# Reduction of pollutants from diesel exhaust by high pressure gas injection

## Author(s)

Daizaburo Kawai, Iddi S.N. Mkilaha, Takuya Osawa, Ichiro Naruse, Kazutomo Ohtake

## Abstract

In order to reduce the pollutants from diesel exhaust, high-pressure gas was injected during combustion into a modified pre-chamber of an IDI diesel engine at a varied load and gas injection timing. The result shows that high-pressure gas injection can reduce the particulates and NOx simultaneously, with little influence on the engine performance. The combustion process in the pre-chamber was visualized by means of an ultra high-speed video system and image analysis of the pictures obtained. The results of the visualization show that by injecting gas, the flame is first quenched, followed by the reduction of NOx in the pre-chamber by hydrocarbon. Although high-pressure gas injection could have caused a substantial increase in HC as a result of temperature quenching, this seems to be controlled by the consumed portion of HC during the recycling of NOx. Chemical analysis of polycyclic aromatics compounds was carried out for the purpose of establishing its variations with gas injection. It was established that gas injection not only reduces PM by oxidation of solid carbon, but also the PAH component.