

Effect of Hydrogen-Diesel Dual Fuel Combustion on the Performance and Emission Characteristics of a Four Stroke-Single Cylinder Diesel Engine

Authors : Madhujit Deb, G. R. K. Sastry, R. S. Panua, Rahul Banerjee, P. K. Bose

Abstract : The present work attempts to investigate the combustion, performance and emission characteristics of an existing single-cylinder four-stroke compression-ignition engine operated in dual-fuel mode with hydrogen as an alternative fuel. Environmental concerns and limited amount of petroleum fuels have caused interests in the development of alternative fuels like hydrogen for internal combustion (IC) engines. In this experimental investigation, a diesel engine is made to run using hydrogen in dual fuel mode with diesel, where hydrogen is introduced into the intake manifold using an LPG-CNG injector and pilot diesel is injected using diesel injectors. A Timed Manifold Injection (TMI) system has been developed to vary the injection strategies. The optimized timing for the injection of hydrogen was 100 CA after top dead center (ATDC). From the study it was observed that with increasing hydrogen rate, enhancement in brake thermal efficiency (BTHE) of the engine has been observed with reduction in brake specific energy consumption (BSEC). Furthermore, Soot contents decrease with an increase in indicated specific NO_x emissions with the enhancement of hydrogen flow rate.

Keywords : diesel engine, hydrogen, BTHE, BSEC, soot, NO_x

Conference Title : ICASDE 2015 : International Conference on Aircraft Structural Design Engineering

Conference Location : San Francisco, United States

Conference Dates : June 07-08, 2015