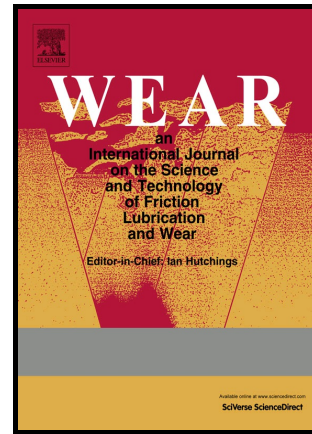


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# Investigation on the fretting fatigue behaviors of Ti-6Al-4V dovetail joint specimens treated with shot-peening

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## Abstract

In this study, Ti-6Al-4V dovetail joint specimens which highly simulate the attachment between the blade and disk of fan stages in a certain gas turbine engine were designed and used in fretting fatigue experiments. The fretting wear mechanism was characterized using a bench level experimental method. The effect of shot-peening on both fretting wear mechanism and fretting fatigue property was evaluated. The results indicated that shot-peening transformed the fretting wear behavior, altered the dominant crack initiation mechanism and dramatically promoted the fretting fatigue performance of Ti-6Al-4V dovetail joint specimens. Different reinforcement mechanisms of the multiple surface modifications created by shot-peening were also analyzed and summarized in this study.

Keywords:

Ti-6Al-4V; Dovetail joint; Fretting wear; Fretting fatigue; Shot-peening

## 1. Introduction

Fretting fatigue is a type of damage occurs in regions of contact between two parts under vibratory loading conditions which can lead to great service life reduction of mechanical structures such as the dovetail region in the blade/disc joint in a gas turbine engine. The damage is typified by small relative displacements and produce wear, surface damage, stick, micro-plasticity, etc., making the fatigue cracks nucleate more easily.

The fretting fatigue problem appears so wildly on dovetail joints in gas turbine

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