



Industrial Electrical System Distribution Analysis

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This course will describe the various disturbances and irregularities that commonly occur on electrical systems. Voltage variations such as surges, sags, impulses are addressed. Also grounding bonding and shielding are explained with references to the National Electrical Code Requirements. This course is designed for those responsible for proper operation of industrial power distribution systems.

I. Introduction

II. Power System Overview

- Power System Equipment
- Voltage and Current Relationship
- Normal Monitoring of Power Quality

III. Power System Equipment

- Generators
- Transformers
- Capacitors
- Voltage Regulators
- Reactors

IV. Power System Disturbances

- Voltage Surges
- Voltage Sags
- Impulses or Spikes
- Harmonics

V. Power Conditioning

- Filtering Techniques
- Surge Protection
- Lightning Protection
- Motor Starting Control

VI. Grounding, Bonding and Shielding

- Proper Grounding
- NEC Requirements

- Bonding of Conduit and Raceways
- Shielding of Control and Communications Circuits
- Maintenance of the Electrical Grounding System

VII. Monitoring Power System Quality

- Monitoring Equipment
- Frequency of Monitoring
- Location of Monitoring Equipment
- Solutions to Disturbance Problems

VIII. Harmonics

- Description of Harmonics
- How Harmonics Effect Equipment
- Solutions to Harmonics
- Determining Harmonic Effects on Neutral Current
- Sources of Harmonics

IX. Short Circuit Analysis

- Factors that Determine Short Circuit Current
- Transformer KVA and % Z
- Conduit and Raceway Factors
- Calculating Short Circuit Current
- Determining Short Circuit Protection

X. Course Review and Summary