



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** THE CONTINUED AIRWORTHINESS  
OF OLDER AIRPLANES

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1. PURPOSE. This advisory circular (AC) provides information and recommendations to manufacturers and airplane owners/operators for the development and use of programs to assure the continued airworthiness of older airplanes not covered under AC 91-56, Supplemental Structural Inspection Program for Large Transport Category Airplanes.

2. BACKGROUND. Airplanes are designed and built to provide many years of service. For the airplane to remain airworthy and safe to operate for a long inservice life, it should be operated in accordance with the recommendations of the manufacturer and cared for with sound inspection and maintenance practices.

a. Service experience has revealed that an aging airplane needs more care and special attention during the maintenance processes and, at times, requires more frequent inspection of structural components for damage due to environmental deterioration, accidental damage, and fatigue. Typical areas requiring more frequent inspection, and key to continuing the useful life of an airplane are structural points such as:

(1) Wing spar capstrips, with particular attention to the spar lower capstrips.

(2) Wing attach points, both on the wing and on the fuselage.

(3) Wing fuselage carry-through structure.

(4) Wing upper and lower covers between spars.

(5) Pressurized structures, especially around doors, windows, windshields and other cutouts on pressurized airplanes.

(6) Horizontal tail spars and spar capstrips.

(7) Horizontal tail spar attachments and fuselage attachments.

(8) Horizontal tail fuselage carry-through structure.

(9) Vertical tail spars and spar capstrips.

(10) Vertical tail spar attachments and fuselage attachments.

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- (11) Lifting surfaces.
  - (12) Control surfaces and their respective hinge points.
  - (13) Control surface balance weight attachments.
  - (14) Control system attach points at the various control surfaces.
  - (15) Tab hinges.
  - (16) Tab actuators.
  - (17) Main landing gear attach points where landing gear loads feed into primary wing and/or fuselage structure.
  - (18) Structure and flooring especially in the vicinity of lavatory and galley areas and areas of overboard drains and vents.
  - (19) Structural and flooring area attachments in cabin and cockpit and at seat and equipment attachments.
- b. In addition to the key items outlined above which are important to safety of flight, there are other areas that should receive special attention. Typical areas are:
- (1) Engine mounts.
  - (2) Propeller blades.
  - (3) Door latching mechanisms on pressurized airplanes.
  - (4) Windshields and windows on pressurized airplanes.
  - (5) Landing gear shimmy dampers.
  - (6) Main and nose gear supporting structure.
  - (7) Cowling, fairing, and fillet attachments and supporting structure.
  - (8) Materials used in aircraft compartment interiors (including finishes or decorative surfaces applied to the materials) to assure they have not deteriorated due to aging, cleaning or other causes that would increase their flammability over what it was when they were new.

3. CONTINUED AIRWORTHINESS. To provide for a safe operation, a program called "continued airworthiness" should be developed by the manufacturer and used by owners/operators where virtually every component comprising an airplane is involved in some form of preservation, inspection, maintenance, preventive maintenance, overhaul, repair, and/or replacement activity.

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a. Safety of operation through continued airworthiness demands increasing vigilance as an airplane ages. Airplane structural materials do have finite lives, and the extent of these is affected by age, operational environment, and operational experience which the material endures in day-to-day usage of the airplane.

b. Maintenance information needs to be continually updated. Open communication should exist with the owner/operator advising the manufacturer as soon as a new situation arises, and the manufacturer responding with solid help. Such communication and cooperation will facilitate the maintenance of an entire fleet of airplanes in a continuously airworthy condition.

4. MANUFACTURERS' PARTICIPATION. The framework for continued airworthiness of airplanes is dependent upon the care and thought designed into the airplane at its inception and reflected in the type design. Following type certification, the establishment of, and adherence to, thorough maintenance procedures is required. Thus the manufacturer should prepare and distribute recommendations on the need for increased inspection vigilance for those older (geriatric) airplanes which may not have a well-defined program for continued airworthiness, and which include areas of special consideration as are listed in paragraph 2(a) and (b) of this AC. This information should be available in clear, concise language to those who need it. Sometimes, especially for complex airplanes, it may be necessary to provide specific training in the proper maintenance of the airplane and its systems. These activities should be developed by the manufacturer based upon its familiarity with the design and function of the airplanes.

5. IMPLEMENTATION BY OWNERS/OPERATORS. Vigilance is the price of safety and, even though the manufacturers have done their best to anticipate all the maintenance required to provide for continued airworthiness, aging airplanes demand ever increasing care. Because of this the final care rests primarily with the owner/operator who should:

a. Follow the manufacturer's recommended maintenance and inspection procedures.

b. Recognize that corrosion or damage to structure can drastically shorten fatigue life and be on the lookout for these conditions.

c. Be alert to the possibility that the airplane is not being used in a manner significantly different from the originally intended mission profile. Low altitude operation, such as pipeline patrol, sightseeing, or training operations, will subject the airplanes to more fatigue damage than high altitude cruise.

d. Comply with applicable Airworthiness Directives, and review possible modifications available from the manufacturer. Structural improvements are usually directed to lowering working stresses, and the sooner they are made, the better they are to slow the onset of cumulative damage to the original structure.

e. Become interested in the fatigue program on prospective new airplanes, including a clear understanding of the related inspection program recommended by the manufacturer, and make certain all significant areas of the airplane's structure are treated in the airplane's inspection program.

  
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