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An Investigation into the Effect of Auxiliary Fuels on the Performance of Diesel Engines at High Load

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It is well known that a method introducing a small amount of fuel into the intake manifold of a diesel engine is effective for the improvement of engine performance at high load.

We applied this method to a diesel engine with a pre-combustion chamber and could obtain the improvement of engine performances and smoke-limited power output.

The effects on combustion and performance under various loads and speeds were presented, and it is found that overall engine performances are improved at high load and made worse at low load. By analyzing the gases and thermodynamic analysis of pressure diagrams it is found that an addition of auxiliary fuels improves diesel combustion.

Auxiliary fuels introducing into the intake air produce pre-reaction with heat, and improve ignition and combustion of main fuel. In consequence ignition delay and combustion period of main fuel can be shortened, then engine performances can be improved. Using diesel fuels and L. P. G. as auxiliary fuels in this investigation, it is found that improving style of diesel combustion is chiefly due to the difference in cetane number of auxiliary fuels.

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