



SUBJ: Effect of Engine Dampers on Propeller Life

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin (SAIB) alerts you, owners, operators, pilots, mechanics, and certificated repair facilities of the **potential for propeller failure due to high vibratory stress induced by worn or improper engine crankshaft dampers.**

The FAA is concerned because excessive engine crankshaft wear, damage, improper installation, or unapproved propeller/ engine installations will result in a significant increase in propeller vibratory stress.

NOTE: Propeller vibratory stress is torsionally induced when the engine cylinders fire. The vibratory stress is a high frequency vibration typically unnoticed by the pilot. This differs from a vibration such as a propeller out-of-balance condition or an airframe induced vibration caused by blade passage as the propeller rotates.

Background

Poor maintenance of piston engines

Crankshaft dampers on piston engines have a significant influence on propeller stresses. Except for small engines (less than 200 horsepower), most piston engines on aircraft use vibration dampers attached to the crankshaft. The dampers are moveable weights attached to the crankshaft by pins and bushings. The dampening effects are designed to reduce peak vibratory stress occurring at specific frequencies in certain parts of the engine or the propeller or both. Propellers installed on dampened engines are vibrationally tested and certificated based on the test results. The tests are performed on engines with a specific damper configuration and the propeller approval is granted for only those specific engine and propeller combinations. Any variations in the crankshaft damper configuration can have significant adverse effects on the propeller vibratory stress characteristics. Such variations can occur from excessive wear or damage in the pins and bushings of the crankshaft damper assemblies, improperly installed crankshaft dampers, as well as situations where a propeller was installed on an incompatible, or untested, engine/ propeller combination.

The following are possible sources of wear or damage to damper pins and bushings:

- Prolonged operation without an oil change.
- Excessive time-between-overhaul (TBO). Operators have extended engine life by doing “top overhauls” without splitting the engine case, which is necessary for damper pin/ bushing inspection or replacement.
- Non-compliance with inspection or replacement requirements of damper pins and bushings during overhaul.
- Ground strike or sudden stoppage of a rotating engine.

- Improper (abrupt) handling of throttles during engine run-up to full static RPM or decrease from full to idle power.

The concern with regard to crankshaft dampers is that there is no simple way to inspect for damper problems. A defective damper can remain hidden because propeller vibratory stresses are typically not evident to the pilot. A damper problem might not be revealed until a propeller fails.

Recommendations

Piston engine maintenance

- Perform proper and timely maintenance of the aircraft, propeller, and engine to avoid a significant increase in propeller vibratory stress.
- Do not ignore vibration or changes in vibration patterns as this can be a sign of a more serious problem.
- During engine overhaul, follow manufacturer's recommendations for replacement of crankshaft damper pins and bushings. Use of new parts is important to ensure long term, safe operation.

For Further Information Contact

Jay Turnberg, Propeller Specialist, Standards Staff, FAA, Engine and Propeller Directorate; 12 New England Executive Park, Burlington, MA 01803; e-mail: jay.turnberg@faa.gov; phone: (781) 238-7116; fax: (781) 238-7199.

For Hamilton Sundstrand, Avia, Dowty, Hoffmann, or MT Propellers:

Terry Fahr, Aerospace Engineer, Boston Aircraft Certification Office, FAA, 12 New England Executive Park, Burlington, MA 01803; e-mail: terry.fahr@faa.gov; phone: (781) 238-7158; fax: (781) 238-7170.

For Hartzell Propellers:

Tim Smyth, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, Propulsion Branch, 2300 East Devon Avenue, Des Plaines, IL 60018; e-mail: timothy.smyth@faa.gov; phone: (847) 294-7132, fax: (847) 294-7834.

For McCauley Propellers:

Jeff Janusz, Aerospace Engineer, Wichita Aircraft Certification Office, FAA, Propulsion Branch, 1801 Airport Road, Room 100, Wichita, KS 67209; e-mail: jeff.janusz@faa.gov; phone: (316) 946-4148; fax: (316) 946-4107.

For Sensenich Propellers:

James Delisio, Aerospace Engineer, New York Aircraft Certification Office, FAA, Propulsion Branch, 1600 Stewart Avenue, Suite 410, Westbury, NY 11590; e-mail: james.delisio@faa.gov; phone: (516) 228-7321; fax: (516) 794-5531.

For Related Service Information Contact

Avia Propeller Ltd., Beranových 666, 199 00, Prague – Letňany, Czech Republic; phone: +420/0/2/9633 6530 or 31; fax: +420/0/2/9633 6519 or 33.

Dowty Propellers, Anson Business Park, Cheltenham Road East, Gloucester GL 2 9QN, UK; phone: 44 (0) 1452 716000; fax: 44 (0) 1452 716001.

Hamilton Sundstrand, One Hamilton Rd, Windsor Locks, CT 06095; phone: (860) 654-6822; fax: (860) 654-5107.

Hartzell Propeller Inc., Hartzell Propeller Product Support, Attn: Product Support; One Propeller Place, Piqua, OH 45356-2634; phone: (937) 778-4379; fax: (937) 778-4391 (Intl. 001.937.778.4391).

Hoffmann GmbH & Co.KG, Kuepferlingstr. 9, D-83022, Rosenheim, Germany; phone: +49-8031-1878-0; fax: +49-8031-1878-78.

McCauley Propeller Systems, P.O. Box 7704, Wichita, KS 67277-7704; phone: (800) 621-7767; fax: (316) 831-3858.

MT-Propeller Entwicklung GmbH, Flugplatzstr. 1, D-94348 Atting, Germany; phone: +49-(0)9429-94090; fax: +49-(0)9429-8432.

Sensenich Propeller Manufacturing Company, Inc., 14 Citation Lane, Lititz, PA 17543; phone: (717) 569-0435; fax: (717) 560-3725.