UNITED STATES OF AMERICA
CIVIL AERONAUTICS BOARD
WASHINGTON, D. C.

Civil Air Regulations Amendment 4b-8
Effective: May 17, 1958
Adopted: April 15, 1958

AIRPLANE AIRWORTHINESS; TRANSPORT CATEGORIES

MISCELLANEOUS AMENDMENTS RESULTING FROM THE
1957 ANNUAL AIRWORTHINESS REVIEW

There are contained herein amendments with respect to various issues stemming from the 1957 Annual Airworthiness Review.

Of the substantive changes, there is a new requirement in § 4b.132 (e) which establishes basic objective criteria to insure, for the all-engines-operating condition, adequate lateral control within the operating speed range and appropriate airplane response to control application in all stages of flight. The provisions up to this time did not prescribe any specific requirements in this respect. It is expected that this rule will result in a more effective evaluation of the airplane's lateral stability and controllability.

The fatigue evaluation provisions, although applicable to all of the flight structure, do not specify any loading conditions for vertical flight surfaces with respect to the fail safe strength criteria in § 4b.270 (b). For completeness of these provisions, an addition to § 4b.270 (b) is contained herein which sets forth ultimate loads, relative to the fail safe strength evaluation of vertical surfaces, in terms of the generally applicable unsymmetrical and maneuvering limit loading conditions now prescribed in the regulations. There is also a change to § 4b.236 (c) (2) which prescribes vertical load factors necessary for defining more completely the unsymmetrical loads applicable in the taxying and ground handling conditions for landing gears of multi-wheel units.

Currently effective regulations require trim tab controls to be irreversible unless the tab is properly balanced and is shown to be free from flutter. The regulations do not cover this design feature with respect to other trim devices such as adjustable stabilizers, etc. A change is contained herein to § 4b.322 to require that all trim control systems be free from drift or creep.

There are contained herein several important changes with respect to powerplants. New § 4b.409 requires an in-flight investigation of turbine powerplants with respect to stall, surge, flame-out, etc. Included also is a change to § 4b.435 which establishes more definite specifications for fuel system filtration. In addition, the powerplant operating limitation provisions in § 4b.718 are being revised to make them more specifically applicable to turbine powerplants.

There are included several changes to the provisions regarding personnel accommodations, emergency evacuation, and ditching. The most substantive one involves a change to § 4b.362 (d) which would permit the substitution of 2 type IV exits in lieu of each required type III exit, when such exits are intended for ditching.

Changes are being made to the provisions dealing with the landing gear retraction system, § 4b.334 (b); with altimeter static pressure source tolerances, § 4b.612 (b) (5); and with markings of the air-speed indicator, § 4b.732. A new § 4b.659 is included which requires appropriate protection of the airplane against failure of high energy rotors when such rotors are incorporated in any equipment on the airplane. There is included an amendment to § 4b.603 which requires the incorporation of a maximum air-speed indicator if the air-speed limitations vary appreciably with altitude.

In addition, there are included other changes which are of a clarifying or editorial nature.

Interested persons have been afforded an opportunity to participate in the making of this amendment (22 F.R. 9116), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby amends Part 4b of the Civil Air Regulations (14 CFR Part 4b, as amended) effective May 17, 1958:

1. By amending § 4b.1 (b) (1) by deleting the parenthetical phrase "(see NACA Technical Note 3182)" and inserting in lieu thereof "(see NACA Technical Report 1235)".

2. By amending § 4b.132 by adding a new paragraph (e) to read as follows:

4b.132 Directional and lateral control. * * *

(e) Lateral control; all engines operating. Roll response shall be rapid and of sufficient

USCOMM-DC-1093h

magnitude to perform normal maneuvers, such as recovery from upsets produced by gusts and the initiation of evasive maneuvers. In sideslips, up to sideslip angles which might be required in normal operation, sufficient excess lateral control shall remain to perform a limited amount of maneuvering and to correct for gusts. Lateral control shall be sufficient at all speeds up to V_{NE} to provide a peak roll rate necessary for safety without requiring excessive control forces or excessive control travel.

