

NEW FACILITY TO TEST FLUID FILM JOURNAL BEARINGS AT THE NASA GLENN RESEARCH CENTER IN CLEVELAND, OHIO, USA

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ABSTRACT

A new rig to test journal fluid film bearings is in operating condition at the NASA Glenn Research Center in Cleveland, Ohio, USA since August 2006. This rig can apply total radial loads to 133,000 N (30,000 lbs) and can rotate the shaft to 13,000 RPM. The test bearing has a diameter of 68 mm and the length of 38 mm. Two such bearings are used to support the total load. The shaft is also supported by two fluid film bearings. The rig is well instrumented for measuring oil flow, oil inlet and outlet temperatures, bearing sleeve circumferential temperatures and the oil temperatures in oil supply pockets. The shaft position is monitored by proximity probes. Vibration levels at four locations are also displayed and recorded. Preliminary tests of wave bearings at 8,000 RPM and loads to 20,000 N (4,500 lbs) show a good correlation between the test and prediction data. The new rig shares the oil system and some of the instrumentations with the original fluid film bearing rig that has operated since 1997. Both rigs are also sharing part of the displays in the control room, the air turbine controller and the Escort Data Acquisition System. The original rig is currently used for testing PVD coatings on the wave bearing surfaces under both start-stop and oil-off condition.

Keywords: Rig, fluid film bearings, wave bearing, PVD coatings.