1. Record Nr. UNINA9910953225003321

Autore	Bielawa Richard L
Titolo	Rotary wing structural dynamics and aeroelasticity / / Richard L. Bielawa
Pubbl/distr/stampa	Reston, Va., : American Institute of Aeronautics and Astronautics, c2006
ISBN	1-62870-117-X 1-60086-237-3 1-60086-109-1
Edizione	[2nd ed.]
Descrizione fisica	xix, 749 p. : ill
Collana	AIAA education series
Disciplina	629.132/362
Soggetti	Helicopters - Aerodynamics Aeroelasticity
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Title -- Copyright -- Foreword -- Table of Contents -- Preface -- Introduction -- Basic Analytical Techniques -- Rotating Beams -- Gyroscopics -- Drive System Dynamics -- Fuselage Vibrations -- Methods for Vibration Control -- Vibration Test Procedures -- Stability Analysis Methods: Linear Systems -- Mechanical and Aeromechanical Instabilities of Rotors -- Mechanical and Aeromechanical Instabilities of Rotor-Pylon Systems -- Unsteady Aerodynamics and Flutter of Rotors -- Analysis of Nonlinear Systems -- Model Rotor Testing for Aeroelastic Stability -- Elastomeric Devices for Rotorcraft -- Blade Section Properties -- Cross-over Topics -- Concluding Thoughts -- Appendix A: Glossary of Rotorcraft-Related Terms -- Appendix B: Charts for Blade Frequency Estimation -- Appendix C: Generalized Frequency-Domain Substructure Synthesis -- Appendix D: Basic Equations of Motion for Ground Resonance and Air Resonance -- Appendix E: Composite Materials-Basics -- References -- Index.
Sommario/riassunto	Drawing on his extensive experience as a practicing engineer, designer, educator, and researcher in rotorcraft, the author presents a comprehensive account of the fundamental concepts of structural dynamics and aero-elasticity for conventional rotary wing aircraft, as

well as for tilt-rotor and tilt-wing concepts. Intended for use in graduate-level courses and by practicing engineers, the volume covers all of the important topics needed for the complete understanding of rotorcraft structural dynamics and aeroelasticity, including basic analysis tools, rotating beams, gyroscopic phenomena, drive system dynamics, fuselage vibrations, methods for controlling vibrations, dynamic test procedures, stability analysis, mechanical and aeromechanical instabilities of rotors and rotor-pylon assemblies, unsteady aerodynamics and flutter of rotors, and model testing. The second edition provides more up-to-date solution techniques, as well as new material that the author has developed since the first edition. New chapters have been included dealing with elastomeric devices, airfoil sections with an emphasis on composites, "cross-over" topics, and a historical perspective on the subject material. A new appendix has been provided presenting basic material on composites. The text is further enhanced by the inclusion of problems in each chapter.