3. By amending § 4b.236 (c) (2) by adding a new sentence between the first and second sentences to read as follows: "For one and 2 deflated tires the vertical load factor at the center of gravity shall be 60 percent and 50 percent, respectively, of the factor with no deflated tires, except that it shall not be less than 1g."

4. By amending § 4b.270 (b) by deleting the words "subparagraphs (1) and (2)" in the second sentence and inserting in lieu thereof the words "subparagraphs (1) through (4)"; by deleting § 4b.211 (b)" in subparagraph (2) and inserting in lieu thereof "§§ 4b.211 (b) and 4b.215 (b)"; and by adding new subparagraphs (3) and (4) to read as follows:

4b.270 General. * * *

(b) Fail safe strength. * * *

(3) Eighty percent of the limit loads resulting from the conditions specified in § 4b.220 (c). These loads shall be considered to be ultimate.

(4) Eighty percent of the limit maneuvering loads resulting from the conditions specified in § 4b.215 (a), except that the load need not exceed 100 percent of the critical load obtained in compliance with the provisions of § 4b.215 (a) using a pilot effort of 180 pounds. This load shall be considered to be ultimate.

5. By amending § 4b.322 (f) by adding a new sentence at the beginning thereof to read as follows: "All trim control systems shall be designed to prevent creeping in flight."

6. By amending § 4b.334 (b) by adding a new sentence at the end thereof to read as follows: "A means shall be provided to prevent the retraction of the landing gear while the airplane is on the ground."

7. By amending § 4b.358 (b) by adding a new subparagraph (6) to read as follows:

4b.358 Seats, berths, and safety belts. * * *

(b) Arrangement. * * *

(6) Seats for cabin attendants shall be disposed within the passenger compartment near approved floor level emergency exits. (See § 4b.362 (g).)

8. By amending § 4b.362 (d) to read as follows:

4b.362 Emergency evacuation. * * *

(d) Ditching emergency exits. Except as otherwise provided in this paragraph, at least 2 exits, one on each side of the airplane, meeting the minimum dimensions of the exits specified in paragraph (b) (3) of this section and located above the water level, shall be provided. In addition, it shall be shown that there is not less than one emergency exit located above the water level for every 35 passengers. It shall be permissible to substitute 2 type IV exits for each required type III exit. When the configuration of the airplane is such that it will not permit the location of side exits above the water level, the required number of side exits shall be replaced by an equal number of overhead hatches of not less than the dimensions of exits specified in paragraph (b) (3) of this section, except that on airplanes having a passenger capacity of 35 or less only one such overhead hatch need be provided.

9. By amending § 4b.362 (e) (2) by adding at the end thereof the following phrase: "except that sliding window emergency exits in the flight crew area need not be openable from the outside if the Administrator finds that the proximity of other approved exits makes them convenient and readily accessible to the flight crew area."

10. By amending § 4b.362 (f) (1) and (2) by inserting in the first sentence of each subparagraph between the words "all" and "emergency" the word "passenger".

11. By amending § 4b.362 (f) (3) by inserting between the words "exits" and "and" the phrase "which are required to be openable from the outside,".

12. By adding a new § 4b.409 to read as follows:

4b.409 Turbine powerplant operating characteristics. Turbine powerplant operating characteristics shall be investigated in flight to determine that no adverse characteristics, such as stall, surge, or flameout, are present to a hazardous degree during normal and emergency operation of the airplane within the range of operating limitations of the airplane and of the engine.

13. By amending § 4b.435 by adding the words "or filter" after the word "strainer" in the title of the section in the introductory paragraph, and in paragraphs (a), (b), and (c).

14. By amending § 4b.435 (d) by deleting the words "filter or strainers" and inserting in lieu thereof the words "strainers or filters".

15. By amending § 4b.435 by adding a new paragraph (e) to read as follows:

4b.435 Fuel strainer or filter. * * *

(e) The fuel strainer or filter shall be of adequate capacity, commensurate with operating limitations established to insure proper service and of appropriate mesh to insure proper engine operation with the fuel contaminated to a degree, with respect to particle size and density, which can be reasonably expected to occur in service. The degree of fuel filtering shall be not less than that established for the engine in accordance with Part 13 of this subchapter.

