

Anirut Noipeng 2011: A Study of Parameters for Methane Reduction from Diesel Dual Fuel Engines by Fuel Injection in front of Catalytic Converters. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Assistant Professor Ekathai Wirojsakunchai, Ph.D. 136 pages.

In the current study, a technique, called raw fuel injection, is selected for heating up exhaust temperature sufficient to treat methane via Diesel Oxidation Catalyst (DOC). The benefit of using this technique lies in low energy consumption with minimal system complexity and costs as seen in many diesel aftertreatment operations. The raw fuel injection system is installed into the tailpipe of DDF engine where the first DOC is installed in order to increase temperature and the second DOC is installed downstream of the first DOC in order to treat methane. Engine speed, lambda, engine-out exhaust temperature, and raw fuel injection amounts are varied to investigate impact of various factors on reducing methane.

Results showed that the exhaust temperature of 200°C and Lambda of 1.7 was sufficiently high for oxidizing diesel fuel in DOC. Once this condition was met, the key important parameter on reducing methane is not only fuel injection amount (resulting in exhaust temperature variations), but also the characteristic of engine-out exhausts. Fuel injection amounts could be optimized with the characteristic of engine-out exhaust and CH₄ conversion efficiency. Therefore, modified exhaust characteristics via raw fuel injection demonstrated improvements in reducing methane emissions from DDF engines.

Student's signature

Thesis Advisor's signature