

## Effect of Variation of Injection Timing on Performance and Emission Characteristics of Compression Ignition Engine: A CFD Approach

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**Abstract :** Compression ignition (CI) engines are known for their high thermal efficiency in comparison with spark-ignited (SI) engines. This makes CI engines a potential candidate for the future prime source of power for transportation sector to reduce greenhouse gas emissions and to shrink carbon footprint. However, CI engines produce high levels of NO<sub>x</sub> and soot emissions. Conventional methods to reduce NO<sub>x</sub> and soot emissions often result in the infamous NO<sub>x</sub>-soot trade-off. The injection parameters are one of the most important factors in the working of CI engines. The engine performance, power output, economy etc., is greatly dependent on the effectiveness of the injection parameters. The injection parameter has their direct impact on combustion process and pollutant formation. The injection parameter's values are required to be optimised according to the application of the engine. Control of fuel injection mode is one method for reduction of NO<sub>x</sub> and soot emissions that is achievable. This study aims to assess, compare and analyse the influence of the effect of injection characteristics that is SOI timing studied on combustion and emissions in in-cylinder combustion processes with that of conventional DI Diesel Engine system using the commercial Computational Fluid Dynamic (CFD) package STAR- CD ES-ICE.

**Keywords :** variation of injection timing, compression ignition engine, spark-ignited, Computational Fluid Dynamic

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