ULTRASONIC FLAW TESTING (UT)

Ultrasonic nondestructive testing (NDT) – a method of characterizing material thickness, integrity, or other physical properties by means of high frequency sound waves - is a widely used technique for product testing and quality control.

ULTRASONIC TICKNESS MEASUREMENT (UTTM)

In thickness gaging applications, ultrasonic techniques permit quick and reliable measurement of thickness without requiring access to both sides of a part. Calibrated accuracies as high as ±2 micrometers or ±0.0001 inch is achievable in some applications.

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OBJECTIVES OF NDT

(1) to ensure product integrity, and in turn, reliability;

- To detect internal or surface flaws
- To measure the dimension of materials
- To determine the materials structure
- To evaluate the physical & mechanical properties of materials

(2) to avoid failures, prevent accidents & save human life;

(3) to make a profit for the user;

(4) to ensure customer satisfaction & maintain the manufacturer's reputation;

(5) to aid in better product design;

(6) to control manufacturing processes;

(7) to lower manufacturing costs;

(8) to maintain uniform quality level;

(7) to ensure operational readiness.

Definition of NDT

The use of noninvasive techniques to determine the integrity of a material, component or structure or quantitatively measure some characteristic of an object.

i.e. Inspect or measure without doing harm.

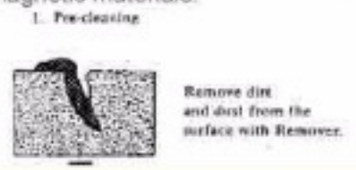
IMPORTANCE OF NDT

1. NDT increases the safety and reliability of the product during operation.
2. It decreases the cost of the product by reducing scrap and conserving materials, labour and energy.
3. It enhances the reputation of the manufacturer as a producer of quality goods. All of the above factors boost the sales of the product which bring more economical benefits for the manufacturer.
4. NDT is also used widely for routine or periodic determination of quality of the plants and structures during service.
5. This not only increases the safety of operation but also eliminates any forced shut down of the plants.

DYE PENETRANT TESTING

Liquid Penetrant Testing (PT)

- This is a method which can be employed for the detection open-surface discontinuities in any industrial product which is made from a non-porous material.
- This method is widely used for testing of non-magnetic materials.



MAGNETIC PARTICLE INSPECTION (MT)

- Magnetic Particle Inspection (commonly referred to as Magnaflux testing) is only effective at checking for flaws located at or near the surface.
- MT uses a metallic powder or liquid along with strong magnetic field probes to locate flaws. (Particles will align along voids)
- MT can only be used on materials that can be magnetized

HARDNESS TEST

- Hardness: is the resistance of the material to scratching, indentation or penetration.
- It is a surface property not related directly to any other mechanical property i.e. strong or stiff materials are not necessary hard.
- Hardness can't be seen or calculated from stress-strain curved but only by using one of the following: Brinel, Knoop, Vickers, Rockwell and shore A hardness test.