

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

14 CFR Part 39 [66 FR 57852 No. 223; 11/19/01][SN]  
[R150HT]

Hartzell Propeller Inc.

[AD 2001-23-08](#)

Amendment 39-12505

Effective Dec. 24, 2001

[Supersedes AD 90-02-23](#)

[L ATA Code: 61](#)

[Recurring: 150H](#)

[Docket No. 89-ANE-44-AD; Amendment 39-12505; AD 2001-23-08] RIN 2120-AA64

### Airworthiness Directives; Hartzell Propeller Inc. ( )HC-( )2Y(-)( ) Propellers

**AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Final rule.

**SUMMARY:** **This amendment supersedes priority letter AD 90-02-23**, that is applicable to certain Hartzell Propeller Inc. ( )HC-( )2Y(-)( ) propellers. That priority letter currently requires repetitive visual inspections of propeller hubs for cracks using a 10X glass and, if necessary, removal of cracked hubs and replacement with serviceable parts. This amendment changes the frequency and method of inspection by requiring initial and repetitive eddy current inspections (ECI) of the propeller hub fillet radius for cracks and requires that certain model propeller hubs be removed from service. In addition, this AD allows installation of an improved design propeller hub as terminating action to the repetitive ECI. This amendment is prompted by reports of cracked propeller hubs found in service after they had been inspected in accordance with the visual inspections required by the current AD. The actions specified in this AD are intended to prevent failure of the propeller hub resulting from cracks, that can cause blade separation and subsequent loss of aircraft control.

**DATES:** Effective date December 24, 2001.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of December 24, 2001.

**ADDRESSES:** The service information referenced in this AD may be obtained from Hartzell Propeller Inc., Product Support Department, One Propeller Place, Piqua, OH 45356; telephone: (937) 778-4379, fax: (937) 778-4391.

This information may be examined, by appointment, at the Federal Aviation Administration (FAA), New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

**FOR FURTHER INFORMATION CONTACT:** Tomaso DiPaolo, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, Small Airplane Directorate, 2300 East Devon

Avenue, Des Plaines, IL 60018; telephone: (847) 294-7031, fax: (847) 294-7834.

**SUPPLEMENTARY INFORMATION:** A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) by superseding **priority letter airworthiness directive (AD)**

**90-02-23**, applicable to certain Hartzell Propeller Inc. ( )HC-( )2Y(-)( ) propellers, was published in the Federal Register on January 27, 1999 (64 FR 4061). That action proposed to change the frequency and method of inspection by requiring initial and repetitive ECI of the propeller hub fillet radius for cracks and, if necessary, removal and replacement of cracked hubs with serviceable parts. In addition, that action proposed to expand the models of propellers affected and allow installation of an improved design propeller hub as terminating action to the repetitive ECI.

**Comments**

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

**Replace “A” Hub Design With “B” Hub Design**

The manufacturer notes that since the NPRM was published, there have been some instances of fractures involving the rear hub half of the “A” suffix serial numbered hubs. Since the rear half of the hub cannot be readily inspected, the manufacturer recommends the replacement of “A” suffix hubs with the current “B” suffix hubs, which incorporate a new design.

The FAA agrees in part and has incorporated into this AD the replacement requirements for “A” suffix hubs per **Hartzell Service Bulletin HC-SB-61-227, Revision 2**, dated May 8, 2000. The FAA is also considering expanding the applicability of this action in the future to remove from service all “A” suffix hub designs, regardless of the aircraft model they are installed on.

**Current AD is Adequate**

One commenter contends that the current AD, requiring visual inspections using a 10 x glass at intervals of 50 hours, adequately detects cracked hubs prior to catastrophic failure. Since a new design hub is available, and no catastrophic failures have been attributed to a failure to detect a crack using the current inspections, the commenter contends that there is no need for a more expensive eddy current inspection.

The FAA does not agree. The service history of these propellers since the current AD was issued indicates that the visual inspections are not working as intended. Two hubs that were apparently inspected visually did, in fact, fail in service, releasing propeller blades. In another instance, a crack was discovered during overhaul, 32 hours following a visual inspection performed in accordance with the current AD. Other instances were reported where cracks were found only after unusual vibrations or grease and oil on the windshield prompted examinations of the propeller hubs, which had passed the visual inspection required by the current AD. As a result, the FAA believes that an ECI of the propeller hub is required in order

to increase the probability of detection and decrease the risk of in-service failure of the hub.

### **Increase Repetitive Inspection Period**

One commenter requests that the repetitive inspection period be changed from 150 hours to 400-500 hours, then shortened after more data is collected. The commenter feels that the cost analysis does not reflect the true costs of having to perform ECI every 150 hours, particularly for operators located in remote areas of the country.

