Advanced Aircraft Design: Conceptual Design, Analysis and Optimization of Subsonic Civil Airplanes

Egbert Torenbeek

Hardcover ISBN: 978-1-118-56811-8  July 2013  $134.25

DESCRIPTION

Although the overall appearance of modern airliners has not changed a lot since the introduction of jetliners in the 1950s, their safety, efficiency and environmental friendliness have improved considerably. Main contributors to this have been gas turbine engine technology, advanced materials, computational aerodynamics, advanced structural analysis and on-board systems. Since aircraft design became a highly multidisciplinary activity, the development of multidisciplinary optimization (MDO) has become a popular new discipline. Despite this, the application of MDO during the conceptual design phase is not yet widespread.

*Advanced Aircraft Design: Conceptual Design, Analysis and Optimization of Subsonic Civil Airplanes* presents a quasi-analytical optimization approach based on a concise set of sizing equations. Objectives are aerodynamic efficiency, mission fuel, empty weight and maximum takeoff weight. Independent design variables studied include design cruise altitude, wing area and span and thrust or power loading. Principal features of integrated concepts such as the blended wing and body and highly non-planar wings are also covered.

The quasi-analytical approach enables designers to compare the results of high-fidelity MDO optimization with lower-fidelity methods which need far less computational effort. Another advantage to this approach is that it can provide answers to “what if” questions rapidly and with little computational cost.

Key features:
• Presents a new fundamental vision on conceptual airplane design optimization

• Provides an overview of advanced technologies for propulsion and reducing aerodynamic drag

• Offers insight into the derivation of design sensitivity information

• Emphasizes design based on first principles

• Considers pros and cons of innovative configurations

• Reconsiders optimum cruise performance at transonic Mach numbers

*Advanced Aircraft Design: Conceptual Design, Analysis and Optimization of Subsonic Civil Airplanes* advances understanding of the initial optimization of civil airplanes and is a must-have reference for aerospace engineering students, applied researchers, aircraft design engineers and analysts.

---

**ABOUT THE AUTHOR**

**Egbert Torenbeek, Delft University of Technology, The Netherlands**

Egbert Torenbeek is Professor Emeritus of Aircraft Design at Delft University of Technology. He graduated as an engineer in 1961 at TU Delft and in 1964 he became responsible for teaching the Aircraft Preliminary Design course at the department of Aerospace Engineering. After a sabbatical at Lockheed Georgia Company, he became a senior lecturer and full professor of the Aircraft Design chair at TU Delft, initiating research and teaching in computer-assisted aircraft design.

---

**SERIES**

Aerospace Series

---

For additional product details, please visit [https://www.wiley.com/en-us](https://www.wiley.com/en-us)