

**VIBRATION TRANSMISSION THROUGH BEARINGS
WITH APPLICATION TO GEARBOXES**

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ABSTRACT

Cabin noise has become a major concern to manufacturers and users of helicopters. Gear noise is the largest part of this unwanted noise. The crucial noise path is generally considered to be from the gears themselves through the gear-supporting shafts and bearings into the gearbox case, and from there either through the gearbox mounts or the surrounding air to the helicopter cabin. If the noise, that is, the gear and shaft vibration, can be prevented from being transmitted through the gearbox bearings, then the noise cannot make its way into the helicopter cabin. Thus the vibration-transmitting properties of bearings are of paramount importance. This paper surveys the state of the art in predicting vibration transmission through the types of bearings used in helicopter gearboxes. Comparisons are made with available experimental results, and needed analytical improvements are identified. Less-commonly used types of gearbox bearings (e.g., fluid film) are evaluated for their potential in reducing vibration transmission.

Keywords: Noise, Vibration transmission, Bearing properties