



Barbados Civil Aviation
Department

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AIRWORTHINESS

ADVISORY

CIRCULAR

MAINTENANCE RECORDS

MAINTENANCE RECORDS

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MAINTENANCE RECORDS

SECTION 1. GENERAL

1. INTRODUCTION.

1.1. The purpose of this Advisory Circular is to describe methods, procedures and practices that have been determined to be an acceptable means of showing compliance with Aircraft Operations, Airworthiness and Air Operator Certification & Administration Regulations.

2. RELATED MATERIAL.

Civil Aviation (Aircraft Operations) Regulations 2007

Civil Aviation (Airworthiness) Regulations 2007

Civil Aviation (Air Operator Certification & Administration) Regulations 2007

3. REQUIREMENTS.

3.1. Civil Aviation (Aircraft Operations) Regulations 27 (1) states that an operator of an aircraft shall be responsible for maintaining the aircraft in an airworthy condition by ensuring that:

3.1.1. No person shall perform maintenance, preventive maintenance, or alterations to an aircraft other than as prescribed by the BCARs.

3.1.2. No person shall certify an aircraft as airworthy unless he is qualified in accordance with the Act or regulations made thereunder to issue such certification.

3.1.3. No person shall operate an aircraft for which a maintenance manual of the manufacturer or instructions for continued airworthiness containing airworthiness limitations section has been issued.

3.2. Civil Aviation (Airworthiness) Regulations, 33 and 34 detail requirements for maintenance records and content, form and disposition of maintenance, preventive maintenance, rebuilding and modification of records.

3.3. Civil Aviation (Air Operator Certification & Administration) Regulations, 79 and 80 further detail requirements for a Technical Log and the establishment of a system for the retention of technical records.

3.4. In order for the Owner, Operator or Lessee to be able to demonstrate to the BCAD that all the requirements of BCARs are being met, the following minimum requirements for the upkeep and retention of aircraft records must be met.

SECTION 2

AIRCRAFT, ENGINE AND PROPELLER LOG BOOKS

1. INTRODUCTION

Civil Aviation (Airworthiness) Regulations Part V prescribes the requirements for maintenance records and entries following maintenance, preventive maintenance, overhaul and modifications for aircraft and aeronautical products. Log books shall therefore be kept for each aircraft registered in Barbados, for each engine and for each variable-pitch propeller fitted to such aircraft. The BCARs also prescribes the information which must be recorded, the timescales within which the record must be made and the person responsible for making such entries. Also included in the BCARs are the requirements for the retention of records, and details concerning acts in connection with records which constitute offences under the Act.

2 PURPOSE.

It is intended that a log book should constitute a history of the aircraft, engine or propeller to which it refers in terms of, as appropriate: Constructor Date of Construction Constructors No./Serial No. Aircraft Registration Type Aircraft/engine to which fitted Operator Flying hours/cycles, etc. Maintenance Continued compliance with mandatory requirements.

3 SOURCE AND FORMAT OF LOG BOOKS

3.1 Log books can take any form acceptable to the BCAD. The BCAD however, has developed log books, AW-044, AW-045 and AW-046 which may be used for aircraft, engines and propellers respectively.

3.2 **Alternative Form of Log Book.** To enable acceptance of an alternative technical record system the following features should be taken into account:

- (a) Compliance with the requirements of BCARs must be shown.
- (b) The record must be kept in indelible hard copy form or in the form of a computer memory acceptably safeguarded against erasure and available when required as a printed-out hard copy.
- (c) Any computer system used must be capable of a total quarantine of the record for a particular aircraft, engine or variable-pitch propeller on command and must be capable of a subsequent print-out of data in a form acceptable to the DCA.
- (d) Safeguards against erasure of any computer memory must include adequate defences against fraud, malpractice, incompetence and accidents such as power failure. Any erase function must be unavailable once data is committed to the memory.

NOTE: *The requirements of Airworthiness Regulations Part V apply to all forms of technical records and must be satisfied.*

(e) Any recording system offered for acceptance must be capable of maintaining the required timescale for updating.

