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# Morton Effect Experimental, 00128

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Morton Effect (ME) is a thermally induced instability phenomenon that most commonly arises in rotating shafts with large overhung masses and supported by fluid film bearings. It occurs when an asymmetric journal temperature distribution develops, leading to intolerable synchronous vibrations and hysteresis behavior with respect to rotor speed. A full-scale test rig has been developed to understand the underlying causes for the ME better, improve related simulation tools, and develop novel, effective remedies. The 2nd generation test rig is an advanced version of generation 1, which was limited to measuring journal temperatures resulting from imposed, circular, synchronous whirl orbits.

The 2nd generation rig can produce ME while measuring journal temperatures and vibration. Version 2.0 of the ME test rig features a much larger shaft freer to vibrate and axially spaced RTDs in addition to the circumferential spacing. The rig is expected to produce ME between 5100-5500 rpm. The two shaft subassemblies are complete, with the wheels mounted to the main shaft and ball bearings mounted on both shafts. Electrical power, instrumentation, and lubrication systems are complete, and the test rig is assembled. Rotor balancing is conducted, and the lift-off of the rotor was checked. This year, a real-time plot system is established to search for ME efficiently. The real-time plot system is developed utilizing LabVIEW and MATLAB codes, and the real-time plots include the 1X amplitude (or phase angle) vs. frequency, 1X amplitudes vs. time, journal displacements, etc. From the real-time plot system, ME has been found near the designed ME speed ranges. The observed large 1X vibration and hysteresis in the run-up and coast-down processes, which are the main features of ME, supports ME occurrence. The success of ME observation can contribute to preventing ME effectively and further advancing the ME software in future work.