**Experimental Analysis of Residual Bow in The Misaligned Rotor-Bearing Train System Integrated with Active-Magnetic-Bearing**

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**Abstract**

This poster presents an analysis of the impact of residual bow on a misaligned rotor-train system equipped with an Active magnetic bearing (AMB). The study utilizes an experimental approach to better understand the dynamics of the rotor system when exposed to a combination of faults. A simple rotor test rig was developed, consisting of two flexible shafts connected by a flexible coupling, each mounted with a rigid disc at mid span and supported by rolling element bearing. AMB was installed close to the disc on the second rotor to attenuate the vibration. Proximity and current probes were utilized to capture the rotor vibrations and current signals in two orthogonal directions from the rig at discrete rotor angular speeds. The forced response from the experiment were analyzed using time-domain and full-spectrum analyses to investigate the various harmonics caused by the faults. The study’s finding provides valuable insights into the complex dynamics of the rotor system under fault scenarios. The results suggest that residual bow has a significant impact on the rotor system dynamics, leading to higher vibration amplitude at the 1× harmonics and generates the multiplicative load in the presence of misalignment in the system, which causes the appearance of other harmonics. However, the implementation of AMB was found to be effective in reducing the vibration amplitude and improving the system’s stability.

**Keywords:** Misalignment; Residual bow; Rotor-bearing system; Active magnetic bearing; Sensors.