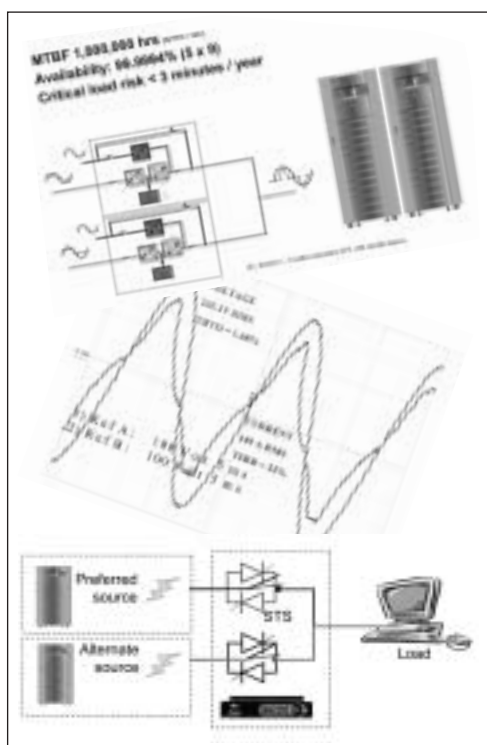


# EMERGENCY POWER SUPPLIES: ELECTRICAL DISTRIBUTION DESIGN, INSTALLATION AND COMMISSIONING



## OBJECTIVES:

This workshop will enable you 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

## WHO SHOULD ATTEND:

- Power System Protection and Control Engineers
- Electrical Engineers
- Maintenance Engineers
- Building Service Designers
- Project Engineers
- Systems Planners and Managers



## THE WORKSHOP

Power is becoming a commodity that can no longer be taken for granted. Our dependence on electricity is growing and even a few hours of power disruption has become unthinkable. An unscheduled interruption can cause immense damage, accidents and loss of life. While it is impossible to guarantee 100% availability of power at all points in any system, vulnerable sections can be provided with alternative emergency power supply to ensure more reliable power availability, thereby avoiding the problems of power interruption.

This workshop has the objective of teaching 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. Newer technologies like fuel cells are now available and are fast becoming mainstream solutions. Of course, all this comes at a price, which means that the solution must match the actual needs without excessive insurance and thereby optimise investments. This workshop will discuss how to save costs by finding the right solution to your needs so that you invest just what is needed and where it is needed. This workshop will also briefly look at the design issues involved in planning the distribution of emergency power.

### PRE-REQUISITES

Working knowledge of electrical engineering and hands-on work with power distribution systems in a plant environment with critical processes is desirable. Real-life experience with diesel generating units and other critical power supply sources such as Uninterrupted Power Supply (UPS) systems will further enable the workshop to be placed in context.

## PRACTICAL SESSIONS

This is a practical, hands on workshop enabling participants to work through practical exercises which reinforce the concepts discussed.

## ON-SITE TRAINING

- ✓ **SAVE** over 50% by having an IDC workshop presented at your premises.
- ✓ Customise the training to **YOUR** workplace.
- ✓ Have the training delivered when and where you need it.

Contact us for a **FREE** proposal.

## THE PROGRAM

### DAY ONE

#### 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 AND CLASSIFICATIONS

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

#### BASIC ENGINE DESIGN AND 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

### DAY TWO

#### 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
- Case study

#### 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
- Case study involving critical process application

#### CONFIGURING POWER DISTRIBUTION SYSTEM FOR EMERGENCY LOADS

- Integrating emergency and critical power needs in the distribution network
- Multiple units nearer the consumer vs. larger centralised 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 AND 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

#### SUMMARY, OPEN FORUM AND CLOSING