

PROCEDURES FOR PRESERVATION, CUSTODY AND DISPOSAL OF FDR RECORDS

1.0 PURPOSE

- 1.0.1 This Advisory Circular (AC) is issued to provide guidance information on procedures for preservation, custody and disposal of FDR records in accordance with the Civil Aviation Regulations. The aircraft maintenance reliability program is a subsection of an approved aircraft maintenance program. The fitment of FDR/DFDR is made mandatory in twin-engine aircraft where Special Type Certificate (STC) is available or where the manufacturer has included this equipment as a part of the Type Certificate.
- 1.0.2 It gives practices acceptable to the Authority with regard to development, management and approval of aircraft maintenance reliability control programs using the Manufacturer Maintenance Planning Document which establish the criteria for classifying maintenance processes.
- 1.0.3 This Advisory Circular (AC) cancels CAA-AC-OPS029 dated July 2020.

2.0 REFERENCES.

- I Regulation 22 of the Civil Aviation (Air Operator Certification and Administration) Regulations, 2022.
- II Regulation 34 to 36 of the Civil Aviation (Instrument and Equipment) Regulations, 2022

3.0 GUIDANCE AND PROCEDURES

3.1 General:

- 3.1.1 The Reliability Control Program focuses on maintaining failure rates below a predetermined value; i.e., an acceptable level of reliability. The maintenance philosophy, consideration of operational and environmental factors, record keeping systems, the extent and scope of the operator's application of reliability control, are reflected and defined in his own reliability programme document.
- 3.1.2 There are four general categories of an operator's maintenance programme:
- a. Systems/components;
 - b. Power plants/components;
 - c. Aircraft/engine checks and inspections; and

d. Structural inspection/overhaul.

- 3.1.3 All four may be controlled by a composite programme, or each may be handled individually. The programme can encompass a select group of items from a category without affecting other controls for the remaining items of that category. For example, the basic engine might be maintained by a programme that does not include its accessories. The accessories could be on another programme or they could be under traditional operations specifications control.
- 3.1.4 Statistical analysis is most effective in its application to systems and components because the occurrence of failures can be readily reduced to meaningful statistics. When alert rates are used in the analysis, graphic charts (or equivalent displays) show areas in need of corrective action. Conversely, statistical analysis of inspection findings or other abnormalities related to aircraft/engine check and inspection periods requires judgmental analysis. Therefore, programmes encompassing aircraft/engine check or inspection intervals might consider numerical indicators, but sampling inspection and discrepancy analysis would be of more benefit.
- 3.1.5 The three Primary Maintenance Processes utilized by maintenance programmes are:
- a. hard-time;
 - b. on-condition; and
 - c. condition-monitoring.
- 3.1.6 Each programme should include specific definitions of the processes it uses and how they are applied. The detailed requirements for the condition-monitoring process are included in the Airline Manufacturer Maintenance Planning Document which is issued by the manufacturer.

3.2 Action Required

In order to ensure that the recording integrity of FDR/DFDR units for carrying out investigation of accidents /incidents and for monitoring the performance of aircraft systems and the performance of flight crew with regard to adherence to operation limitations given in the flight manual, the following action is required:

- 3.2.1 All operators are required to carry out an FDR/DFDR readout at their own or any approved facility as per the frequency given in this AC for each serial number of the unit operated by them. Proper records are to be maintained for the readouts and evaluation carried out by the operator, which should be authenticated by the QCM for satisfactory recording and for completion of the specified hours of the FDR spool. The calibration chart for the foil type FDR already installed must be available in order to enable proper decoding and interpretation of the results.
- 3.2.2 One copy of each DFDR readout and FDR foil, after evaluation by the operator, may be forwarded to UCAA, for carrying out a confirmation test on the proper recording and calibration of FDR/DFDR. The FDR foil or the readout should be clearly marked with the following information:
- a. Model and the Serial number of the FDR/DFDR unit
 - b. Registration marking of the aircraft on which installed period of operation.

3.2.3 While evaluating the readout, amongst other aspects, the following aspects should be checked:

- a. Recording of all parameters
- b. Continuity of Data
- c. Whether the parameters recorded are realistic for the particular phase of flight.
- d. Exceedance of critical parameters such as EGT, Engine RPM / vibration, Engine oil pressure, rate of climb/descent, 'g' values during cruise and landing, and any other parameter exceedance which may affect the safety of aircraft.

3.2.4 Whenever malfunctioning or unsatisfactory recording is observed during the in-house performance check, immediate corrective action should be taken by the QCM and proper record of removal and corrective action taken should be maintained.