The FAA does not agree. The service history demonstrates the need for ECI in lieu of the visual inspection. The **150-hour interval** is based on an engineering evaluation of crack growth. The cost analysis estimates the average cost to perform the mandated actions. Those costs could be higher in certain cases. Operators could mitigate higher costs by seeking training and certification to perform the ECI at the operator's location. Operators desiring to pursue this alternative should contact Hartzell. In addition, the AD allows for replacement of certain propeller hubs as terminating action for the repetitive ECI.

### **Mandatory Overhaul**

One commenter notes that instead of requiring repetitive ECI and making design changes to the propeller, operators should be required to adhere to the manufacturer's recommended overhaul interval of 5 years or 1,000 hours. The commenter is concerned that the design changes will introduce a new set of problems, and in the commenter's opinion, while a propeller failure is extremely critical, the older Hartzell propeller designs are extremely reliable when properly maintained.

The FAA does not agree. The cracks were not caused by the lack of maintenance. The **repetitive ECI inspection is required at intervals of 150 hours** which is far more often than a 5-year or 1,000-hour time between overhaul.

### **Seriousness of Propeller Failure**

One commenter expresses concerns that the FAA has treated the potential failure of these propeller hubs with too much complacency, allowing visual inspections using a 10X glass. The commenter notes that a crack detected using a 10X glass may well be very close to failure and that any propeller hub failure exposes the aircraft to serious control problems and could likely result in a loss of the aircraft.

The FAA agrees that cracks in a propeller hub present a very serious unsafe condition. When the current AD was issued, the FAA viewed a visual inspection with a very short repetitive interval as sufficient to address that serious unsafe condition. Based on the service history since then, the FAA has determined that an inspection method with a higher sensitivity of crack detection is needed, and this AD will require an ECI with longer intervals.

### **AD Applicability and Aircraft Names**

One commenter suggests changes to the aircraft names listed in the AD. The commenter notes that two different type certificates cover aircraft named Britten Norman BN-2, and the AD does not clearly indicate which aircraft may have the affected propellers. The

commenter also notes that the phrase “agricultural category” does not clearly identify which aircraft may have an affected propeller. The commenter also notes that the Hartzell Y-shank propeller does not appear to be eligible for installation on a number of the aircraft listed in the AD.

The FAA agrees that the applicability of the proposed AD was not clear and that changes are needed to provide operators with an unambiguous identification of the affected propellers. The FAA has reviewed the aircraft type certificate data sheets and supplemental type certificate data sheets and has changed the reference to the “Britten Norman BN-2( ) aircraft” to “Pilatus Britten Norman or Britten Norman BN-2 series aircraft (also known as the Islander or Trislander).” The AD applies to all Hartzell Y-shank propellers installed on any Britten Norman or Pilatus Britten Norman BN-2 series aircraft that have a Textron Lycoming 540 series engine. The AD does not apply to the Textron Lycoming 541 series engine. The general statement of applicability also includes all Hartzell Y-shank propeller installed on any aircraft certificated in the acrobatic category or that has ever been used for agricultural purposes. The list of aircraft types that follows that general statement includes the changes the commenter noted, “Great Lakes Aircraft Co. 2T-1 series aircraft” has been changed to “Great Lakes Aircraft Co. or Chaparral Motors 2T-1 series aircraft,” Piper “PA-36-600” has been changed to “Piper PA-36-300.” The list includes those aircraft types that may have a Hartzell Y-shank propeller installed through supplemental type certificate (STC). That STC approval may not be reflected on the aircraft's type certificate data sheet.

### **Other Changes**

Since the FAA published this proposal, the manufacturer has updated **Service Bulletin HC-SB-61-227**. This AD references **Hartzell Propeller Service Bulletin HC-SB-61-227, Revision 2**, dated May 8, 2000.

The FAA has also made editorial changes in the requirements of the AD. Those changes do not alter the substance of the requirements from what was proposed.

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the changes described previously. The FAA has determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

### **Economic Analysis**

There are approximately 10,800 propellers of the affected design in the worldwide fleet. The FAA estimates that 4,600 propellers installed on aircraft of U.S. registry would be affected by ECI action of this AD, that it would take approximately 1 work hour per propeller to accomplish the ECI actions, and that the average ECI rate is \$150 per work hour. Based on these figures, the total cost impact of the proposed AD on U.S. operators per ECI is estimated to be \$690,000. The FAA estimates that 2,100 propellers installed on aircraft of U.S. registry would be affected by the replacement action, and that it would take approximately 6 work hours to replace a propeller, the average parts cost for a replacement propeller hub is \$2,600, and that the average rate is \$60 per work hour. Based on these figures, the total cost impact of the proposed AD on U.S. operators for replacement is estimated to be \$6,216,000.

