Evaluating Bending Fatigue Strength of Aluminum Honeycomb Sandwich Beams Using Local Parameters

任貽明,張立言
Mechanical Engineering
Engineering
ymjen@chu.edu.tw

Abstract

This study analyzed the four-point bending fatigue strengths of aluminum honeycomb sandwich beams with cores of various relative densities. The debonding of the adhesive between the face sheet and the core was identified to be the major failure mode. Several global parameters and local parameters were considered to evaluate the fatigue life of the studied sandwich structures. The finite element approach was utilized to determine the local stress/strain by considering the geometry and dimensions of the adhesive. The circular shaped local parameter which combines the peeling stress and the shear stress of the adhesive on the debonding plane, correlates with the fatigue life of the sandwich beams with various core densities effectively. The predicted locations of debonding initiation using the circular-shaped combined interfacial stress parameter are identical to those observed in fatigue tests.

Keyword：Honeycomb, Sandwich beam, Debonding, Fatigue, Bending.