SERVICE LETTER 1989-4D

July 20, 2001

TO: FAA-Approved Propeller Repair Stations

SUBJECT: Dynamic Balance and Vibration Troubleshooting of McCauley Constant Speed and Turbine Propellers

MODEL AFFECTED: All Constant Speed Propellers used on Piston Powered Applications
All Propellers use on Turbine Engine Applications

SERVICE MANUAL AFFECTED: MPC-11, MPC-12, MPC-13, MPC-14, CMM500-1 and CMM1100-[X]

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

Service Letter 1989-4D replaces Service Letter 1989-4C dated June 5, 1998. Information on dynamic balancing and vibration troubleshooting is added. Lines in margins indicate changes.

DYNAMIC BALANCING

McCauley endorses dynamic balance on propellers installed on piston and turbine powered aircraft.

SECTION 1: Piston Powered Applications

Following are approved procedures and guidelines for dynamic balancing of McCauley propellers used on piston powered aircraft. All of the procedures and guidelines listed below should be used in conjunction with the dynamic balance equipment manufacturer's instructions.

1) Perform dynamic balance test according to the dynamic balance equipment manufacturer's instructions.

2) If the initial reading is over 0.8 ips, McCauley recommends the following should be checked/corrected:

   A. Shimming of the spinner shell.

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

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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B. Propeller installation (properly torqued and installed flat against the mounting flange).

NOTE: If the shimming of the spinner shell and propeller installation are found to be acceptable but the initial reading is still over 0.8 ips, we recommend the propeller be taken to an FAA-approved Certified Propeller Repair Station or international equivalent for inspection.

3) If the initial reading is under 0.8 ips continue the balance in accordance with the dynamic balance equipment manufacturer's instructions.

4) Repeat the dynamic balance until the correct balance level (approximately 0.07 ips or lower) is achieved.

NOTE: Most dynamic balance equipment manufacturers specify 0.15 - 0.2 ips as being an acceptable level. McCauley Propeller Systems agrees that 0.15 - 0.2 ips is an acceptable level, but our experience has shown that 0.07 ips or lower is noticeably smoother.

NOTE: At no time are static balance weights to be moved to adjust the dynamic balance.

5) The dynamic balance weights should be permanently mounted in accordance with the dynamic balance equipment manufacturer's instructions.

SECTION 2: Turbine Powered Applications

Following are instructions detailing approved procedures used during dynamic balance of McCauley turbine propellers. It is highly recommended that this procedure be performed following static balancing. All of the procedures and guidelines listed below should be used in conjunction with the dynamic balance equipment manufacturer's instructions.

1) Perform dynamic balance according to balance equipment manufacturer's instructions.

2) If the initial reading is over 0.8 ips, McCauley recommends the following should be checked/corrected:

A. Shimming of the spinner shell.

B. Propeller installation (properly torqued and installed flat against the mounting flange).

NOTE: If the shimming of the spinner shell and propeller installation are found to be acceptable but the initial reading is still over 0.8, we recommend the propeller be taken to an FAA-approved Certified Propeller Repair Station or international equivalent for inspection.

3) If the initial reading is under 0.8 ips continue the balance in accordance with the balance equipment manufacturer's instructions.

4) If test indicates the addition of weights, temporarily place indicated mass of balance washers (AN 970-3; washer weight = 0.144 ounces each (4.1 grams)) and screw (AN 502-10-X) in place of spinner mounting screw at location indicated by testing equipment.

NOTE: At no time are static balance weights to be moved to adjust dynamic balance.

5) Repeat the dynamic balance until the correct balance level (approximately 0.07 ips or lower) is achieved.

NOTE: Most dynamic balance equipment manufacturers specify 0.15 - 0.2 ips as being an acceptable level. McCauley Propeller Systems agrees that 0.15 - 0.2 is an acceptable level, but our experience has shown that 0.07 ips or lower is noticeably smoother.

6) When dynamic balance is satisfactory, remove balance washers and screw from spinner screw hole, and permanently mount to spinner bulkhead assembly at a point adjacent to the test location as shown on Figure 1. Always place at least one balance weight under screw head/washer for stress relief (see Figure1). Return original spinner screw to hole.

NOTE: Some bulkheads are not predrilled. Any weight-mounting holes must be drilled at the size and location specified on Figure 1. The holes should also be deburred after drilling.

WARNING: Extreme care should be taken when drilling bulkheads near blades to avoid shank damage. Blade shank damage could potentially require propeller disassembly and blade replacement depending on the severity of the damage.

