



CIVIL AVIATION PUBLICATION

AIR 04

MAINTENANCE PROGRAMMES (GENERAL AVIATION & RPAS)

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MAINTENANCE PROGRAMME (GENERAL AVIATION & RPAS)

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1.1 Introduction

This CAP is applicable to manned aircraft subject to operation under regulation CAR OPS 2A/H, remotely piloted aircraft operating under CAR OPS 4 and aerial work operations under CAR OPS 5.

The Maintenance Programme for such aircraft on The Bahamas Register is required to be accepted by the BCAA. As such, it is therefore required to include all the maintenance that will ensure the continuing airworthiness of the aircraft.

The Owner/Operator's Airworthiness Coordinator is required to submit Form AIR 04 "Maintenance Programme Declaration". The information required to be annotated on the form is based on the policies and guidance contained in CAP AIR 02. The Airworthiness Coordinator should review the document at least annually and keep the accepted maintenance programme up to date by submitting an amended Form AIR 04 when applicable.

1.2 Annual Utilisation

The Owner/Operator is responsible for ensuring that the Maintenance Programme is appropriate for its age, utilisation, operating environment and configuration. The recommended maintenance by the Type Certificate Holder is normally based on an assumed utilisation and operating environment. Should the anticipated, or actual utilisation of the aircraft, vary by more than 25% from these assumptions then the Maintenance Programme should be reviewed and the tasks and frequencies adjusted as necessary. In some cases the Type Certificate Holder has produced specific low utilisation recommendations for the adoption of owners/operators which should be used when applicable.

1.3 Maintenance Source Documents

The maintenance of the aircraft, engines, propellers and equipment are normally in accordance with the Type Certificate Holders' and the applicable Supplemental Type Certificate Holder's instructions for continuing airworthiness, their inspection standards and any additional requirements of the BCAA. The Maintenance Programme Declaration Form AIR 04 requires these source documents to be declared. The revision status of the documents is not required to be recorded as it is expected that only the latest revisions will be applicable.

1.4 Additional Maintenance Tasks

The source documents used as the basis for the Maintenance Programme do not normally include the required maintenance for such things as seats, safety equipment, galley equipment etc. as these can be specified and sourced from different equipment manufacturers. The aircraft manufacturers recommended maintenance document (e.g. MPD) will frequently say "in accordance with the manufacturer's requirements" for these items.

The information for continuing airworthiness for these items is found in the documents supplied from the Original Equipment Manufacturer (OEM). These must be reviewed and the necessary maintenance tasks extracted and recorded on the Maintenance Programme Declaration Form AIR 04.



Modifications to the aircraft, engines, propellers and equipment performed after manufacture of the aircraft are not normally included in the source documents used as the basis for the Maintenance Programme and recorded in Part 2 of the Maintenance Programme Declaration Form AIR 04. The information for continuing airworthiness supplied with these modifications should be reviewed and their details recorded in the Maintenance Programme Declaration Form AIR 04.

Special Operating Approvals such as RVSM, All Weather Operations (AWOPS), EVS/HUD, EFB etc. frequently require further maintenance and are not normally included in the source documents used as the basis for the Maintenance Programme and recorded in Part 2 of the Maintenance Programme Declaration Form AIR 04. The additional maintenance tasks associated with maintaining these approvals should be reviewed and their details recorded in the Maintenance Programme Declaration Form AIR 04.

The Owner/Operator may elect to perform non-mandatory maintenance tasks normally derived from Service Bulletins, Service Letters etc. These should be recorded in Part 4 of the Maintenance Programme Declaration Form AIR 04.

Parts 4 and 5 of the Maintenance Declaration Form must be kept up to date by the Airworthiness Coordinator but changes to these sections do not require to be submitted to the BCAA after the initial assessment and acceptance by them.

1.5 Inspections of Flight Recorder Systems

In order to ensure the continued serviceability and reliability of the Flight Recorder systems, inspections are required at certain intervals. Refer to CAP AIR 02 for details of the inspection requirements.

1.6 Calibration of the FDR system

In order to ensure the continued serviceability of the FDR system certain aircraft types require the system to be calibrated at certain intervals. Refer to CAP AIR 02 for details of the calibration requirements.

1.7 Maintenance Programme Variations

The periods prescribed by the accepted Maintenance Programme may be varied by the Operator provided that such variations are within the limits specified below. Variations shall be permitted only when the periods prescribed by this Programme (or documents in support of this Programme) cannot be complied with due to circumstances which could not reasonably have been foreseen by the operator. The decision to vary any of the prescribed periods shall be made only by the operator after consultation with, and the agreement of, the Airworthiness Coordinator. Particulars of every variation so made shall be entered in the appropriate Log Book(s).

(a) Items Controlled by Flying Hours

(1) 5000 flying hours or less 10%

- (2) More than 5000 flying hours 500 flying hours
- (b) Items Controlled by Calendar Time
 - (1) 1 year or less 10% or 1 month, whichever is the lesser
 - (2) More than 1 year but not exceeding 3 years; 2 months;
 - (3) More than 3 years; 3 months.
- (c) Items Controlled by Landing/Cycles
 - (1) 500 landings/cycles or less 10% or 25 landings/cycles, whichever is the lesser
 - (2) More than 500 landings/cycles 10% or 500 landings/cycles, whichever is the lesser
- (d) Items Controlled by More Than One Limit For items controlled by more than one limit, e.g. items controlled by flying hours and calendar time or flying hours and landings/cycles, the more restrictive limit shall be applied.

