§ 27.151 Flight controls.

(a) Longitudinal, lateral, directional, and collective controls may not exhibit excessive breakout force, friction, or preload.

(b) Control system forces and free play may not inhibit a smooth, direct rotorcraft response to control system input.

§ 27.151 Trim control.

The trim control—

(a) Must trim any steady longitudinal, lateral, and collective control forces to zero in level flight at any appropriate speed; and

(b) May not introduce any undesirable discontinuities in control force gradients.

§ 27.175 Demonstration of static longitudinal stability.

(a) Climbing. Static longitudinal stability must be shown in the climb condition at speeds from \( V_y - 10 \) kt to \( V_y + 10 \) kt with—

(1) Critical weight;

(2) Critical center of gravity;

(3) Maximum continuous power;

(4) The landing gear retracted; and

(5) The rotorcraft trimmed at \( V_y \).

(b) Cruise. Static longitudinal stability must be shown in the cruise condition at speeds from 0.8 \( V_{NE} \) - 10 kt to 0.8 \( V_{NE} \) + 10 kt or, if \( V_H \) is less than 0.8 \( V_{NE} \), from \( V_H - 10 \) kt to \( V_H + 10 \) kt, with—

(1) Critical weight;

(2) Critical center of gravity;

(3) Power for level flight at 0.8 \( V_{NE} \) or \( V_H \), whichever is less;

(4) The landing gear retracted; and

(5) The rotorcraft trimmed at 0.8 \( V_{NE} \) or \( V_H \), whichever is less.

(c) \( V_{NE} \). Static longitudinal stability must be shown at speeds from \( V_{NE} - 20 \) kt to \( V_{NE} \) with—

(1) Critical weight;

(2) Critical center of gravity;

(3) Power required for level flight at \( V_{NE} - 10 \) kt or maximum continuous power, whichever is less;

(4) The landing gear retracted; and

(5) The rotorcraft trimmed at \( V_{NE} - 10 \) kt.

(d) Autorotation. Static longitudinal stability must be shown in autorotation at—

(1) Airspeeds from the minimum rate of descent airspeed - 10 kt to the minimum rate of descent airspeed + 10 kt, with—
§ 27.301 Loads.

(a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.

(b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the rotorcraft. These loads can be maintained without exceptional piloting skill or alertness.

[Amdt. No. 27–44, 73 FR 11000, Feb. 29, 2008]

GROUND AND WATER HANDLING CHARACTERISTICS

§ 27.231 General.

The rotorcraft must have satisfactory ground and water handling characteristics, including freedom from uncontrollable tendencies in any condition expected in operation.

§ 27.235 Taxing condition.

The rotorcraft must be designed to withstand the loads that would occur when the rotorcraft is taxied over the roughest ground that may reasonably be expected in normal operation.

§ 27.239 Spray characteristics.

If certification for water operation is requested, no spray characteristics during taxiing, takeoff, or landing may obscure the vision of the pilot or damage the rotors, propellers, or other parts of the rotorcraft.

§ 27.241 Ground resonance.

The rotorcraft may have no dangerous tendency to oscillate on the ground with the rotor turning.

MISCELLANEOUS FLIGHT REQUIREMENTS

§ 27.251 Vibration.

Each part of the rotorcraft must be free from excessive vibration under each appropriate speed and power condition.

Subpart C—Strength Requirements

GENERAL

§ 27.301 Loads.

(a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.

(b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the rotorcraft. These loads...