

Development of an experimental and numerical platform for rotor bearing fatigue investigations using elastomer-metal laminates

Project Outline

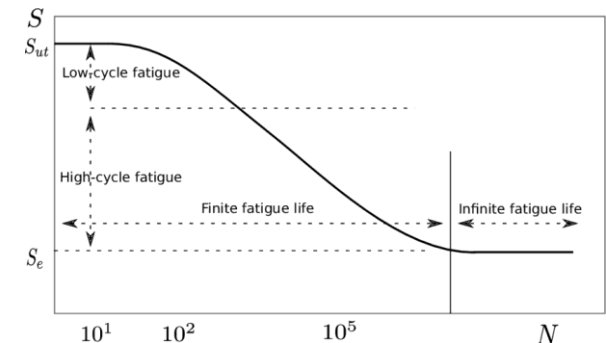
Elastomeric rotor bearings are key components in modern helicopter rotor systems. Their load-carrying capability and fatigue resistance are largely determined by the interaction of multiple bonded steel and elastomer layers. In this project, a steel-reinforced natural rubber laminate will be investigated as a simplified representative structure for rotor-bearing-related fatigue studies. The objective is to establish a suitable experimental testing methodology, identify appropriate specimen geometries, characterize the structural response of the laminate, and develop calibrated finite element models. A first series of fatigue experiments will be conducted to evaluate the suitability of the proposed laminate concept for future rotor-bearing fatigue investigations.

Work Packages

1. Literature review on rotor bearings and elastomer-metal laminates
2. Characterization of laminate architecture and development of specimen geometries
3. Design and evaluation of specimen manufacturing and testing procedures
4. Experimental characterization under quasi-static loading conditions
5. Development and calibration of finite element models
6. Initial fatigue tests and assessment of the suitability for future fatigue investigations

Recommended Background:

- Interest and experience in experimental mechanics and structural testing
- Experience in CAD and FEM modelling
- Interest in fatigue and durability of engineering structures
- Independent and structured working style



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