Docket No. SA-533

Exhibit No. 7-P

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

FAR 25.699 and JAR 25.699

(4 Pages)

CEN09MA142 Section 4

Attachment 4.2 FAR 25.699 and JAR 25 change 8, paragraph 25.699

JAR 25.689 (continued)

(d) Clevis pins subject to load or motion and retained only by cotter pins may not be used in the control system.

(e) Turnbuckles must be attached to parts having angular motion in a manner that will positively prevent binding throughout the range of travel.

(f) There must be provisions for visual inspection of fairleads. pulleys, terminals, and turnbuckles.

JAR 25.693 Joints

Control system joints (in push-pull systems) that are subject to angular motion, except those in ball and roller bearing systems must have a special factor of safety of not less than 3.33 with respect to the ultimate bearing strength of the softest material used as a bearing. This factor may be reduced to 2.0 for joints in cable control systems. For ball or roller bearings, the approved ratings, may not be exceeded.

JAR 25.697 Lift and drag devices, controls

(a) Each lift device control must be designed so that the pilots can place the device in any take-off, en-route, approach, or landing position established under JAR 25.101 (d). Lift and drag devices must maintain the selected positions, except for movement produced by an automatic positioning or load limiting device, without further attention by the pilots. (See ACJ 25 .697 (a).)

(b) Each lift and drag device control must be designed and located to make inadvertent operation improbable. Lift and drag devices intended for ground operation only must have means to prevent the inadvertent operation of their controls in flight if that operation could be hazardous.

(c) The rate of motion of the surfaces in response to the operation of the control and the characteristics of the automatic positioning or load limiting device must give satisfactory flight and performance characteristics under steady or changing conditions of airspeed, engine power, and aeroplane attitude.

(d) The lift device control must be designed to retract the surfaces from the fully extended position, during steady flight at maximum continuous engine power at any speed below $V_F + 9.0$ (knots).

JAR 25.699 Lift and drag device indicator

(a) There must be means to indicate to the pilots the position of each lift or drag device having a separate control in the cockpit to adjust its position. In addition, an indication of unsymmetrical operation or other malfunction in the lift or drag device systems

JAR 25.699 (a) (continued)

must be provided when such indication is necessary to enable the pilots to prevent or counteract an unsafe flight or ground condition, considering the effects on flight characteristics and performance.

(b) There must be means to indicate to the pilots the take-off, en-route, approach, and landing lift device positions.

(c) If any extension of the lift and drag device beyond the landing position is possible, the control must be clearly marked to identify this range of extension.

JAR 25.701 Wing-flap interconnection

(a) Unless the aeroplane has safe flight characteristics with the wing-flaps retracted on one side and extended on the other, the motion of wing-flaps on opposite sides of the plane of symmetry must be synchronised by a mechanical interconnection or approved equivalent means.

(b) If a wing-flap interconnection is used, it must be designed to account for the applicable unsymmetrical loads, including those resulting from flight with the engines on one side of the plane of symmetry inoperative and the remaining engines at take-off power.

(c) For aeroplanes with wing-flaps that are not subjected to slipstream conditions, the structure must be designed for the loads imposed when the wing-flaps on one side are carrying the most severe load occurring in the prescribed symmetrical conditions and those on the other side are carrying not more than 80% of that load.

(d) The wing-flap interconnection must be designed for the loads resulting when the wing-flap surfaces on one side of the plane symmetry are jammed and immovable while the surfaces on the other side are free to move and the full power of the surface actuating system is applied.

JAR 25.703 Take-off warning system

A take-off warning system must be installed and must meet the following requirements:

(a) The system must provide to the pilots an aural warning that is automatically activated during the initial portion of the take-off roll if the aeroplane is in a configuration, including any of the following, that would not allow a safe take-off:

(1) The wing-flaps or leading edge devices are not within the approved range of take-off positions.

JAR 25.703 (a) (continued)

(2) Wing spoilers (except lateral control spoilers meeting the requirements of JAR 25.671), speed brakes, or longitudinal trim devices are in a position that would not allow a safe take-off.

[(3) The parking brake is unreleased.]

