

CHAPTER 142. MONITOR FLIGHT DATA RECORDERS

SECTION 1. BACKGROUND

1. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODES.

A. Maintenance:

- Ramp Inspection: 3627
- Spot Inspection: 3628
- Cockpit En Route Inspection: 3629

B. Avionics:

- Ramp Inspection: 5627
- Spot Inspection: 5628
- Cockpit En Route Inspection: 5629

3. OBJECTIVE. This chapter provides guidance for monitoring flight data recorders (FDR), to ensure that performance levels are maintained.

5. GENERAL.

A. Definitions:

(1) *Flight time (airplanes):* The time from the instant the airplane begins the takeoff roll until the airplane has completed the landing roll

(2) *Flight time (rotorcraft):* The time that the rotorcraft begins liftoff until the time that the rotorcraft has landed at its destination

B. A review of data extracted from FDR's has shown a significant loss of data during takeoffs, touchdowns, flights through turbulence, and unusual vibration situations. Due to these data losses, Avionics Aviation Safety Inspectors (ASI) need to ensure that an air carrier's monitoring procedures and inspection schedules will maintain the required FDR performance levels.

C. State-of-the-art advancements in certain digital FDR's incorporate the use of continuous self-monitoring and fault condition alert capabilities. These types of digital FDR's are being accepted by airlines as new or direct replacements for foil recorders.

D. FDR Regulatory Requirements.

(1) FAR Section 91.609(b) requires that certain aircraft be equipped with one or more approved digital

FDR capable of utilizing a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. FAR Section 91.609(b) applies to aircraft that are operated solely under FAR Part 91; those operators must retain the recorded data as required by FAR Section 91.609(f) for accidents or occurrences requiring notification of the NTSB.

(2) FAR Section 135.152(a) requires that certain aircraft configured with 10 to 19 passenger seats be equipped with one or more digital FDR and specifies the recorder shall retain no less than 8 hours of operation. FAR Section 135.152(d) provides that a FAR Part 135 certificate holder required to comply with Section 135.152(a) shall retain the 8 hours of recorded data prescribed in paragraph (a) until the aircraft has been operating for at least 8 hours of the operating time specified in paragraph (c). Since the recorder is required to retain at least 8 hours of data, compliance with the 8-hour retention requirement of FAR Section 135.152(d) is satisfied for aircraft specified in paragraph (a).

(3) FAR Section 135.152(b) requires that digital FDR be installed in multi-engine turbine-powered airplanes configured with 20 to 30 passenger seats and multi-engine turbine-powered rotorcraft having passenger seating configuration of 20 or more. FAR Section 135.152(d) requires the certificate holder of these aircraft to retain the recorded data specified in paragraph (b) until the airplane has been operated for at least 25 hours, and for rotorcraft until the rotorcraft has been operating for at least 10 hours, of the operating time specified in paragraph (c).

NOTE: FAR Section 135.152(d) originally contained two incorrect references to record retention requirements. (One in the first paragraph and one in the last paragraph.) In both instances the requirements are preceded by the phrase, "except as provided in paragraph (c) of this section." The correct reference is paragraph (e), which states additional requirements in the event the aircraft is involved in an accident or occurrence.

(4) Means of compliance with the retention of data for aircraft specified in FAR Section 135.152(b) will require the use of flight recorders capable of recording, protecting, and retaining at least 25 hours for airplanes and at least 10 hours for rotorcraft.

(5) FAR Section 121.343(a) requires that no person may operate a large airplane that is certificated for operations above 25,000 feet altitude or is turbine-engine powered unless it is equipped with one or more approved flight recorders that record data which may be determined within the ranges, accuracies, and recording intervals specified in Appendix B of this part.

(6) FAR Section 121.343(b) requires that no person may operate a large airplane type certificated up to and including September 30, 1969, for operations above 25,000 feet altitude, or a turbine-engine powered airplane certificated before the same date, unless it is equipped before May 26, 1989, with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium.

(7) FAR Section 121.343(c) requires that no person may operate an airplane specified in paragraph (b) of this section unless it is equipped, before May 26, 1994, with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium.

(8) FAR Section 121.343(d) requires that no person may operate an airplane specified in paragraph (b) of this section that is manufactured after May 26, 1989, as well as airplanes specified in paragraph (a) of this section that have been type certificated after September 30, 1969, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium.

(9) FAR Section 121.343(e) requires that after October 11, 1991, no person may operate a large airplane equipped with a digital data bus and ARINC 717 digital flight data acquisition unit (DFDAU) or equivalent unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. Any parameters specified in Appendix B of this part that are available on the digital data bus must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified.

(10) FAR Section 121.343(f) requires that no person may operate an airplane specified in paragraph (b) of this section that is manufactured after October 11, 1991, nor an airplane specified in paragraph (a) of this section that has been type certificated after September 30, 1969, and manufactured after October 11, 1991, unless it is equipped with one or more flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The parameters specified in Appendix B of this part must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified.

