ABSTRACT

An investigation was made to determine the effects of ethanol at an ultra-lean effective systems utilizing an experimental study. The present study is planned to develop and evaluate the performance, emission and combustion characteristics with the consideration of two cases, first the ultra-lean burn Internal Combustion engine was modified to operate on ethanol blend fuels, secondly dual fuel operated diesel engine experimentally with an ultra-lean fuel injection opening pressures. The study looked at case I, constant speed operation of 0%, 10%, and 15% ethanol blends with gasoline mixtures by mass of fuel operating in ultra-lean operating systems. In experiment practice the use of homogeneous lean mixtures in engine has been handicapped by several difficulties. The most serious one is that the flame propagation through mixtures becomes gradually slower as the mixture becomes leaner. The mixture distribution in a multi-cylinder engine is a problem because even small variation in mixture ratio on the leaner side will strongly effect power output. Enhancement of lean combustion of homogeneous mixtures can be achieved by (i) using ethanol blends with gasoline (ii) using high-ignition energy (iii) providing high compression ratios (iv) creating high swirl in the combustion chamber. The study looked at case II, the engine was operated under dual fuel mode at constant speed of 1500 rpm. During starting of experiment, engine run with pure diesel mode and once the engine reaches to the rated speed enrichment fuel is inducted in the mixing chamber. The enrichment used with varying the blend percentage 10%, 20% by mass of fuel. Operating the engine at variable load at an ultra-lean fuel injection opening pressures of 200 bar and 220 bar at compression ratios of 17.5 and 18.5.