

## Combined Effect of EGR and Inlet Air Preheating on Engine Performance in Diesel Engine

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### Abstract

*Concern of environmental pollution and energy crisis all over the world have caused the research attention on reduction of IC engine exhaust emissions and saving of energy simultaneously. This investigation mainly focuses on reducing exhaust emission and energy saving by investigating diesel combustion with neat diesel fuel and a new attachment of inlet air preheater with Exhaust Gas Recirculation (EGR) system. Experiment was conducted in a four stroke naturally aspirated (NA) diesel engine with inlet air preheating attachment and EGR system. Inlet air preheating and EGR were applied to the experimental engine separately and also together to observe their effects on engine performance. In this study, engine exhaust gas temperature was used to preheat the inlet air passing through a newly designed air preheating system. In inlet air preheating attachment, a counter flow heat exchanger was used to transfer heat from exhaust gases to inlet air. It was found that combined effect of inlet air preheating attachment and EGR system provided better result on engine performance than individual effect. It was found that at medium load conditions, oxides of nitrogen ( $NO_x$ ), carbon monoxide (CO), engine noise, and brake specific fuel consumption decreased when inlet air preheating and EGR were applied together as compared to those during normal operations of the engine. Thus the modified engine provides clean atmosphere and better fuel economy without reducing useful characteristics (brake power, brake thermal efficiency etc) of the engine.*

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