



NIGERIA CIVIL AVIATION AUTHORITY

Advisory Circular

NCAA-AC-AWS003

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AIRCRAFT MAINTENANCE PROGRAMME - COMMERCIAL AIR OPERATORS

1.0 PURPOSE

This advisory circular is issued to provide guidance information on the regulatory requirements that relate to preparation of a maintenance program for an aircraft engaged in commercial air transport. It gives general information, and explains procedures that would guide an operator to prepare an acceptable aircraft maintenance program as required by Regulation 3.2.2 of Part 9 of the Nigeria Civil Aviation Regulations.

2.0 REFERENCES

- 2.1 [Part 9](#) of the Nigeria Civil Aviation Regulations.
- 2.2 Regulation [5.1.3 of Part 5](#) of the Nigeria Civil Aviation Regulations.
- 2.3 Regulations [5.5.1.2](#) and [5.6.1.4](#) of the Nigeria Civil Aviation Regulations.

3.0 GUIDANCE AND PROCEDURE

3.1 Interpretations

- 3.1.1 **Maintenance Program** – means a document which describes the specific scheduled maintenance tasks, their frequency of completion and related procedures, such as a reliability program,
- 3.1.2 **Applicability** – the requirement of an approved maintenance program applies to all aircraft registered in Nigeria that shall or are engaged in commercial air transport, ref. Regulation 5.1.3 of Part 5 of the Nigeria Civil Aviation Regulations. It is required that during the aircraft certification process the air operator presents the maintenance program applicable to the aircraft operation in question to the Authority for approval.
- 3.1.3 **Maintenance responsibility** – Regulation 3.2.2 of Part 9 of the Nigeria Civil Aviation Regulations requires that an Air Operator Certificate (AOC) holder ensures the airworthiness of the aircraft and the serviceability of both operational and emergency equipment by carrying out maintenance on the aircraft in accordance with the approved

operator's aircraft maintenance program. It is the operator's responsibility to ensure that each aircraft released to service is airworthy;

3.2 Maintenance Program Requirements

3.2.1 The aircraft maintenance program should be based on aircraft maintenance program information made available by the State of Design or by the organization responsible for the type design. For large aero plane, this information is normally issued in the form of a maintenance review board report for the particular aircraft type, for small aircrafts it is normally included in the aircraft maintenance manual.

3.2.2 It is recommended that the air operator utilizes relevant, current manufacturer's recommended maintenance program time intervals and maintenance processes.

3.2.3 Deviations from the manufacturer's recommended maintenance practices, time intervals and maintenance processes may be approved by the Authority but only after the air operator has presented acceptable justification.

Note:

(i) *Scheduled maintenance intervals may be extended by the Quality Manager on request up to 10% only of the prescribed period, however the extended shall be subtracted from the next maintenance interval.*

(ii) *The Authority should be notified any time any variation is applied.*

3.2.4 Where the operations include ETOPS, it is required that the operator takes account of the special requirements of ETOPS. The ETOPS maintenance program provides standards, guidance and direction necessary to support the intended operations. Maintenance personnel involved should be aware of the special nature of ETOPS and they should have the knowledge, skills and ability to accomplish the requirements of the program.

3.3 Maintenance Program Contents

3.3.1 An approved maintenance program shall include the following:

- a) Maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aircraft;
- b) A continuing structural integrity and corrosion control program;
- c) Procedures for changing or deviating from the established standards.

Note: Any approved extension to schedule maintenance inspection should be deducted from the next inspection interval period.

- d) Where applicable, condition monitoring and reliability program descriptions for aircraft systems, components and power plants.
- e) The maintenance certificates to be issued for the maintenance functions.
- f) The persons authorized to sign the maintenance release certificates.

- g) Life-limited items and components control system.
- h) Unscheduled Maintenance. e.g.
- (i) Mechanical irregularities occurring during flight time, such as hard landings, overweight landings, lightning strike or crew observed operation and function defects.
- (ii) Inspection irregularity findings: structural, mechanical, operational and functional.
- i) Maintenance functions (e.g. component removal, replacement, and system adjustments) that may require carrying out a pre certification test flight to ensure safe performance and operation.
- j) Performance test flight schedule for the maintenance functions that require pre-certification flight testing.
- k) Critical Maintenance Inspection Items that require a duplicate inspection; these include, but not limited to:
 - (i) Installation, rigging, and adjustments of engine and flight controls;
 - (ii) Installation and repair of major structural components;
 - (iii) Installation of aircraft engines, propellers, and rotors;
 - (iv) Calibration, or rigging of components such as engines ,propellers,
 - (v) Transmissions, gearboxes, and navigation equipment.
- l) **Off the Aircraft Maintenance** – Overhaul and Repair of Engine, Propeller, and Appliance, whether scheduled or unscheduled, may be independent from maintenance performed on the aircraft. However, the tasks shall be performed in accordance with the procedures approved by the authority, and in compliance with the current manufactures instructions and standards.

