

Vibration Fatigue Analysis and Experimental Study of Typical Titanium Alloy Panels Under High-Temperature Environment (Postprint)

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Abstract

Vibration and high temperature have long been critical factors affecting aircraft structural safety. Aircraft structures subjected to combined vibration loads and high-temperature environments are more susceptible to fatigue failure. The typical titanium alloy panel structural configurations examined in this study include stiffened panels and honeycomb panels. Through analytical and experimental methods, systematic investigations were conducted on the vibration characteristics, vibration fatigue life, and failure locations of the panels by varying panel thickness, stiffener spacing, and structural connection configurations. The research findings demonstrate that failure in stiffened panels occurred at the stiffeners or connection angles, honeycomb panels exhibited no failure within the 8-hour test duration, and panel thickness, stiffener spacing, and structural connection configuration exerted minimal influence on the vibration fatigue life of the panels.

Full Text

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