ANGLE-BEAM TRANSDUCERS

Angle-beam transducers are used in nondestructive evaluation of castings and riveted steel connections and in the inspection of welded structural elements by the pulse-echo technique. This technique requires the ultrasonic beam to travel at a small angle to the surface of the structure Angle-beam transducers are based on the principle that a longitudinal wave incident on a solid 1-solid 2 interface is mode converted into a refracted shear wave and a refracted longitudinal wave, propagating in solid 2 as shown in Fig. 5.24.

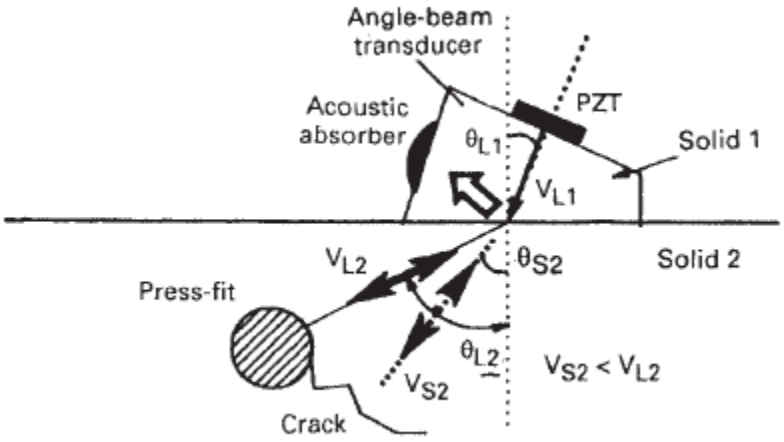

Fig 5.24 Angle-beam transducer.

The directions of the refracted waves are dictated by Snell's law. These waves are used to selectively investigate welded joints, cracks, and other structural faults. According to Snell's law, as _L1 is increased, _L2 and _S2 also increase. Corresponding to _L1 (crit.), _L2 becomes 90° and VL2 ceases to exist, and only VS2 propagates in solid 2. If _L1 is increased much beyond _L1 (crit.), VS2 also disappears. In this situation a SAW propagates on the surface of solid 2. SAWs are used in NDT to detect surface cracks.

Source: http://mediatoget.blogspot.in/2012/06/angle-beam-transducers.html