

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Smart Materials and Adaptive Structures (5)

Author: Dr. peng weibin

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, peng_weibin@yahoo.com

DAMAGE IDENTIFICATION METHOD FOR WELD STRUCTURE

Abstract

The damage identification method for weld structure was presented in this article. Optical fiber Bragg sensors bonded on the surface of weld structure were used to measure a series of static strain along welding line, and wavelet transform was applied to the received strain signals. The slight strain change near damage area was shown distinctly by low scale wavelet transform coefficients. A novel damage index that correlated low scale wavelet transform coefficients with damage location and states was introduced. Using MSC/Nastran software and Matlab wavelet toolbox, the simulating system was established. A simple aluminum alloy board was analyzed, which include undamaged and various damaged states. As a result, the damage index changed abruptly in the damage area, which could be used to localize damage. The local maximum value of damage index increased with damage level increase, and the relation curve was given in the paper. The results demonstrated the viability of the damage detection ideas for various damage states in weld structure. Potential applications about the damage identification method were discussed.