3.3 Standardization of life of FDR

3.3.1 Overhaul life for the following FDR unit has been fixed as below:

Type of FDR Maintenance Programme Periodicity (In hours)

TYPE OF FDR	MAINTENANCE PROGRAM	PERIODICITY IN HRS
Sunstrand 573B	Hard Time	6000
Sunstrand 980-4100	Hard Time	6000
Lockheed 209	Hard Time	B/C 4000, O/H 1500
Fairchild 17M800	Hard Time	B/C 4000, O/H 8000
Fairchild SS FDR	On Condition	B/C 4000
Bur-1	Hard Time	F/C 500, B/C 1000, O/H 2000

B/C – Bench Check
O/H – Over haul
F/C – Function Check

3.3.2 Such of those operators who have an approved TBO less than proposed above for the particular type may be permitted to develop the life as per approved life development programme in phases.

3.3.3 All operators are advised to note that while proposing the periodicity, nature of maintenance and life of major components, manufacturers recommendations should be given overriding consideration. The life followed by other operators using similar type of unit by the same manufacturer should be considered to standardize life limitation in respect of equipment's/components.

3.4 Requirements

3.4.1 Scheduled and non-Scheduled Operators

a. Scheduled Operators

- (i) Tape based recorders
FDR monitoring frequency -90 days
- (ii) Solid State recorders
CAA officials (Flight Recorder Lab) will carry out Random sampling of flight data obtainable from the recorders (FDR) installed on various aircraft.

b. Non Scheduled Operators

- (i) Tape based recorders
FDR monitoring frequency -90 days
- (ii) Solid State recorders
FDR monitoring frequency - 365 days/ 1 year
In addition, CAA officials may carry out Random milking from non- scheduled operators at any time of choice.

3.4.2 Preservation of Flight Recorded records

Purpose

This AC is also intended to provide information to air operators, flight crew members and ground personnel regarding the training required to disable appropriate circuit breakers for the preservation of recorded data on cockpit voice recorders (CVR) and flight data recorders (FDR) following an accident or an incident.

- a. No person shall erase any communications pertaining to the flight being undertaken that have been recorded by a cockpit voice recorder.
- b. It is expected that the appropriate steps for disabling of a FDR and/or CVR following an accident or incident will be included in these procedures.
- c. An air operator's training program should include initial and annual training on emergency procedures. This training should include procedures for disabling the FDR/CVR following an accident or incident, and must be provided to flight crew members and ground personnel.

Actions

Air operators are requested to review their training programs to ensure all flight crew members and ground personnel receive adequate training with regard to the proper procedures to safeguard on-board recorded data following an occurrence. In order to meet the above stated requirements of the CARs, the following training should be provided to the flight crew members and ground personnel during initial and recurrent training sessions:

- a. Initial and annual recurrent training that addresses the importance of preserving information held on a CVR and/or FDR;
- b. Initial and annual recurrent training that addresses the proper procedures for disabling a CVR/FDR following an incident or accident;
- c. Awareness of the consequences of incorrectly disabling a CVR and/or FDR following an incident or accident; and
- d. The Air Operators training program should contain a provision that ensures all flight crew members and ground personnel are trained regarding any specific aircraft differences or procedures concerning the disabling of a CVR and/or FDR.

3.4.3 The maintenance reliability program must reflect the application of the following control systems.

- a. data collection;
- b. data analysis;
- c. corrective action;
- d. performance standards;
- e. data display and report;
- f. maintenance interval adjustment and process change, and;
- g. programme revision.

3.4.4 These systems explain the framework which the operator can use to develop his particular reliability programme.

3.5 **Data collection system**

Typical sources of performance information are as follows, however, it is not implied that all of these sources need be included in the programme nor does this listing prohibit the use of other sources of information:

- a. Pilot reports;
- b. In-flight engine performance data;
- c. Mechanical interruptions/delays;
- d. Engine shutdowns;
- e. Unscheduled removals;
- f. Confirmed failures;
- g. Functional checks;
- h. Bench checks;
- i. Shop findings;
- j. Sampling inspections;
- k. Inspection write ups; and
- l. Service difficulty report Mechanical Reliability Reports (MRR).

3.6 **Data analysis system**

Data analysis is the process of evaluating mechanical performance data to identify characteristics indicating a need for programme adjustment, revision of maintenance practices, hardware improvement (modification), etc. The initial step in analysis is the comparison of the data to a standard representing acceptable performance. The standard may be a running average, tabulations of removal rates for past periods, graphs, charts, or any means of depicting a "norm."

