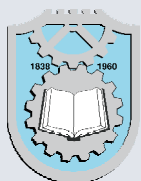


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Motor Vehicles & Motors 2014**

**VEHICLE AS A SAFETY FACTOR
OF THE TRANSPORTATION ACTIVITY**

Proceedings of Papers



October 9th - 10th, 2014
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**International Congress
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**VEHICLE AS A SAFETY FACTOR OF
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MVM2014-053

Saša MILOJEVIĆ¹
Radivoje PEŠIĆ²
Dragan TARANOVIĆ³
Aleksandar DAVINIĆ⁴

TRIBOLOGICAL OPTIMIZATION OF RECIPROCATING MACHINES ACCORDING TO IMPROVING PERFORMANCE

ABSTRACT: Lowering fuel consumption and exhaust emissions continue to be prime targets in the development of technology applied for Motor Vehicles and their equipment. Into the focus of attention are the reduction of the vehicle weight as well as, in the field of internal combustion engine technology, more efficient combustion system and accessory components.

As a complex system, the internal combustion engine accounts for a major part of the vehicle mass. The key components, the cylinder head and the cylinder block, for heavy loaded diesel engines, are today almost exclusively produced from aluminum. Also, by application of the aluminum pistons, it reduces engines' weight and inertial forces, as well as the engine vibrations. According to the later, the use of lightweight materials for construction of engine's accessories as it is small air reciprocating compressor for braking system of trucks and buses, has significant contributions to the reduction of equipped vehicle mass.

The advantage of aluminum with regard to the specific weight is notable, but exist the problem because it has considerable disadvantages in terms of the thermal expansion coefficient. The greater thermal expansion would cause unacceptable deformation and higher clearances during reciprocating machine operations. These high clearances would drastically increase the oil consumption and worsen the acoustic excitation. With additional coating on the cylinder liner surfaces it overcoming of poor aluminum strain properties. The application of tribological inserts towards lowering friction resulting in higher performance. The authors hope to obtain more measurement data on the test rig for small air reciprocating compressors in the Engine Laboratory at the Faculty of Engineering University of Kragujevac, which is currently being brought into operation.

KEYWORDS: Reciprocating aluminum machines, Plasma spray coating, Lowering friction

INTRODUCTION

Society relies on reciprocating machines for transportation, commerce and power generation: Internal Combustion Engines (ICEs), utility devices (e.g., compressors, pumps, portable generators, etc.). ICEs power the world's fleet of vehicles, which is passed number of one billion passenger cars and other vehicles on our roads today.

In gasoline-powered vehicles, over 62% of the fuel's energy is lost in the ICEs. IC engines are very inefficient at converting the fuel's chemical energy to mechanical work, losing energy to engine friction, pumping air into and out of the engine, and wasted heat. Advanced engine technologies such as variable valve timing, turbocharging, direct fuel injection, and cylinder deactivation can be used to reduce these losses. In addition, diesels are about 30-35% more efficient than gasoline engines [10,11].

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