Notes:

- (i) *It is required to develop independent Inspection Check List or Work Package task cards for each scheduled periodic maintenance check (e.g. Daily Inspection Check List, 200hrs. Inspection Work Package task cards etc), with the details and depth of the required inspection which shall be used by the maintenance personnel when performing the inspection tasks, and where applicable indicate the relevant maintenance manual reference.*
- (ii) *The inspection check lists or task cards shall in addition have provisions for the mechanic and the authorised engineer’s signature to certify completion of the task.*
- (iii) *To minimize Scheduled Continuous Airworthiness records paper work, a separate signature sheet that references the specific periodic inspection, the check list or task card item and the applicable aircraft registration may be used.*
- (iv) *The certified inspection signature sheets shall form part of the aircraft maintenance inspection records.*

m) SPECIFIC MAINTENANCE REQUIREMENTS.

Referenced to Nigeria Regulations

1. **AIRCRAFT BATTERY CAPACITY CHECKS.** Aircraft batteries shall be maintained in accordance with the manufacturer's recommendations. In the absence of any manufacturer's instructions the following periods apply:

- a. Lead acid Battery - not exceeding 3 months: capacity check, bench test
- b. Ni-Cad Battery - not exceeding 4 months: capacity check, bench test.

2. **EMERGENCY EQUIPMENT.** The required Emergency Equipment will be maintained to a programme based on the equipment manufacturer's recommendations. In addition, the following requirements are complied with in the Maintenance Programme:

Emergency equipment is to be checked for correct complement, stowage, installation and expiry date(s) at suitable periods.

First Aid Kit(s) contents are checked at periods not exceeding 12 months.

3. **EMERGENCY ESCAPE PROVISIONS (as applicable)**

- a. Portable Valise Type Life rafts. At the appropriate Overhaul Period, 10% of all life rafts installed in fleets will be test inflated using system bottle and release mechanisms.
- b. Door and Escape Chutes/Slides. Shall be maintained in accordance with the manufacturer's recommendations
- c. Emergency Exits/Hatches. All emergency exits and hatches are functioned by both internal and external means at periods specified in this Maintenance Programme. In the absence of manufacturer's specific recommendations these occur at suitable periods not exceeding 6 months elapsed time.

4. **FLEXIBLE HOSES.** Flexible hoses shall be inspected, overhauled or life limited in accordance with the manufacturer's recommendations.

In the absence of manufacturer's recommendations, hoses shall be subject to a programme of pressure testing at periods not exceeding 6 years from installation and 3 yearly thereafter, or in accordance with an alternative programme as agreed by the NCAA.

5. **FUEL/OIL SYSTEM CONTAMINATION CHECKS.** Consumable fluids, gases etc. uplifted prior to flight will be of the correct specification, free from contamination, and correctly recorded

Fuel system water drain checks are to be carried out in accordance with the MCM /CAME procedures.

The procedures shall be in accordance with the manufacturer's recommendations. In the absence of manufacturer's recommendations, the frequency of the water drain checks shall be approved by the NCAA.

6. **PRESSURE VESSELS.** Oxygen/Nitrogen pressure vessels are to be overhauled or tested in accordance with manufacturer's recommendations. In the absence of any such recommendations the periods specified in British Standard Institute Standard (BSI) BS5430 are applied.

7. **SEAT BELTS AND HARNESSSES.** In the absence of manufacturer's recommendations, all installed seat belts and harnesses shall be subject to a programme of Detailed Visual Inspection at periods not exceeding 6 months.

8. **AIRWORTHINESS NOTICES.** NCAA Airworthiness Notices (or All Operators' Letter) detail additional maintenance requirements. Procedures are in place to assess all

Referenced to Nigeria Regulations

Airworthiness Notices on a continuing basis for applicability to aircraft maintained to this Maintenance Programme. Where necessary relevant maintenance tasks are included in the Maintenance Programme.

- 9. VITAL POINTS AND CONTROL SYSTEMS.** Whenever inspections are made or work is undertaken on vital points, flying or engine control systems, a detailed investigation must be made on completion of the task to ensure that all tools, rags or any other loose articles which could impede the free movement and safe operation of the system(s) have been removed and that the system(s) and installation in the aircraft zone are clean and unobstructed.

If, as a result of the application of tasks associated with the programme, any part of either the main or any associated system is dismantled, isolated, adjusted, repaired or renewed, that part of the system(s) which has been disturbed shall be subjected to an independent inspection in accordance with Nig.CARs 5.6.1.5

- 10. MAINTENANCE APPLICABLE TO SPECIFIC AEROPLANE OPERATIONS.** The Maintenance Programme contains the necessary tasks required to ensure continued compliance with additional special authorisations/approvals:

- a. Automatic Approach and Automatic Landing CAT I /CAT II /CAT IIIa / CAT IIIb
- b. Minimum Navigation Performance Specifications (MNPS)
- c. Reduced Vertical Separation Minima (RVSM)
- d. Extended Range Operations with two-engined aeroplanes (ETOPS) Sea Pilot transfers
- e. Offshore operations
- f. Helicopter Emergency Medical Service (HEMS) Transportation of Dangerous Goods
- g. Other (Specify)

- 11. CUSTOMER FURNISHED EQUIPMENT (CFE/VFE/BFE).** The Maintenance Programme contains the necessary tasks required to ensure continued airworthiness of additional equipment fitted to this aircraft.

