THE EFFECT OF THE EXHAUST GAS RECIRCULATION SYSTEM (EGR) ON THE NO_X EMISSIONS OF THE DIESEL ENGINES. A STUDY

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Abstract: The diesel engine operates at lean mixture, the air required for a complete combustion of diesel fuel as being in excess. Also, due to the high pressure cylinder, and the temperature at which combustion occurs is increased. So, the two basic elements mentioned above help produce nitrogen oxides (NO_x). Apart from the specific catalysts that help to mitigate emissions, the exhaust gas recirculation (EGR) system serves as the basis to reduce NO_x emissions. The innovative EGR system enables reduction of NO_x, recirculating through the inlet to lower the combustion temperature (the exhaust gases take the place of the oxygen). The temperature of the exhaust gases into the intake is lower and their density becomes higher. Thus, by cooling the exhaust gases before their being recirculated, the EGR system efficiency is improved. It has been demonstrated experimentally that in addition to the role of reducing pollution, EGR helps to reduce the fuel consumption. Over time, the engine performance lowers due to the residual deposits in the manifold, especially the engines with turbocharger shaft pronounced wear, loss-making oil reaching the air intake system. The oil in contact with the exhaust gases in the presence of relatively high temperature will transform into a layer of solid soot and this even makes it difficult to clog the air intake of the engine. To avoid these inconveniences, a periodic cleaning of the turbo-intercooler-EGR-intake-manifold circuit is recommended. This paper aims to show the influence of the EGR system on the NO_x emission from the diesel engines, the functioning mode and some experiments from literature.

KEYWORDS: diesel engine, lean mixture, NO_x emissions, EGR system, performance, turbocharger, intercooler, intake manifold

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