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Airworthiness Directive

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39 [60 FR 2877 NO. 8 1/12/95]

Docket No. 94-ANE-59; Amendment 39-8463; AD **95-01-02**

Hartzell Propeller, Inc., Model HC-B4 Series Propellers

PDF Copy (If Available):

▼ Preamble Information

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule; request for comments.

SUMMARY: This amendment supersedes three existing airworthiness directives (AD), applicable to Hartzell Model HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R and HC-B4TN-5(D,G,J)L/LT10282N(B,K)-5.3R propellers installed on Mitsubishi MU-2 series aircraft. These AD's currently require replacement of existing LT10282 (B,K)-5.3R propeller blades with LT10282N(B,K)-5.3R improved "N" configuration propeller blades, and repetitive inspection and rework when required of the inner hub arm bore. This amendment requires new repair limits, shot peening procedures, and retirement at 10,000 hours time in service for the "N" configuration blades. Additionally, this action requires replacement of existing propeller hubs with new improved fatigue strength steel hubs and requires inspection, and specified rework as necessary, of the new steel hubs at a repetitive interval of 3,000 hours time in service. This amendment is prompted by a determination that the current hub design and blade repair limits do not adequately protect against initiation of fatigue cracks in the propeller hub arm bore and do not prevent the resonant speed of the propeller from shifting into the permitted ground idle operating range. The actions specified by this AD are intended to prevent initiation of fatigue cracks in propeller assemblies and subsequent progression to propeller failure, with departure of the blade, or hub arm and blade, that may result in loss of aircraft control.

DATES: Effective January 27, 1995.

ADDRESSES:

Submit comments in triplicate to the Federal Aviation Administration (FAA), New England Region, Office of the Assistant Chief Counsel, Attention: Rules Docket No. 94-ANE-59, 12 New England Executive Park, Burlington, MA 01803-5299.

The service information referenced in this AD may be obtained from Hartzell Propeller Inc., One Propeller Place, Piqua, OH 45356-2634; telephone (513) 778-4200, fax (513) 778-4391. This information may be examined at the FAA, New England Region, Office of the Assistant Chief Counsel, 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, Room 232, Des Plaines, IL 60018; telephone (708) 294-7031, fax (708) 294-7834.

SUPPLEMENTARY INFORMATION:

Airworthiness directive (AD) 93-01-09, Amendment 39-8463, effective April 20, 1993, applicable to Hartzell Model HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R propellers installed on Mitsubishi MU-2 series aircraft was published in the Federal Register on March 26, 1993 (58 FR 16347). That action was prompted by three reports of propeller blades separating during flight. The manufacturer's investigation of the failed blades revealed that fatigue cracks could initiate at the radius end of the blade bearing bore. That condition, if not corrected, can result in fatigue cracks initiating and progressing to failure resulting in departure of the blade and possible loss of aircraft control.

That AD requires initial and repetitive inspections for fatigue cracks at the blade bearing bore. All affected propeller blades showing evidence of cracks or propeller blades not meeting acceptable rework criteria are required to be replaced with serviceable blades prior to further flight. Additionally, as a terminating action to the repetitive inspections, AD 93-01-09 requires replacement of existing LT10282 (B,K)-5.3R propeller blades with LT10282N(B,K)-5.3R improved "N" configuration propeller blades at the next overhaul, or within 15 months of the effective date of that AD (July 31, 1994), whichever occurs first. Propeller blades modified to the "N" configuration have design improvements in the blade bearing bore that reduce the susceptibility to corrosion and localized stresses. The modified blades also have additional thickness added to the blade inboard stations to reduce operating stresses. The FAA determined that long term continued operational safety would be better assured by actual modification of the propeller to remove the source of the problem rather than continuing with repetitive inspections.

On April 28, 1993, the FAA issued priority letter AD 93-09-04, applicable to both Hartzell Model HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R and Model HC-B4TN-5 (D,G,J)L/LT10282N(B,K)-5.3R propellers installed on Mitsubishi Model MU-2B-60 aircraft. That AD was published in the Federal Register on July 22, 1993 (58 FR 39139). That AD action was prompted by two reports of propeller hub arm assembly fatigue failures and subsequent hub arm and blade separation from

aircraft in flight. Preliminary data indicated that fatigue cracks can originate in the propeller hub arm assembly.

That AD requires initial and repetitive removals from service of affected propeller hub assemblies for inspection and specified rework procedures before returning to service. That AD was an interim action until more data became available on the cause of propeller hub arm assembly failures.