(f) On any occasion requiring the transfer of responsibility for the upkeep of a technical record system the form taken by the system, must lend itself to removal without loss of content.

(g) In a computer system the information contained in the log book should, when printed out, be in a coherent format and legible to the user without a need for in depth knowledge of computer language. In addition, to enable the efficient conduct of investigations the required data should, when printed out, preferably be discrete from other data stored in excess of the requirements.

NOTE: *Any extension of the log book in the form of files, appendices or subsidiary records held elsewhere such as by Non-Destructive Testing (NDT) specialists or Test Houses are deemed in a legal sense to be part of the subject log book and must be treated accordingly, including the retention of clear cross-references with the basic log book.*

4. TIMESCALE LIMITATIONS FOR THE UPKEEP OF RECORDS

4.1 Apart from those entries shown in paragraph 4.2, each entry should be made as soon as is practicable after the occurrence to which it relates, but in no event more than seven days after the event.

4.2 In engine and variable-pitch propeller log books, where the operator has chosen to record total aggregated flying time accrued since the last issue of a Certificate of Release to Service (CRS), each entry related to flight time must be made on the occasion of any work which will require the issue of the next CRS.

5 INFORMATION TO BE RECORDED

5.1 Information Which Must be Recorded.

5.1.1 **Aircraft Log Book.** The following entries shall be included in the aircraft log book.

(a) the name of the constructor, the type of the aircraft, the number assigned to it by the constructor and the date of the construction of the aircraft,

(b) the nationality and registration marks of the aircraft,

(c) the name and address of the operator of the aircraft,

(d) the date of each flight and the duration of the period between take-off and landing, or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-off and landings on that day,

- (e) particulars of all maintenance work carried out on the aircraft or its equipment,
- (f) particulars of any defects occurring in the aircraft or in any equipment required to be carried therein by or under the BCARs, and of the action taken to rectify such defects including a reference to the relevant entries in the technical log required by the BCARs, and
- (g) particulars of any overhauls, repairs, replacements and modifications relating to the aircraft or its equipment.

NOTE: *Entries are not required to be made under sub-paragraphs (e), (f) and (g) in respect of any engine or variable pitch propeller (see respectively paragraphs 5.1.2 and 5.1.3).*

5.1.2 Engine Log Book. The following entries shall be included in the engine log book:

- (a) the name of the constructor, the type of the engine, the number assigned to it by the constructor and the date of the construction of the engine,
- (b) the nationality and registration marks of each aircraft in which the engine is fitted,
- (c) the name and address of the operator of each such aircraft,
- (d) either,
 - (i) the date of each flight and the duration of the period between take-off and landing or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-offs and landings on that day, or
 - (ii) the aggregate duration of periods between take-off and landing for all flights made by that aircraft since the immediately preceding occasion that any maintenance, overhaul, repair, replacement, modification or inspection was undertaken on the engine,
- (e) particulars of all maintenance work done on the engine,
- (f) particulars of any defects occurring in the engine, and of the rectification of such defects, including a reference to the relevant entries in the technical log required by the BCARs, and
- (g) particulars of all overhauls, repairs, replacements and modifications relating to the engine or any of its accessories.

5.1.3 Variable-Pitch Propeller Log Book. The following entries shall be included in the variable-pitch propeller log book:

- (a) the name of the constructor, the type of the propeller, the number assigned to it by the constructor and the date of the construction of the propeller,
- (b) the nationality and registration marks of each aircraft, and the type and number of each engine, to which the propeller is fitted,
- (c) the name and address of the operator of each such aircraft,
- (d) either,

- (i) the date of each flight and the duration of the period between take-off and landing or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-offs and landings on that day, or
- (ii) the aggregate duration of periods between take-off and landing for all flights made by that aircraft since the immediately preceding occasion that any maintenance, overhaul, repair, replacement, modification or inspection was undertaken on the propeller,
- (e) particulars of all maintenance work done on the propeller,
- (f) particulars of any defects occurring in the propeller, and of the rectification of such defects, including a reference to the relevant entries in the technical log required by the BCARs, and
- (g) particulars of any overhauls, repairs, replacements and modifications relating to the propeller.

