MAGNETIC PARTICLE TEST

1.0 PRINCIPLES OF MAGNETIC PARTICLE TESTING:

Introduction
Capabilities of Magnetic Particle Testing
    Personnel Qualifications
Magnets and magnetic Fields
    Magnetic Fields
Law of Magnetism
    Materials Influenced by Magnetic Fields
Characteristics of Magnetic Fields

2.0 Effects of Discontinuities on Materials:

Surface Discontinuities
Scratches
Subsurface Discontinuities
Lesson 2 - Quiz
Lesson 3 - Magnetization
    Circular Fields
    Contact Plates
    Prods
    Discontinuity Detection
    Longitudinal Field
    Field Direction

3.0 Magnetization Methods :

Test Materials
    Wet Particles
    Dry Particle
Longitudinal Magnetization
    Field Strength

4.0 Principles of Demagnetization.

    Introduction
    Alternating Current Demagnetization
    Direct Current Demagnetization
    Efficiency of Demagnetization
    Reasons to Demagnetize

5.0 Equipment :

Equipment Selection
    Technical and Specification Requirements
    Purpose of Test
    Area Tested
Mobile Equipment
Stationary Equipment

Particles Used

6.0 Discontinuities :

Inherent Discontinuities
Processing Discontinuities
In-service Discontinuities

7.0 Principles :

Theories
Techniques
Magnetic Field Theory
- Magnetic Domains
- Magnetic Fields
- Magnetized Ring
- Bar Magnet

Effect of materials on Electromagnetic Fields
- Units of Measure for Magnetic Flux
- Magnetic hysteresis
- Magnetic Permeability

8.0 Flux Fields:

Electric Current
- Alternating Current
- Direct Current
- Half Wave Direct Current
- Full Wave Direct Current
- Three Phase Full Wave Direct Current

9.0 Magnetic Particles and Methods of Application:

Introduction
- Current Level and Particle Application

Continuous Method
- Dry Continuous Method
- Wet Continuous Method

Residual Method
- Field Direction
- Magnetic Field Measurements

Circular magnetization
- Direct Contact
- Central Conductor
- Amperage Requirements

Sensitivity Level
- Amperage
- Testing Media
- Direct Contact Circular Magnetization
- Coil Shot
- Cable Wrap

10.0 Magnetization by Means of Electric Current:

- Introduction
- Circular Magnetization
  - Circular magnetization of Solid Test Objects
  - Circular magnetization with Prods
  - Circular Magnetization with Direct Contact Head
  - Circular magnetization with Induced Current
  - Circular magnetization of Hollow Test Objects
- Longitudinal magnetization
- Coil Magnetization
- Filed Flow Magnetization
- Yoke Magnetization
  - Combined Circular and Longitudinal magnetization
  - Units of Measure and Terminology
- Types of magnetic materials
- Calculation of magnetic Force Requirements
  - Prods
  - Yokes
  - Coils
  - Air Core Coil Longitudinal magnetization
  - Fill Factor Coils
- Interpretation of Indications
  - Relevant Indications
  - Non-relevant Indications
  - False Indications

11.0Demagnetization :

- Purpose
- Principles of Operation for Demagnetization
- Reasons to Demagnetize…
- Justification for Demagnetizing

Demagnetization Methods

- Heating Above Curie Point
- Electromagnetic Demagnetization
- Alternating Current Demagnetization
- Direct Current Magnetization
- Yoke Demagnetization
- Demagnetization Practices

12.0Equipment :

- Stationary Equipment
- Portable Equipment
- Dry Powder Test Equipment
  - Powder Selection
  - Powder Application.
  - Applicators

- Wet Visible Test Equipment
  - Particle Selection
  - Wet Fluorescent Method
  - Test Variables
  - Surface Preparation
  - Suspension application

Current Application Choices
Selection of Media
Selection of Technique
Field orientation
    Head Shot
    Central Conductor
    Longitudinal Field
Sensitivity Requirements
Conclusion
