



SERVICE BULLETIN

No. 384

Piper Aircraft Corporation

"FAA DOA EA-1 Approved"

Lock Haven, Pennsylvania, U.S.A.

April 25, 1973 M

<u>Subject:</u>	Inspection of Propeller Blade Shank -- reference attached Hartzell Service Bulletin No. 94A dated March 1, 1973
<u>Models and Serial Numbers Affected:</u>	Refer to attached Hartzell Service Bulletin No. 94A, <u>Effectivity</u> .
<u>Compliance Time:</u>	Refer to attached Hartzell Service Bulletin No. 94A, <u>Required Action</u> .
<u>Purpose:</u>	To provide distribution of the attached Hartzell Service Bulletin No. 94A, dated March 1, 1973 to owners and operators of affected PA-31 Navajo aircraft.

Balance of Service Bulletin format not applicable; refer to attached Hartzell Service Bulletin No. 94A, dated March 1, 1973 for further information regarding propeller blade shank inspection and the special propeller or blade replacement program.

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Manufacturers of Airplane Propellers
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PIQUA, OHIO 45356

Bulletin No. 94A

DOA-FAA Approved

March 1, 1973

(Replaces Bulletin No. 94,
October 3, 1969)

Subject: Inspection of Propeller Blade Shank

Effectivity: Propeller Model HC-E2Y(K,R)-2B/C8475-4 Installed on Piper Model PA-31 "Navajo". (This does not apply to the three-blade propeller, or propellers which have complied with Bulletin 97, Page 6, revised June 7, 1972.)

Discussion: After 1240 hours operation the cause of extreme vibration of one engine-propeller combination was found to be a cracked blade shank. This crack was due to fatigue, resulting from vibration of the system, and occurred at the outer edge of the ball bearing race which supports the blade within the hub.

The airplane involved was tested to determine the cause; but these tests confirmed the original tests, indicating that the vibratory stresses were well within allowable limits. Even though there appears to be no unusual condition in the engine-propeller system which caused the crack to develop, the consequences of a complete blade failure are such as to make it mandatory for inspection of this propeller on other PA-31 aircraft equipped with this model propeller.

Required
Action:

- 1) For propellers which have been in service for 1000 hours or more inspect the blade shanks within the next 100 hours, by the dye penetrant method, for cracks in the radius adjacent to the retention flange.
- 2) Regardless of previous inspection, inspect for possible indentations and wear due to the sharp edge of the bearing as shown on the sketch. Blades showing wear in this critical area must be retired from service.
- 3) For those blades not rejected, inspect for chafing, fretting, or unusual wear where the A-2202 bearing race contacts the blade retention radius. If this surface is worn or marked in any way, carefully fit the A-2202 bearing race by polishing the radius area only. It is suggested that the blade be chucked in a lathe for uniform radius polishing.

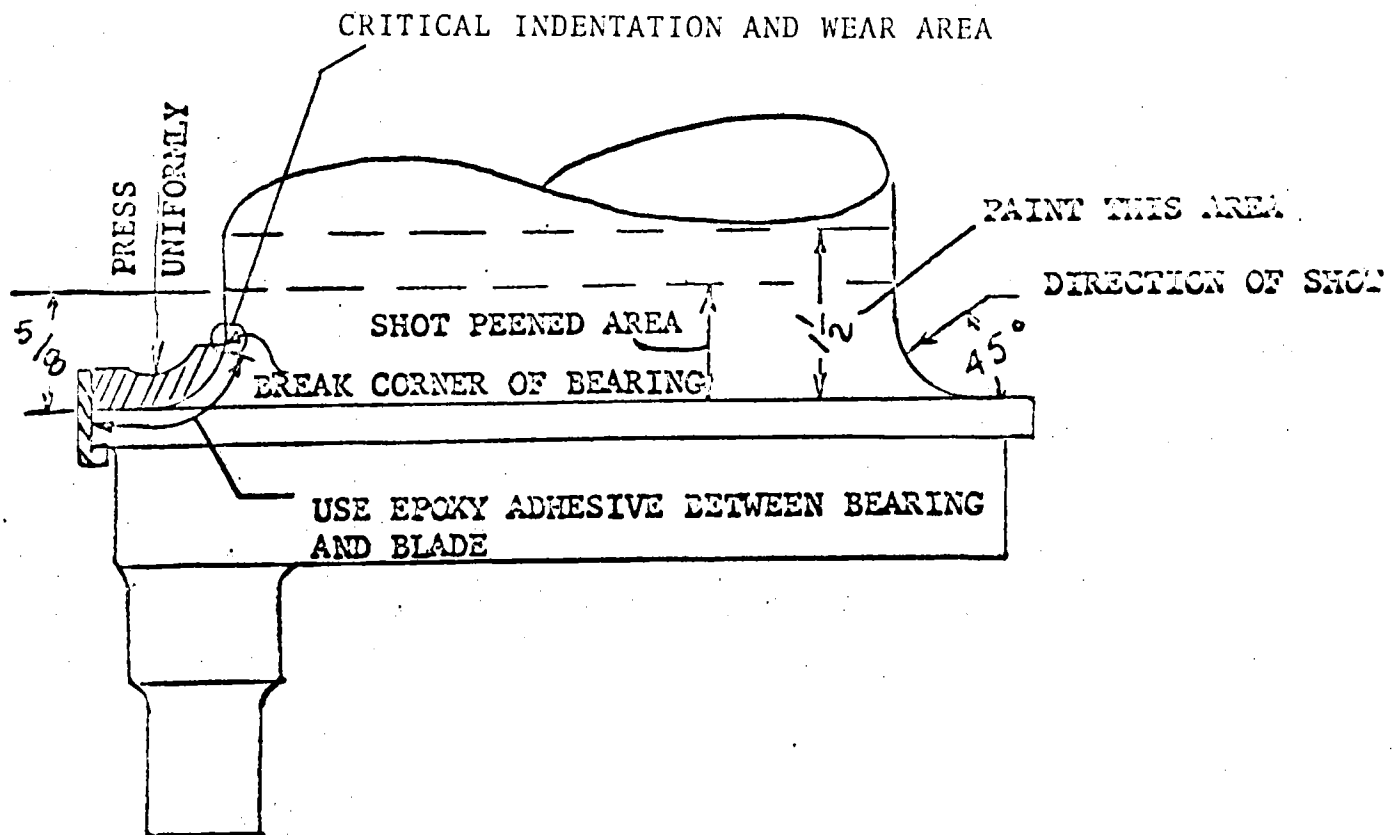
Required
Action:
(Cont'd)

