PROPOSED AIRWORTHINESS DIRECTIVE

This Proposed Airworthiness Directive (PAD) is issued by the Civil Aviation Safety Authority with a view to address the unsafe condition detailed below. The Airworthiness Directive (AD) will require that the action set out in the requirement section (being action that the delegate considers necessary to correct the unsafe condition) be taken in relation to the aircraft or aeronautical product mentioned in the applicability section: (a) in the circumstances mentioned in the requirement section; and (b) in accordance with the instructions set out in the requirement section; and (c) at the time mentioned in the compliance section.

Propellers - General

PAD/PROP/1 Amdt 3 Propellers – Inspection and Overhaul

Applicability: This Proposed Airworthiness Directive ***(PAD)*** applies to all propellers.

References: Subpart 200.B of the Civil Aviation Safety Regulations 1998 (CASR).

Requirement: For aircraft operating for commercial purposes as prescribed in Regulation (CAR)206, perform any one of the following four requirements that apply:

1. Overhaul the propeller;
   a. as per the manufacturer's recommended flight hourly Time Between Overhaul (TBO); or
   b. at the calendar TBO, whichever occurs first.
2. If there is no recommended calendar TBO published by the manufacturer,
   a. overhaul the propeller at the manufacturer's flight hourly TBO; and
   b. at 6 years since new, since the last overhaul or since the "Hub/Blade Inspection" set out in Appendix 1 of this PAD, remove the propeller from the aircraft, inspect and, where required, rectify any defects or damage identified during the inspection process in accordance with the manufacturer's instructions or other approved data. The inspection shall include as a minimum the tasks of the Hub/Blade Inspection set out in Appendix 1 of this PAD.
3. If there is no recommended flight hourly TBO or calendar TBO published by the manufacturer,
   a. Perform requirement 2.b. above; and
   b. at 12 years since new, since the last overhaul or since the last "Bare Blade Inspection" set out in Appendix 2 of this PAD, remove the propeller from the aircraft and perform all requirements of the Bare Blade Inspection and, where required, rectify any defects or damage identified during the inspection process in accordance with the manufacturer's instructions or other approved data.
4. Overhaul at intervals as detailed in an Approved Maintenance Program or System of Maintenance based on the manufacturer's TBO recommendations.

Propellers - General

PAD/PROP/1 Amdt 3 (continued)

5. For aircraft used for private operations only, the following options exist. Either comply with a. or b.;

   a. Any one of the 4 requirements above (1., 2., 3. or 4.) that apply or,

   b. Overhaul the propeller as per the manufacturer's recommended flight hourly TBO and perform the following in lieu of the manufacturers calendar overhaul requirements;

      At 6 years since new, since the last overhaul or since the Hub/Blade Inspection set out in Appendix 1 of this PAD, remove the propeller from the aircraft, inspect and, where required, rectify any defects or damage identified during the inspection process in accordance with the manufacturer's instructions or other approved data. The inspection shall include as a minimum the tasks of the Hub/Blade Inspection set out in Appendix 1 of this PAD.

Compliance

The initial compliance time for the applicable AD requirements is within 2 years of the effective date of this PAD;

The recurring compliance times for the applicable AD requirements are as detailed in the AD requirements and the manufacturers approved data.

Note 1: The periods of operation, or elapsed calendar time, shall be calculated from the date of the initial installation of the propeller on an aircraft following manufacture or complete overhaul of the propeller. This time may be preceded by a period of storage stated by the manufacturer or of up to 2 years (whichever occurs first) when storage is carried out in accordance with the manufacturer's recommendations.

Periods of storage in excess of 2 years or subsequent to the initial installation shall be counted as if the propeller were installed.

Background:

Amendment 3 is required due to information received through the CASA Service Difficulty Reporting system and other reports indicating that propellers that are presented for repair/ overhaul at extended calendar times commonly exhibit defects that compromise the flight safety of aircraft. The most common defects relate to excessive corrosion to the hub and blade areas and significant wear of the components of controllable propellers due to seal degradation and subsequent oil loss.

