SERVICE BULLETIN
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This Service Bulletin replaces Service Bulletin 2000-001A dated 24 January 2003

Propeller Blade Inspection

A. Background:
There is concern that a potential problem may exist in propeller blades of the models listed below. Many of these propellers have a manufacturing date as early as 1946. The concern stems from the obvious possibility that there can be detectable deterioration of the blade retention system due to moisture intrusion or vibration. Neither of these problems are specific to older propellers. Obviously the older the propeller the more opportunity there is for this condition to exist. The track record of these propeller blades, during the past years since 1946 indicate clearly that there is no unusual problem that has surfaced which would require drastic or emergency action. There is however, a better way to verify the airworthiness of these propeller blades. Past inspection criteria is in need of being updated, specifically in the shank retention area. This service bulletin addresses that need. FAR 35.35 specifically states that a propeller shall have a blade retention safety factor of two. The retention system for these propeller blades have been tested and verified to have a safety factor of 4.2 or more. Thus it appears that this is the strongest "link in the chain". This does not imply that it should be neglected.

Moisture Intrusion. These laminated wood propeller blades were assembled using a wood preservative. The material is a proprietary liquid by the name of Nelsonite. Deterioration of the wood in these propellers is very rare. The Tarver Propeller company has found rusted retention screws in these blades yet the wood had no decay. Some of the suspected wood was analyzed by the Forest Products Laboratory, a branch of the U. S. Department of Agriculture, and was found to have no decay even though it was stained by iron oxide.

Vibration. Vibration, whether caused by an unbalanced propeller or engine is a matter that must be corrected. Vibration causes resonant nodes at various frequencies that are harmonically related to engine/propeller rpm which in turn can be aggravated by the dynamic loads on the propeller. This condition causes excessive stress on the blade retention system as well as the hub and of course the engine. Static balance of a propeller is valid. If the propeller is properly statically balanced, engine unbalance, if it exists, should be corrected, but not by unbalancing the propeller.

B. Requirements:
This Service Bulletin addresses two requirements. Inspection following the criteria provided in this bulletin will assist in bringing a propeller, which is in an unknown condition of airworthiness, into a known condition of airworthiness. First, the Service Bulletin provides inspection criteria for

assembled propellers to aid in determining the integrity of the blade attachment area. The second is the provision of more reliable inspection criteria for inspection of propeller blades at an appropriately rated propeller repair station.

Airworthiness Condition. Clearly there are situations in the field, for various reasons, where the owner/operator does not know the airworthiness condition of his propeller. An operator should not continue using a propeller that is in an unknown condition. After compliance with this service bulletin and associated maintenance manuals, the owner/operator will have a propeller of which the condition is established.

Inspection Criteria. In the past, the inspection criteria for the blade retention system consisted of verifying that each of the lag screws in the shank will accept 150 in/lb of torque without breaking or stripping the threads in the wood. Passing this test does not entirely verify the integrity of the screw. The Tarver Propeller company has found that a screw that passes this torque test can have enough rust on the threads that makes the part unairworthy. Many screws have been held in place so tight with rust that it is impossible to back out the screw without twisting it in two. Therefore a more thorough inspection method is detailed below which eliminates this ambiguity.

C. Effectivity:
This service bulletin is applicable to all Aeromatic propellers models F200, F200-H, 220, 220-1, 220H. The Aeromatic models listed above were originally manufactured by Koppers, then Univair, then South 80, then Brown Propellers, LTD. Tarver Propellers, LLC is now the TC holder of the above model propellers and blades.

D. Compliance Requirements:
If the owner/operator has one of the above propellers which is in an unknown condition, then Tarver Propellers, LLC considers compliance with this service bulletin to be mandatory prior to putting it into service or continuing service beyond the times listed below.

E. Description:
This Service Bulletin provides information for visual inspection of all the above wood propeller blades for unsafe condition due to corroded lag screws and decay (dry rot) of the wood at the blade leading edge and at the interface of the blade and ferrule.

F. Instructions
For those propellers that are judged to be in need of this inspection, the following shall be performed:

Part I: Initial Inspection for Blade Looseness between the Blade Shank and Metal Ferrule.

