required by paragraph (d)(1)(iv) of this section that may occur from fatigue or other in-service causes before such damage has grown to the extent that the component cannot sustain the required residual strength capability. In establishing these inspection intervals, the following items must be considered:

(A) The growth rate, including no-growth, of the damage under the repeated loads expected in-service determined by tests or analysis supported by tests;

(B) The required residual strength for the assumed damage established after considering the damage type, inspection interval, detectability of damage, and the techniques adopted for damage detection. The minimum required residual strength is limit load; and

(C) Whether the inspection will detect the damage growth before the minimum residual strength is reached and restored to ultimate load capability, or whether the component will require replacement.

(3) Each applicant must consider the effects of damage on stiffness, dynamic behavior, loads, and functional performance on all PSEs when substantiating the maximum assumed damage size and inspection interval.

(e) Fatigue Evaluation: If an applicant establishes that the damage tolerance evaluation described in paragraph (d) of this section is impractical within the limits of geometry, inspectability, or good design practice, the applicant must do a fatigue evaluation of the particular composite rotorcraft structure and:

(1) Identify all PSEs considered in the fatigue evaluation;

(2) Identify the types of damage for all PSEs considered in the fatigue evaluation;

(3) Establish supplemental procedures to minimize the risk of catastrophic failure associated with the damages identified in paragraph (d) of this section; and

(4) Include these supplemental procedures in the Airworthiness Limitations section of the Instructions for Continued Airworthiness required by § 27.1529.

[Doc. No. FAA–2009–0660, Amdt. 27–47, 76 FR 74663, Dec. 1, 2011]

Subpart D—Design and Construction

GENERAL

§ 27.601 Design.

(a) The rotorcraft may have no design features or details that experience has shown to be hazardous or unreliable.

(b) The suitability of each questionable design detail and part must be established by tests.

§ 27.602 Critical parts.

(a) *Critical part.* A critical part is a part, the failure of which could have a catastrophic effect upon the rotocraft, and for which critical characteristics have been identified which must be controlled to ensure the required level of integrity.

(b) If the type design includes crtical parts, a critical parts list shall be established. Procedures shall be established to define the critical design characteristics, identify processes that affect those characteristics, and identify the design change and process change controls necessary for showing compliance with the quality assurance requirements of part 21 of this chapter.

[Doc. No. 29311, 64 FR 46232, Aug. 24, 1999]

§ 27.603 Materials.

The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must—

(a) Be established on the basis of experience or tests;

(b) Meet approved specifications that ensure their having the strength and other properties assumed in the design data; and

(c) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.

(Secs. 313(a), 601, 603, 604, Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27–11, 41 FR 55469, Dec. 20, 1976; Amdt. 27–16, 43 FR 50599, Oct. 30, 1978]