

Non Destructive Testing

Credits:4

Unit-1: INTRODUCTION

Visual Methods: Optical aids, In-situ metallography, Optical holographic methods, Dynamic inspection. PENETRANT FLAW DETECTION: Principles, Process, and Penetrant systems, Liquid penetrant materials, Emulsifiers, cleaners, developers, sensitivity; Advantages, Limitations, Applications.

Unit-2: RADIOGRAPHIC METHODS

Principles of radiography, sources of radiation, Ionizing radiation - X-rays sources, gamma-rays sources, Recording of radiation, Radiographic sensitivity, Fluoroscopic methods, special techniques, Radiation safety, Advantages, Limitations, applications.

Unit-3: ULTRASONIC TESTING OF MATERIALS

Generation of Ultrasonic waves, general characteristics of ultrasonic waves, methods and instruments for ultrasonic materials testing, special techniques, advantages, disadvantages, applications.

Unit-4: MAGNETIC METHODS

Methods of generating fields, magnetic particles and suspending liquids magnetography, field sensitive probes, measurement of metal properties, advantages, limitations

Unit-5: ELECTRICAL METHODS

Eddy current methods, potential-drop methods, applications and limitations. ELECTROMAGNETIC TESTING: Magnetism, Magnetic domains, Magnetization curves, Magnetic Hysteresis, Hysteresis-loop tests, comparator - bridge tests Absolute single-coil system, applications and limitations.

Unit-6: OTHER METHODS

Acoustic emission methods, Leak detection, Thermal inspection, advantages and limitations of processes.

TEXT BOOK;

1. Non-Destructive Testing by P. Halmshaw, 2nd edition, 1988

2. Testing of Metallic Materials by A.V.K.Suryanarayana, 2nd edition, 2007

REFERENCE BOOKS:

1. Nondestructive inspection and quality control, ASM Handbook, Vol.II.
2. Ultrasonic Testing of Metals, J Krantkramer and H. Krantkramer, spinger Vekg, 1987
3. Non-destructive Testing Hand Book, Vol. I & II, R.C. McManter Ed., Ronald Press
4. Non-destructive Testing, J.F. Hinsley, Macdonald and Evans, 1959