

ABSTRAK

Bearing berfungsi sebagai bantalan yang menumpu sebuah poros agar poros dapat berputar tanpa mengalami gesekan yang berlebihan, serta dapat menahan radial load dan menahan gerak ke arah kiri dan kanan shaft (*Thrust Load*) pada saat berputar secara bersama-sama. Dalam Tugas Akhir ini, penulis melakukan penelitian tentang predictive maintenance terhadap *Tapered Roller Bearing 32310U* yang sering mengalami kerusakan. Penelitian dan pengujian vibrasi dilakukan di lab,prodi Teknik Mesin Universitas Mercu Buana. Data data vibrasi dianalisa melalui matlab dikombinasikan dengan algoritma Fast Fourier Transform (FFT) untuk mendapatkan nilai nilai frekuensi natural taper bearing. Signal harmonic diberikan ke permukaan bearing dalam arah vertical atau tegak lurus dengan permukaan taper bearing. Response getaran yang diukur dilakukan pada tiga sumbu yaitu sumbu x, sumbu y dan sumbu z. Hasil penelitian ini, menunjukkan kemampuan FRFs dalam memprediksi adanya kerusakan pada taper bearing. Pengujian pada taper bearing dengan keadaan tanpa rumah bearing kerusakan pada taper bearing terdapat pada arah sumbu X dan Y, sedangkan frekuensi yang muncul akibat rusaknya taper bearing yaitu kearah sumbu Y, untuk rentang frekuensi 0 – 1200 Hz, dimana pada keadaan bearing normal terdapat 8 buah frekuensi pribadi yaitu 8, 20, 40, 56, 73, 88, 104, dan 120 Hz. Dan Pada keadaan dengan rumah bearing terlihat adanya perbedaan pada ketiga sumbu dari hasil pengujian. Dimana pada sumbu X dan Y terdapat dua modus getar yaitu pada frekuensi pribadi 8 dan 35 Hz.

Kata kunci: predictive maintenance, analisis vibrasi, frequency response function, taper bearing



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ABSTRACT

Bearing acts as a pad that supports a shaft to rotate without excessive friction hold the radial load and maintain the motion towards the left and right shafts (Thrust Load) when rotating together. In this Final Project, the author conducted a research on predictive maintenance of the 32310U Tapered Roller Bearing which is often damaged. Vibration research and testing was carried out in the lab, Mechanical Engineering Study Program at the University of Mercu Buana. Vibration data data were analyzed through Matlab combined with the Fast Fourier Transform (FFT) algorithm to obtain the value of the natural taper bearing frequency value. Harmonics signal is given to the bearing surface in a vertical or perpendicular direction to the taper bearing surface. The vibration response measurement was carried out on three axes (x, y, and z). The results of this study indicate the ability of FRFs to predict damage to the taper bearing. Tests on the taper bearing with no bearing housing taper bearing damage are found in the X and Y axis direction, while the frequency that occurs due to damage to the taper bearing is towards the Y axis, for the frequency range 0 - 1200 Hz, where in normal bearing conditions there are 8 pieces Personal frequencies are 8, 20, 40, 56, 73, 88, 104 and 120 Hz. And in the circumstances with the bearing house there are differences in the three axes of the test results. Where on the X and Y axis there are two vibrate modes, namely at the personal frequency 8 and 35 Hz. The results of this study indicated the ability of FRFs to predict any damage on the bearing taper.

Keywords: *predictive maintenance, vibration analysis, frequency response function, taper bearing*



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