

**DYNAMIC ANALYSIS OF HIGH-SPEED CENTRIFUGAL PUMP BEARING
SUPPORT STRUCTURE**

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ABSTRACT

A high-speed centrifugal pump is exhibiting high vibrations on the test bed. The vibration levels were found to be very high in the horizontal direction on the Drive End Bearing. Detailed vibration analysis showed resonance phenomena in the horizontal direction close to the rated speed. The resonant frequency is shifted away from the rated speed by changing the mass characteristics of the bearing support structure, especially at the upper half. Vibration levels on the test bed were reduced by adding mass on the upper half at the test bed itself and the machine was passed for vibration severity point of view, as all other performance tests were already cleared. Subsequently the bearing pedestal and the support structure was modeled for dynamic analysis and found to be having a resonant frequency close to the rated speed. The upper half of the bearing support is modified to accommodate the additional mass, to change the resonant frequency away from the rated speed. Thus the resonant condition is avoided. This paper gives the details of theoretical and experimental investigation into the above problem.