## **Regulatory Impact**

This final rule does not have federalism implications, as defined in Executive Order 13132, because it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Accordingly, the FAA has not consulted with state authorities prior to publication of this final rule.

For the reasons discussed above, I certify that this action

- (1) is not a “significant regulatory action” under Executive Order 12866;
- (2) is not a “significant rule” under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and
- (3) if promulgated, will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

A final evaluation has been prepared for this action and it is contained in the Rules Docket. A copy of it may be obtained by contacting the Rules Docket at the location provided under the caption ADDRESSES.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **Adoption of the Amendment**

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

### **PART 39--AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **Sec. 39.13 [Amended]**

2. Section 39.13 is amended by adding a new airworthiness directive (AD), Amendment 39-12505, to read as follows:

**2001-23-08 HARTZELL PROPELLER INC.:** Amendment 39-12505. Docket No. 89-ANE-44. **Supersedes** priority letter AD 90-02-23.

**Applicability:** This airworthiness directive (AD) is applicable to Hartzell Inc. ( )HC-( )2Y( )-( ) propeller models (also known as Y-shank propellers) installed on Piper PA-32 series aircraft with Textron Lycoming 540 series engines that are rated at 300 HP or higher, or installed on Pilatus Britten Norman or Britten Norman BN-2 series aircraft (also known as Islander or Trislander) with Textron Lycoming 540 series engines, or installed on any aircraft certificated in the acrobatic category, or installed on any aircraft that has ever been used for agricultural operations. These propellers have model numbers in the form of ( )HC-( )2Y( )-( ), which have no suffix letter or have the suffix letter “A” or “E” at the end of the hub serial number. This AD does not apply to Hartzell Propeller Inc ( )HC-( )2Y( )-( ) propeller models with the suffix letter “B” at the end of the hub serial number.

The following list of aircraft, type certificated in the acrobatic category or used for agricultural operations, may have Hartzell Y-shank propellers installed, but this list is for reference purposes only: *Aermacchi S.p.A.* (formerly SIAI-Marchetti) S.205 series aircraft, S. 208 series aircraft, F.260 series aircraft; *American Champion* (formerly Bellanca, Champion) 8KCAB, 8GCBC; *Aviat* (licensed by Sky International (formerly White International and Pitts)) S-1T, S-2, S-2A, S-2S, S-2B ; *Cessna* A188A, A188B, T188C; *Flugzeugwerke Altenrhein AG* (FFA) AS202/18A “BRAVO”, AS202/18A4” BRAVO;” *Great Lakes Aircraft Co.* or *Chaparral Motors* 2T-1 series aircraft; *Moravan National Corporation* Zlin 526 ; *Piper* PA-25-260, PA-36-300; *SOCATA--Groupe Aerospatiale* (Morane Saulnier) MS893A, and MS893E.

{*Note: See SB (Small AC X-Ref) for a detailed list of affected AC and Prop Models*}

**Note 1:** This airworthiness directive (AD) applies to each propeller identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For propellers that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (f) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific actions to address it.

**Compliance:** Required as indicated, unless accomplished previously.

To prevent failure of the propeller hub resulting from cracks, that can cause blade separation and subsequent loss of aircraft control, accomplish the following:

### **Eddy Current Inspection**

- (a) Perform initial and repetitive eddy current inspections (ECI) of the propeller hub fillet radius for cracks. The initial ECI is for propellers with no suffix letter at the end of the serial number and on propellers with serial numbers DN3607A, DN3609A, DN3613A, DN3615A, DN3628A, DN3630A, DN3641A, DN3940A, DN3944A,

DN3949A, and DN3962A. The repetitive ECI is for propellers with the suffix letter “E” at the end of the hub serial number. Perform the ECI's in accordance with **Hartzell Propeller Inc. Service Bulletin (SB) No. HC-SB-61-227, Revision 2**, dated May 8, 2000, as follows:

- (1) For propellers previously inspected visually in accordance with **AD 90-02-23**, perform the initial ECI within 50 hours time-in-service (TIS) since the last visual inspection. For all other applicable propellers, perform the initial ECI within 50 hours TIS after the effective date of this AD.
  - (i) Prior to further flight, remove from service cracked propeller hubs and replace with a serviceable part.
  - (ii) If no cracks are found, then permanently mark the end of the hub serial number with the suffix letter “E” in accordance with **Hartzell Propeller Inc. SB No. HC-SB-61-227, Revision 2**, dated May 8, 2000.
- (2) **Thereafter, perform the repetitive ECI at intervals not to exceed 150 hours TIS since last ECI.** Prior to further flight, remove from service cracked propeller hubs and replace with a serviceable part.