5.1.4 **Airworthiness Directives.** A clear record of all Airworthiness Directives issued for the aircraft, engine or propeller type and which shows applicability, date and method of compliance and continued compliance if repetitive. A clear record with all applicable mandatory requirements is required.

5.1.5 Each record of work done should, when required, be covered by a CRS unless the certification has been made elsewhere, in which case either another CRS must be made in the log book or reference made to the previous certification made elsewhere.

5.1.6 Whenever a Flight Release Certificate is issued, the aircraft log book should be endorsed with the reason for its issue including the condition being invoked, and a copy included in the log book.

5.1.7 Duplicate inspections certified must be recorded in the appropriate log book except that, if made elsewhere such as in the Technical Log or in a workpack, they may be cross-referred to in the log book.

5.1.8 For aircraft exceeding 2730 kg MTWA, it is required that a separate Modification Record Book be maintained. This Modification Record Book can be used as the vehicle for maintaining the record of applicable ADs and compliance with the same. All applicable manufacturers Service Bulletins should be recorded when complied with and all major repairs and all modifications.

5.2 Information Recording Practice

5.2.1 General

- (a) Maintenance and Inspection (including routine inspections)
 - (i) When maintaining the record of compliance with mandatory requirements, all sources of such requirements must be complied with. The primary source is the regulatory authority of the state of design certification of the aircraft, engine, propeller or items of equipment, in addition to which there may be BCAD Additional Directives imposed and

BCAD Airworthiness Advisory Circulars of a mandatory nature.

(ii) When a mandatory requirement is of a repetitive nature it is important to highlight this fact so that it will not be confused with once-only requirements.

(iii) Inspections of an optional nature, if adopted, should be recorded. It is recommended that such inspections, when strongly recommended by the manufacturers, should either be adopted or the justification for non-adoption be recorded.

(iv) When a mandatory requirement can be complied with via a choice or combination of options, the method of compliance must be recorded, and where compliance is by a series of progressive actions, the extent of compliance must be kept accurately on record.

(v) When raising log books for imported aircraft, engines or propellers, a copy of the C of A for Export should be attached. After C of A renewal, the cut-off point used in the review of the technical record should be highlighted. Usually, in log books this is achieved by ruling off the affected page, recording totals for each column and continuing on a fresh page.

(b) **Overhauls.** Details of any overhauls should be included in the relevant log book, except that where the details are contained in another document such as an Approved Certificate or equivalent foreign certification acceptable to the DCA, it is only necessary to make a cross-reference in the log book to identify the document. Such documents should be retained as part of the record.

(c) **Replacements**

(i) Details of any replacements should be included in the relevant log book. Where any component is the subject of a life control system, it must be possible to readily establish the status of such components relative to the life control system.

(ii) Various methods are available to prove component status but two are perhaps more common, i.e. component listings and component cards. These cards must include the date and aircraft hours or other parameter(s) at which the item was fitted and the remaining life available on the item. Note that lives can be expressed in a number of parameters apart from hours flown, and the record must be made in terms of whatever parameter is specified by the manufacturer. Particular care must be exercised where a component is the subject of a mandatory requirement to ensure that the component fitted is always in compliance with the requirement.

(iii) Where component life control is by on-condition monitoring then the performance control parameter(s) should be recorded (where possible in a way that shows any deterioration progressively) and the record kept must be compatible with the statistical system in use. In all cases the record of component changes, or the history of rectification of a system defect should show the precise identity of items removed and fitted and all known detail of life available and expended, in addition to the reason for the work.