1) Prior to further flight, visually inspect each propeller blade for mounting security by pushing and pulling (with as much force that a man can apply with one hand on the tip) of the blade in a fore and aft motion. While exerting these forces, play can be detected by placing your thumb at the point where the wood blade enters the ferrule. Perform this inspection on both blades. If any motion is detected the propeller is unairworthy.

2) This test should be a part of the airplane preflight inspection. If no looseness (play) is detected, the airplane may continue operation until compliance to Part II of this Service Bulletin.

Part II: <u>Shop Inspection. The Following Procedures are to be used in Conjunction with the Koppers Aeromatic Repair Manual and Shop Inspection Procedures for Blade Repair</u>

1) If any looseness (play) is detected the *propeller* must be removed and forwarded to an appropriately rated propeller repair station for disassembly and inspection.
   a) The blades must be removed from the hub and inspected for broken, missing, or the presence of unapproved lag screws.
   b) Each lag screw shall be removed and inspected for corrosion. Refer to note 1.
   c) The ferrule shall be removed from the blade in order to gain unobstructed access to the wood for inspection. The ferrule may be reconditioned as necessary and reused. Refer to note 2.
   d) The blade shank perimeter screw holes and balance weight holes shall be inspected for wood decay, cracks or delamination. Refer to note 3.
   e) The ferrule shall be reinstalled on the shank in the same clock position as it was prior to removal. Refer to note 4.
   f) If the propeller blade is finished with plastic coating, the interface where the ferrule meets the coating shall be sealed using spot putty or plastic patch or a combination of both depending on how much area has to be covered.
   g) If the blade does not have plastic coating, then spot putty may be used to reseal the area. The lag screws shall be reinstalled and torqued before the seal has dried.
   h) The lag screws shall be dipped in Nelsonite, installed into a screw hole and torqued to 150 in/lb in addition to running torque. See Note 5.
   i) The metal leading edge/tipping shall be inspected in accordance with Service Bulletin 25C.

Note 1. All lag screws shall be removed using reverse torque. If the screw breaks during reverse torque it is a strong indication of excessive corrosion. All screws shall meet the installation criteria of Part II, 1. h. Lag screws that are to be installed shall bear no signs of rust.

Note 2. The ferrule may be cleaned of surface corrosion and corrosion proofed by application of zinc chromate primer. Deep corrosion pits anywhere on the ferrule is criteria for rejection.

Note 3. Inspect the wood using a sharp tool (such as an awl) that can be used to probe the wood in various places in and around the exposed shank. The screw hole threads shall be inspected for damage with a borescope. Look for any visible cracks in the wood in the screw holes and any obvious gross damage to the threads. Small cracks in no more than 3 screw holes and if, later, the screw will meet the requirements of Part II, 1. h, then this is not criteria for rejection of the blade. Cracks that connect two or more screw holes are cause for rejection of the blade. Most blades contain some amount of lead wool in the center of the balance hole. This lead may cause a whitish stain on the wood near the lead and is not criteria for rejection unless the wood is found to be soft based upon the probing described above. Various degrees of brown stain will virtually always be present on the wood and is not the deciding factor for rejection.

Note 4. The ferrule will have a small hole drilled in the side wall and a matching hole will be found in the shank of the blade. Be sure that these holes match up when reinstalling the ferrule.

Note 5. The ferrule shall be reassembled onto the blade shank. Screws of the same length as were removed shall be used to reinstall the ferrule. After all screws have seated against the ferrule, all of them shall be re-torqued at least three times. This assures a uniform strain among the screws. THIS IS IMPORTANT!

Part III. **Repetitive Inspections** The inspection detailed in Part I should be performed any time the condition of the propeller blades becomes unknown or when any looseness of a blade is detected as detailed in Part I "Prior to Further Flight".

Summary: This inspection requires that the propeller be disassembled, reassembled, the blade angles checked, balanced, pressure checking the hub, and adding lubricant. The estimated time to perform this, assuming no repairs or parts are required, is 8 to 12 hours.

This bulletin may be complied with by an appropriately rated propeller repair station or by Tarver Propellers, LLC.

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