Scopus

Documents

Zareei, J.[a b] , Mahmood, F.W.[a] , Abdullah, S.[a] , Ali, Y.[a] , Mohamad, T.I.[a]

Prediction of performance a direct injection engine fueled with natural gas-hydrogen blends

(2014) *International Journal of Mechanical and Mechatronics Engineering*, 14 (3), pp. 149-156.

[a] Center for Automotive Research, Faculty of Engineering andthe Built Environment, University Kebangsaan Malaysia, Malaysia

[b] Department of Automotive Engineering, Faculty of Mechanical Engineering, Standard Research Institute, Tehran, Iran

Abstract

With increasing concerns about energy shortages and environmental protection, research on improving engine fuel economy and reducing exhaust emissions has become a major research focus in combustion and engine development. Also, with conversion a conventional port fuel injection engine to direct injection (DI) and using alternative fuels, air/fuel mixture can be controlled and the engine is allowed to operate with very lean condition. With appropriate control of the air to fuel ratio gradient, the combustion process allows clean and controlled combustion, resulting in future improvement in fuel economy and emission control. In this study, the effects of mixtures of hydrogen and compressed natural gas (CNG) on a spark ignition engine are numerically considered. This article presents the results of a direct-injection engine using methane-hydrogen mixtures containing H2 between 0% and 30% by volume. The result shows that the percentage of hydrogen in the CNG increases the burning velocity of CNG and reduces the optimal ignition timing to obtain the maximum peak pressure of an engine running with a blend of hydrogen and CNG. With hydrogen addition to natural gas, the peak heat release rates increase. For 20% hydrogen, the maximum values at crank angles (CAs) for in-cylinder temperature and heat release rate are achieved at 6° CA, and the maximum temperature is approximately 150 K. also it can be seen that torque and power was increased with adding hydrogen to natural gas and it is about 3%. Port injection gasoline is converted into direct injection by CNG fuel in this engine. © June 2014 IJENS.

Author Keywords

Compressed natural gas; Direct injection; Hydrogen; Spark ignition engine

Document Type: Article

Source: Scopus