(b) The warning required by sub-paragraph (a) of this paragraph must continue until –

(1) The configuration is changed to allow a safe take-off;

[(2) Action is taken by the pilot to abandon the take-off roll;]

(3) The aeroplane is rotated for take-off; or

(4) The warning is manually de-activated by the pilot. (See ACJ 25.703 (b)(4).)

[(c) The means used to activate the system must function properly for all authorised take-off power settings and procedures, and throughout the ranges] of take-off weights, altitudes, and temperatures for which certification is requested.

LANDING GEAR

JAR 25.721 General

(a) The main landing gear system must be designed so that if it fails due to overloads during take-off and landing (assuming the overloads to act in the upward and aft directions), the failure mode is not likely to cause –

(1) For aeroplanes that have a passenger seating configuration, excluding pilots seats, of nine seats or less, the spillage of enough fuel from any fuel system in the fuselage to constitute a fire hazard; and

(2) For aeroplanes that have a passenger seating configuration, excluding pilots seats, of 10 seats or more, the spillage of enough fuel from any part of the fuel system to constitute a fire hazard.

(b) Each aeroplane that has a passenger seating configuration excluding pilots seats, of 10 or more must be designed so that with the aeroplane under control it can be landed on a paved runway with any one or more landing gear legs not extended without sustaining a structural component failure that is likely to cause the spillage of enough fuel to constitute a fire hazard.

(c) Compliance with the provisions of this section may be shown by analysis or tests, or both.

JAR 25.723 Shock absorption tests

(a) It must be shown that the limit load factors selected for design in accordance with JAR 25.473 for take-off and landing weights, respectively, will not be exceeded. This must be shown by energy absorption tests except that analysis based on tests conducted on a landing gear system with identical energy absorption characteristics may be used for increases in previously approved take-off and landing [weights. (See ACJ 25 .723 (a).)]

(b) The landing gear may not fail in a test, demonstrating its reserve energy absorption capacity, simulating a descent velocity of 12 fps at design landing weight, assuming aeroplane lift not greater than the aeroplane weight acting during the landing impact.

JAR 25.725 Limit drop tests

(a) If compliance with JAR 25.723 (a) is shown by free drop tests, these tests must be made on the complete aeroplane, or on units consisting of a wheel, tyre, and shock absorber, in their proper positions, from free drop heights not less than –

(1) 18.7 in for the design landing weight conditions; and

(2) 6.7 in for the design take-off weight conditions.

(b) If aeroplane lift is simulated by air cylinders or by other mechanical means, the weight used for the drop must be equal to W. If the effect of aeroplane lift is represented in free drop tests by an equivalent reduced mass, the landing gear must be dropped with an effective mass equal to

$$W_e = W \left(\frac{h + (1 - L)\, d}{h + d} \right)$$

where —

W_e = the effective weight to be used in the drop test (lb);

h = specified free drop height (in);

d = deflection under impact of the tyre (at the approved inflation pressure) plus the vertical component of the axle travel relative to the drop mass (in);

W = W_M for main gear units (lb), equal to the static weight on that unit with the aeroplane in the level attitude (with the nose wheel clear in the case of nose, wheel type aeroplanes);

W = W_T for tail gate units (lb), equal to the static weight on the tail unit with the aeroplane in the tail-down attitude;

W = W_N for nose wheel units (lb), equal to the vertical component of the static reaction that would exist at the nose wheel, assuming that the mass of the aeroplane acts at the centre of gravity and exerts a force of 1.0 g downward and 0.25 g forward; and

L = the ratio of the assumed aeroplane lift to the aeroplane weight, but not more than 1.0.

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Code of Federal Regulations

Sec. 25.699

Part 25 AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES	
Subpart D--Design and Construction	Control Systems

Sec. 25.699

[Lift and drag device indicator.**]**

[(a) There must be means to indicate to the pilots the position of each lift or drag device having a separate control in the cockpit to adjust its position. In addition, an indication of unsymmetrical operation or other malfunction in the lift or drag device systems must be provided when such indication is necessary to enable the pilots to prevent or counteract an unsafe flight or ground condition, considering the effects on flight characteristics and performance.
(b) There must be means to indicate to the pilots the takeoff, en route, approach, and landing lift device positions.
(c) If any extension of the lift and drag devices beyond the landing position is possible, the controls must be clearly marked to identify this range of extension.**]**

Amdt. 25-23, Eff. 5/8/70

Comments

Document History

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