Civil Aeronautics Manual 41

Certification and Operation Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States

FEDERAL AVIATION AGENCY

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FEDERAL AVIATION AGENCY

E. R. QUESADA, *Administrator*

Introductory Note

This manual contains in consolidated form (1) Civil Air Regulations Part 41, Certification and Operation Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States, dated April 15, 1955, Amendments 41–1 through 41–27, and the editorial changes required by Special Regulations SR–430 and SR–431, effective December 31, 1958 and February 13, 1959, respectively; and (2) the rules, policies, and interpretations issued by the Administrator of the Federal Aviation Agency in application to the various sections of the regulations.

FAA *rules* are supplementary regulations issued pursuant to authority expressly conferred on the Administrator in the Civil Air Regulations. Such rules are mandatory and must be complied with.

FAA *policies* provide detailed technical information on recommended methods of complying with the Civil Air Regulations. Such policies are for the guidance of the public and are not mandatory in nature.

FAA *interpretations* define or explain words and phrases of the Civil Air Regulations. Such interpretations are for the guidance of the public and will be followed by the Agency in determining compliance with the regulations.

This manual is arranged to give the number, title, and text of each section of the regulations followed by any rules, policies, or interpretations applicable to that section. These rules, policies, or interpretations of the Administrator are identified by consecutive dash numbers appended to the regulation section number.

This manual supersedes Civil Aeronautics Manual 41 dated February 1956 and all supplements thereto. As amendments and other pertinent materials pertaining to Part 41 are issued, they will be included in this manual.

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Certification and Operation Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States

Certificate

41.0 General.

The regulations in this part are prescribed for scheduled air transportation operations conducted by air carriers between a place in any State of the United States, or the District of Columbia, and any place in a Territory or possession of the United States; or between any place in a Territory or possession and a place in any other Territory or possession of the United States; or between places in a Territory or possession; or between any place in the United States and any place outside thereof; or between any two places outside the United States. The regulations in this part shall also apply to:

(a) Scheduled air transportation operations conducted by air carriers between a place in any State of the United States and the State of Alaska or the State of Hawaii, respectively, or between the State of Alaska and the State of Hawaii; and

(b) Any scheduled operations conducted between points within the State of Alaska or the State of Hawaii, respectively, by a common carrier engaged in the carriage by aircraft of persons or property for compensation or hire or of U.S. mail unless such operations are conducted as an Air Taxi Operator under Parts 42 or 47 of this subchapter.

41.1 *Issuance.* An air carrier operating certificate prescribing the type of operation, the routes over which such operation may be conducted, the airports which may be used, and such other specifications and restrictions as may be reasonably required in the interest of safety shall be issued by the Administrator to an applicant who demonstrates that he is capable of conducting the proposed operations in accordance with the applicable regulations specified in this part.

(a) *Alaskan air carriers.* Whenever, upon investigation, the Administrator finds that the general standards of safety required for air carrier operations within the State of Alaska require or permit a deviation from any specific requirement of this part for a particular operation or a class of operations for which an application for an air carrier operating certificate has been made, he may issue an air carrier operating certificate with appropriate changes, specifying therein the period during which such deviations may be permitted.

41.1–1 *Application for air carrier operating certificate (FAA rules which apply to sec. 41.1).*

(a) *General.*

(1) The holder of a certificate of convenience and necessity shall apply to the Administrator for an air carrier operating certificate at least 30 days prior to the date proposed for beginning scheduled air carrier operations outside the continental limits of the United States. The application shall be prepared in looseleaf form, on white paper approximately 8″ x 10½″ in size, using one side of the sheet only. The application shall be executed by a duly authorized officer or employee of the applicant having knowledge of the matters set forth therein, and shall have attached thereto two copies of the appropriate written authority issued to such officer or employee by the applicant.

(2) A minimum of two copies of the application, and of subsequent amendments thereto, shall be filed with the Regional Administrator having jurisdiction over the area in which the principal office of the air carrier is located. If the principal office of the air carrier is not located within the area of a numbered region, the application shall be submitted either to the international field office having jurisdiction over the area in which the principal office of the air carrier is located, or directly to the Regional Administrator, International Region, Washington, D. C.

