



UNIVERSITY OF SARAJEVO  
FACULTY OF MECHANICAL ENGINEERING



UNIVERZITET U SARAJEVO  
MAŠINSKI FAKULTET SARAJEVO

• Vilsonovo setaliste 9, 71000 Sarajevo, Bosnia & Herzegovina, Phone +387 33 656 562, Fax.+ 387 33 653 055 •

### WHO WE ARE:

The Faculty of Mechanical Engineering, University of Sarajevo was established in 1958 and is a well-known and recognised scientific and research institution with a long tradition. Mechanical engineers are educated and research projects are conducted through 10 departments, while the aspects of transport are specifically undertaken in the Department for Engines and Vehicles. Since its foundation, the department maintains its own laboratory for testing internal combustion engines and measuring equipment for the testing of power train transmission systems and other equipment for laboratory and road tests. Numerous studies, conducted at the department, were recorded for automotive and transport companies. With the development of simulation methods and computer technology in the last 20 years, the department has been actively working on the simulation of physical-chemical processes in the engine, gas-dynamic processes in engine, the construction of engines and motor vehicles, and the study of the operational characteristics of the vehicle through various types of testing. It has a modern laboratory for testing turbo compressors and it is involved in the formation of a laboratory for braking systems.

### COLLABORATION INTERESTS:

Given the wide range of interests in the field of automobiles and transport, the department can play a significant role in the research projects being conducted within the framework of EU FP7 as well as in other international projects. Due to the lack of modern laboratory equipment, international cooperation commitments are aimed at stimulating the process of combustion engines and the work of some systems of road vehicles. In a possible role in future EU FP7 projects, the department sees itself as a partner in projects which can provide scientific research and experimental services. It can also be a project coordinator in some less complex projects.

### AREAS FOR R&D COLLABORATION:

Given its long experience in research activities and its experimental and simulation methods in the automotive and transport fields, areas of interest and possible cooperation in research projects include:

- Research of the phenomena of IC engines with a special attention to ecology.
- Use of alternative fuels.
- Research of process exchange of an air/fuel mixture, with special emphasis on turbocharging.
- Analysis of kinematic and dynamic parameters of complex systems in IC engines and motor vehicles.
- Tire rolling process problem area.

- Development of modern systems to increase the active and passive safety of motor vehicles.

### MAIN ACHIEVEMENTS:

The greatest achievements of the scientific and research personnel of the Faculty of Mechanical Engineering, University of Sarajevo were in the field of numerical fluid mechanics and the modeling of turbulent flows with an application to fluid flows through different systems as well as the study of the process of combustion elemental multiphase fuel droplets. Also, the Department for IC engines and vehicles has made a significant contribution to the development of diesel engines for heavy trucks and to the optimization of transport flows and fuel consumption in urban public transport buses in the city of Sarajevo. Of particular importance is an international project on the analysis of burning alternative fuel, supported by the USA.

At the end of the last century, significant activity was devoted to the process of approval and certification of vehicles and the creation of legislation that relates to the field of motor vehicles and transport in Bosnia and Herzegovina. In the last two decades, there have been a number of different computer programs to simulate the flow of fuel in the overall fuel injection system for diesel engines, including common rail system. The definition of thermodynamic processes in IC engines, the dynamics and oscillations of internal combustion engines with a special emphasis on the torsional vibration damper, the simulation of vehicle dynamics in unsteady cases, the movement and the simulation system of active safety vehicles such as ABS and ESP have all been elaborated. With the establishment of laboratories for turbo compressors, the department made preparations for the implementation of specific research on turbo compressors which simulate their functioning in deteriorated conditions.

### WHAT MAKES US A GOOD PARTNER?

The Department for Engines and Vehicles has always had excellent cooperation with research institutions in the USA and Europe. Immediately after the war in Bosnia and Herzegovina, cooperation with similar institutions in the region has been renewed and collaboration has continued beyond. The established cooperation with the firm BKM from San Diego, USA has enabled the successful resolution of the problem of flows of fuel in accumulator diesel fuel injection systems. The department emphasized cooperation with the Technical Faculty in Maribor, where, during the implementation of European projects, associates of the department participated in research on the use of alternative fuels (bio-diesel and its blends) in the fuel injection system for heavy diesel engines used in buses. Significant co-



operation in research and exchange of researchers was realised with TU Darmstadt.

**PROJECTS:**

- Study of the characteristic of the process of forming the working of matter and the combustion of alternative fuels for diesel engines, Sarajevo, 2007.
- Research diagnosis of power machinery contactless methods of measuring torsion vibrations, Sarajevo, 2007.
- Study of the needs, opportunities and economic feasibility of introducing natural gas as fuel to drive motor vehicles in the Canton of Sarajevo, 2003.

