

# ADVANCED SQUEEZE FILM DAMPERS – AN INDEGENOUS EXPLORATORY STUDY

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## ABSTRACT

Modern design trend in any rotating machinery is characterized by an ever increasing demand for higher speeds in order to obtain increased power to weight ratio, which is extremely essential as far as aircraft gas turbines are concerned. These high speeds invariably pose the threat of vibration associated with problems that could lead to catastrophic failure of the entire system. Since it could be far more practical to dissipate the unwanted energy generated from these vibrations ( since it is extremely difficult to eliminate the vibrations at the source) a suitable solution is found in providing external damping at the bearing supports in the form of squeeze film or elastomeric damping. Alternatively advanced bearing concepts are being evolved to generate the desired support coefficients at all speeds.

This discussion pertains to some of the new concepts attempted in obtaining damping source either provided externally or generated in the bearing itself apart from some interesting results in conventional squeeze film damper. Three new concepts have been tried out by way of modifying the land profile of the conventional squeeze film damper and by way of introducing extremely flexible metallic foils and introducing perforation in the foils within the squeeze film thickness. All these modifications have yielded enhanced damping capabilities and better vibration attenuation. It is important to note that the sizes of the conventional damper need not be increased when such modifications are introduced in conventional squeeze film damper. Discussions in this paper is limited to describing these new concepts (either increasing the effective damper length or decreasing the effective squeeze film thickness or increasing dissipating capacity further by introducing perforation in the foils) in brief and a few results showing the improvement achieved over the conventional squeeze film damper.