



# SERVICE LETTER 1989-2C

February 15, 2002

**TO:** FAA-Approved Propeller Repair Stations, Aircraft Manufacturers, Aircraft Mechanics, and Owners/Operators

**SUBJECT:** Normal Criteria for Static Blade Shake and Twist of McCauley Propellers

**MODELS AFFECTED:** All Variable Pitch Propellers

**SERVICE MANUALS AFFECTED:** 720415, 710930, 780630, 701115, 761001, 810915, 790901, 860201, 810301, 880415, 890119, MPC1100-1, CMM1100-1

This service information is to be added to the appropriate McCauley Service Manual until the next manual revision is issued.

Service Letter 1989-2B was obsoleted and incorporated into manual SPM100-1. McCauley has determined that this Service Letter should remain active and are releasing Service Letter 1989-2C. Lines in the margins indicate changes.

There has been some concern in the field regarding slight static blade shake and twist on McCauley propellers as installed on aircraft. This service letter defines acceptable limits of blade twist and shake as well as procedures to correct any movement considered excessive.

## **BLADE SHAKE:**

Blade shake is defined as the tendency for the propeller blades to wobble slightly when the tip is physically moved by hand (lead edge to trail edge; see Figure 1). This tendency is a natural result of the fabrication of parts within the McCauley retention system. While accumulation of tolerances is measured in thousandths of an inch, it must be remembered that both the parts causing blade shake, and the pivot point about which the blade rotates, are near the blade root. As a result, very small differences at the blade root will be magnified many times when measured at the tip. Total maximum allowable movement up to 1/8 or .125 inch (3.13mm) is considered normal. C1100 series propellers may have a maximum movement of 3/16 or .1875 inch (4.7mm).

Normal blade shake (less than maximum allowable movement) is no cause for concern, as it disappears during propeller rotation due to the high centrifugal forces acting on the blades (20,000 - 45,000 lbs.).

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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If, however, blade shake exceeds maximum movement allowable, it should be reduced, *when convenient*, by inserting shims in the blade assembly by an FAA-approved propeller repairman. In many cases, adjustment can be performed with the propellers still installed on the aircraft. Refer to the appropriate McCauley Service Manual for instructions on installing shims.

### **BLADE TWIST:**

Two Categories of "Blade Twist" exist. They are defined as follows:

A. The first type is "rotational play" and can be defined as the sum total of rotational movement a propeller blade allows when moved by hand around its axis of rotation (see Figure 2). This movement is, to a limited degree, considered normal and should not be cause for concern. Please note that, while a specific rotational movement limit is no longer given, all blades in a propeller should have about the same amount of "rotational play". If the *difference* in rotational play between two blades is beyond 1.0 degree, uneven internal wear and/or damage is the possible cause.

(For example, rotational movement of No. 1 blade measures 1.2 degrees, and No. 2 blade measures 2.3 degrees. This would be considered excessive since their difference is beyond 1.0 degree.) The cause of the excessive difference should be determined by an FAA approved propeller repairman or international equivalent at the next opportunity.

B. The second type is "blade angle split" and is a measurement of the angle differences between all the blades in the same propeller. This value is much more critical than "rotational play" described above, as a high blade angle split may indicate internal problems. While such angle split is very rare, the operator may want to measure it if a problem is suspected, most notably by a marked increase in propeller vibration levels. "Blade angle split" may be checked as follows:

- 1) By hand, twist all blades toward high pitch. This will eliminate any "play" in the propeller linkage, and reduce the possibility of a false angle reading.
- 2) Using a propeller protractor at the appropriate reference station, measure the angle of each blade. If measurements differ greatly (more than 0.5 degrees) between blades on the same propeller, excessive wear or damage to internal parts may exist.
- 3) If excessive wear or damage is suspected, the propeller should be disassembled and the cause determined and corrected by an FAA-approved propeller repairman or international equivalent per the applicable McCauley Service Manual.

