

SECTION 37. CONTINUING ANALYSIS AND SURVEILLANCE SYSTEMS

2166. PURPOSE. This section provides information and guidance for continuing analysis and surveillance systems.

2167. DISCUSSION. Continuing analysis and surveillance system requirements were incorporated into the regulations in conjunction with required inspection items (RII) and related requirements to upgrade the maintenance rules in response to a series of maintenance related accidents. FAR Part 135 subsequently adopted these requirements for aircraft type certificated for 10-or-more passenger seats.

a. A continuing analysis and surveillance system serves to ensure the adequacy of an operator's maintenance program and to confirm that it is being properly controlled and adhered to. In addition to their conventional regulatory authority, FAR Sections 121.373, 127.136, and 135.431 incorporate provisions for the FAA to mandate revisions to an operator's maintenance program based on deficiencies or irregularities disclosed by the continuing surveillance and analysis system.

b. A continuing analysis and surveillance system encompasses two basic functions. The first is audit, which looks at the administration and supervisory aspects of the operator's program, including work performed by persons outside of the operator's basic organization. The second function concerns monitoring the mechanical performance of affected aircraft engines and components and it normally includes a data collection/analysis system that may or may not be part of a reliability program. As with other facets of continuous airworthiness maintenance programs, the complexity of the analysis and surveillance systems should be commensurate with the certificate holders' operation.

c. The audit function of the continuing analysis and surveillance system encompasses operational matters; such as, maintenance scheduling, control and accountability of work forms, conformance to technical instructions pertaining to work forms and other technical instructions, and compliance with procedural requirements. It also addresses the adequacy of equipment and facilities, parts protection and stocking, competency of mechanics, and housekeeping. To be effective, audits should be divorced from other maintenance functions. Some operators have a separate quality assurance section for this purpose while others assign the audit function to their aircraft inspection units. When audit is assigned to organizational units with other duties, the audit should be accomplished as an independent activity. Audit is normally on-the-scene observation and monitoring and should be a scheduled, ongoing activity. A thorough continuing analysis and surveillance system should encompass periodic audits of contract agencies.

d. The mechanical performance analysis function may be satisfied by a reliability program or by an independent data collection and analysis system. Advisory Circular 120-17A, Maintenance Control by Reliability Methods, provides guidance on complete reliability programs from which data collection and data analysis systems can be extracted. The system should include charting or some appropriate means of recording and accounting for pertinent data at specified

intervals to assure continuous operation of the program. Data collection and data analysis are essential elements for supporting the condition-monitoring process.

2168. APPLICATION.

a. The use of contract agencies; i.e., repair stations or other certificated operators for maintenance, complicates the continuous analysis and surveillance system. Normally, the operator relies on the contract agency for technical guidance because of the agency's higher level of expertise and experience. When a problem arises, the operator must work with the contract agency to identify and resolve the problem which may develop into a controversy. Large contract agencies tend to disregard the needs of small operators and concentrate on their own interests or those of larger customers. Conversely, the contracting operator does not always provide essential information such as failure characteristics, service times, etc. All maintenance contracts or agreements should include provisions for the contracting operator's analysis and surveillance system as part of the operator's total maintenance program.

b. For contract operations wherein an operator contracts with another operator for total maintenance support, the contracting operator is still responsible for the continuing analysis and surveillance requirement. The contracting operator must have adequate personnel and resources to accomplish both the audit and performance analysis functions and to provide pertinent data to its assigned principal inspectors.

c. When aircraft fleets are grouped for reliability control or other purposes involving data collection, the data generated by a single airplane or a small fleet can be overwhelmed by a larger fleet of the group. Unacceptable performance on a small fleet may not contribute sufficient statistical impact to be detected unless data from the discrepant fleet is individually reviewed. Conversely, data from the total of the fleets provides a valid comparison for behavior of the small fleet.

d. The complexity and sophistication of the system should be relative to the certificate holder's operation. A small operator should not be expected to have a continuous analysis system suitable for a large airline. However, they should have a system with continuous data collection with specified analysis points and repetitive audits. Duties and responsibilities should be assigned and the system should be described in the operator's manual.

e. A recent innovation is data collection/analysis programs utilizing the manufacturer as a repository. This arrangement is usually a means to support the condition-monitoring process. Timely and thorough reporting by the operator and prompt response from the manufacturer are essential. Although this arrangement may be authorized by the Maintenance Review Board Report, the operator is not relieved of the ultimate responsibility for the effectiveness of the program. If the manufacturer fails to support the program, the operator is obligated to come up with a viable substitute.

