ABSTRAK

Engine mounting dirancang untuk mengatasi sumber getaran yang terdapat pada mesin, *engine mounting* biasanya terbuat dari bahan elastomer seperti karet yang dapat meredam getaran berlebih. *Engine mounting* bisa mengalami kerusakan setelah digunakan dalam waktu yang cukup lama. Ketika mencapai batas umurnya atau mengalami kerusakan, karet pada *engine mounting* dapat mengeras dan terjadi keretakan. Supaya *engine mounting* dapat memberikan kinerja yang baik, maka perlu dilakukan perawatan secara berkala. Metode perawatan bisa melalui metode visual dan metode deteksi getaran berlebih. Apabila menggunakan metode getaran dengan pendekatan analisis *Hilbert Huang Transform*. Sensor getaran diletakan pada area *mounting engine* dengan posisi *horizontal, vertical, dan axial*. Dengan variasi putaran 750 rpm, 2000 rpm dan 3000 rpm. Setelah dilakukan data dalam bentuk txt akan dilakukan analisis menggunakan Matlab 2020a, data di olah menggunakan *Fast Fourier Transform* (FFT). Selanjutnya Metode *Hilbert Huang Transform* menggabungkan dua elemen utama: *Empirical Mode Decomposition* (EMD) untuk menguraikan sinyal menjadi *Intrinsic Mode Function* (IMF) dan Transformasi Hilbert untuk menganalisis sinyal waktu-frekuensi dari setiap *Intrinsic Mode Function* dari pemecah sinyal pertama sampai menjadi residual. Dari Hasil pengujian diperoleh frekuensi tertinggi *Fast Fourier Transform* (FFT) sebesar 1533 Hz dan Amplitudo sebesar 0.009862 mm/s^2. Dalam kondisi Normal. Dan untuk kondisi rusak pada *mounting engine*. Dapat disimpulkan bahwa frekuensi tertinggi didapatkan frekuensi sebesar 1662 Hz dengan Amplitudo sebesar 0.01371 mm/s^2. Di proses ke *Empirical Mode Decomposition* (EMD) diperoleh frekuensi *mounting* kondisi rusak 8 Hz dengan nilai *amplitude* 0,00005212 m/s^2. Sedangkan dalam kondisi normal diperoleh frekuensi paling tinggi sebesar 7 *Hz* dengan nilai *amplitude* 0,0001274 m/s^2. Pada *mounting* rusak muncul 5 kali kenaikan frekuensi melalui proses *Intrinsic Mode Function* (IMF). Selanjutnya diperoleh transformasi *Hilbert* dengan kondisi rusak dengan frekuensi 2124 *Hz* dengan amplitudo 0,007594 m/s^2, pada kondisi *mounting* rusak dan ber-resonansi cukup banyak. Hal ini menandakan bahwa *Hilbert Huang Transform* mampu untuk mendeteksi kerusakan pada komponen karena bentuk sinyal non-stasioner dan nonlinear.

Kata Kunci: *Mounting Engine, Hilbert Huang Transform,* Getaran

ANALYSIS OF ENGINE MOUNTING DAMAGE ON AYLA VEHICLES USING HILBERT HUANG TRANSFORM

ABSTRACT

Engine mounting is designed to overcome the source of vibration found in the engine, engine mounting is usually made of elastomeric materials such as rubber that can reduce excess vibration. Engine mountings can be damaged after being used for a long time. When it reaches its lifespan or is damaged, the rubber on the engine mounting can harden and crack. In order for the engine mounting to provide good performance, it needs to be maintained regularly. Maintenance methods can be through visual methods and excessive vibration detection methods. When using the vibration method with the Hilbert Huang Transform analysis approach. Vibration sensors are placed in the engine mounting area with horizontal, vertical, and axial positions. With variations in rotation of 750 rpm, 2000 rpm and 3000 rpm. After the data in txt form will be analyzed using Matlab 2020a, the data is processed using Fast Fourier Transform (FFT). Furthermore, the Hilbert Huang Transform method combines two main elements: Empirical Mode Decomposition (EMD) to decompose the signal into Intrinsic Mode Function (IMF) and Hilbert Transform to analyze the time-frequency signal of each Intrinsic Mode Function from the first signal splitter until it becomes residual. The test results obtained the highest frequency of Fast Fourier Transform (FFT) of 1533 Hz and Amplitude of 0.009862 mm/s^2. In Normal condition. And for damaged conditions on engine mounting. It can be concluded that the highest frequency is obtained at 1662 Hz with an amplitude of 0.01371 mm/s^2. In the process of Empirical Mode Decomposition (EMD), the frequency of the damaged condition mounting is 8 Hz with an amplitude value of 0.00005212 m/s^2. While in normal conditions the highest frequency is obtained at 7 Hz with an amplitude value of 0,0001274 *m/s^2. In the damaged mounting appears 5 times the frequency increase through the Intrinsic Mode Function (IMF) process. Furthermore, the Hilbert transform is obtained with damaged conditions with a frequency of 2124 Hz with an amplitude of 0.007594 m/s^2, in damaged mounting conditions and resonates quite a lot. This indicates that the Hilbert Huang Transform is able to detect damage to components due to non-stationary and nonlinear signal shapes.*

***Keywords**: Engine Mounting, Hilbert Huang Transform, Vibration*