3.7 **Corrective action system**

The actions to be taken are a reflection of the analysis and should be positive enough to effectively restore performance to an acceptable level within a reasonable time. The system should provide periodic feedback until such time as performance has reached an acceptable level. Special provisions should be included for critical failures; i.e., failures in which loss of the function or secondary effects of the failure impair the airworthiness of the aircraft.

3.8 **Statistical performance standards system**

A performance measurement expressed numerically in terms of system or component failures, pilot reports, delays or some other event (bracketed by hours of aircraft operation, number of landings, operating cycles, or other exposure measurement) serves as the basis for the standard.

3.9 **Data display and report system**

Programmes incorporating statistical performance standards (alert type programmes) should develop a monthly report, with appropriate data displays, summarizing the previous month's activity. The report should cover all aircraft systems controlled by the programme in sufficient depth to enable the Authority and other recipients of the report to evaluate the effectiveness of the total maintenance programme. It should highlight systems which have exceeded the established performance standards and discuss what action has been taken or planned. The report should explain changes which have been made or are planned in the aircraft maintenance programme, including changes in maintenance and inspection intervals and changes from one maintenance process to another. It should discuss continuing over-alert conditions carried forward from previous reports and should report the progress of corrective action programmes.

3.10 **Maintenance interval adjustments**

Maintenance interval adjustments should not interfere with an ongoing corrective action. Special procedures for escalating systems or components whose current performance exceeds control limits should be provided.

3.11 **Programme revision system**

The programme should include a procedure for revision which is compatible with the Authority approvals.

The programme areas requiring formal Authority approval include any changes to the programme that involve-

- a. Any of the program control systems.
- b. Adding or deleting components/systems.
- c. Adding or deleting aircraft types.
- d. All procedural and organizational changes concerning administration of the programme.

3.12 **Program Administration**

- 3.12.1 Administration of reliability programmes (as discussed in this circular) requires a specific organizational structure within the operator's maintenance organization. Participants of the reliability programme and ministration team should be drawn from appropriate elements of the organization and should be authorized to act on behalf of their elements. In any case however, the Manager Quality should be responsible for the management of all the approved activities of the reliability programme.

- 3.12.2 The reliability programme administration team may vary from one operator to another. It may have a technical board that analyses performance deteriorations and shop findings to make determinations that may be acted on by an administrative board. The two boards can be combined if this better serves the needs of the particular operator. The board type of administration should entail meetings scheduled for some specified interval and should provide for assembling a board at any time a decision is needed.
- 3.12.3 In the absence of a formal administration team, operators with sufficient organizational capability may designate or assign appropriate responsibilities to specific element of the operator's organization.
- 3.12.4 It is important to know that the effective management of the established procedures of operating each system is essential to the success of the programme. These procedures should be incorporated in appropriate sections of the operator's manual system. Forms should be used, as necessary, to facilitate and document recurring transactions that involve several elements.

3.13 **Reliability Programme Document**

- 3.13.1 The operator should develop a document describing the application of reliability control methods this document should include at least the following:
- a) General description of the programme;
 - b) Organizational structure, duties and responsibilities;
 - c) Description of the individual systems;
 - d) Derivation of performance standards (if used);
 - e) Changes to the programme including designation of changes requiring Authority approval;
 - f) Copy and explanation of all forms peculiar to the system; and
 - g) Revision control and certification of revisions to the document.
- 3.13.2 The document should describe the workings of all systems in sufficient detail to provide for proper operation of the programme. It should include in detail how the three maintenance processes are applied. The document should describe the monthly report and any other reports relative to the programme, and include samples of these reports with instructions for their use. The organisational element(s) responsible for publishing reports should be identified and the distribution should be stated. Copies of pertinent reports should be provided to the Authority.
- 3.13.3 The document should also include definitions of significant terms used in the programme with particular emphasis on definitions of the three maintenance processes.

4.0 PROGRAMME APPROVAL

4.1 Initial Approval

- 4.1.1 The programme document and related data should be submitted to the Authority in the form and manner prescribed. Guidance on the submission will be provided at the Pre-Application Meeting.
- 4.1.2 Approval will be certified with the organization maintenance programme document and specified in the Operations Specifications.

4.2 Revision Approval

Amendments to the Reliability Programme shall be subjected to a review, evaluation and approval process before incorporation. It is important to take in consideration the impact of the proposed amendments on the overall organisation manual system.