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

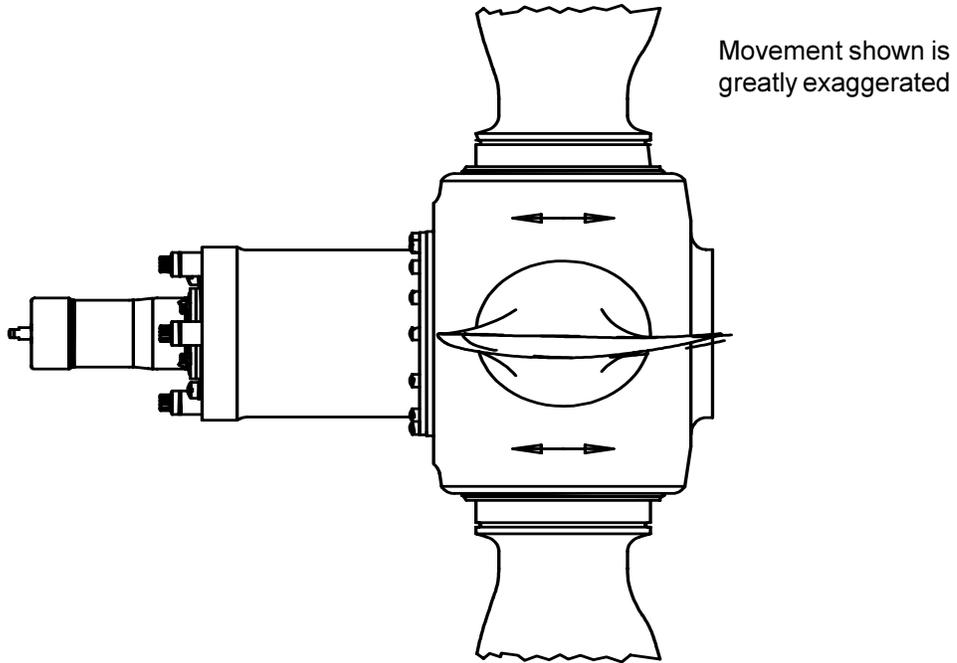


Figure 1 - Blade Shake

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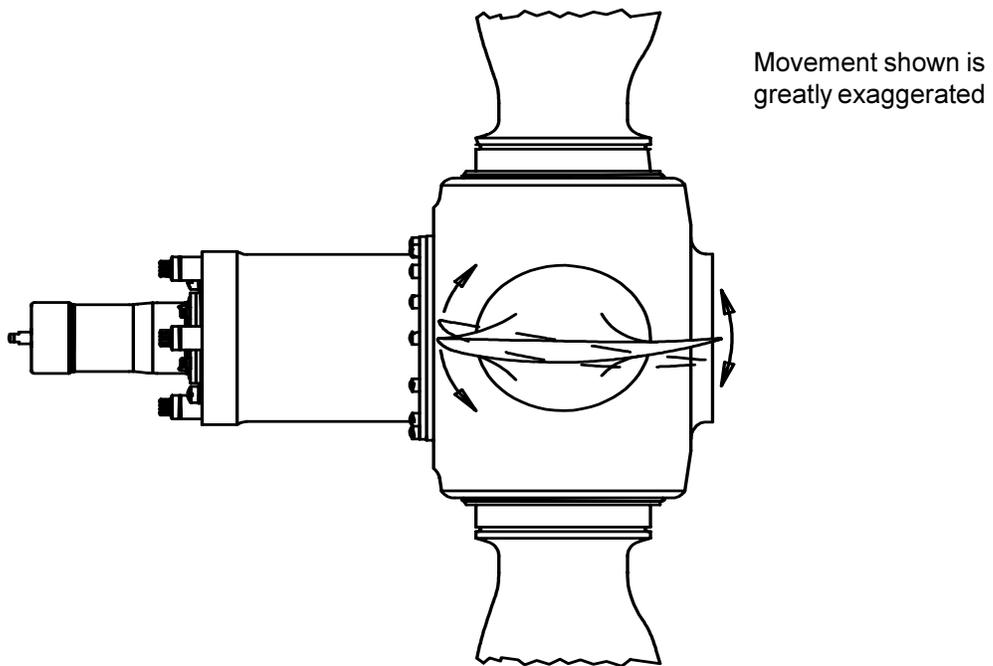


Figure 2 - Blade Twist