(iv) When a major component such as an engine, wing flap, etc. is changed, a record of all parts or accessories transferred from the removed item to the fitted item should be made, showing when necessary, remaining life available. Any serviceable items being re-used without re-lifing should follow a similar procedure. The information recorded should include the origin and prior location of the item. It is thus clearly vital that parts recovered from out-of-use aircraft or major assemblies for possible future re-use must, at the time of recovery, only be considered acceptable if their history of use is genuinely known and on record and their condition established by an Organisation approved for the purpose. Where a component has been recovered from an aircraft involved in an incident/accident, then conditions for its use must be agreed with the BCAD.

(d) Repairs

(i) A summary of any repair must be recorded including the reason for the work, with reference to supporting documentation, and must be accompanied by a CRS.

(ii) The log book record must include proof of origin of all materials and parts used, unless the organisation concerned is BCAD Approved and has an alternative method approved by the BCAD for the control of procurement and, use of materials or parts and holds a record in a referenced workpack of the origin of parts used

(iii) Any record of repair involving welding should include the welder's Approval number, in addition to a CRS which must be issued by the person taking responsibility for the work,

(e) Modifications

(i) All modifications must be recorded in the appropriate log book and when required, in the Modification Record Book, quoting the title and the authorisation. This can take the form of an STC or STA number issued by the FAA or Transport Canada, a UKCAA major modification approval reference, an Alert Service Bulletin, Service Bulletin or other document issued by an organisation taking design responsibility for the modification under an approval by a foreign authority acceptable to the DCA. All supporting documents such as drawings, Supplemental Type Certificate, etc. should be listed or, if kept separately, cross-referenced to.

(ii) When the modification is satisfying a mandatory requirement the record should highlight this fact and should be cross-referred in the separately maintained record of compliance with mandatory requirements, showing clearly the extent of compliance.

5.2.2 Aircraft Log Books

(a) The identity of the engine and where appropriate, any propellers should be included. In the case of fixed-pitch propellers for which no log book is required, the Aircraft Log Book is likely to be the only location of such information.

(b) It is usual to make provision for a range of rigging information with datums

and tolerances, the completion of which would normally be the responsibility of the constructor or the person who initially issues the log book.

5.2.3 **Engine Log Books**

(a) The installed location of the engine and the identity of the aircraft to which it is fitted should be shown. The Engine Inspection and Test Certificate and the Export C of A should be fixed into the log book. This Test Certificate should include the latest issue of the Engine Type Certificate Data Sheet and reference to inspection and test records and a list of parts subject to individual life control (overhaul, ultimate etc.).

(b) For engines of modular construction, a log must be maintained for each module and the log must be treated as part of an engine's technical record for as long as it is installed on the particular engine. The module record should include full identity details, history of use, a record of flight times and cycles and maintenance and rectification work carried out. All life-limited components must be identified with their limiting parameters shown, e.g. the maximum permitted number of thermal cycles and proportion of life remaining. The log for that module which carries whole-engine identity and the Data Plate should in addition, carry a record of module changes with identities as well as all the information normally required in an Engine Log Book. Each module record should have attached the manufacturers or overhaulers document approximating to the Engine Inspection and Test Certificate issued for a whole engine.

5.2.4 **Variable-Pitch Propellers.** The basic pitch setting should be recorded whenever it has been set, altered or verified. The identity of individual blades should be included initially and then maintained, since the log book associates with the hub.

6 THE UPKEEP OF LOG BOOKS

6.1 Permanent legibility is the keynote. Handwritten entries must be made in ink or indelible pencil. Any document kept in or with the log book should be either securely attached or kept in an attached pocket but should not prevent reference to the page to which it is attached.

6.2 Initiation of a continuation log book is the responsibility of the user and he should transfer sufficient data for continuity and number the log books consecutively.

6.3 Each completed column of figures should be totalled and carried forward.

6.4.1 Any error should be corrected but remain legible. The corrections should be signed. In a machine system, errors discovered after the data has been inserted into the memory should be corrected by a new entry not an erasure and the correct entry annotated as a correction with an authorisation code.

