

**Training Title**

**COMPETENT MANAGER**

**Training Duration**

**5 Days**

**Training Dates & Venue**

ML029	Competent Manager	05	14 - 18 June 2021	\$6,500	London, UK
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In any of the 5 star hotels in Dubai. The exact venue will be informed soon.

**Training Fees**

- 6,500 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**TRAINING DESCRIPTION**

Electrical safety plays an important role in electrical power systems in maintaining the safety to human being and equipment. Also it will maintain the continuity of power supply and power quality to the industrial and commercial consumers. A properly plan, design and operation of the electrical power system should ensure the safety and reliability of the system. Understanding the steps and procedures employed in a good electrical safety program requires an understanding of the nature of electrical hazards. Understanding the nature of the hazards is useless unless protective strategies are developed to protect the worker. This course includes studying the safety rules according to the HTM 06-02. This course includes a synopsis of the types of protective strategies that should be used to protect the worker. This course covers all aspects of safety issues of Electrical power system including regulatory and environmental requirements, general design considerations, application of switching and power equipment, and safe grounding design

**TRAINING OBJECTIVES**

1. To present the recommended practices, and guides, of which NFPA 70E contained, which are developed through a consensus standards development process approved by the American National Standards Institute.

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2. To provide the Health Technical Memorandum 06-02 (HTM 06-02) contents and rules.
3. To provide a practical understanding of electrical power system safety.
4. To declare the regulatory and legal safety requirements.
5. To demonstrate the earthing systems Safety.
6. To explain the relation between maintenance activities for various equipment and safety.
7. To select and maintain the electrical equipment in hazardous areas and its standard.
8. To indicate arc flash hazard and mitigation.
9. To introduce main recommendations for electrical safety.
10. To review of general work and plant safety rules.

### WHO SHOULD ATTEND

Electrical power generation systems and distribution engineers and technicians in utilities and industrial plants, managers of private electricity producers and large power consumers, substation engineers, consulting engineers, manufacturers of power equipment and technologists and other technical personnel involved in the design, operation and maintenance of high/medium/low voltage power systems.

### TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

### COURSE OUTLINE

#### I. Hazards of Electricity

1. Hazard Analysis
2. Shock

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3. Arc definition, description and characteristics
4. Arc Burns
5. Blast
6. Affected Body Parts (Skin, The Nervous System, Muscular System Heart , The Pulmonary System )
7. Summary of Causes—Injury and Death
8. Shock Effect
9. Arc Flash Effect
10. Causes of Injury
11. Causes of Death
12. Protective Strategies

## II. Technical Overview of Electrical System and protection Concepts

1. Power System Supplies
2. Generation System Layout
3. Standby Power
4. Main And Standby Power
5. Basic Services Power
6. Distribution System Basics
  - a. load schedules
  - b. Diversity Factor
  - c. Load Factor
  - d. Load Flow
  - e. Interlocking And Inter-tripping
7. Distribution Systems Layout
  - a. Simple radial system
  - b. Expanded radial system
  - c. Primary loop system
  - d. Closed-loop operation
  - e. Secondary selective system
  - f. Type of Feeders
8. Instrument Transformers
  - a. Current Transformer
  - b. Voltage Transformers
9. The Reasons For Protection
10. Principles of protection
11. Disconnection Devices
12. Protection and system design
13. Nature of short circuit currents
14. Sources Of Short Circuits
15. Short Circuit Protection Philosophy

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## 16. Categories of Protection

### III. Vital Issues for The Trainer

1. Procedures to be carried out by an Authorized Person (LV) to enable work on main intake, distribution and final circuits
2. Procedures to be carried out by an Authorized Person (LV) to enable work on emergency Generators and UPS
3. Safety precautions and procedures for live working and testing
4. How to Work on a low voltage system associated with a high voltage system
5. How to use operating Manuals
6. Required records and diagrams
7. Authorization and Certificates
8. Permanent posters and safety signs
9. First Aids
10. Safety documentation (model forms)
11. Audit of safe system of work, safety procedures and check lists
12. Qualifications and training requirements

### IV. Earthing Systems Safety

1. Equipment Earthing
2. System Earthing
3. Consumer Earthing
4. Touch And Step Voltage
5. Effect of electric shock on human beings
6. Electric shock and sensitive earth leakage protection
7. Sensitive earth leakage protection
8. General control measures for electrical hazards
9. Wear Personal Protective Equipment (PPE)
  - a. Personal safety clothing and equipment
  - b. Personnel protective equipment for working with Batteries:

### V. Arc Flash Hazards Analysis And Mitigation

1. Short history of arc flash research
2. NPFA-70E-2004 application
3. Calculating the Required Level of Arc Protection (Flash Hazard Calculations)
4. Arc flash hazard assessment
5. Traditional methods for reducing arc flash
6. New strategies for reducing arc flash hazards and suggestions for Limiting Arc-flash and Shock Hazards

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7. Standardizing Arc Flash Hazard Labels
8. The Role of Over-current Protective

## VI. Electrical Isolation and Earthing Procedures according to Health Technical Memorandum 06-02 (HTM 06-02)

1. Electrical Safety Rules
2. Substations and Switchgear Rooms
3. Access to High Voltage Enclosures and Equipment
4. Responsibilities for Power Systems
5. Electrical Safety Documents
6. Electrical Permit to Work
7. Switching of power systems
8. Isolation
9. Earthing of High Voltage Electrical Equipment
10. Earthing of Low Voltage Electrical Equipment
11. Work on Electrical Equipment
12. Work on HV Transformers
13. Work on LV Transformers
14. Work on Cables
15. Portable Electric Tools Classes
16. Work permit system objectives
  - 16.1. Purpose of PTW system
  - 16.2. Legislations
  - 16.3. The condition under which the permit will become invalid
  - 16.4. Permits types
  - 16.5. Hot work (naked flame/spark potential)
  - 16.6. Cold work
  - 16.7. Entry permit
  - 16.8. Formal procedures and standing order
  - 16.9. No permit required
  - 16.10. Distribution of the permit
17. Certificates required for certain types of job
  - 17.1. Isolation confirmation certificate (ICC)
  - 17.2. Plant contamination certificate
  - 17.3. Hot and odd bolt certificate
  - 17.4. Clearance for excavation certificate
  - 17.5. Clearance to move heavy equipment
  - 17.6. Electrical isolation certificate:
  - 17.7. Sanction for test permit (permit to work on live electrical system for test purposes)
18. Switching Program

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19. Classification of Hazardous Area
20. Electrical authorization level
21. Locking out
  - 21.1.Safe working limits
  - 21.2.Lock-Out Procedures
  - 21.3.Suspended Work
22. Definitions
23. Rules For The Operation Of The Electrical Supply System
24. How To Make Electrical Apparatus Safe For Maintenance Work
25. Commissioning of Apparatus
26. Precautions
  - 26.1.Precautions for capacitors
  - 26.2.Safety aspects for CT
  - 26.3.Safety aspects for VT
  - 26.4.precautions for switchgears stored energy mechanisms
  - 26.5.Precautions for batteries

NOTE:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.

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