Air Coupled Ultrasonic NDT and its applications

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ABSTRACT

The use of Air Coupled Ultrasonics, particularly for industry applications, is fast becoming a reality largely due to the advent of highly efficient transducers and the selection of wave modes that have lower acoustic impedances. The coupling through air allows for a wider use of the ultrasonic NDT technologies when compared with the conventional couplant based methods. The increased speed of inspection, the portability of the systems (since couplants are not required), the sensitivity to defects, inspection of hidden regions, etc. are some of the key advantages of the air coupled ultrasonic techniques. The dis-advantages of the technique include the limitation of the frequency of operation and the requirement of high voltage for excitation. In this paper, the application of Longitudinal, Shear, and Lamb wave modes that are excited and received by air coupled ultrasound transducers will be discussed. The technique is applied to aerospace components, composite pipes, adhesive bonded components, among others. The defects considered include weld inspection, delamination characterisation in composite structures, interfacial weakness in bonded components, etc. that are made with metals and or composites.