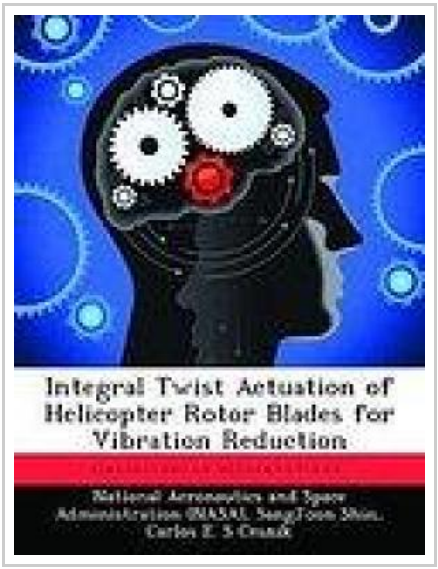

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Integral Twist Actuation of Helicopter Rotor Blades for Vibration Reduction

By National Aeronautics and Space Administration (NASA)

Bibliioscholar Mrz 2013, 2013. Taschenbuch. Book Condition: Neu. 246x189x5 mm. This item is printed on demand - Print on Demand Neuware - Active integral twist control for vibration reduction of helicopter rotors during forward flight is investigated. The twist deformation is obtained using embedded anisotropic piezocomposite actuators. An analytical framework is developed to examine integrally-twisted blades and their aeroelastic response during different flight conditions: frequency domain analysis for hover, and time domain analysis for forward flight. Both stem from the same three-dimensional electroelastic beam formulation with geometrical-exactness, and axe coupled with a finite-state dynamic inflow aerodynamics model. A prototype Active Twist Rotor blade was designed with this framework using Active Fiber Composites as the actuator. The ATR prototype blade was successfully tested under non-rotating conditions. Hover testing was conducted to evaluate structural integrity and dynamic response. In both conditions, a very good correlation was obtained against the analysis. Finally, a four-bladed ATR system is built and tested to demonstrate its concept in forward flight. This experiment was conducted at NASA Langley T~ansonic Dynamics Tunnel and represents the first-of-a-kind Mach-scaled fully-active-twist rotor system to undergo forward flight test. In parallel, the impact upon the fixed- and rotating-system loads is estimated by...

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