- 4) Re-shot peen the radius as shown on the sketch. Use S-390. Cover 100 percent. Test the effectiveness of the peening with the C-2 Almen gage. The arc height should be .007 minimum.
- NOTE: Propeller overhaul stations who intend to shot peen propeller blades according to this bulletin must submit sample blades to the Hartzell Factory for approval. Without this approval, these blades must be sent to the factory to have this work done.
- 5) This inspection should be repeated at intervals of 1000 hours. Shot peening need not be repeated unless there is evidence that the bearing race has worn the surface smooth, or below the pebble grain; particularly in the area where the edge of the bearing race contacts the surface of the retention shoulder.
 - 6) Clean the blade retention shoulder with a solvent. (The polyurethane paint need not be removed.) Clean the mating surface of the A-2202 bearing race after the sharp corner is broken (see sketch).
 - 7) Apply a 2-part epoxy adhesive to the blade retention radius, using only enough to fill all voids between the bearing and the blade surface. Brush off all excess.
 - 8) Install the A-2202 bearing race and the A-2204 bearing guide ring. Press the bearing uniformly against the blade retention shoulder with at least 6000 lb. force. (CAUTION: The adhesive must be forced out from the two mating surfaces, else the blade will not be held in perfect alignment with respect to the hub.)
 - 9) Wipe off all adhesive from the bearing race, else it could interfere with the bearing movement.
 - 10) Allow 12 hours for the epoxy to set before the propeller is run up on the airplane.

Epoxy adhesive and applicators are available from the Hartzell factory. We currently use Hysol Epoxi-Patch 0151 Clear or Scotch Weld 1838. Avoid a thick epoxy.

Required
Action:
(Cont'd)

- 10) Hysol Dissolver AC-4079 or Houghton 224 can be used to dissolve epoxy adhesive after it has set up. This can be used for subsequent overhauls requiring removal of the bearings and inspecting the surfaces.
- 11) Disassembly and assembly of the propeller is described in Hartzell Manual No. 117().



See Bulletin No. 97 for checking corrosion in the blade balance hole.

HARTZELL PROPELLER, INC.
PIQUA, OHIO

Bulletin No. 94A
Supplement No. 1

March 1, 1973

SUBJECT: Implementation of Bulletin No. 94A

- 1) In order to reduce the cost of implementing this bulletin with the greatest conservatism to the aircraft owner, the following new schedule of prices is offered for blades or propellers, effective March 1, 1973 to March 1, 1974.
 - (a) New blades C8475-4 or FC8475-4 \$210.00
 - (b) HIC-E2Y(K,R)-2B(F)/ (F)C8475-4 prop \$725.00
with new blades
- 2) Credit for customer's rejected blades is computed on the basis of 2000 hours useful life, as follows:

$$\text{Credit each blade} = \$175 \times \left[1 - \frac{\text{hours flown}}{2000} \right]$$
- 3) Credit for customer's used hub is \$140.
- 4) Example: If customer wishes to trade his propeller, which has 1500 hours time, for one with new blades and overhauled hub, net cost is \$497.50.
- 5) In order to obtain credit for rejected blades, it is necessary to send them to the Hartzell Factory (prepaid) and include a statement as to the hours flown, and the serial numbers of the new replacement blades. (Exception: It is not necessary to return blades which are outside of the North American continent. Send in the serial numbers and time only.) Rejected blades must be returned to your Piper Distributor for disposal action.