanics* (2nd edition very favourably reviewed here in 1996) to which this text is indeed a good introduction.

Relegation of notes on the flight test procedures to an appendix emphasises the book's concentration on showing how predictions can be made from fundamental