



An Experimental Investigation on Periodic Forced Vibrations of a Bladed Disk

By Colin J. Duffield

Biblioscholar Okt 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x9 mm. This item is printed on demand - Print on Demand Neuware - Turbine engine blades are subject to extreme dynamic vibrational loads during normal operations. Harmonic forcing produced from periodic wakes created by fixed stators can excite blade resonant frequencies. Prolonged or repeated exposure to these forces can cause vibration-induced fatigue, otherwise known as High Cycle Fatigue (HCF). HCF effects are magnified by small material, manufacturing and geometrical irregularities among the blades, called mistuning. Structural mistuning can result in some blades experiencing stresses much higher than would be encountered in a perfect structure. Blade amplitude increases of over 100% have been observed in blades with natural frequencies less than 2% off their nominal value. Premature blade failures, operational costs and engine servicing all increase due to the HCF problem. This study offered a novel approach to characterize mistuning effects on forced vibration behavior of bladed disks. A model fan reduced in dynamic scale from an operational jet engine fan and with weak inter-blade coupling was fabricated. 156 pp. Englisch.



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