

# Safety and Incident Management Plan for Heat Engine Laboratory

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## Introduction

The Heat Engine Laboratory at Ahsanullah University of Science & Technology (AUST) is an essential facility for students to gain practical knowledge of internal combustion engine functions and components. The lab provides hands-on experience in engine dismantling, assembly, and performance testing, preparing students for national and international automobile competitions. The lab is equipped with a variety of engines, testing devices, and components, including an engine test set, diesel and petrol engines, exhaust gas analyzers, brakes, gearboxes, and more. This document provides a safety and incident management plan to meet accreditation requirements and ensure a safe learning environment.

## Safety Rules and Practices

The following safety rules and procedures are implemented to maintain a safe environment in the lab:

- **Personal Protective Equipment (PPE):** All lab users must wear appropriate PPE, including lab coats, safety goggles, heat-resistant gloves, and closed-toe shoes when working with engines and mechanical components.
- **Restricted Access:** Access to the lab is restricted to authorized personnel only. Students must be supervised by the Lab In-Charge or Lab Assistant while conducting experiments.
- **Safe Handling of Equipment:** Proper handling of engines, testing devices, and mechanical components is essential to avoid accidents. Malfunctioning equipment should be reported immediately.
- **Chemical Safety:** Proper protocols must be followed when handling fuels, lubricants, and coolants. Safety Data Sheets (SDS) are available for all chemicals used in the lab.
- **Heat Safety:** High-temperature components, such as exhaust systems, should be handled carefully, with clear labeling on hot surfaces. Heat-resistant gloves are required when handling these components.
- **Emergency Exits and Fire Safety:** Emergency exits are unobstructed, and fire extinguishers are accessible in the lab. Students are briefed on fire evacuation procedures at the beginning of each term.

# Incident and Accident Prevention Procedures

The following preventive measures are implemented to minimize the risk of incidents:

- **Routine Inspections:** The Lab In-Charge conducts routine safety inspections to ensure all equipment is in safe working condition.
- **Equipment Maintenance:** Engines, testing equipment, and other apparatus undergo regular maintenance to ensure functionality and safety.
- **Safety Training:** All students receive safety training covering PPE usage, emergency procedures, and specific handling instructions for engines and testing equipment.
- **Emergency Drills:** Periodic emergency drills familiarize students and staff with evacuation routes and procedures in the event of a fire or other emergencies.

## Provisions for Managing Accidents and Health Hazard Conditions

In the event of an accident or health hazard, the following provisions are in place to ensure quick and effective response:

- **Emergency Contacts:** Contact details for the Lab In-Charge, Warden, Assistant Warden, and emergency medical services are posted prominently in the lab.
- **First Aid Kit:** A fully stocked first aid kit is available in the lab to treat minor injuries, such as cuts or burns.
- **Fire Extinguishers:** Fire extinguishers are strategically located in the lab for use in emergencies.
- **Emergency Response Protocol:** In case of an emergency, the Lab In-Charge should be notified immediately. If necessary, the Lab In-Charge will contact the Warden and Assistant Warden to coordinate with the AUST Fire/Disaster Safety Team.
- **Evacuation Procedure:** For severe incidents, such as a fire or chemical spill, all personnel should follow the designated evacuation route to the assembly point outside the building.

## Roles and Responsibilities

### Lab In-Charge

The Lab In-Charge holds overall responsibility for lab safety and incident management. Key responsibilities include:

- Conducting regular safety checks and maintenance inspections of all lab equipment.

- Providing initial safety training to students and lab personnel before experiments.
- Responding to incidents and coordinating with the Warden and Assistant Warden during emergencies.
- Reporting safety concerns to the Department Head and ensuring corrective actions are implemented.

## **Lab Assistant/Attendant**

Under the supervision of the Lab In-Charge, the Lab Assistant is responsible for:

- Assisting with the setup and maintenance of lab equipment.
- Monitoring students during lab sessions to ensure adherence to safety protocols.
- Reporting any equipment issues or safety concerns to the Lab In-Charge.

## **Warden and Assistant Warden**

As part of the AUST Fire/Disaster Safety Team, the Warden and Assistant Warden are responsible for:

- Assisting with evacuation procedures during emergencies.
- Coordinating with emergency services if required.
- Reporting incidents to the Campus Safety Task Force for further action.

## **Lab-Specific Incident Prevention Plan**

The following guidelines apply to the Heat Engine Laboratory to ensure safe conduct of activities:

1. **Engine Dismantling and Assembly:** Students must handle engine components carefully, especially sharp or heavy parts. Gloves and safety goggles are required.
2. **Engine Testing:** When performing engine performance tests, ensure all connections are secure, and wear hearing protection as engines can produce loud noise.
3. **Exhaust Gas Analysis:** The exhaust gas analyzer should be used with proper ventilation to avoid inhaling fumes. PPE, including face masks, is mandatory.
4. **Heat Balance and Power Balance Studies:** Handle engine components with caution, as they may be hot. Allow adequate cooling time after tests to prevent burns.
5. **Brake and Gearbox Experiments:** When testing disk and drum brakes or gearbox operations, ensure all parts are securely fastened to prevent accidents.

## **Conclusion**

The Heat Engine Laboratory is committed to maintaining a high standard of safety for all students, faculty, and staff. Through established safety protocols, incident prevention practices, and emergency response measures, the lab minimizes risks and ensures a prompt and effective response to incidents. Regular reviews and updates to this safety plan ensure compliance with accreditation standards and evolving safety practices.