



SurTech

Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex

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Department of Automobile Engineering

Report on Two-Day Workshop on Advanced Fuel Injection Technology

Topic: Two-Day Workshop on “Advanced Fuel Injection Technology”

Organized by: Department of Automobile Engineering, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex (DSCSITSC)

Organized for: 03rd Year Students, Automobile Engineering Department, Bengal Institute of Technology (BIT), Katwa

Speaker: Mr. Sandip Bhadra and Mr. Supriya Dhara, Technical Assistant, Department of Automobile Engineering, DSCSITSC

Date: 01st April to 02nd April 2025

Time: From 10:30 AM to 04:00 PM

Venue: Satish Dhawan Automobile Workshop Shed

No. of Participation: 07

Introduction:

The Department of Automobile Engineering of Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex was organized two days workshop on “Advanced Fuel Injection Technology” for the 03rd year diploma students of Automobile Engineering Department, Bengal Institute of Technology (BIT), Katwa. The sessions were conducted by experienced Technical Assistants, Mr. Sandip Bhadra and Mr. Supriya Dhara, and were held at the Satish Shawan Automobile Workshop Shed. This workshop was coordinated by Mr. Kalyan Mukherjee, TiC, Department of Automobile Engineering, DSCSITSC.

The workshop was focused on equipping students with essential knowledge and hands-on exposure to modern fuel injection systems, which play a crucial role in improving engine performance, fuel economy, and emission control in today’s vehicles.

Background:

Fuel injection technology has evolved significantly in recent decades, replacing traditional carburetors in almost all modern engines. With increasing pressure to meet stringent emission norms, enhance engine efficiency, and reduce fuel consumption, advanced fuel injection systems such as Common Rail Direct Injection (CRDi), Gasoline Direct Injection (GDI), and Electronic Fuel Injection (EFI) have become standard in both passenger and commercial vehicles.

Objective:

The main objectives of the workshop were:

- To provide theoretical and practical knowledge of modern fuel injection systems.
- To understand the functioning and advantages of CRDi, GDI, MPFI, and EFI systems.
- To explore the emission and fuel efficiency benefits of advanced injection methods.
- To familiarize students with fuel injection components, testing, and diagnostics.

Overview of the Workshop:

During the workshop, the following key areas were covered:

- **Day 1 (01/04/2025): Introduction & Practical Demonstration**

- ❖ Basics of Fuel Injection Systems
 - ✚ Carburetion vs Fuel Injection
 - ✚ Components of fuel injection system
 - ✚ Fuel pumps, injectors, filters, sensors
- ❖ Types of Fuel Injection Systems
 - ✚ Multi-Point Fuel Injection (MPFI)
 - ✚ Electronic Fuel Injection (EFI)
 - ✚ Common Rail Direct Injection (CRDi)
 - ✚ Gasoline Direct Injection (GDI)
- ❖ Working Mechanism and Control
 - ✚ Role of ECU in injection timing and fuel delivery
 - ✚ Sensor-based fuel mapping
- ❖ Hands-on Demonstration
 - ✚ CRDi system setup
 - ✚ Injector spray pattern observation
 - ✚ Fuel rail pressure analysis
- **Day 2 (02/04/2025): Advanced Technology and Diagnostics**
 - ❖ Emission Control through Fuel Injection
 - ✚ Comparison of emission levels in carburetor vs FI systems
 - ✚ Euro/BS norms and their implications
 - ❖ Fuel Injection in Hybrid and EVs (Theoretical)
 - ✚ Transition from fuel-based to electric propulsion
 - ✚ Integrated hybrid fuel delivery concepts
 - ❖ Diagnostics and Troubleshooting of FI Systems
 - ✚ Use of diagnostic tools and scanners
 - ✚ Common injector faults and maintenance practices

Learning Outcomes:

At the end of the workshop, students were able to:

- Understand the construction and working of various fuel injection systems.
- Identify and explain the components involved in CRDi, MPFI, EFI, and GDI systems.
- Recognize the importance of fuel injection in emission control and fuel efficiency.
- Operate and interpret basic diagnostic tools used in injection system servicing.
- Apply their knowledge to practical engine setups and perform basic fault analysis.

Conclusion:

The two-day workshop on Advanced Fuel Injection Technology was an informative and enriching experience for all participating students. It provided a detailed understanding of how modern fuel injection systems work and how they contribute to vehicle efficiency and environmental compliance. Students actively participated in live demonstrations, hands-on practice, and technical discussions. The small batch size facilitated personalized attention and ensured that each student gained maximum benefit from the sessions.



Two-Days Workshop on Advanced Fuel Injection Technology, on 01-02/04/2025