Intisari

Gas buang mesin diesel (opasitas gas buang) yang ada di Laboratorium Alat Berat, Departemen Teknik Mesin, UGM merupakan masalah yang serius. Emisi gas buang ini mengandung gas nitrogen oksida (NO_x), karbon monoksida (CO), hidrokarbon (C_xH_x), dan partikulat (jelaga). Gas -gas ini berbahaya untuk kesehatan manusia dan lingkungan. Sehingga diperlukan alat untuk mengurangi bahaya dari emisi gas buang yaitu *catalytic converter*.

Penelitian dari *catalytic converter* ini diterapkan pada mesin diesel Cummins 4BT 3.9-C110. Ada empat kondisi uji yang dilakukan pengambilan data opasitas gas buang. Kondisi uji pertama yaitu pengujian tanpa menggunakan *catalytic converter*. Pengujian ke dua yaitu pengujian menggunakan *catalytic converter* berbahan aluminium. Pengujian ke tiga yaitu pengujian menggunakan *catalytic converter* berbahan aluminium dipadukan batu apung. Pengujian ke empat yaitu pengujian menggunakan *catalytic converter* berbahan aluminium dipadukan dengan karbon aktif.

Hasil pengujian menunjukkan bahwa penggunaan *catalytic converter* berbahan aluminium dapat menurunkan opasitas gas buang sebesar 51,43 %, penggunaan *catalytic converter* berbahan aluminium dipadukan batu apung dapat menurunkan opasitas gas buang sebesar 80,58 %, dan penggunaan *catalytic converter* berbahan aluminium dipadukan karbon aktif dapat menurunkan opasitas gas buang sebesar 82,86 %. Pengurangan nilai opasitas ini disebabkan karena adanya reaksi emisi gas buang dengan material dari *catalytic converter*. Pengurangan nilai opasitas ini akan semakin meningkat dengan adanya perpaduan penggunaan material ganda.

Kata kunci : mesin diesel, *catalytic converter*, opasitas

Abstract

Diesel engine exhaust gas (exhaust gas opacity) in Heavy Equipment Laboratory of Mechanical Engineering Department, UGM is a serious problem. This exhaust gases contain nitrogen oxide (NO_x), carbon monoxide (CO), hydrocarbon (C_xH_x), and particulate (soot). These gases are hazardous for human and environment health. Therefore, it is necessary to discover tools to reduce the danger of exhaust gas, which is catalytic converter.

The research of the catalytic converter is applied to the Cummins 4BT 3.9-C110 diesel engine. There are four test conditions which are carried out by taking exhaust gas opacity data. The first test condition is testing without using catalytic converter. The second test condition is the test using catalytic converter made from aluminum. The third test condition is the test using catalytic converter made from aluminum combined with pumice stone. The fourth test condition is the test using catalytic converter made from aluminum combined with activated carbon.

The test results show that the use of aluminum catalytic converter can reduce the exhaust gases opacity by 51.43%, the use of aluminum catalytic converter combined with pumice stone can reduce exhaust gases opacity by 80.58%, and the use of aluminum catalytic converter combined with activated carbon can reduce exhaust gases opacity by 82.86%. This reduction in opacity value is caused by the exhaust gases reaction with the material from the catalytic converter. This reduction in opacity value will increase with the mix of dual material use.

Keywords: diesel engine, catalytic converter, opacity