Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

INVESTIGATIONS ON PERFORMANCE AND EMISSIONS OF A DIESEL ENGINE EQUIPPED WITH A HHO INSTALLATION ON A ROLLER CHASIS

Gheorghe Dan, Bica Marin, Tutunea Dragos*

Laboratory of Thermal Machines, Faculty of Mechanics, University of Craiova, Romania

Abstract

This paper analyzes the effect of adding oxyhydrogen gas in a diesel engine which operates on a roller chassis dynamometer. The oxyhydrogen gas was obtained from a S603-5 generator model and powered by the vehicle's electrical system. The oxyhydrogen injector was mounted after the air filter housing and air flow meter and before the turbocharger. For the experiments, a LPS 2810 roller chassis and a Capelec gas analyzer were used to measure the emissions and opacity of the exhaust gases. The load curve of the dynamometer is in line with the vehicle characteristics being dependent of the vehicle's speed. The results show the impact of oxyhydrogen gases on the engine performance, resulting in an increase in engine torque by an average of 13.53% and in power by 3.34% compared with diesel. The carbon-related gas emissions decrease because oxyhydrogen gas does not provide carbon in the combustion process. The nitrogen oxide increases by 8.68% on average, which is caused by the addition of oxygen to the fuel combustion reaction. Emissions of carbon monoxide, carbon dioxide and hydrocarbons decrease compared to diesel by an average percentage of 17.3%, 8.05% and 4.46% respectively.

Key words: dual-fuel engine performance, HHO emissions control, oxyhydrogen in internal combustion engine

Received: November, 2024; Revised final: May, 2025; Accepted: June, 2025

* Author to whom all correspondence should be addressed: e-mail: dragostutunea@yahoo.com; Phone: +0400745523262