

1. Record Nr.	UNINA9910784328803321
Autore	Watkinson John <1950->
Titolo	Art of the helicopter [[electronic resource] /] / John Watkinson
Pubbl/distr/stampa	Oxford ; ; Burlington, MA, : Elsevier Butterworth-Heinemann, 2004
ISBN	1-280-96648-3 9786610966486 0-08-047203-6
Descrizione fisica	1 online resource (405 p.)
Disciplina	629.133352
Soggetti	Helicopters Helicopters - Aerodynamics Helicopters - Control systems Helicopters - Electric equipment
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	front cover; copyright; table of contents; front matter; Preface; Acknowledgements; body; 1 Introduction to rotorcraft; 1.1 Applications of the helicopter; 1.2 A short technical helicopter history; 1.3 Types of rotorcraft; 1.4 Rotor configurations; 1.5 The essential elements; 1.6 The airframe; 1.7 Engine and transmission; 1.8 The fuel system; 1.9 The landing gear; 1.10 Oleos and ground resonance; 1.11 The rotors; 1.12 The control system; 1.13 Electrical and hydraulic system; 1.14 Instruments and avionics; 2 Technical background; 2.1 Introduction to mechanics; 2.2 Mass and density 2.3 Force and acceleration2.4 Strength and rigidity; 2.5 Resultants and components of forces; 2.6 Moments and couples; 2.7 Work, energy, power and momentum; 2.8 Efficiency; 2.9 Gases and the atmosphere; 2.10 Sound; 2.11 The mechanics of oscillation; 2.12 The mechanics of rotation; 2.13 Sidebands; 2.14 Fourier analysis; 2.15 Centrifugal and Coriolis forces; 2.16 Rotating masses and precession; 2.17 The gyroscope; 2.18 Piezo-electric and laser gyroscopes; 2.19 Feedback; 3 Introduction to helicopter dynamics; 3.1 Creating and controlling lift; 3.2 The centre of pressure; 3.3 The coefficient of lift 3.4 Collective control3.5 In the hover; 3.6 Forces on the blades; 3.7

Rotor coning; 3.8 Torque and thrust in rotors; 3.9 The rotor as an actuator; 3.10 Blade element theory; 3.11 Disc loading; 3.12 Figure of merit; 3.13 Blade twist and taper; 3.14 Swirl; 3.15 Vertical autorotation; 3.16 Tip loss and the vortex ring; 3.17 Ground effect; 3.18 Cyclic control; 3.19 Basic manoeuvres; 3.20 In translational flight; 3.21 Inflow and coning roll; 3.22 Rotor H-force; 3.23 Blade stall and compressibility; 3.24 The speed limit; 3.25 Harmonic blade motion; 3.26 Sources of vibration; 3.27 Vibration control  
3.28 Harmonic pitch control 3.29 Blade design; 4 Rotors in practice; 4.1 Introduction; 4.2 Why articulated rotors are used; 4.3 Axes galore; 4.4 Flapping; 4.5 Droop stops; 4.6 Introduction to dragging; 4.7 Order of hinges; 4.8 Types of rotor head; 4.9 Zero-offset heads; 4.10 Dangers of zero-offset heads -negative g; 4.11 Rotor response; 4.12 Feathering; 4.13 Pitch control; 4.14 Cyclic trim; 4.15 Tilting heads; 4.16 Dragging dynamics; 4.17 Ground resonance; 4.18 Air resonance; 4.19 Dynamic rollover; 4.20 Some rotor head examples; 4.21 Blade construction; 4.22 Blade tracking; 4.23 Blade folding  
5 The tail 5.1 Introduction; 5.2 Balancing the torque; 5.3 The conventional tail rotor; 5.4 Tail rotor location; 5.5 Tail rotor performance; 5.6 The tail plane; 5.7 The stabilator; 5.8 Fins; 5.9 The tail boom; 5.10 The fenestron; 5.11 NOTAR; 5.12 Tail rotor failure; 6 Engines and transmissions; 6.1 Introduction; 6.2 Choice of engine; 6.3 A piston-engine installation; 6.4 A turbine installation; 6.5 Correlators and governors; 6.6 The gasoline engine; 6.7 The ignition system; 6.8 The starter; 6.9 The oil system; 6.10 The carburettor; 6.11 Fuel injection; 6.12 The turbocharger  
6.13 Gasoline engine instruments

---

## Sommario/riassunto

The modern helicopter is a sophisticated device which merges a surprising number of technologies together. This wide range of disciplines is one of the fascinations of the helicopter, but it is also makes a complete understanding difficult. Those searching for an understanding of the helicopter will find The Art of the Helicopter invaluable. John Watkinson approaches every subject associated with the helicopter from first principles and builds up in a clearly explained logical sequence using plain English and clear diagrams, avoiding unnecessary mathematics. Technical terms and

---