2169.-2175. RESERVED.

SECTION 38. INSPECTION PROGRAMS AND ORGANIZATION

2176. PURPOSE. This section provides the inspector with information pertinent to the evaluation of inspection programs and organizations of air carriers and commercial operators under FAR Parts 121 and 127 and operators of aircraft type certificated for 10-or-more passenger seats under FAR Part 135.

2177. GENERAL. The regulations specify that each operator shall have an inspection program and a program covering other maintenance. Additional requirements call for a maintenance organization adequate to perform the work and an inspection organization adequate to perform required inspections. In the case of required inspections, there must be a separation between the inspection organization and the maintenance organization.

2178. INSPECTION PROGRAMS. The following information pertains to the methods and procedures used to conduct inspection activities in accordance with regulatory requirements:

a. The inspection program incorporates a plan of procedure to ensure that maintenance, preventive maintenance, and alterations are performed in accordance with the certificate holder's manual; that competent personnel and adequate facilities and equipment are provided for the proper performance of maintenance, preventive maintenance, and alterations; and that each aircraft released to service is airworthy. This plan also covers AIRWORTHINESS INSPECTIONS AND REQUIRED INSPECTION ITEMS (RII).

(1) Airworthiness Inspections. FAR Section 121.135(b)(1) and similar provisions of FAR Parts 127 and 135 stipulate each operator's manual must contain airworthiness inspections, including instructions covering procedures, standards, responsibilities, and authority of inspection personnel. FAR 1 defines inspection as maintenance. Therefore, the methods and procedures established by the operator's manual must be followed as prescribed by FAR Sections 121.367, 127.134, and 135.427. Completion of inspection items not designated as "required inspection items" will also be accomplished in accordance with the instructions contained in the operator's manual.

(2) Required Inspection Items (RII). FAR Sections 121.369(b)(2), 127.134(b)(2), and 135.427(b)(2) deal with the designation of maintenance and alteration work which must be inspected (required inspection items). As stated in the regulation, the manual must contain "a designation of the items of maintenance and alteration that must be inspected (required inspection items) including at least those that could result in a failure, malfunction, or defect endangering the safe operation of the aircraft, if not performed properly or if improper parts or materials are used." It is up to the operator to evaluate its work program and to identify required inspection items in a suitable manner. For example, such items may be identified with the abbreviation "RII," an asterisk, or any similar method. The operator, in determining the work items which are to be its required inspection items, should consider the importance of, but not limit its consideration to, the following maintenance operations:

- (a) Installation, rigging, and adjustments of flight control and surfaces.
- (b) Installation and repair of major structural components.
- (c) Installation of an aircraft engine, propellers, and rotor and overhaul or calibration of certain components such as engines, propellers, transmissions, and gear boxes, or navigation equipment, the failure of which would affect the safe operation of the aircraft.

2179. INSPECTION ORGANIZATION. The following consists of the operator's executive structure and administrative personnel relative to the performance of its REQUIRED INSPECTIONS.

a. FAR Sections 121.365, 127.132, and 135.423 stipulate that each air carrier must have an organization adequate to perform REQUIRED INSPECTIONS and that the performance of REQUIRED INSPECTIONS shall be so organized so as to separate the required inspection functions from the other maintenance, preventive maintenance, and alteration functions.

