

# NON-DESTRUCTIVE TESTING OF METALS/ALLOYS

- NDT is testing of materials without destroying them.
- Purpose is to detect and evaluate any defects or predict the strength and serviceability of the parts
- To initiate preventive maintenance programs
- In-situ without damaging the parts

# NON-DESTRUCTIVE TESTING OF METALS/ALLOYS

## VARIOUS METHODS:-

- Magnetic particle inspection
- X-Ray radiography
- Gamma Radiography
- Ultra sonic Testing
- Electrical Method

- Damping Test
- Non-Magnetic methods
- Optical Holography method
- Hardness Testing

## MPI :-

- For detecting flaws in magnetizable materials
- Visible indication of defects produced on surface of defect
- Method will locate cracks/surface defects
- Magnaflux is commonly associated
- Grinding cracks & fatigue cracks detected
- Magnetic powder i.e.ferromagnetic particles
- Wet technique– red/black oxide in water etc

## X- RAY RADIOGRAPHY

- For internal cavities/discontinuities
- Emergent radiation is detected & recorded

$$I = I_0 e^{-\mu x}$$

- $I_0$  = Intensity of incident X ray radiation
- $I$  = Intensity of emergent X ray radiation
- $x$  = Thickness of absorbing material

# RADIOGRAPHY

INCLUDES X-RAYS, GAMMA RAY & VARIATIONS OF THESE METHODS.

- PASSING RAYS THROUGH MATERIALS TO BE TESTED
- REVEAL INTERNAL STRUCTURE
- APPLICATION IN FOUNDRY & WELDED PRODUCTS

# GAMMA RADIOGRAPHY

- PRINCIPLE SAME AS X-RAY RADIOGRAPHY
- SHORTER WAVELENGTH ,MORE PENETRATING
- SMALL SIZE,HIGH PENETRATION,LOW COST
- LOW INTENSITY THUS LONG EXPOSURE
- SHORT HALF LIFE SO DECAY OR REPLACEMENT
- PROTECTION IS NECESSARY.

# ULTRASONIC INSPECTION

- Frequency is 15 kilocycles/sec upwards.  
Railroads, water or pipe parts etc. are tested for cracks.
- Ultrasonic waves are produced by piezoelectric effect
- A discontinuity or flaw in specimen will send back an echo