Abstracts

STRESS

Recent Developments Achieved in China About the Center-Hole Relaxation Technique for Residual-Stress Measurement

by C.N. Hu

The paper introduces recent developments achieved in China regarding the center-hole relaxation technique for residual-stress measurement. A special device developed by the author for small blind-hole drilling and measuring is described. Some examples of application of this method by using this special device are given. They include stress measurement of (1) stiffened top flange of the test section of a railway steel box girder bridge, (2) the butt weld joints of the 15 MnVNi' alloy steel thick plates, and (3) the welded side frames of a diesel locomotive. *Strain, 119-125 (Aug. 1986).*

Effect of Stress on Ultrasonic Pulses in Fiber-Reinforced Composites

by J.H. Hemann and G.Y. Baaklini

An acoustical-ultrasonic technique was used to demonstrate relationships existing between changes in attenuation of stress waves and tensile stress on an eight-ply 0-degree graphite-epoxy fiber-reinforced composite. All tests were conducted in the linear range of the material for which no mechanical or macroscopic damage was evident. Changes in attenuation were measured as a function of tensile stress in the frequency domain and in the time domain. Stress-wave propagation in these specimens was dispersive, i.e., the wave speed depends on frequency. Wave speeds varied from 267,400 cm/sec to 680,000 cm/sec as the frequency of the signal was varied from 150 kHz to 1.9 MHz which strongly suggests that flexural/lamb wave modes of propagation exist. The magnitude of the attenuation changes depended strongly on tensile stress. It was further observed that the wave speeds increased slightly for all tested frequencies as the stress was increased. *Analytical Ultrasonics in Materials Research and Testing, 181-191 (Jan 1986).*