



Training Program:

Emergency Power Supplies

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Introduction:

The objective of this course is to teach the basic facts about ensuring reliable power supply to critical systems using various available options. The solutions can vary from the simple diesel generating set as standby sources to superconducting energy sag support systems. Also, newer technologies like fuel cells are now available and are fast becoming mainstream solutions.

This course will discuss how to save dollars by finding the right solution to your needs so that you invest just what is needed and where it is needed. This course will also briefly look at the design issues involved in planning the distribution of emergency power.

Target Audience:

Electrical engineers, technicians, maintenance engineers, power system protection and control engineers, project engineers, systems planners and managers building service designers.

Training Objectives:

At the end of this course, participants will be able to:

- Understand the level of failure-proofing that specific equipment may require
- Know the various available options of critical power supply systems
- Evaluate these options objectively
- Specify the solution that is the best and most economical for your needs

- Design a suitable power distribution system for emergency power
- Manage the installation, commissioning and maintenance of the distribution system

Accreditation:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Course Outline

Power Quality

- Electrical parameters
- What is power quality?
- Problems - effects and mitigation
- Reliability, Available solutions and making the right choices

Voltage Variations

- Voltage amplitude, Voltage sag and its effects
- Equipment sensitivity, Control measures
- Voltage improvements, fluctuations and flicker

Continuity of Power

- Power failure, Needs of equipment, Understanding failures
- Interruptions and voltage/frequency excursions
- Uninterrupted, emergency and standby power
- Redundancy and automation

Diesel Technology & Classifications

- Basic engine processes, Reciprocating engines
- Spark ignition engines, Diesel and dual fuel engines
- Speed and service classifications

Basic Engine Design & Ratings

- Design characteristics and formulas, Turbo charger
- Ambient conditions, ISO ratings
- Performance and efficiency
- Engine speed, Fuel combustion methods

Conventional Uninterrupted Power Supply

- Main classification, Rotary and static
- Rotary, advanced and hybrid UPS systems

Static UPS Systems

- Configuration, Types of static UPS systems
- UPS metering, indications, alarms and protection
- Power quality and UPS, UPS configurations
- Redundant UPS configuration and building high reliability power supplies

New Technologies

- Problems in existing technologies
- Maintenance issues on prolonged operation
- Environmental problems, Fuel cell, Micro turbine

Fuel Cell

- Historical perspective, Operating principle
- Types of cells available and comparison
- Fuel cell system for backup power-overview
- Comparison with battery powered UPS

Micro Turbine

- Conventional gas turbine power plant
- Efficiency issues and combined cycle power generation
- Comparison of micro turbines with conventional turbines

- Typical micro turbine based standby power unit

Configuring Power Distribution System for Emergency Loads

- Integrating emergency and critical power needs in the distribution network
- Multiple units nearer the consumer vs. larger centralized units
- Paying attention to motor starting requirements and accompanying voltage sag
- Typical distribution scenarios in large industrial systems for integration of emergency power
- Automation of starting, load changeover and shutdown

Parallel Operation & Tie Protection

- Parallel operation between emergency sources, Load sharing between sources
- Parallel operation of emergency source with normal source
- Utility stipulations and local codes, Issue of tie-line separation
- Static transfer switch and its application in critical power installations