

Experimental test bench with diesel engine for the study of multi fuels usage

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Abstract

The diesel engine has entered a shadow cone because of emissions of nitrogen oxides and particles. However, the engine offers superior torque and power and low consumption, therefore research is needed to obtain an engine with diesel performance and spark ignition engine emissions. In this paper, we will present an experimental stand with D115 diesel engine with a common rail injection system equipped in parallel with a single point injection system in the intake manifold. The purpose of the dual supply is to obtain a homogeneous combustible air mixture in the combustion chamber with a coefficient of excess air below the detonation limit and which can be ignited by pilot injection of diesel.

The experimental test bench is presented in detail regarding both the hardware and the software part (developed in the laboratory) together with the calibration curves of the force and temperature sensors

In this paper, in order to highlight the performance of the stand, standard experimental results described in the literature will be presented.

Although there is a wide range of experimental tests in the field of internal combustion engines from the additional injection of water, alcohol, bioethanol and so on, this paper aims to provide additional data in order to understand the phenomena of combustion and pollutant emissions. By injecting alcohol into the intake manifold of the diesel engine, the aim is to ensure a poor but homogeneous mixture of fuel in the combustion chamber, which will lead to a reduction of polluting emissions while maintaining the performance of the diesel engine. It also shows the conversion of the fuel supply system of the engine, of Romanian production D115, from a classic injection system to one with a common rail. In

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addition to the mechanical part, the algorithms developed for engine and stand control are presented.

By the presented stand and preliminary experimental results, we show the potential of the developed experimental test bench.

Keywords: Diesel engines, engine emissions, experimental stands, injection systems, intake manifolds

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