



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 (BS II – BS VI)

Topic: Two-Day Workshop on “Advanced Fuel Injection Technology (BS II – BS VI)”

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

Organized for: 03rd Year Diploma Students, Automobile Engineering Department, Nalhati Government Polytechnic College, Nalhati, Birbhum

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

Date: 24th April to 25th April 2025

Time: From 11:00 AM to 04:00 PM

Venue: Satish Dhawan Automobile Workshop Shed

No. of Participation: 12

Introduction:

The Department of Automobile Engineering, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex (DSCSITSC), hosted a two-day workshop titled “Advanced Fuel Injection Technology (BSII – BS VI)” for the Diploma students of the Automobile Engineering Department, Nalhati Government Polytechnic College, Nalhati, Birbhum. The workshop, held on the 24th and 25th of April 2025, was conducted by experienced Technical Assistants Mr. Sandip Bhadra and Mr. Supriya Dhara, who offered a mix of theoretical knowledge and practical exposure at the Satish Dhawan Automobile Workshop Shed. The workshop focused on the progressive developments in fuel injection technology aligned with the evolution of Bharat Stage emission norms from BSII to BS VI. This workshop was coordinated by Mr. Kalyan Mukherjee, TiC, Department of Automobile Engineering, DSCSITSC.

Background:

Fuel injection technology has evolved significantly to meet increasingly stringent emission regulations under Bharat Stage (BS) norms. The transition from BSII to BS VI marked a technological leap, requiring precise fuel delivery, electronic control systems, and advanced emission management strategies. Understanding these systems is vital for students aiming to work in the modern automotive sector, where fuel efficiency and low emissions are top priorities. This workshop was designed to familiarize students with key technical concepts, component-level functions, and practical diagnostics of these advanced fuel injection systems.

Objective:

The workshop was conducted with the following objectives:

- To explore the evolution of fuel injection systems from BSII to BS VI.
- To understand the integration of electronic control units (ECUs) and sensor-based fuel management.
- To explain the emission control systems such as EGR, DPF, SCR used in BS IV–VI engines.
- To provide hands-on exposure to fuel injector testing, pressure measurements, and spray pattern analysis.
- To enhance student understanding of practical engine tuning and diagnostics based on BS norms.

Overview of the Workshop:

During the workshop, the following key areas were covered:

- Day 1 – 24/04/2025: Fuel Injection Evolution and BS Norms
 - ❖ Introduction to Bharat Stage (BS) Emission Norms
 - ✚ Overview from BSII to BS VI: key differences
 - ✚ Role of fuel injection in meeting emission standards
 - ❖ Fuel Injection Systems Overview
 - ✚ Carburettor vs MPFI vs CRDi
 - ✚ Importance of precise injection and atomization
 - ❖ BSIII to BSVI Injection Upgrades
 - ✚ MPFI to CRDi transition
 - ✚ Introduction of ECUs and sensor networks
 - ❖ Hands-on Demonstration
 - ✚ Injector nozzle spray testing
 - ✚ Fuel pump operation and pressure regulation
 - ✚ Observation of engine behavior with injector variations
- Day 2 – 25/04/2025: Emission Control and Diagnostics
 - ❖ Advanced Components in BS IV, BS VI Engines
 - ✚ EGR (Exhaust Gas Recirculation)
 - ✚ DPF (Diesel Particulate Filter)
 - ✚ SCR (Selective Catalytic Reduction) systems
 - ❖ BS VI-Specific Fuel Injection Systems
 - ✚ Integration with onboard diagnostics (OBD-II)
 - ✚ Role of Lambda sensor, MAP, MAF sensors
 - ❖ Practical Session
 - ✚ Diagnostic trouble codes (DTC) demonstration
 - ✚ Use of scan tools for injection and emission-related errors
 - ✚ Live analysis of fuel injection system parameters
 - ❖ Interactive Discussion & Student Queries

Learning Outcomes:

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

- Understand the differences in fuel injection systems across BS norms.
- Identify the key components of CRDi, MPFI, and BS VI-compliant systems.
- Interpret and diagnose fuel injection-related issues using tools and scanners.
- Analyze the impact of fuel injection on emissions, performance, and efficiency.
- Recognize the importance of electronic control and emissions hardware like DPF, EGR, and SCR.
- Gain industry-relevant skills for careers in automotive diagnostics, R&D, and servicing.

Conclusion:

The workshop was a comprehensive and engaging experience for the 12 participating students, offering a strong foundation in both the theory and application of modern fuel injection systems. The gradual progression of content from BSII to BS VI ensured a clear understanding of technological advancements and the impact of regulatory frameworks on fuel system design. The inclusion of live demonstrations and real-time testing enhanced the practical knowledge of students and encouraged active participation through hands-on tasks and interactive Q&A sessions.



Two-Days Workshop on Advanced Fuel Injection Technology (BSII-BSVI), on 24-25/04/2025