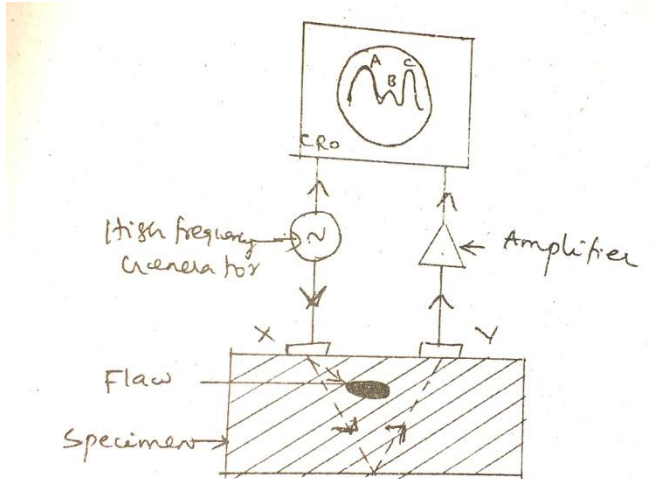


Ultrasonic methods of non-destructive testing:

Ultrasonic wave® are used to detect surface and internal faults (such as cracks, cavities, presence of foreign objects etc.) in materials, castings, weldings.



A - Incident pulse

B - Pulse from flaw

C - Reflected pulse from the bottom of specimen

K - Transmitting transducer

Y - Receiving transducer

Ultrasonics is also used to assess the continuity of composite materials such as reinforced plastics and adhesive bondings. In ultrasonic flaw detection, the frequency range commonly used is 1-15 MHz. Ultrasonics can propagate only through an elastic medium and there must be continuous mechanical coupling. When an ultrasonic wave strikes an interface between two media it is partly reflected. The intensity of reflected and transmitted ultrasonic energy at an interface of two media are determined by the specific acoustic impedances of the media. This property is used in ultrasonic testing.

A strong pulse of ultrasonics is sent through the specimen to be tested. At the location of flaw

(crack or cavity) there occurs a change in acoustic impedance and hence the pulse is partly reflected. Hence, it is a weak echo pulse. The incident pulse A, the echo pulse from the flaw B and the pulse reflected by the other end, the specimen C are seen in the screen of a cathode ray oscilloscope. If the specimen is free from any flaw, there will be only two pulse A and C. The presence and the I distance from A, of echo pulse B indicate the nature and location of flaw inside the specimen,

Advantages of Ultrasonic testing:

1. Deep seated defects in metals can be located.
2. Minute flaws can be detected.
3. Location, nature and size of a defect can be accurately determined.
4. Operation is simple and elegant.
5. Low cost and high speed inspection.
6. Large size specimens can be inspected in a very short duration.

Disadvantages of ultrasonic testings:

1. No permanent record (photograph) of the flaw can be obtained, as it can only be observed on the screen of CRO.
2. Only skilled and well-trained technicians can perform this testing.
3. There should be good mechanical coupling b/w the crystals (called probe) and specimen to be tested.


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