16. By amending § 4b.603 by amending paragraph (a) to read as follows, and by deleting paragraph (j):

4b.603 Flight and navigational instruments. * * *

(a) Air-speed indicating system. If the air-speed limitations vary with altitude, the air-speed indicator shall incorporate a maximum allowable air-speed indication showing the variation of V_{NE} with altitude including compressibility limitations. (See § 4b.732.)

17. By amending § 4b.612 (b) (5) to read as follows:

4b.612 Flight and navigational instruments. * * *

(b) Static air vent and pressure altimeter systems. * * *

(5) The design and installation of the altimeter system shall be such that the error in indicated pressure altitude at sea level in standard atmosphere, excluding instrument calibration error, does not result in a value more than the $\pm$ 30 feet per 100 knots in speed for the appropriate configuration in the speed range between 1.3 V_{s_0} (flaps extended) and 1.8 V_{s_1} (flaps retracted), except that the error need not be less than $\pm$ 30 feet.

18. By amending § 4b.651 (h) (1) to read as follows:

4b.651 Oxygen equipment and supply. * * *

(h) Protective breathing system. * * *

(1) The protective breathing equipment shall include masks covering the eyes, nose, and mouth, or only the nose and mouth when accessory equipment is provided to protect the eyes. Such equipment while in use shall not prevent the flight crew from using the radio equipment of the airplane or from communicating with each other while at their assigned duty stations. That part of the equipment provided to protect the eyes shall be of a type and construction which will not cause any appreciable adverse effect on vision and shall permit wearing corrective glasses by individual members of the flight crew.

19. By adding a new § 4b.659 to read as follows:

4b.659 Equipment incorporating high energy rotors. Equipment incorporating high energy rotors shall be demonstrated as capable of containing a failed rotor or shall be so located that failure will not affect the ability of the airplane to continue safe flight.

20. By amending § 4b.718 to read as follows:

4b.718 Powerplant limitations. The following powerplant limitations shall be established for the airplane as applicable for the type(s) of engine(s) installed. They shall not exceed the corresponding limits established as part of the type certification of the engine and propeller installed in the airplane.

(a) Take-off operation.

(1) Maximum rotational speed (rpm);

(2) Maximum permissible manifold pressure;

(3) Maximum permissible gas temperature for turbine engines;

(4) The time limit for use of the power which corresponds with the values established in subparagraphs (1) through (3) of this paragraph;

(5) When the time limit established in subparagraph (4) of this paragraph exceeds 2 minutes, the maximum allowable cylinder head and oil temperatures; and

(6) Maximum cylinder head and oil temperatures if these differ from the maximum limits for continuous operation.

(b) Maximum continuous operation.

(1) Maximum rotational speed (rpm);

(2) Maximum permissible manifold pressure; and

(3) Maximum permissible cylinder head, oil, and gas temperatures.

(c) Fuel grade or specification designation.

(1) The minimum grade of fuel required for satisfactory operation at the limits specified in paragraphs (a) and (b) of this section for reciprocating engines, and

(2) The designation of the fuel required for satisfactory operation at the limits specified in paragraphs (a) and (b) of this section for turbine engines.

21. By amending § 4b.732 to read as follows:

4b.732 Air-speed limitation information. The air-speed limitations (see § 4b.741 (a)) shall be presented in such a manner that they can be easily read and interpreted by the flight crew.

22. By amending § 4b.741 (a) by deleting the words, "marking the air-speed indicator" and inserting in lieu thereof the words, "the presentation of the air-speed limitations to the flight crew".

23. By amending § 4b.742 by redesignating paragraph (d) as paragraph (e) and adding a new paragraph (d) to read as follows:

4b.742 Operating procedures. * * *

(d) Restarting of turbine engines. The recommended procedures to be followed in restarting turbine engines in flight shall be described. These procedures shall include the effects of altitude.

(Sec. 205, 52 Stat. 984; 49 U.S.C. 425. Interpret or apply secs. 601, 603, 52 Stat. 1007, 1009, as amended; 49 U.S.C. 551, 553)

By the Civil Aeronautics Board:

/s/ M. C. Mulligan

M. C. Mulligan
Secretary

(SEAL)

Part 4b last printed December 31, 1953.