

§ 27.571

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paragraph (b)(1) of this section. In addition, each float must be designed for combined vertical and drag loads using a relative limit speed of 20 knots between the rotorcraft and the water. The vertical load may not be less than the highest likely buoyancy load determined under paragraph (b)(1) of this section.

[Amdt. 27–26, 55 FR 8000, Mar. 6, 1990]

FATIGUE EVALUATION

§ 27.571 Fatigue evaluation of flight structure.

(a) *General.* Each portion of the flight structure (the flight structure includes rotors, rotor drive systems between the engines and the rotor hubs, controls, fuselage, landing gear, and their related primary attachments), the failure of which could be catastrophic, must be identified and must be evaluated under paragraph (b), (c), (d), or (e) of this section. The following apply to each fatigue evaluation:

(1) The procedure for the evaluation must be approved.

(2) The locations of probable failure must be determined.

(3) Inflight measurement must be included in determining the following:

(i) Loads or stresses in all critical conditions throughout the range of limitations in § 27.309, except that maneuvering load factors need not exceed the maximum values expected in operation.

(ii) The effect of altitude upon these loads or stresses.

(4) The loading spectra must be as severe as those expected in operation including, but not limited to, external cargo operations, if applicable, and ground-air-ground cycles. The loading spectra must be based on loads or stresses determined under paragraph (a)(3) of this section.

(b) *Fatigue tolerance evaluation.* It must be shown that the fatigue tolerance of the structure ensures that the probability of catastrophic fatigue failure is extremely remote without establishing replacement times, inspection intervals or other procedures under section A27.4 of appendix A.

(c) *Replacement time evaluation.* It must be shown that the probability of catastrophic fatigue failure is ex-

tremely remote within a replacement time furnished under section A27.4 of appendix A.

(d) *Fail-safe evaluation.* The following apply to fail-safe evaluation:

(1) It must be shown that all partial failures will become readily detectable under inspection procedures furnished under section A27.4 of appendix A.

(2) The interval between the time when any partial failure becomes readily detectable under paragraph (d)(1) of this section, and the time when any such failure is expected to reduce the remaining strength of the structure to limit or maximum attainable loads (whichever is less), must be determined.

(3) It must be shown that the interval determined under paragraph (d)(2) of this section is long enough, in relation to the inspection intervals and related procedures furnished under section A27.4 of appendix A, to provide a probability of detection great enough to ensure that the probability of catastrophic failure is extremely remote.

(e) *Combination of replacement time and failsafe evaluations.* A component may be evaluated under a combination of paragraphs (c) and (d) of this section. For such component it must be shown that the probability of catastrophic failure is extremely remote with an approved combination of replacement time, inspection intervals, and related procedures furnished under section A27.4 of appendix A.

(Secs. 313(a), 601, 603, 604, and 605, 72 Stat. 752, 775, and 778, (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425; sec. 6(c), 49 U.S.C. 1655(c)))

[Amdt. 27–3, 33 FR 14106, Sept. 18, 1968, as amended by Amdt. 27–12, 42 FR 15044, Mar. 17, 1977; Amdt. 27–18, 45 FR 60177, Sept. 11, 1980; Amdt. 27–26, 55 FR 8000, Mar. 6, 1990]

§ 27.573 Damage Tolerance and Fatigue Evaluation of Composite Rotorcraft Structures.

(a) Each applicant must evaluate the composite rotorcraft structure under the damage tolerance standards of paragraph (d) of this section unless the applicant establishes that a damage tolerance evaluation is impractical within the limits of geometry, inspectability, and good design practice. If an applicant establishes that it