ABSTRACT

Bearing on the Fan has a function as a support for the fan shaft to remain rotating with minimal friction. Friction caused between engine components will produce vibrations that can be used as vibration measurement measurement data to analyze damage to the bearing. One method used is the spectrum analysis method. However, the spectrum method still contains many harmonics and sidebands from some complex industrial fan components. Therefore in this study will examine the cepstrum method to detect damage to the bearing in which the cepstrum method can sort out the harmonic family that comes from the harmonics of several industrial fan components so that damage to the bearing can be analyzed more easily.

This research uses an industrial fan prototype. The bearings used are ASB 6209 2RS type bearings with normal conditions and external track defect conditions. Damage was intentionally made using an Electrical Discharge Machine (EDM) on wire machining wires used in diameter of 0.25 mm. The recording process and data processing using a laptop that has been installed matlab r2018a software. Recording of each data is done for 10 seconds with a pause of 2 seconds. Set of data taken as many as 10 data sets with the amount of data in each set of 20 data.

The results of the study show the spectrum can detect fan shaft speed frequency of 9,114 Hz and Ball Pass Frequency Outer (BPFO) damage of 36.52 Hz. In addition, the spectrum method can also detect gear shaft speed frequencies of 22.59 Hz. However, the frequency amplitude of a BPFO is difficult to detect because it coincides with the amplitude of the other components. Whereas the cepstrum analysis method is clearly visible at the peak of BPFO quefrency of 0.027 seconds because the cepstrum method can sort out the frequencies of harmonic families in the spectrum.

Keywords : Ball bearings, BPFO, industrial fan, harmonics, spectrum