Engine and Auxiliary Systems

Edited by
Prof. Dr. A.K.M. Mohiuddin

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Chapter 16

Investigation of Spark Ignition Multipoint Engine Using Water Addition - Part II: Performance and Emission

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Introduction

Nowadays, every country in the world is focusing on green environment implementation control strategy which is the main agenda of their vision.

Internal combustion engines both Spark Ignition (SI) and Compression Ignition (CI) engines are the one that produce a large quantity of emission to the environment as well as to the human health. This is also reported by Malaysia Department of Environment (MDOE) where motor vehicle emissions are the leading cause of air pollution in Malaysia, and the Malaysia Department of Environment (MDOE) is looking for new ways to combat the problem[1].

The operation of SI engine causes the production of emissions viz., unburnt hydrocarbon, carbon monoxide (CO), nitrogen oxide (NOx), and carbon dioxide (CO_2). The increase amount of hydrocarbon and carbon monoxide is due to rich mixture which does not have enough oxygen to react with all the carbon and hydrogen. The generation of NOx emissions is a function of the combustion temperature, highest near stoichiometric condition when the temperature at the peak value [2].

Various emission control strategies exist for IC engine which can reduce the emission as well as the fuel consumption of the engine. One of the strategies that will be discussed in this chapter is the water addition to the spark ignition engine.

The technique of water addition technology either in SI engine or CI engine is nearly as old as the creation of engine itself. The techniques of water addition itself can be explained in many such as:

i) manifold injection or carburetion of water gasoline emulsions

separate induction of water and gasoline

direct cylinder injection of water

) manifold water vapor induction and