



Motor Maintenance and Testing

Duration 5 Days

Introduction

The focus of this 5-day class is to present a comprehensive overview of electrical theory and principles related to the operation of AC and DC rotating machines, (motors, generators, and alternators). The course will expand basic technical skills related to fundamental concepts while at the same time introducing more advanced topics. Various types of AC and DC motors are discussed during the class giving participants practical solutions to every day field-related problems. A comparison between motors and generators is emphasized as it relates to installation, troubleshooting, maintenance, and testing.

Methods of starting, braking, and controlling the speed of motors is covered as well as correct safety procedures in compliance with NFPA 70E

Who Should Attend

Maintenance supervisors, personal are advised to attend this course.

Course Objectives

- 1- Understanding methods of starting, braking, and controlling the speed of motors.
- 2- Applying safety procedures in compliance with NFPA 70E
- 3- Recognize motor failure causes
- 4- understanding NFPA 70B Requirements for Motor Testing

Course outline

I. Basic Theory and Fundamentals

A. Magnetism

1. Fundamental Properties
2. Force between Magnetic Poles
3. Magnetic Fields and Flux

B. Electro-Magnetism

1. Electric Current and Magnetism
2. Coils (Inductors)
3. Electromagnetic Induction

II. AC Motor Theory and Construction

A. The Rotating Magnetic Field

B. Types of AC Motors

1. Three-Phase Motors
2. Induction Motors
3. Wound-Rotor Motors
4. Synchronous Motors
5. Single-Phase Motors

C. Motor Data

1. Electrical Rating
2. Power Rating
3. NEMA Design Codes

D. Motor Protection

1. Overcurrent Protection
2. Overload Protection



- III. AC Alternator Theory and Construction
 - A. Principles of Operation
 - B. Construction of Small Alternators
 - C. Alternator Controls
- IV. DC Motor Theory and Construction
 - A. Operating Theory
 - B. Construction
 - C. Self-Excited DC Motors
- V. DC Generator Theory and Construction
 - A. Operating Theory
 - B. Construction
 - C. Separately Excited and Permanent Magnetic DC Generators
 - D. Self-Excited DC Generators
- VI. AC and DC Motor Control
 - A. Starting Methods
 - B. Braking Methods
 - C. Multi-Speed Motors
 - D. Adjustable-Speed Motors
 - E. Mechanical Drive Systems
- VII. AC Motor Maintenance and Troubleshooting
 - A. Visual Inspection
 - B. Mechanical Maintenance
 - 1. Bearings
 - 2. Alignment
 - C. Motor Failure Causes
 - D. Control Circuit Troubleshooting
 - E. Nameplate Information
 - F. Motor Winding Identification
 - 1. Wye Identification and Connection
 - 2. Delta Identification and Connection
 - G. NFPA 70B Requirements for Motor Testing
 - 1. Motor Rotation Test
 - 2. Insulation Test
 - 3. Surge Test
- 1.1. VIII. Final Exam and Paperwork