b. FAR Sections 121.371(d), 127.135(d), and 135.429(d) require the operator to maintain, or determine that, each person with whom it arranges for the performance of its required inspections to maintain a current listing of individuals who have been trained, qualified, and authorized to inspect its required inspection items. In addition, the regulation requires that the individuals must be identified by name, occupation title, and the required inspections that the individual is authorized to perform. As an acceptable means of compliance with these requirements, the operator's personnel roster (or the contractor's roster) which contains occupation titles such as "mechanic," "lead mechanic," "inspector," and "foreman" may be used. This roster should include a method of positive identification of those who are trained, qualified, and authorized. The individuals who are authorized may be informed by a letter or a list which shows the extent of their responsibilities, authorities, and inspection limitations. However, if only a list is used, it should be signed by each authorized individual. This signature is necessary to assure that the person so authorized is fully aware of his inspection limitations.

2180. GUIDANCE. Surveillance of an operator's inspection organization may be conducted on a routine basis or for some specific reason such as management reorganization, acquisition of newer and more complex aircraft, growth in fleet size, or any other factor that may affect flight safety. Careful thought should be given to findings relating to airworthiness and required inspections before any judgments are made concerning noncompliance with regulatory requirements. The following facts should be considered before making a decision relating to the character of an air carrier's or commercial operator's inspection organization:

a. Regulations provide that each air carrier or commercial operator who operates under FAR Parts 121, 127, and for aircraft type certificated for 10 or more passengers under 135 must separate its maintenance organization from its inspection organization if it performs maintenance and required inspection item work.

b. Required inspection items must be designated and must be handled by properly authorized, certificated, qualified, and informed personnel.

c. Individuals authorized to perform required inspections must be listed by name, occupation title, and the inspection the individual is authorized to perform.

d. In addition to required inspections, the air carrier's manual must contain airworthiness inspections, including instructions covering procedures, standards, responsibilities, and authority of inspection personnel.

e. Inspection is maintenance; therefore, airworthiness inspections must be performed in accordance with the air carrier's manual.

f. The operator can determine the methods he will use to accomplish airworthiness inspections and the persons who will perform the inspections. These procedures may or may not involve personnel from the organization required by FAR Sections 121.365(b), 127.132(b), or 135.423(b).

g. The separation of the air carrier maintenance organization from the inspection organization does not apply to the accomplishment of airworthiness inspections.

2181.-2187. RESERVED.

SECTION 39. AIRCRAFT EVALUATION GROUP (AEG)

2188. GENERAL. Flight Standards Division Managers at directorate headquarters will provide, through Aircraft Evaluation Groups, appropriate Flight Standards technical support to elements of the directorate. Activities start at the time an application is submitted for an aircraft/engine type certificate and continues throughout its service life. These groups, comprised of operations, maintenance, and avionics specialists, provide technical services within their areas of responsibility. The Aircraft Evaluation Groups have the responsibility for determining pilot type rating requirements, master minimum equipment lists, maintenance program development, manufacturer's maintenance manual evaluation, and operating rules and policy evaluation related to the aircraft type. The AEG's advise the manufacturer during the design and certification process of pertinent operating requirements and make certain determinations and recommendations to the FAA field offices who will ultimately be responsible for training and maintenance programs. In addition, the AEG's manage the Flight Operations Evaluation Board, Flight Standardization Board, and Maintenance Review Board, which are comprised of representatives from the AEG and FAA field offices.

2189. DUTIES OF THE MAINTENANCE/AVIONICS SPECIALISTS. The maintenance/avionics representatives are responsible for the following board activities:

a. Maintenance Review Board (MRB). Composed of selected FAA airworthiness inspectors and specialists, it approves initial maintenance/inspection requirements for new type design aircraft. It provides guidance to industry maintenance steering groups engaged in establishing maintenance standards by assigning specialists to specific working groups as observers, to provide counselling, as needed, during their deliberations. These standards are used in the development of each operator's FAA approved maintenance program and exert considerable safety, as well as economic impact, upon future operations of the aircraft. Boards are comprised of carefully selected maintenance, avionics, engineering, and flight test or operations specialists within FAA. Their findings are disseminated to FAA headquarters, regional and district offices, and manufacturers and operators of the aircraft under consideration. Although individual board members may reside in various geographical areas, primary responsibility for establishment of the boards and conduct of their activities resides in the region responsible for aircraft type certification. Since their functions parallel the certification process, their involvement commences as soon as practicable during new aircraft development.

