

## **Abstract:-**

The accomplishment of the common rail direct injection diesel engine is a function injection strategy which depends upon several variables, for instance, fuel injection's pressure (FIP), Main injection's timing (MIT), Pilot injection's timing (PIT), Pilot injection's quantity (PIQ), Boost pressure from Turbocharger. These variables are also known as controllable variables. Combustion of the engine is analyzed by emissions (such as NO<sub>x</sub>, CO, UHC, and Particulate Matter) from engine and increment or decrement in the rate of pressure rise and Rate of Heat Release. These variables are also known as Response variables. Each variable mentioned above as controlled variable has its own effect on combustion and performance of the engine. On occurs a slight change in one controlled variable every response variable changes. Every controlled variable is interlinked to each other so by changing only one controlled variable one cannot predict actual behavior of combustion parameters. Hence For the study of optimized behavior of combustion every parameter has to be altered at the same time so their Interaction factor can be analyzed in an effective way. Interaction effect helps to analyze the actual effect of the individual parameter with respect to others. This interaction factor could be obtained by various designs of experiments (DOE) (E.g. Factorial design, Taguchi method and Response surface methodology) and ANOVA technique and can give optimized result for CRDi Diesel engine to increase performance.