- 12. ENGINE AND APU MAINTENANCE PROGRAMME.** The Maintenance Program should include both engine on-wing and off-wing tasks as contained in the applicable Engine/APU Maintenance Manual Chapter 4 & 5.

- 13. FLIGHT RECORDER SYSTEMS Reference: Nig.CARs IS 7.8.1.4**
Approval, Operational Serviceability and Readout of Flight Recorder Systems.

The Maintenance Programme should contain the necessary tasks required to ensure that the Flight Data Recorder System(s) remain serviceable with regard to the parameters to be recorded and the duration of recording.

Inspections of Flight Recorder System

For aircraft required to be equipped with any type of recorder: Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, will be monitored by manual and/or automatic checks.

Flight data recording (FDR) systems or aircraft data recording systems (ADRS), cockpit voice recorders (CVR) systems or cockpit audio recording systems (CARS), and airborne image recorders (AIR) systems or airborne image recording systems

Referenced to Nigeria Regulations

(AIRS) shall have recording system inspection and analysis intervals of 12 months. Nig.CARs IS 7.8.1.4 contains the specific requirements for the inspections and analysis

Calibration of Flight Recorder System

The FDR system will be calibrated as follows:

- (a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out **at least every five years or in accordance with the recommendations of the sensor manufacturer** to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
- (b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as **recommended by the sensor manufacturer, or at least every two years**

14. MODE "S", "C" TRANSPONDER ICAO 24-BIT AIRCRAFT ADDRESSES

The correct Mode S address should be periodically confirmed for each transponder installed on the aircraft, via a field test set at an appropriate maintenance opportunity (not to exceed a 2 year periodicity). This task should be incorporated into the Approved Maintenance Programme.

15. IN-FLIGHT ENTERTAINMENT SYSTEMS (IFE) The Maintenance Program should include IFE maintenance tasks as recommended by the OEMs/vendors.

16. COCKPIT VOICE RECORDERS

Reference: Nig.CARs IS 7.8.1.4(b) (5 & 6)

The maintenance programme should contain the necessary tasks required to ensure the Cockpit Voice Recorder (CVR) system remains serviceable. In the absence of maintenance tasks being prescribed by the TC / STC holders or original equipment manufacturer, the **annual inspection** specified in the referenced Nig.CARs shall be followed. Also, if the interval specified by the TC/STC holder is less restrictive than the Nig.CARs interval, the more restrictive interval shall be followed.

17. COMPASS SWING

The Maintenance Program should contain the necessary tasks required to ensure that the Compass Swing is carried out as per manufacturer's recommendation. In the absence of any manufacturer's instructions the following periods apply.

- a. 1 year for compasses in aircraft intended for IFR flight or Commercial Air Transport.
- b. 2 years for aircraft intended only for VFR flight and not to be flown at night or for instrument flight training.

18. AIRCRAFT WEIGHING

The Maintenance Program should include the aircraft weighing details. The following should be used as guide:

- a. The aircraft will be weighed and the position of its centre of gravity determined as contained in the Instructions for continuing airworthiness

published by the TCDS Holder.

- b. Modifications, repairs or aircraft painting which may adversely affect the weight and performance of the aircraft should result in the weighing of the aircraft.
- c. In the absence of the published instruction in (a) above or the maintenance event in (b) above, the aircraft should be weighed at five year intervals or at such other times as the NCAA may require.

3.4 Application of the Approved Maintenance Program – Instructions, standards and procedures to be followed when applying the provisions of the approved maintenance program, including the recording of scheduled and unscheduled maintenance should be defined in the operator's Maintenance Control Manual (MCM).

3.5 Maintenance Organisation – The approved maintenance program functions must be carried out at a Approved Maintenance Organisation,.

3.6 Release to Service

3.6.1 The aircraft shall be returned to service by a Maintenance Organisation approved by the Authority, which as such is responsible for meeting the requirements of IS 4.1.1 of Part 6 of the Nigeria Civil Aviation Regulations.

3.6.2 A person approving the return to service of an aircraft or aircraft component after any inspection performed in accordance with Part 8 of the Nigeria Civil Aviation Regulations, shall make entries on the certificate of release to service and or in the maintenance record of that equipment, information as required by Part 5 of the Nigeria Civil Aviation Regulations.

3.6.3 It is required that the operator maintains a listing of persons authorized to release the aircraft to service after maintenance even when some of the maintenance is subcontracted to other organizations. The authorized signatories shall be identified by name, occupational title, and the authorization limitation.

3.7 Approval Process

3.7.1 The maintenance program should be submitted to the Authority for approval.

3.7.2 The maintenance program shall be evaluated. When the Authority is satisfied with the program the list of effective pages is stamped and signed approved and returned to the operator. A copy of the approved program will be retained by the Authority.

3.7.3 In the case of foreign registered aircraft, it is required that the maintenance program be approved by the State of Registry. It is then evaluated, and accepted by the Authority if satisfactory.

3.7.4 If discrepancies are found, a notice listing specific discrepancies found and recommendations, outlining what will be required to correct the discrepancies is issued to the operator.