(11) FAR Section 91.609(b) requires that aircraft operated solely under FAR Part 91 must be equipped with one or more approved digital FDR's that are capable of retaining no less than 8 hours of aircraft operation.

(12) FAR Section 135.152(a) requires that certain aircraft configured with 10 to 19 passenger seats be equipped with one or more digital FDR's that are capable of retaining no less than 8 hours of aircraft operation. A FAR Part 135 operator required to comply with FAR Section 135.152(a) must retain the 8 hours of recorded data until the aircraft has been operating for at least 8 hours of the operating time specified in FAR Section 35.152(c). Therefore, the retention period for these aircraft is 8 hours of flight time, excluding the original recording time period.

(13) FAR Section 135.152(d) requires that multi-engine turbine-powered airplanes configured with 20 to 30 passenger seats and multi-engine turbine-powered rotorcraft having a passenger seating configuration of 20 or more, be equipped with one or more digital FDR's that are capable of retaining no less than 8 hours of aircraft operation. The certificate holders' of these aircraft must retain this data for the following durations:

- Airplanes - Until the airplane has been operated for at least 25 hours, excluding the original recording time
- Rotorcraft - Until the rotorcraft has been operated for at least 10 hours, excluding the original recording time

NOTE: There are several exceptions to this guidance as stated in FAR Sections 135.152(c) and (e).

E. Acoustic Underwater Locator Beacon Maintenance.

(1) In order to ensure the timely activation of underwater acoustic beacons associated with FDR's, Avionics ASI's should evaluate their certificate hold-

er's maintenance and inspection programs to ensure that procedures for testing beacons, conducted concurrently with battery replacement, provide for functionally testing the beacons prior to replacing the old battery.

(2) Operators' maintenance programs should also be evaluated to ensure that operational testing is being accomplished, consistent with the recorder or

beacon manufacturer's recommended procedures, at specified intervals and when possible, in conjunction with a numbered or phase inspection, e.g., "A," "B," or "C," check.

(3) These requirements must be reflected on work cards or other inspection cards to ensure system-wide compliance.

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SECTION 2. PROCEDURES

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites:

- Knowledge of the regulatory requirements of FAR Parts 91, 121, 125, and/or 135, as applicable
- Experience with the equipment being inspected
- Completion of the Airworthiness Inspector's Indoctrination Course, or previous equivalent

B. Coordination. This task requires coordination with the certificate holder.

3. REFERENCES, FORMS, AND JOB AIDS.

A. References:

- FAR Parts 23 and 25

B. Forms. None.

C. Job Aids. None.

5. PROCEDURES.

A. Perform the Inspection.

(1) Determine the type of FDR currently in operation.

(2) Evaluate the operator's maintenance program. Accomplish the following:

(a) Ensure that the FDR system test program is accomplished in accordance with the manufacturer's recommendations or an approved equivalent method

(b) Verify that the continuous self-monitoring and fault condition alert capabilities (digital FDR's) will detect the loss or deterioration of input signals before periodic readouts are allowed to be waived

(c) Ensure that the performance levels for ranges, accuracies, and recording intervals are maintained by periodic FDR bench checks and detailed analysis of recording tapes

(d) Review the operator's FDR, computer readouts, ramp test set readouts, and compare for the following:

- Missing parameters

- Data loss
- Deterioration of signals

NOTE: Periodic readouts can be waived if not required by the maintenance review board.

(e) Review the certificate holder's maintenance procedures for acoustic underwater locator beacons. The manufacturer's recommendations must be closely followed, including the procedures for the battery check.

(f) Ensure that the digital FDR ramp equipment, if used, can detect the loss or deterioration of input signal from sensors or transducers before periodic readouts are allowed to be waived

(g) Ensure that the manual includes procedures that prevent the operator from destroying recorded data from the removed unit until the aircraft has accumulated the appropriate amount of operating time for that type of aircraft

(h) Ensure that the performance levels for ranges, accuracies, and recording intervals are maintained

(3) Inspect the operator's recordkeeping system. Accomplish the following:

(a) Ensure that the most recent instrument calibration and recorder correlation is being retained by either the air carrier or another agency keeping the records on their premises, to include the recording medium from which this calibration is derived

(b) Review the operator's FDR readouts and calibration records for the following:

- Missing parameters
- Data loss
- Deterioration of signals

(c) Examine the FDR readouts to ensure that the actual data is within the ranges, accuracies, and recording intervals as specified in FAR Part 121, Appendix B

B. Analyze Inspection Results. Review the inspection results and discuss any discrepancies with the operator.

7. TASK OUTCOMES

A. File PTRS Data Sheet.

B. Completion of this task may result in a revision to the operator's maintenance program/manual.

C. Document Task. File all supporting paperwork in the operator's office file.

9. FUTURE ACTIVITIES. Perform a follow-up as required.