

# ARC Flash Hazard Analysis

## INTRODUCTION

- This ARC Flash Hazard Analysis training seminar will look upon the severity and adequate safety measures executed in the electrical installation. It shall comply with IEEE 1584 and NFPA 70E. Technology is also instrumental in preventing arc flash hazards. Electrical accident preventions are always placed, but accidents still take a toll on the persons working on the premises. Electricity is a familiar and necessary part of everyday life, but electricity can kill or severely injure people and cause damage to property. Hazard risk categories are of prime importance as it will determine the incident energy and type of personal protective gear.
- Limits of approach will ensure safe distances while working in an electrical installation. These are simple precautions and personal protective equipment to be used when working with switchgear that can be taken to reduce the risk of arc flashes significantly. Proper and correct personal protective equipment is mandatory as it can save lives and prevent severe injuries. Arc flash hazards analysis and labeling can inculcate safe working habits and eliminate flashovers.

This training seminar will highlight:

- Causes of arc flash
- Types of faults and its effect
- Arc flash incidents
- Limits of approach
- Technology in reducing arc flashes

## OBJECTIVES

At the end of this training seminar, participants will learn to:

- Understand the importance of arc flash accident prevention in medium and high voltage electrical installation
- Explain the necessity of working safely
- Learn the dangers and hazards of high voltage electrical faults
- Determine how to avoid accidents at your workplace
- Analyse the various methods of arc flash reduction devices

## TRAINING METHODOLOGY

- This Electrical Engineering course will illustrate the dangers of arc flashes to participants. Each seminar participant will receive a copy of the comprehensive seminar notes. The presenter will outline and discuss the topics using computer displays, video clips and power point presentation.
- The seminar is designed to have an interactive format to maximize delegate participation. Questions and answers are encouraged throughout and at the daily sessions. Needs-Based case-studies and examples will be discussed in problem-solving workshop sessions.

## ORGANISATIONAL IMPACT

- Technical training and up-skilling to improve and realise the full potential of a competent workforce
- Productivity increase through minimisation of project time acceptance/design and commissioning
- Identification of opportunities for improvements due to a deep understanding of the presented state-of-the-art technologies
- Networking of personnel with technology leaders and other engineers and technicians with strong field experience
- Exposure of personnel to the standard international procedures
- Attitude change of workforce, as continuous follow up of new technologies and their up taking could otherwise create a workforce with high resistance to change due to lack of understanding

## PERSONAL IMPACT

- The importance of safety in high voltage installations
- Understand the hazards of arc flash accidents
- Identify the dangers and risks of accidents in a high voltage installation
- Appreciate the importance of hazard warning labels
- Be careful and aware of limits of approach
- Recognize the effort of implementing arc flash hazard reduction devices

## WHO SHOULD ATTEND?

- The technicians and maintenance staff will be able to comprehend the hazards and dangers of arc flash. This will enable them to exercise safety during maintenance and work.

This training course is suitable for a wide range of professionals but will greatly benefit:

- Electrical Engineers
- Maintenance Technicians
- Management Professionals
- Project Engineers
- Safety Officers

## Course Outline

### What are Arc Flash Hazards and their Relevance to IEC, IEEE 1584 and NPFA 70E Standards

- Overview and Definition of Arc Flash
- Electric Shock Hazards
- Internal Arc Fault and Electrical Safety Hazards
- The Severity of Arc Flashes and Arc Blast
- IEEE 1584 and NFPA 70E Relevance to Arc Flash Hazards
- IEC Standard Time / Current Zones effects of AC Currents on Persons
- Electrically Safe Working Environment and Safety Programmes
- Importance and Implementation of Lock-out Tag-out and Its Significance

### The Impact of Arc Flash Accidents and How can such Incidents be Avoided and Controlled

- Current Limiting Fuses and Fast Acting Circuit Breakers
- How Over Current Protective Devices can Reduce Arc Flash Hazards
- Arc Flash Metrics
- Arc Flash Incidents
- Arc Flash Mitigation Methods
- Arc Flash Safety Solutions
- Can arc flash incidents be avoided?
- Arc Proof and Arc Resistant Switchgears

### Understanding Limits of Approach Boundaries and Precautions, Installation of Arc Flash Protection Relays

- Limits of Approach
- Arc Flash Protection Boundary
- Importance of Arc Flash Warning Labels
- Incident Energy
- Hazards Risk Categories
- Hazardous Area Classifications
- Electrical Intrinsic Safety
- Types and Operation of Arc Flash Protection Relay

### ARC Flash Risk Assessment and Hazard Analysis Information

- Arcing Flash Safety and Maintenance
- ARMS – Arcflash Reduction Maintenance System
- Ultra-fast Earthing Switch (UFES)
- Arc Vault Method of Arc Flash Control
- Incident Energy vs. Bolted Faults
- Arc Flash Hazards Analysis and Mitigation

## Minimising ARC flash effects and phases of ARC formation

- Time Current Selectivity
- Active and Passive Measures to Minimise Arc Flashes
- Consequences of An Internal Arc
- Arc Flash Accidents and Preventions
- Avoiding Arc Flash Blasts
- Remote Racking of Circuit Breakers
- Risk Assessment Applied to Electrical Equipment and Isolation
- Case Studies, Wrap-up Session with Q&A