b. Type Certification Board (TCB). Air carrier and general aviation airworthiness inspectors shall participate in TCB activities, as appropriate, for aircraft used in each area of responsibility. At least one maintenance specialist and one avionics and/or instrument specialist shall take part in the TCB process as applicable. Activities of the airworthiness personnel shall be coordinated with the chairperson of the TCB. Assignment of airworthiness members shall be made by the region upon receipt of an application or type certification.

(1) Maintenance/avionics inspectors will become a working member of the board as soon as the region accepts a new or amended TCB application. Early

involvement with regional engineering and manufacturing staff elements will lead to a greater level of effectiveness throughout the TCB proceedings. The Maintenance Review Board chairperson, or his/her designate, shall be assigned as the principal airworthiness element for TCB activities. In order to maintain continuity throughout the proceedings, TCB's and MRB's will run concurrently.

(2) Regulatory Requirements dealing with damage tolerance and fatigue evaluation stipulate that the TCB applicant must provide sufficient information to assist operators in establishing the frequency, extent, and methods of inspections of critical structures. This kind of information must be included in the Instructions for Continued Airworthiness required by FAR Sections 23.1529, 25.1529, 27.1529, 29.1529, 33.4, 33.5, and 35.4. The maintenance/inspection program established to satisfy the certification and operational requirements should be the same. This key area will require a close working relationship between the TCB and the respective FAA specialist responsible for the maintenance functions of the type certification process and approval of operators' maintenance programs. For this reason, the appropriate maintenance/avionics specialists will have the prime responsibility for assuring compliance with Sections 23.1529, 25.1529, 27.1529, 29.1529, 33.4, 33.5, and 35.4.

c. Airworthiness Directive (AD) Review Board. Airworthiness personnel assigned to the AEG shall participate as members of the appropriate AD board. Their prime responsibility includes a careful study of the proposed AD to assure that it contains sufficient and accurate information. Consideration should be given to the conditions and limitations set forth to assure they are compatible with both the general aviation and air carrier maintenance procedures. For instance, the phrase "at next overhaul" is not compatible with the maintenance procedures of general aviation aircraft. The proposed AD should describe and adequately implement corrective action. For instance, "Flightcrews should be advised to feather the propeller immediately when _____." This type of action is not complete unless there is a placard installed or the flight manual amended to this affect.

d. Flight Operations Evaluation Board (FOEB). Provides guidance to engineering and flight test authorities for operational considerations which may affect airworthiness certification. It is also the approving authority for the master minimum equipment list (MMEL) developed during consultation with operators and the manufacturer, and which is supplied to each operator for guidance in development of his/her company MEL. The airworthiness specialist assigned to FOEB shall be a member assigned to the MRB being conducted for the particular aircraft. The airworthiness specialist must have a thorough knowledge of the aircraft and its systems and components. This knowledge of the reliability and redundancy of the systems and components is necessary to properly assess the aircraft's airworthiness with specific equipment inoperative.

2190.-2199. RESERVED.

CHAPTER 7. GENERAL AVIATION/COMMERCIAL

SECTION 1. OPERATORS OF LARGE AND TURBINE-POWERED MULTIENGINE AIRPLANES -
INSPECTION PROGRAMS

2200. PURPOSE. This section provides guidance to the inspector on the review and approval of inspection programs required by FAR Part 91, Subpart C.

2201. SELECTION OF INSPECTION PROGRAM. FAR Section 91.169 provides five options to the owner/operator in the selection of an inspection program as follows:

a. Option 1. A continuous airworthiness inspection program that is a part of a continuous airworthiness maintenance program currently in use by a person holding a certificated issued under FAR Part 121.

b. Option 2. An approved aircraft inspection program currently in use by a person holding an ATCO certificate under FAR Part 135.

c. Option 3. An approved continuous inspection program currently in use by a person certificated as an air travel club under Part 123. This is no longer an available option, see FAR Section 125.1(d).

d. Option 4. A current inspection program recommended by the manufacturer.

e. Option 5. Any other inspection program established by the registered owner or operator of the airplane and approved by the Administrator under FAR Section 91.169(g).

