

Noise emission analysis in diesel engine with the palm oil methyl ester as a substitution fuel

J. M. Zikri¹, M. S. M. Sani^{1, a)} and A. Abdul Adam²

¹ Advanced Structural Integrity & Vibration Research, Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

² Advanced Fluid Focus Group, Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

^{a)} Corresponding author: mshahrir@ump.edu.my

ABSTRACT

Despite of the emergence of the hybrid and electric vehicle in the automotive sector recently, the power that constantly delivered by the petroleum-based engine still be the one of the important factors that was considered by the customer. Even so, the automotive manufacturers in the 20s are making a big move by producing the engine that possessed the ability to use the biodiesel up to 20 % of blending ratio since the biodiesel addition does not owe to much drop of engine performance. As the noise emission highly contribute to the environmental pollution apart from the poisonous gases released by the fossil fuel usage, this study was carried out to identify the effectiveness of biodiesel in reducing the noise generated by the engine using multiple blend ratio. The Sound Power Level (SPL) method was used to investigate the maximum noise produced together with the location of the noise generated by the engine when using different blend ratio. Various engine speed and load were used in order to give the most similar condition to the real-working engine. Generally, the results indicated that the changes of engine speed and load could owing to the gradually increment of noise level in the engine, nevertheless, the increment was reported to be partially for some of the setup with the Pure Diesel (D100) usage. With the biodiesel usage, it is notable that the highest value was obtained by the B10 located at the flywheel and dynamometer with the value of 100.91dB and on the contrary, the lowest value could be obtained by the D100 with the value of 77.63dB located at the cylinder head. As can be summarized, different proportion of biodiesel could vary the noise level due to the changes of the fuel properties that influenced the combustion, mechanical and gas-flow noise in the engine.

KEYWORDS

Diesel Engine; Electric vehicle; Environmental pollution; Automotive sector

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