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## Study on Influence of Whirl Instability on the Performance of Hydrodynamic Journal Bearing

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*Abstract:* Hydrodynamic journal bearings are measured to be an important component of all the rotary machineries. It is used to upkeep radial loads underneath high speed working circumstances. They are often used in applications concerning high loads and/or high speeds among two faces that have virtual motion. Journal bearings are particular to faces that mate cylindrically through the functional load in the centrifugal path. The contact between two faces of metals is prevented using the thin oil film through lubricant due to formation of pressure in the Journal Bearings. The term oil whirl can be defined from "self-excited instability" which occurs due to tremendous vibrations with a maximum amplitude. This paper represents stability analysis of journal bearings using stiffness estimation at different journal speeds & loads. In this theoretical analysis and an experimental investigation is presented on journal bearing at various loads (150 to 750 N) and at 800 r.p.m. for SAE 20W40 oil, by calculating stability speeds for each load. Experimental results of pressure distribution are in very good agreement with theoretical ones, which shows bearing is stable upto synchronous speed.