VIBRATION TROUBLESHOOTING

Troubleshooting vibration problems can be very challenging and time consuming. Most digital dynamic equipment can also be used to track down vibration problems. The digital dynamic balancing equipment can display the amplitude and frequency of the vibration, which will help determine the vibration source. While vibration problems are occasionally caused by the propeller, they are usually caused by other things. Below is a list of other possible sources of vibration:

1. Engine
2. Worn, old, cracked or loose engine mounts
3. Cracked or loose engine mount structure
4. Cracked or broken spinner bulkheads
5. Loose or improperly mounted engine cowlings
6. Loose cowl flaps

7. Loose landing gear doors
8. Out of balance elevators
9. Loose control yokes
10. Exhaust stack touching engine cowling
11. Component in engine compartment that is touching engine cowling

RECOMMENDED EQUIPMENT

For dynamic balancing and vibration troubleshooting, McCauley Propeller Systems recommends the ACES model 2020 ProBalancer Analyzer, which is available from:

ACES Systems
TEC, Aviation Division
10737 Lexington Drive
Knoxville, TN 379323294
Tel: 865-671-2003
Fax: 865-675-1241
www.Acessystems.com

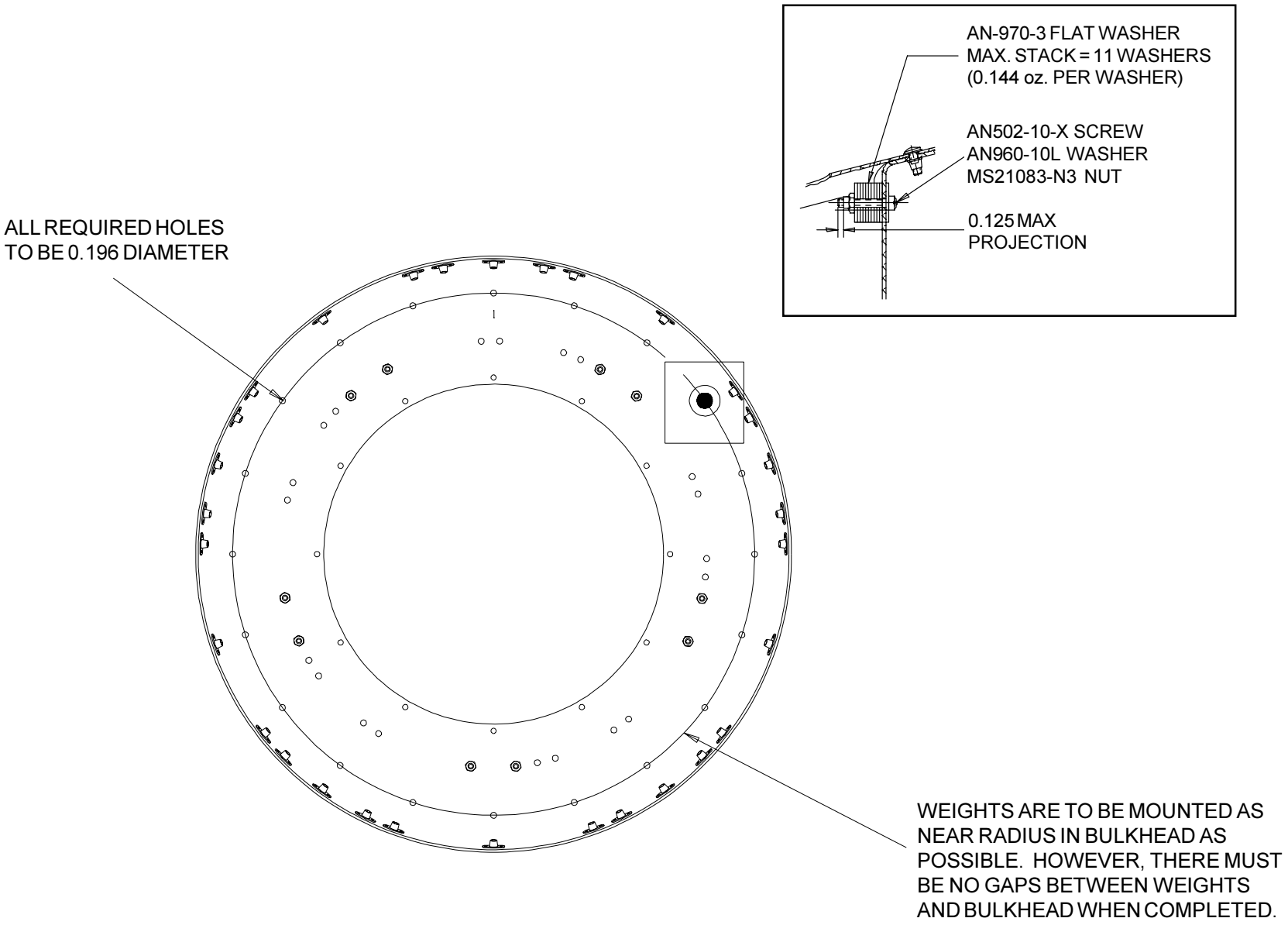

Fig. 1: Mounting Balance Weights