On June 10, 1993, the FAA issued priority letter AD 93-12-01, also applicable to both Hartzell Model HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R and Model HC-B4TN-5(D,G,J)L/LT10282N(B,K)-5.3R propellers installed on MU-2B-26A, -36A, and, -40 aircraft. That AD was published in the Federal Register on September 29, 1993 (58 FR 50840). That action was prompted by a report of a hub assembly with a crack indication in the hub arm that was found during the inspection and rework required by AD 93-09-04. In addition, although not stated in AD 93-12-01, the FAA based AD 93-12-01 on flight strain survey investigations. Airworthiness Directive 93-12-01 cites the same safety concerns and requirements as AD 93-09-04 and was also an interim action until more data became available on the cause of propeller hub arm assembly failures.

Since the issuance of AD 93-09-04 and AD 93-12-01, the FAA determined that fretting can cause a fatigue crack to initiate in the propeller hub arms of the affected propellers. The fatigue crack initiates in the propeller inner hub arm bore. The fretting fatigue can be caused by a high stress loading condition that occurs two times per revolution when operating in a propeller ground resonance condition known as the "reactionless mode." The propeller resonance condition can be experienced in MU-2 series aircraft when Hartzell HC-B4 series propellers, with blades at or near the previous thickness repair limits, are operated at the originally certified engine ground idle speed when a quartering tail wind is present.

The FAA has also issued AD 94-11-04, Amendment 39-8920, effective on June 10, 1994, applicable to Mitsubishi Model MU-2B-26A, -36A, -40, -60, and MU-2B-36 aircraft Modified by Supplemental Type Certificate (STC) SA2413SW. That AD restricts the engine ground idle speed to a range of 76.5 percent to 78.5 percent to prevent the possibility of operating the propeller too close to the ground idle resonant speed. The requirements of AD 94-11-04 are not affected by this action.

Since the issuance of AD's 93-01-09, 93-09-04, and 93-12-01, the manufacturer has developed an improved fatigue strength steel propeller hub that has a compressive rolled internal bearing bore in the hub arms. Additionally, to further assure propeller operation will not occur in the reactionless mode, the manufacturer has developed new repair limits and shot peening procedures, and has established a retirement life limit of 10,000 hours time in service for the "N" configuration propeller blades. This AD will mandate phase in of the new steel hub design and the new "N" configuration propeller blade repair limits, shot peening procedures, and retirement life.

The FAA has reviewed and approved the technical contents of the following service documents:

Hartzell Alert Service Bulletins (ASB's) No. A182A and A183A both dated March

11, 1994, that describe procedures for installation, inspection, and rework as required for an improved fatigue strength steel hub applicable to propellers installed on Mitsubishi MU-2B-60 aircraft and MU-2B-26A, -36A, -40 or other MU-2 model aircraft, respectively; and

Hartzell ASB No. A188 dated February 25, 1994, applicable to affected propellers installed on all Mitsubishi MU-2 series aircraft that describes new repair limits and procedures for shot peening the LT10282N(B,K)-5.3R blade surfaces for optimum service life when installed on Mitsubishi MU-2 series aircraft.

Since an unsafe condition has been identified that is likely to exist or develop on other propellers of this same type design, the FAA is superseding AD's 93-01-09, 93-09-04, and 93-12-01; and adopting a new AD which requires replacement of any remaining LT10282(B,K)-5.3R propeller blades with LT10282N(B,K)-5.3R improved "N" configuration propeller blades, requires shot peening of all "N" blades, and establishes a new life limit of 10,000 hours time in service for "N" blades used on Mitsubishi MU-2 series aircraft; and requires replacement of Part Number (P/N) 840-139 or P/N 840-91 propeller hubs with new improved fatigue strength steel hubs which require inspection, and specified rework as necessary, at a repetitive interval of 3,000 hours time in service. The actions are required to be accomplished in accordance with the alert service bulletins described previously.

Since a situation exists that requires the immediate adoption of this regulation, it is found that notice and opportunity for prior public comment hereon are impracticable, and that good cause exists for making this amendment effective in less than 30 days.

Comments Invited

Although this action is in the form of a final rule that involves requirements affecting flight safety and, thus, was not preceded by notice and an opportunity for public comment, comments are invited on this rule. Interested persons are invited to comment on this rule by submitting such written data, views, or arguments as they may desire. Communications should identify the Rules Docket number and be submitted in triplicate to the address specified under the caption "ADDRESSES." All communications received on or before the closing date for comments will be considered, and this rule may be amended in light of the comments received. Factual information that supports the commenter's ideas and suggestions is extremely helpful in evaluating the effectiveness of the AD action and determining whether additional rulemaking action would be needed.

Comments are specifically invited on the overall regulatory, economic, environmental, and energy aspects of the rule that might suggest a need to modify the rule. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report that summarizes each FAA-public contact concerned with the substance of this AD will be filed in the Rules Docket.

Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit a self-addressed, stamped

postcard on which the following statement is made: "Comments to Docket Number 94-ANE-59." The postcard will be date stamped and returned to the commenter.

The regulations adopted herein will not have substantial direct effects 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. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

The FAA has determined that this regulation is an emergency regulation that must be issued immediately to correct an unsafe condition in aircraft, and is not a "significant regulatory action" under Executive Order 12866. It has been determined further that this action involves an emergency regulation under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). If it is determined that this emergency regulation otherwise would be significant under DOT Regulatory Policies and Procedures, a final regulatory evaluation will be prepared and placed in the Rules Docket. A copy of it, if filed, may be obtained from 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. App. 1354(a), 1421 and 1423; 49 U.S.C. 106(g); and 14 CFR 11.89. § 39.13 - [AMENDED]

2. Section 39.13 is amended by removing amendment 39-8463 (58 FR 16347, March 26, 1993); amendment 39-8583 (58 FR 39139, July 22, 1993); and amendment 39-8642 (58 FR 50840, September 29, 1993); and by adding a new airworthiness directive to read as follows:

▼ Regulatory Information

95-01-02 Hartzell Propeller Inc.: Amendment 39-9113. Docket 94-ANE-59. Supersedes AD 93-01-09, Amendment 39-8463; AD 93-09-04, Amendment 39-8583; and AD 93-12-01, Amendment 39-8642.

Applicability: Hartzell Propeller Inc. Models HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R, HC-B4TN-5(D,G,J)L/LT10282N(B,K)-5.3R, and HC-B4TN-5(D,G,J)L/LT10282NS(B,K)-5.3R propellers installed on Mitsubishi MU-2B-26A, -36A, -40, -60; MU-2B-30 Modified by Supplemental Type Certificate (STC) SA336GL-D & SA339GL-D; MU-2B-36 Modified by SA2413SW; and any other MU-2 Series aircraft which have the affected propellers installed. NOTE: The parentheses

indicate the presence or absence of an additional letter(s) which vary the basic propeller hub and blade model designation. This Airworthiness Directive (AD) still applies regardless of whether these letters are present or absent on the propeller hub and blade model designation.

Compliance: Required as indicated, unless accomplished previously.

To prevent initiation of fatigue cracks in propeller assemblies and subsequent progression to propeller failure, with departure of the blade, or hub arm and blade, that may result in loss of aircraft control, accomplish the following:

(a) Before further flight replace Hartzell Model HC-B4TN-5(D,G,J)L/LT10282(B,K)-5.3R propeller blades with serviceable Hartzell HC-B4TN-5(D,G,J)L/LT10282N(B,K)-5.3R or HC-B4TN-5(D,G,J)L/LT10282NS(B,K)-5.3R "N" configuration propeller blades. Airworthiness Directive 93-01-09, which is superseded by this AD, required this action to be completed by July 31, 1994.

(b) For propeller hub assemblies that experience a blade strike, as defined in paragraph (g) of this AD, after the effective date of this AD, before further flight, accomplish the following as applicable:

(1) Replace propeller hub unit, Part Number (P/N) 840-139 or P/N 840-91, with a hub that has compressive rolled internal bearing bores, which is identified with the addition of a third letter "A" in the hub serial number prefix (e.g. "CDA1234"). Propeller hub assemblies removed from service in accordance with this AD paragraph are to be permanently retired and may not be returned to service on any aircraft; and

(2) Thereafter, at intervals of 3,000 hours time in service (TIS) or 60 calendar months, whichever occurs first, remove the compressive rolled internal bore hub assembly, identified with the addition of a third letter "A" in the hub serial number prefix (e.g. "CDA1234"), for inspection and specified rework in accordance with Hartzell Alert Service Bulletins (ASB's) No. A182A or A183A, both dated March 11, 1994.

(3) For compressive rolled internal bearing bore hub assemblies, identified with the addition of a third letter "A" in the hub serial number prefix (e.g. "CDA1234"), that experience a blade strike, remove the hub assembly for inspection and specified rework procedures, in accordance with Hartzell ASB Nos. A182A or A183A, both dated March 11, 1994. Thereafter, at intervals of 3,000 TIS or 60 calendar months, whichever occurs first, repeat this inspection and required rework.