#### **Hub Replacement**

- (b) Propellers with serial numbers DN3607A, DN3609A, DN3613A, DN3615A, DN3628A, DN3630A, DN3641A, DN3940A, DN3944A, DN3949A, and DN3962A are to be removed from service and replaced with serviceable parts at next overhaul but not to exceed 1,000 hours TIS or 72 months, whichever comes first, after the effective date of this AD and in accordance with **Hartzell Propeller Inc. SB No. HC-SB-61-227, Revision 2**, dated May 8, 2000.
- (c) Propellers with the suffix “A” at the end of the serial number, excluding serial numbers, DN3607A, DN3609A, DN3613A, DN3615A, DN3628A, DN3630A, DN3641A, DN3940A, DN3944A, DN3949A, and DN3962A, are to be replaced in accordance with **Hartzell Propeller Inc. Service Bulletin (SB) No. HC-SB-61-227, Revision 2**, dated May 8, 2000, as follows:
  - (1) Propeller hubs on aircraft that have been used for agricultural operations are to be removed from service and replaced with serviceable parts at next overhaul but not to exceed 2,000 hours time-in-service (TIS) or 36 months, whichever comes first, after the effective date of this AD.
  - (2) Propeller hubs on aircraft certified in the acrobatic category are to be removed from service and replaced with serviceable parts at next overhaul but not to exceed 1,000 hours TIS or 72 months, whichever comes first, after the effective date of this AD.
  - (3) Propeller hubs installed on Piper PA-32 series aircraft with Textron Lycoming 540 series engines that are rated at 300 HP or higher, or installed on Pilatus Britten Norman or Britten Norman BN-2 series aircraft (also known as Islander or Trislander) with Textron Lycoming 540 series engines, are to be removed from service and replaced with serviceable parts at next overhaul but not to exceed 2,000 hours TIS or 72 months, whichever comes first, after the effective

date of this AD.

- (d) A propeller hub from an aircraft that is identified in the applicability section of this AD may not be removed and reused on an aircraft for which this AD is not applicable.

#### **Terminating Action**

- (e) Replacement of an affected propeller hub with a Hartzell propeller hub model with the serial number suffix letter “B” constitutes terminating action for the initial and repetitive inspection requirements of paragraph (a) of this AD. The hub replacement must be performed in accordance with **Hartzell Propeller Inc. SB No. HC-SB-61-227, Revision 2**, dated May 8, 2000.

#### **Alternative Methods of Compliance**

- (f) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Chicago Aircraft Certification Office. Operators must submit their request through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, Chicago Aircraft Certification Office.

**Note 2:** Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the Chicago Aircraft Certification Office.

#### **Special Flight Permits**

- (g) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the aircraft to a location where the inspection requirements of this AD can be accomplished.

#### **Incorporation by Reference**

- (h) The inspection and replacement must be done in accordance with **Hartzell Propeller Inc. SB No. HC-SB-61-227, Revision 2**, dated May 8, 2000. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

Copies may be obtained from Hartzell Propeller Inc., Product Support Department, One Propeller Place, Piqua, OH 45356; telephone: (937) 778-4379, fax: (937) 778-4391. Copies may be inspected, by appointment, at the FAA, New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

#### **Effective Date of This AD**

- (i) This amendment becomes effective on December 24, 2001.

Issued in Burlington, Massachusetts, on November 7, 2001.

Donald E. Plouffe, Acting Manager, Engine and Propeller Directorate, Aircraft Certification Service.

**FOR FURTHER INFORMATION CONTACT:** Tomaso DiPaolo, Aerospace Engineer, Chicago Aircraft Certification Office, FAA, Small Airplane Directorate, 2300 East Devon Avenue, Des Plaines, IL 60018; telephone: (847) 294-7031, fax: (847) 294-7834.

**Manufacturer's Service Information:**

**Hartzell Service Bulletin HC-SB-61-227**

**[Hartzell Propeller Inc. Service Bulletin No. HC-SB-61-227, Rev. 2](#)**

The service information referenced in this AD may be obtained from Hartzell Propeller Inc., Product Support Department, One Propeller Place, Piqua, OH 45356; telephone: (937) 778-4379,  
778-4379,  
fax: (937) 778-4391.