Amendment 3 clarifies and mandates that inspections are required based on flight hour and calendar periods for all aircraft, regardless of the type of operation.

The previous amendment (Amendment 2 of AD/PROP/1) provided alternate TBO for flight hours for some specific propeller types. This had become outdated and inconsistent with the manufacturers requirements. In most cases, a calendar TBO was not provided and this was also inconsistent with current manufacturer's requirements.

Propellers - General

PAD/PROP/1 Amdt 3 (continued)

The original issue of AD/PROP/1, effective on 1 January 1988, was issued to establish time-in-service periods and minimum overhaul requirements for propellers installed in Australian registered aircraft.

Remarks: External consultation for this PAD will close on: 15 June 2015.

Enquiries or comments regarding this PAD should be emailed to airworthiness.directives@casa.gov.au.

Propellers - General

PAD/PROP/1 Amdt 3 (continued)

PAD/PROP/1 Amdt 3 Appendix 1 — Propellers - Overhaul

Hub/Blade Inspection

For Fixed Pitch Propellers

i. For metal propellers, a visual inspection of the hub and blades for corrosion, nicks and damage, especially to the blade leading edges and thrust faces.
ii. For wooden/composite propellers, a visual inspection of the hub and blades for delamination, damage to the leading edges and thrust faces and crushing of the hub by the mounting plates.
iii. Dressing of the blades as necessary to remove any nicks, damage or corrosion. Application of protective coatings as necessary.
iv. Inspection for thrust bends and angles.
v. Balance in accordance with manufacturer requirements.

For Variable Pitch Propellers

i. Dismantling of the propeller sufficiently to gain access to the blade root bearing assemblies.
ii. Thorough cleaning of the blade root assemblies in accordance with the manufacturer's instructions.
iii. Examination for pitting, fretting, corrosion, cracking and other damage of the hub, bearings, blade roots, and housing, together with replacement of all seals and gaskets.
iv. All of the blade surfaces shall be examined for damage, delamination (where applicable), and the presence of corrosion, removing the paint finish as necessary.
v. In cases where de-icer boots are installed on the blades, a detailed examination for corrosion around their edges shall be carried out, and, if any evidence is found, the boots shall be removed to permit a full inspection of the masked areas.
vi. Removal of blade ferrules to perform a thorough inspection of the blade thread on McCauley threaded series propellers.
vii. Painting and application of protective coatings as required.
viii. Functional testing of the propeller.
ix. Balance in accordance with manufacturer requirements.
x. Incorporation of any Service Bulletins and Airworthiness Directives that may be applicable.

Propellers - General

PAD/PROP/1 Amdt 3 (continued)

Appendix 2

Bare Blade Inspection

i. All requirements of the Hub/Blade Inspection for fixed pitch or variable pitch propellers.
ii. Removal of all de-icing boots, decals, leading edge protective strips, etc.
iii. Removal of all paint and erosion protection.
iv. Removal of all blade root bushings and plugs.
v. Inspection of the complete blade surface for the presence of corrosion. Any corrosion shall be removed and the blades re-protected and prepared for the re-installation of the blade fittings.
vi. Perform all Non-Destructive Inspections that are required for overhaul per the manufacturer's instructions.
vii. Perform full dimensional inspection of all blades

Summary of Proposed Change for AD/PROP/1 Amdt 3. April 2015

Introduction

CASA is currently proposing an amendment to AD/PROP/1, to mandate and clarify CASA policy regarding the Overhaul of Propellers.

Purpose and scope of the proposed amendment.

General

Australian Airworthiness Directive AD/PROP/1 Amdt 2 became effective on 27th November 2003 and required the overhaul of propellers at particular intervals dependent on the type. In some cases, the AD provided Time Between Overhaul (TBO) for flight hours as alternates for the TBO published by the manufacturer for certain specific propeller types.

