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Improvement in performance and emissionsparameters of a single cylinder common rail direct injection compression ignitionengine

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Abstract : This experimental work focuses on the analysis of the performance and emission parameters related to the injection pressure, injection timing and injector location in a modified single cylinder naturally aspirated water cooled common rail diesel engine with a compression ratio of 16:1. The main objective of this experimental work was to evaluate the best injection pressure of diesel that was injected into the cylinder and optimum injector location with respect to the cylinder axis. It was evident from the experimental data that the injection pressure of 50MPa was found to be best in terms of brake thermal efficiency obtained for entire operating range of brake mean effective pressures. The optimum injector location was also identified at full load operation with its corresponding best injection timing at which the maximum torque was obtained. It was seen that the level of smoke emission in common rail direct injection system significantly reduced as compared to conventional mechanical injection system. High level of nitric oxide was noticed in a common rail direct injection timing of diesel that was essential to achieve maximum possible thermal efficiency.

Keywords : Common rail direct injection (CRDI) system, injection pressure, injection timing, injector location and engine emissions.

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