

## عنوان مقاله:

Study of the Vibration Characteristics of SA ۳۳۰ Helicopter Planetary Main Gearbox

## محل انتشار:

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## خلاصه مقاله:

The planetary gear sets find application in the final stages of the helicopter transmission system. Unlike the single axis gear, the planetary gears have complex structural arrangement and unique operational characteristics which makes diagnosis of incipient fault much more challenging with planetary gears compared to the single axis gear. This study provides a background for effective planetary bearing fault analysis in an SA۳۳۰ Super-Puma Helicopter Main gearbox by studying the characteristic of the planetary stage and investigating some prominent frequency components which are vital to fault feature extraction. Vibration data of healthy and faulty conditions at varying load regimes from a seeded fault experiment were captured. The analysis of the vibration transmission paths and the signal amplitude in the time and frequency domain provide the basis for the determination of the best signal quality. Eight transmission paths affecting the signal energy were established however, the shortest path to the radial direction of the faulty bearing assures better signal gain. The gear mesh frequencies and harmonics of the planetary stages are suppressed by the high amplitude frequencies of the forward, aft and bevel reduction gears. The impulsive carrier frequency at high speed has a strong correlation with gear-related frequencies. Though the fault frequencies can be traced in some instances, it is mostly dominated in the spectrum because of the gear-related frequencies and amplitude modulation of the planetary stages. This work enhances the planetary bearing fault extraction.

## کلمات کلیدی:

planetary bearing, seeded fault, Vibration, frequency, harmonics

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