Since November 2003, many manufacturers have amended their recommendations for TBO and AD/PROP/1 Amdt 2 has not been updated to reflect these incremental changes over time. In some cases, the AD has been interpreted that where a calendar TBO is not quoted in the AD, an operator can choose to ignore the manufacturer's recommendations completely and operate a propeller "on condition" for calendar time TBO. This has resulted in CASA receiving many Defect Reports, particularly from maintenance providers of propellers that are significantly past their recommended TBO, in some cases in excess of 25 years since the last overhaul.

Calendar time limits are often misunderstood and are thought to be of lesser importance than accumulated time in hours of operation between overhaul. Manufacturers tend to not differentiate between calendar time since last overhaul and accumulated hours since last overhaul, both criteria being of equal importance to the continued airworthiness of the product.

Note: Appendix 1 inspections do not supersede existing calendar based propeller ADs or Mandatory ICAs.

Optional requirements for private operators of low utilisation aircraft

In consideration of the low utilisation of some private aircraft, CASA has performed a risk assessment of the AD requirements and concluded that under certain conditions, alternate requirements can apply to aircraft in private operations. This view has been established based on analysis of reported defect data in Australia and the experience of operators overseas.

It is proposed that for Private operations, repetitive calendar time inspections each six years of the hub and blade (PAD Appendix 1), are considered adequate to maintain the continuing airworthiness of a low utilisation aircraft. That is, the requirement to perform a full overhaul at a calendar period is not required by the AD, notwithstanding the fundamental obligations of operating an airworthy aircraft as discussed in the background section.

However, the propeller must still be overhauled per the manufacturer's flight hourly TBO.

Aircraft used for Commercial Purposes under CAR 206	
Requirement.	**Compliance**
Requirement 1. When manufacturer's Calendar Time and Flight Time TBO are published.	• Overhaul at flight hour or calendar TBO, whichever occurs first.
Requirement 2. Only when manufacturer's Flight Time TBO is published and manufactures Calendar Time TBO is not available.	• Hub/Blade Inspection as per Appendix 1 every 6 years. • Overhaul at flight hour TBO.
Requirement 3 Only when there is no manufacturer's Flight Time TBO or Calendar Time TBO published	• Hub/Blade Inspection as per Appendix 1 at 6 years since last equivalent inspection. • Bare Blade inspection as per Appendix 2 at 12 years since last overhaul or Appendix 2 equivalent inspection.
Requirement 4. Approved System of Maintenance (SoM) or Approved Maintenance Program (AMP)	• Overhaul at intervals as detailed in the Approved Maintenance Program.

Aircraft used in Private Operations	
Requirement 5. **Option 1.**	• Any applicable requirement as detailed in Table 1 above;
	OR
Option 2.	• Hub/Blade Inspection as per Appendix 1 at 6 years since last inspection. This inspection cycle continues until the OEM Flight Time TBO is reached. • Overhaul at OEM Flight Time TBO.

Impact on industry

The proposed amendments will have some impact on industry, particularly for those propellers of low utilization that have exceeded the manufacturer's recommended calendar Time-between-Overhaul (TBO). The amendment is considered necessary in the interests of Aircraft Airworthiness and Safety and Propeller reliability.

The AD amendment will provide much needed clarity of CASA's position regarding the Overhaul of Propellers and will more closely harmonise with the requirements currently published by other CAAs of New Zealand, UK and Canada.

Consultation

Internal consultation (within CASA) has already taken place in September 2014. The PAD document has been updated after the internal consultation to address the issues raised regarding readability and applicability of the PAD.

External consultation for the AD requirements and content will be open for 8 weeks.

Comments

Comments on the proposed amendment may be forwarded to Airworthiness.Directives@casa.gov.au, by close of business 12 June 2015.