(3) When any facility or service directly affecting the operation of the air carrier concerned is furnished by other than the applicant or the Federal Government, at least two copies of the contract or working agreement concerning such facility or service shall be submitted with the application. In this connection, if formal contracts covering such facility or service have not been completed, letters showing agreement between the contracting parties shall be accepted until copies of the formal contract are obtainable.

(b) *Format of application.* The outline in this paragraph shall be followed in completing the information to be submitted in the application:

APPLICATION FOR AIR CARRIER OPERATING CERTIFICATE

(Outline)

TO: THE FEDERAL AVIATION AGENCY, *Washington, D. C.*

In accordance with section 604 of the Federal Aviation Act of 1958, as amended, and the Civil Air Regulations, application is hereby made for an Air Carrier Operating Certificate.

Give exact name and full post office address of applicant.

Give the name, title, and post office address of the official or employee to whom correspondence in regard to the application is to be addressed.

SECTION I. *Operations.*

A. State whether the type of service proposed is for the carriage of passengers, goods, or mail, or a particular combination thereof. If the type of service is not the same for each route or portion thereof, specify the type of service for each route or portion of a route.

B. State whether the type of operation proposed is day or night, visual flight rules, instrument or over-the-top, or a particular combination thereof. If the type of operation is not the same for each route or portion thereof, specify the type of operation for each route or portion of a route.

SECTION II. *Schedule.*

A. Submit a proposed schedule plan (or plans if seasonal changes or differences in equipment are involved) indicating the following:

1. Block-to-block time and mileage between scheduled stops.

2. Ground time at each intermediate and terminal stop.

B. Specify the basis upon which the proposed schedule has been computed, indicating the following:

1. Cruising speed and altitude.

2. Percentage of horsepower.

3. Direction and velocity of prevailing winds.

SECTION III. *Route.*

A. Submit a map suitable for aerial navigation on which are shown the exact geographical track of the proposed routes, and information with respect to terminal and intermediate stops, available landing areas, and radio navigational facilities. This material will be indicated in a manner that will facilitate identification. The applicant may use any method that will clearly distinguish the information, such as different colors, different types of lines, etc. For example, if different colors are used, the identification will be accomplished as follows:

1. Regular routes: Black.

2. Alternate routes: Green.

3. Terminal and regular intermediate stops: Orange circle.

4. Alternate landing fields or areas: Purple circle.

5. Other available landing fields or areas: Yellow circle.

6. Indicate the location and normal operating range of all radio navigational facilities

to be used in connection with the proposed operation as follows:

a. Show the projected courses of radio range stations by shaded red areas extended the distance of normal expected usability.

b. Show omnidirectional radio facilities by a shaded red circle extended the distance of normal expected usability.

B. *Airports.* Furnish the following information with regard to each regular, alternate, refueling, and provisional airport to be used in the conduct of the proposed operation.

1. Name (if any) of airport.

2. Location (by coordinates, and by name of nearest city or town, and direction and distance thereto).

3. Class of airport or landing area (municipal, commercial, military, private, or marked auxiliary).

4. Altitude above sea level.

5. Dimensions in linear feet of landing space available.

6. If hard-surfaced runways are provided, give number, direction, length, and width of each and indicate type of surfacing.

7. Obstructions (list adjacent obstructions, giving height and location, or attach appropriate C. G. A. L. charts if available).

8. Airport lighting (include beacon, auxiliary beacon, boundary lights, floodlights, etc., and any emergency lighting equipment; and by whom operated).

9. List refueling facilities available.

10. Is airport control tower provided and by whom?

11. Itemize radio navigational facilities provided and indicate the operating agency.

12. Does runway gradient exceed 2 percent? If so, state gradient.

13. What provisions are made for protection of passengers during loading and unloading at scheduled stop airports?

14. Prevailing winds?

15. Where necessary, are adequate snow removal facilities available?

C. *Weather reporting.*

1. Outline the weather service proposed to be used for dispatching over each route; the source, if other than a United States Weather Bureau Station; list in detail the location and agency in control of stations furnishing reports for each service; the frequency and method of collection and dissemination of weather information. Outline available terminal and route forecasting services, the type of maps and the intervals at which they are made each day.

