Flight Test with Fiber Optic Sensors on SH-60B Sea-Hawk Helicopter

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Abstract: The present article describes the measurement strains process with Fiber Optical Sensors (FOS) in a primary helicopter structure with a real spectra flight profile. Fiber Bragg Grating Sensor (FBGs) is a kind of FOS especially suitable for flight testing, due to the low profile of the optical fiber and the high multiplexing capability. FOS sensors are immune to electromagnetic fields, and also do not interfere with the other airplane systems.

The aim of flight test was to determine the stresses spectrum field around the left main beam transmission due to local cracks appearance. Results were evaluated to propose a repair methodology. These types of cracks detected have appeared sooner than expected according to manufacturer maintenance manuals. Flight test strains measurements was analyzed and local repair on the main beam transmission has been implemented. Airworthiness assessment has been done.

Topics Covered: corrosion damage, damage tolerance analysis and assessment, residual strength, fatigue crack growth, stress intensity factors, inspection intervals, environmental conditions, mission spectra.