6.5 All record keepers must remain aware of those actions which constitute offences under the BCARs.

7 TRANSFER OF RESPONSIBILITIES FOR UPKEEP OF A LOG BOOK SYSTEM

- 7.1 After a log book or records system changes hands, it remains the responsibility of the previous operator or keeper to retain the existing record intact, except that if the new operator or keeper demands custody of the existing records, it is a requirement that the previous keeper complies with the demand, at which time full responsibility for the record is also transferred. A new operator should ensure that the records reflect the new situation and any change of ownership if applicable.
- 7.2 Where an alternative form of Technical Records system was being utilised, continuation by a new owner, operator, or maintenance organisation, or the introduction of any other system may not be made without the prior approval of the BCAD
- 7.3 All log books and associated records must be retained until two years after the aircraft engine or propeller is destroyed or permanently withdrawn from use, whoever may be the custodian of the records

8. LOST OR DESTROYED RECORDS

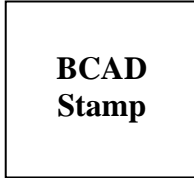
- 8.1 Occasionally, the records for an aircraft are lost or destroyed. The BCAD will require a full statement in writing as to the circumstances of the loss or destruction and will consider what action is appropriate.
- 8.2 In order to re-construct the records, it is necessary to establish the total time in service of the airframe. This can be done by reference to other records that reflect time in service, research of records maintained by repair facilities, and reference to records maintained by approved organizations and individuals. When these things have been done and the record is still incomplete, the owner/operator may make a notarized statement in the new record describing the loss and establishing the time in service based on the research and the best estimate of time in service.
- a). The current status of applicable ADs may present a more formidable problem. This may require a detailed inspection by a maintenance organization to establish that the applicable ADs have been complied with. It can be readily seen that this could entail considerable time, expense and might require re-compliance with the AD
- b). Other items required by BCARs and described in this AAC such as the current status of life limited components, time since last overhaul, current inspection status and current list of alterations and modifications may present difficult problems. Losing records is extremely troublesome, costly and time consuming. Safekeeping of the records is an integral part of a good record keeping system.

- 8.3 The decision to allow the production of a replacement Log Book will be made by the BCAD.
- 8.4. In order that records may be reconstructed and a replacement Log Book accepted, it will be necessary to re-establish the maintenance and modification status. The following will have to be determined, which may require additional maintenance.
- (a) Compliance with the maintenance schedule.
 - (b) The overall status of the airframe, engine(s), propeller(s) and components.
 - (c) Total flying hours since new and/or since overhaul.
 - (d) Compliance with the manufacturers service bulletin, service letters, airworthiness directives and any other appropriate service information.
- 8.5 The following entries should be made in a replacement Log Book by the operator or his appointed agent.
- (a) The name of the constructor, the type of aircraft (engine or propeller), the number assigned to it by the constructor and the date of construction.
 - (b) The nationality and registration marks of the aircraft.
 - (c) The name and address of the registered operator of the aircraft.
 - (d) A statement describing the loss of the original Log Book.
 - (e) The total time since new or overhaul, as appropriate.
 - (f) Particulars of all maintenance work performed in re-establishing the status of the aircraft, engine or propeller, including Certificates of Release to Service, in compliance with paragraph 8.4.
 - (g) Particulars of any previous overhauls, repairs, replacements, inspections and modifications that have been ascertained by research. Particulars of the Authorised Release Certificates, work pack references etc., which have been used in the reconstruction of the records, should be included.

In some cases it may not be possible to accurately establish the time in service, or time since last overhaul etc. and only a best estimate can be made. Where this situation exists, the associated Log Book entry should clearly state that it is an estimate. It therefore follows that when an Inspector signs the Log Book he is stating that he has found the estimate to be acceptable.

- 8.6 When the BCAD Inspector is satisfied with the reconstructed records and the certified Log Book entries, a statement should be entered in the Log Book as follows:

The Barbados Civil Aviation Department has accepted that the original Log Book is lost/destroyed/no longer available*. This replacement Log Book constitutes an accurate record based on the evidence available and is acceptable to the DCA.



..... **Inspector**

For the Director of Civil Aviation

Date:

*** Delete as appropriate**