

GT2007-27821

ON THE COUPLING OF FOIL BEARING SUPPORTED ROTORS: PART 1 – ANALYSIS

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ABSTRACT

The expanded application of high-speed rotor systems operating on compliant foil bearings will be greatly enhanced with the ability to adequately couple multiple shaft systems with differing bearing systems and dynamic performance. In this paper the results of an analytical tradeoff study assessing coupling dynamic characteristics and their impact on coupled rotor-bearing system dynamics are presented. This analysis effort was completed in an effort to establish the form of characteristics needed to couple foil bearing supported rotors to ball bearing supported rotors, other foil bearing supported rotors as well as coupling rigid and flexible rotors both supported on foil bearings. The conclusions from this study indicate that with appropriate coupling design, a wide array of foil bearing supported rotor systems may be successfully coupled.