ULTRASONIC TESTING - SYLLABUS

Introduction

- History of Ultrasonic Testing
- Advantages
- Limitations
- Principles of Ultrasonic Testing

Generation and Characteristics of Sound

- Velocity,
- Wavelength
- Frequency
- Spectrum of sound
- Acoustic Waves
- Amplitude and Energy
- Types of Vibration

Working Principles of Ultrasonic Testing

- Introduction of flaw Detector
- Characteristics of Ultrasonic Sound
- Echo amplitude on flaw detector

Types of Wave (Modes)

- Longitudinal Waves
- Shear Waves
- Surface Waves
- Lamb Waves

Concept of Sound Wave

- Reflection
- Refraction
- Mode Conversion
- Snell's Law
- 1st Critical angle
- 2nd Critical angle

The Sound Beam

- Propagation of Ultrasound
- Dead Zone
- Near Zone (Fresnel)
- Far Zone (Fraunhofer)
- Beam Spread
- Acoustic Impedance
- Couplant
- Attenuation
- The Decibel (dB)

Dependency Criteria

- Area of Defect
- Depth of Defect
- Orientation of Defect

Types of Inspection

- Ultrasonic Testing Techniques
- Pulse Echo Techniques
- Contact Testing
- Immersion Testing
- Through Transmission Technique
- Pitch Catch Technique

Probe

- Piezoelectric Effect
- Piezoelectric Materials
- Types of Probes
- Contact Probe
- Immersion Probe (Flat and Focused)
- Single Crystal
- Dual Crystal

Calibration Blocks

- IIW Type 1 Block
- IIW Type 2 Block
- Resolution
- Sensitivity
- Penetration Power
- Dead zone
- Index Point

Inspection

- Weld Scanning
- Half Beam Path
- Scanning range
- Angle Beam Inspection

Defect Sizing Techniques

- 6dB Technique
- 20dB Technique
- Maximum Amplitude Technique

Reference Block

- Distance Amplitude Correction Curve (DAC)
- DAC types