- Effect of applying new technologies on the emissions of combustion products from motor vehicles in urbanism communities, Sarajevo, 2003.
- Development and construction of a new distribution mechanism for engines, Sarajevo, 1990.
- Investigation of possible use of alcohol in diesel engines, Sarajevo, 1989.
- Methods of testing fuel filters, oil filters and oil coolers, Sarajevo, 1988.
- Analysis of the resonant charging engine family 2F, Sarajevo, 1985.



Figure 1. Laboratory for turbochargers

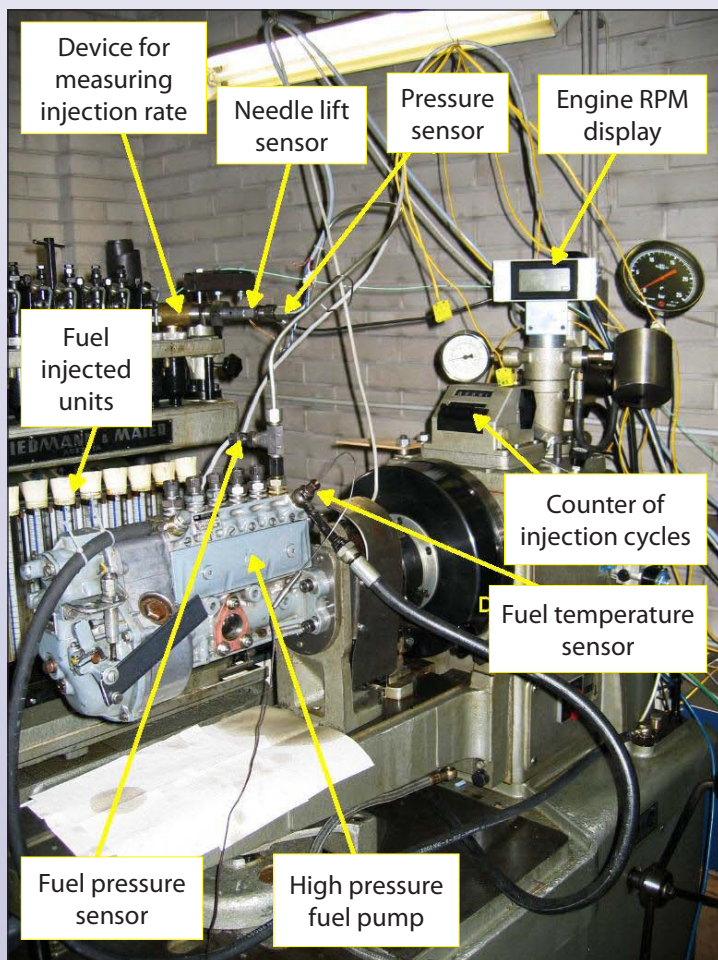


Figure 2. Test bench for diesel fuel injection systems

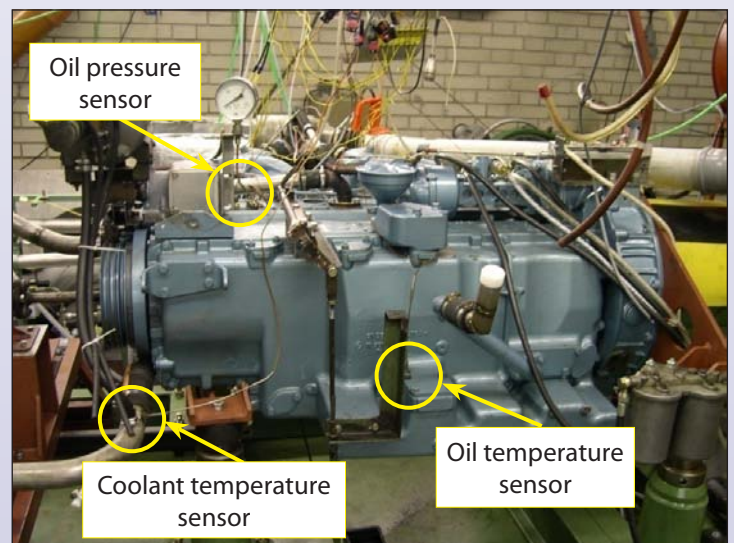


Figure 3. Tested IC engines with different sensors

**OTHER INFORMATION:**

**Name of the organisation:** Faculty of Mechanical Engineering, University of Sarajevo

**Organisation type:** Research and education

**Name of the research department:** IC Engines & Vehicles

**Number of researchers:** 10

**Working languages:** Bosnian, Serbian, Croatian, English

**Webpage:** [www.miv.mef.unsa.ba](http://www.miv.mef.unsa.ba)

**Contact person:** Ivan Filipovic, Ph. D.

**Position:** Head of the Department for IC Engines and Vehicles

**E-mail:** [filipovic@mef.unsa.ba](mailto:filipovic@mef.unsa.ba)

**Tel:** 00387 33 653 208, **Fax:** 00387 33 650 841