

METHOD AND SYSTEM FOR STRUCTURAL HEALTH MONITORING OF BONDED JOINTS

ABSTRACT

Systems and methods for structural health monitoring of adhesively bonded joints using guided waves. The method determines the quality of adhesive bonds between two materials by injecting a high-frequency ultrasonic signal and measuring a characteristic of the ultrasonic waves which propagate through the adhesive, trapped and guided by the interfaces between the bonded materials and the adhesive. Prior to an inspection of an actual adhesively bonded structure, that structure is simulated using a finite element model. Also propagation of guided ultrasonic waves along the adhesive bondline is simulated to derive interface wave predicted properties. During ultrasonic inspection of the actual structure, interface wave measured properties are derived. The quality of the adhesive bondline is determined by comparing the empirical interface wave measured properties to simulated interface wave predicted properties.

Fig. 11