2202. PROGRAMS CURRENTLY IN USE. It appears, at first sight, that the first four options do not involve the field inspector since they are previously approved or manufacturer recommended. However, inspectors should recognize that these programs must be "currently" in use by the airlines, air taxi, or travel clubs supplying the program, or "currently" recommended by the manufacturer. This "current" requirement is intended to prevent use of obsolete programs.

2203. MANUFACTURER'S RECOMMENDED INSPECTION PROGRAM. Option 4 has led to several misconceptions regarding what constitutes a "manufacturers' recommended" program. It should be noted that FAR Section 91.169(f)(4) reads, "A current inspection program recommended by the manufacturer." No reference is made to the aircraft manufacturer specifically. FAR Section 91.169(e), however, requires inspection of the airframe, engines, propellers, appliances, survival equipment, and emergency equipment. Therefore, a complete manufacturer's recommended program consists of that program supplied by the airframe manufacturer, supplemented by the inspection programs, provided by the manufacturers of the appliances, survival equipment, and emergency equipment installed on the aircraft.

2204. PROGRAM APPROVAL. Prospective applicants for approved inspection programs under the provision of FAR Section 91.169(f)(5) should be encouraged to

hold preliminary discussions with FAA inspectors prior to development of their program. This permits the operator and the inspector to become mutually familiar with the elements needed for FAA approval. Prior to approval of a program under Option 5, the inspector must ensure that the program provides a schedule for inspection performance, whether based on time-in-service, calendar time, system cycles, or any combination adequate to provide an airworthy product in view of the airplane operational environment. The inspection, including necessary checks and tests, must be of sufficient detail to permit personnel to correctly perform the inspection without further guidance. Comparison should be made with manufacturer recommended programs. All deletions of items and inspection period escalations must be completely justified by the applicant. When there is no manufacturer's recommended program, the inspector should use a time-tested program for comparison purposes. The different environments in which airplanes operate make it unlikely that a standard program can be developed to meet their various needs. This must be given consideration; however, in the interest of safety, the program developed by an applicant must provide a level of safety equivalent to or greater than that provided by the inspection options of FAR Section 91.169(e).

2205. FAA INITIATED CHANGES TO AN APPROVED FAR SECTION 91.169(f)(5) PROGRAM.

When a program has been approved and in effect, deficiencies may be noted which could not be foreseen prior to approval. Discussion with the operator will normally resolve these in a mutually satisfactory manner. However, FAR Section 91.170 provides a regulatory basis on which to require change, this is the most satisfactory method.

2206. CHANGES REQUESTED BY THE PROGRAM HOLDER. When an owner/operator desires to change his/her program, he/she should submit the proposed changes for approval and include justification for all deletions and/or inspection period escalations. The aircraft may not be inspected in accordance with the changes until after approval.

2207. INSPECTOR'S APPROVAL. Approval will be indicated on the cover page of the inspection program together with the date of approval, inspector's signature, office name, number and location. Each succeeding page will be stamped with the district office stamp, dated and initialed. These are minimum procedures and obviously more elaborate revision control procedures may be used.

2208. CHANGE OF OWNERSHIP. In the event an airplane being operated under the provisions of FAR Part 91, Subpart D, changes ownership or operator, it will be necessary for the new owner or operator to go through the procedures of notification and approval as appropriate. It is entirely possible that the program used by the former owner or operator will be satisfactory; however, if that program is under FAR Section 91.169(f)(5), consideration should be given to the new operational environment of the airplane if different than before.

2209. ADDITIONAL GUIDELINES. Procedures on this subject can be found in Advisory Circular 91-38A, Large and Turbine-Powered Multiengine Airplanes, Part 91, Subpart D.

2210.-2220. RESERVED.