(c) Before further flight for propeller hub assemblies that have never been inspected; or within 750 hours TIS since the last inspection for those propeller hub assemblies inspected in accordance with Hartzell ASB's Nos. A182A, or A183A, both dated March 11, 1994; or ASB No. A182, dated April 28, 1993, or ASB No. A183, dated June 1, 1993; but in no case later than 12 calendar months from the effective date of this AD; accomplish the following:

(1) Replace propeller hub unit P/N 840-139 or P/N 840-91, unless already

accomplished, with a hub that has compressive rolled internal bearing bores, which is identified with the addition of a third letter "A" in the hub serial number prefix (e.g. "CDA1234"). Propeller hub assemblies removed from service in accordance with this AD paragraph are to be permanently retired and may not be returned to service on any aircraft; and

(2) Thereafter at intervals of 3,000 hours TIS or 60 calendar months, whichever occurs first, remove the compressive rolled internal bearing bore hub assembly, identified with the addition of a third letter "A" in the hub serial number prefix (e.g. "CDA1234"), for inspection and specified rework in accordance with Hartzell ASB's No. A182A or A183A both dated March 11, 1994.

(d) Perform a propeller blade thickness inspection, rework if necessary, shot peen, and mark the blades, in accordance with Hartzell ASB No. A188, dated February 25, 1994, in accordance with the following schedule and requirements:

Propeller Blade Time Since New (TSN) on the effective date of this AD.	Compliance Required
Greater than or equal to 2,900 hours TSN	Within 100 hours TIS. after the effective date of this AD, or during compliance with paragraphs (b) or (c) of this AD, as applicable, whichever occurs first.
Less than 2,900 hours TSN but greater than 2,200 hours TSN.	Prior to reaching 3,000 hours time TSN or during compliance with paragraphs (b) or (c) of this AD, as applicable, whichever occurs first.
Less than or equal to 2,200 hours TSN	Within 800 hours TIS after the effective date. of this AD or during compliance with paragraphs (b) or (c) of this AD, as applicable, whichever occurs first.

(1) If blade thickness requires rework of blades comprising thickness reduction of inboard stations then shot peening is also required prior to returning to service.

(2) If the blade thickness inspection is satisfactory and no rework is required, shot peening may be deferred until the next overhaul, but not to exceed 3,000 hours TSN of the propeller blades, or within 60 calendar months since the last overhaul, whichever occurs first.

(3) Propeller Model LT10282N(B,K)-5.3R "N" configuration blades that have been satisfactorily shot peened and inspected and must be metal impression stamped

in the blade butt as well as ink stamped externally on the blade shank with the suffix letter "S" in the blade model designation, per Hartzell ASB No. A188, dated February 25, 1994.

(e) Any blade repairs made after the effective date of this AD shall be accomplished in accordance with the procedures specified in Hartzell ASB No. A188, dated February 25, 1994. NOTE: Airworthiness Directive (AD) 94-11-04 restricts Mitsubishi Model MU-2B-26A, -36A, -40, -60, and MU-2B-36 Aircraft Modified by (STC) SA2413SW to an engine ground idle speed range of 76.5 to 78.5 percent to prevent the possibility of operating the propeller too close to the ground idle resonant speed ("reactionless mode"). The purpose of Paragraphs (d) and (e) of this AD are to insure that the resonant speed does not shift into the permitted engine ground idle range during operation.

(f) Propeller blade Model LT10282N(B,K)-5.3R and LT10282NS(B,K)-5.3R configuration blades now have a retirement life limit of 10,000 hours TIS and are to be permanently retired from service, and replaced with serviceable blades, upon reaching this limit.

(g) A blade strike is defined as a propeller having any blade that has been bent beyond the repair limits specified in Hartzell Standards Practices Manual 202A, Revision 1, Pages 1104-1105, dated June 1994.

(h) The "calendar month" compliance times stated in this AD allow the performance of the required action up to the last day of the month in which compliance is required.

(i) 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, FAA, Chicago Aircraft Certification Office. The request should be forwarded through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, FAA, Chicago Aircraft Certification Office. NOTE: Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the FAA, Chicago Aircraft Certification Office.

(j) Except when propeller hub arm assemblies have experienced a blade strike, 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 requirements of this AD can be accomplished.

(k) The actions required by this AD shall be done in accordance with the following Hartzell Propeller Inc. service documents:

Document No.	Pages	Date
ASB No. A182A Total pages: 3.	1-3	March 11, 1994
ASB No. A183A Total pages: 3.	1-3	March 11, 1994

ASB No. A188 Total pages: 4.	1-4	February 25, 1994
Hartzell Standards Practices Manual 202A, Revision 1 Total pages: 2.	1104-5	June 1994

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., One Propeller Place, Piqua, OH 45356-2634; telephone (513) 778-4200, fax (513) 778-4391. Copies may be inspected at the FAA, New England Region, Office of the Assistant Chief 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.

(l) This amendment becomes effective on January 27, 1995.

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▼ Comments

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