

# SERVICE LETTER



November 28, 2005

SL2005-7

## TITLE

VIOLATION OF OPERATING RESTRICTIONS FOR FOUR AND FIVE BLADED TURBINE PROPELLERS

## MODELS AFFECTED

All Four and Five Bladed Turbine Propellers

## REASON

McCauley has received reports of turbine propellers being operated below the minimum idle propeller speed restriction. The propeller(s) are used on a variety of turbine powered aircraft including Cessna, Raytheon/Beechcraft, DeHavilland, Piper, Fairchild, British Aerospace, and others. The minimum propeller idle speed operating restriction is the result of a specific vibratory resonant condition known as "reactionless mode". Ground operation, at or near a reactionless mode vibratory resonance speed, can cause very high stresses in the propeller blades and hubs. These high stresses are more severe when operating in a tailing wind condition. If the propeller is operated within a restricted RPM range or below a minimum RPM restriction for an extended period of time, the propeller blades and hubs may become unairworthy due to fatigue. Hub or blade failure has the potential of causing a catastrophic event due to blade separation. The propeller RPM restriction is often placed below the minimum idle RPM; however, certain aircraft have a restriction that is above the propeller idle RPM setting. Either restriction is important. The propeller operating restrictions or limitations may be found in the Airplane Flight Manual (AFM) or Airplane Flight Manual Supplement (AFMS). The propeller installations may be controlled by the various airframe manufacturers Type Certificate (TC) or by Supplemental Type Certificate (STC).

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*TO OBTAIN SATISFACTORY RESULTS, PROCEDURES SPECIFIED IN THIS SERVICE INFORMATION MUST BE ACCOMPLISHED IN ACCORDANCE WITH ACCEPTED METHODS AND PREVAILING GOVERNMENT REGULATIONS. MCCAULEY PROPELLER SYSTEMS CANNOT BE RESPONSIBLE FOR THE QUALITY OF WORK PERFORMED IN ACCOMPLISHING THIS SERVICE INFORMATION.*

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## COMPLIANCE

1. Check the Airplane Flight Manual or Airplane Flight Manual Supplement to determine if there are any propeller RPM restrictions or limitations. This includes any stated minimum propeller RPM limitation.
2. Check the propeller RPM settings with the power lever pulled against the flight idle gate to determine if the propeller can be operated below the minimum RPM.

**NOTE:** Transient operation below the minimum RPM limitation is permitted during feathering and unfeathering cycles.

**CAUTION:** DO NOT IMMEDIATELY RE-RIG THE INSTALLATION TO ELIMINATE THE VIOLATION AS BLADE AND HUB DAMAGE MAY HAVE ALREADY OCCURRED.

3. If a propeller is found to be installed and rigged in such a way as to permit propeller operation in violation of an operating restriction or limitation, complete the attached reporting form and return it to McCauley for evaluation and recommend corrective action.
4. It is highly recommended that the aircraft tachometer be checked for accuracy.

## APPROVAL

FAA approval has been obtained on technical data in this publication that affects type design.

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## REPORTING FORM

Provide the following information, pertaining to the propellers in violation, to McCauley by mail or fax.

**NOTE:** If you operate more than one affected aircraft, please submit a separate form for each.

Owner name and contact information:

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Model and serial of the propeller(s).

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Serial numbers of the propeller blades.

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Installation date(s) of the propeller(s).

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Total time of the propeller(s).

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Time since overhaul of the propeller(s).

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Model and serial of the airplane equipped with the propeller(s).

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Set RPM experienced by the propeller(s) while idling.

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Time (engine hours) and cycles the propellers rigged to operate at this idle RPM.

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Is this propeller installed under an STC or TC (OEM installation). If STC what is the STC number.

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McCauley will review the data provided and will provide you an assessment of serviceability of your propeller(s).

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