Notes:

The variations permitted above do not apply to:

1. *Those components for which an ultimate (scrap) or retirement life has been prescribed (e.g. primary structure, components with limited fatigue lives, and high energy rotating parts for which containment is not provided). Details concerning all items of this nature are included in the Type Certificate holder's documents or manuals.*
2. *Those tasks included in the Maintenance Programme that have been classified as mandatory by the Type Certificate holder or the BCAA.*
3. *Certification Maintenance Requirements (CMR) unless specifically approved by the manufacturer and agreed by the BCAA.*

Any variations to the Maintenance Programme beyond that described above must have the approval of the BCAA.

1.8 Inspection Standards

The maintenance and inspection standards applicable to the maintenance tasks must meet the requirements of the Type Certificate Holders recommended standards and practices.

1.9 Systems and Structural Integrity Programmes

Any systems or structural integrity programmes, such as Supplemental Structural Programmes Ageing Structures and Systems, Corrosion Prevention and Control, Fuel Tank Safety, Electrical Wiring Interconnection System (EWIS) published by the Type Certificate Holder must be implemented into the Maintenance Programme.

1.10 Pre – Flight Inspections

Pre-flight Inspections are to be performed in accordance with the Type Certificate Holders instructions and do not require a maintenance release to service (Certificate of Release to Service).

1.11 Extension of Piston Engine Time Between Overhaul (TBO)

This paragraph provides guidance material for the extension of Time Between Overhaul (TBO) and gives guidance on the procedures which are necessary for a light aircraft piston engine to be accepted as being in a condition that will allow operation beyond the recommended overhaul period under the terms of this section, and applicable to the piston engine mounted on aircraft when not used;

- in commercial air transport (CAT),
- in parachute jumping, glider towing, banner towing,
- in aerial application and spraying,
- or other unusually stressful applications that may require more frequent overhauls than provided by the manufacturer.

A piston engine that has reached the end of its normal overhaul period may be expected to have some wear to cylinders, pistons, valves, bearings and other moving parts, but an engine that has been carefully operated and maintained may still be in a condition suitable for a further period of service.

Many factors affect the wear that takes place in an engine, the most important of these include the efficiency of the air intake filter, the techniques used in engine handling, particularly during starting, the quality of the fuel and oil used in the engine and the conditions under which the aircraft is housed when not in use. Conditions of operation are also relevant; the length of flights, the atmospheric conditions during flight and on the ground, and the type of flying undertaken. The meticulous compliance with the approved Maintenance Programme and Maintenance Schedule and any instructions provided in the form of service bulletins or constructor's recommendations will undoubtedly help to prolong the life of an engine.

1.11.1 Conditions for Allow the Extension of Piston Engine TBO

For piston engine manufacturers generally define a limit of operating hours and a time limit (e.g. some Lycoming or Continental engines, have a TBO of 2000 hours or 12 years)

The quality of parts, accessories and workmanship utilised during routine maintenance, engine top overhaul and major overhaul has a direct effect on the service life of the engine. Also, the maintenance and condition of engine and related components, including, but not limited to, propeller, propeller governor, vacuum pump, gear driven alternator, mount, baffles, instrumentation and controls has a direct effect on engine durability.

Therefore, this section is applicable to the engines that have been maintained according with the Instructions for Continued Airworthiness, accepted by the NAA, specified in the engine Maintenance Manual, Overhaul Manual, and Service Bulletins and operated within the limitations published in approved TCH Manual's and the aircraft manufacturer's Aircraft Flight Manual / Pilots Operating Handbook (AFM / POH).

1.11.2 Inspections and Tests to Extension of Piston Engine TBO

The inspections and tests necessary to assess the condition of an engine in compliance with this section and extend the calendar life limit up to 24 years, are detailed as follows:

(a) Inspection and Maintenance

A number of items included in the normal scheduled maintenance of an engine may be repeated to determine the condition of an engine at the end of its normal overhaul period, this items must be integrated with additional annual inspections as specified below.

(b) External Condition

The engine should be examined externally for obvious defects such as a cracked crankcase, excessive play in the propeller shaft, overheating and corrosion, which would make it unacceptable for further use.

(c) Internal Condition

Significant information concerning the internal condition of an engine may be obtained from an examination of the oil filters and magnetic plugs, for metal particle contamination. These checks may be sufficient to show that serious wear or breakdown has taken place and that the engine is unacceptable for further service.

(d) Oil Consumption

Since the oil consumption of an engine may have increased towards the end of its normal overhaul period, an accurate check of the consumption over the last 10 flying hours would show whether it is likely to exceed the maximum recommended by the constructor, if the overhaul period were to be extended.

(e) Compression Check

Piston ring or cylinder wear, or poor valve sealing could, in addition to increasing oil consumption, result in a significant loss of power. A cylinder compression check is a method of determining, without major disassembly, the standard of sealing provided by the valves and piston rings. This should be carried out in accordance with the manufacturer's recommendations.

(f) **Power Output of Aeroplane Engines**

The power developed by an aeroplane engine after initial installation is established in the form of a reference engine speed, which is recorded in the appropriate log book so that a comparison can be made during subsequent power checks. The reference engine speed is the observed engine speed obtained using specified power settings and conditions, corrected, by means of graphs supplied by the engine Manufacturer manual.

(g) **Power Checks**

Carry out power check using the instruction of the manufacturer.

(h) **Servicing**

Carry out all servicing operations necessary be due, in accordance with the approved Maintenance Schedule.

(i) **Log Book Entries**

A record of the checks made, and any rectification or servicing work, must be entered and certified in the engine log book before the engine is cleared to service for its recommended or extended life under the provision of this section.

(j) **Maintenance Programme Amendments**

The aircraft maintenance programme must be developed taking into account the instruction contained in this section and submitted to the authority for approval.