2. Where it has been determined that additional weather reporting services will be required of the U. S. Weather Bureau for the type of operation involved, the air carrier will apply in writing to the appropriate Weather Bureau Regional Office. The request for the weather reporting services considered essential should be made coincidental with this application to the Federal Aviation Agency.

3. For operation within the continental limits of the United States, if other than a U. S. Weather Bureau Station, show proof of U. S. Weather Bureau approval of the service and specify the meteorological facilities available, the number of personnel and the duties of each, such as the making of weather maps, forecasts, observations, etc.

D. *Airway lighting.* List in detail all airway lighting on the routes other than those airway lighting facilities owned and operated by the Federal Aviation Agency if application includes request for night VFR operation.

SECTION IV. *Radio facilities.*

A. *Communications.* List company radio ground communication facilities installed, proposed to be installed, and those available to, but not owned by applicant, for each route. The expected communication coverage of all MF and HF ground facilities should be provided in map form. In the case of VHF, the expected coverage at exemplary altitudes should be outlined. Aircraft reporting and general change points, and frequencies should be specified either on the maps or as an attachment. (If owned by other than applicant, attach two certified copies of operating agreement.) List the following details for each station:

Transmitters. List the following information in regard to each transmitter:

1. Make and model number.

2. Remotely or locally controlled.

3. Types of emission and antenna power for each type of emission.

4. Number of frequency channels provided and actual frequencies in kilocycles proposed to be used.

5. Method of frequency change (quick shift or manual tuning).

6. Primary power source, voltage, phase, etc., and whether commercial source or locally generated.

7. Auxiliary power source.

8. Functional purpose of transmitter. If transmitter is used for more than one function, list in order of primary and secondary functions as:

a. Radiotelephone plane-to-ground primary purpose and radiotelephone point-to-point secondary purpose, or

b. Radiotelephone point-to-point primary purpose and standby radiotelephone plane-to-ground secondary purpose, etc.

Receivers.

1. List each receiver by type or model number and state its primary function, i. e., plane-to-ground guard, point-to-point C. W. or point-to-point radiotelephony.

2. List frequency range of each receiver and state which frequencies in each receiver are crystal controlled, if any.

3. Describe receiver installation to show number of receivers locally controlled and number remotely controlled.

B. *Radio navigational facilities.* List each ground radio navigational facility, other than those operated by the United States Government, to be used in the conduct of the proposed operations (if privately owned ground radio navigational facilities are to be used and are owned by other than the applicant, attach two certified copies of the operating agreement pertaining to the use of such facilities). List the following information with respect to each facility:

1. Type of facility, i. e., ILS, GCA, Non-Directional Radio Beacon, LF Radio Range, VAR, VOR, Loran, etc.

2. Estimated effective range (in miles).

3. Coordinates and location with respect to field or landing area.

4. Power supply; i. e., commercial or locally generated.

5. Auxiliary power supply.

6. Operating frequency or frequencies.

C. *Aircraft radio equipment.* List and describe the aircraft radio equipment installed in each aircraft by:

1. Type number.
2. Manufacturer.
3. Frequency range.
4. Operating frequencies.
5. Emergency power supply.
6. Antenna system.

SECTION V. *Weather minimums.*

A. Submit in detail the proposed ceiling and visibility limitations for takeoff for instrument flight and let-down-through at each regular, alternate, refueling, and provisional airport. Differentiate between daylight and darkness in the listing, and where more than one type of aircraft is to be utilized, and a differential of limitations exists, indicate proposed limitations for each type of aircraft.

B. Submit for each proposed scheduled stop and alternate airport a detailed flight procedure for instrument approach and let-down-through and where specific procedures are necessary because of terrain or traffic conditions, submit a detailed flight procedure for takeoff and climb (such procedure should be set up on the basis of the ceiling and visibility minimums proposed).

SECTION VI. *Aircraft.*

A. List the following information, as applicable, for each aircraft to be used in the proposed operations:

1. The name of the manufacturer.
2. Certification basis and category.
3. Manufacturer's model number.
4. Name of the manufacturer and type number of engines.
5. Name of manufacturer and type number of propellers.
6. N registration number and aircraft designation.
7. Type of service in which aircraft will be used (carriage of persons, property, mail, or combination thereof).
8. Will aircraft be used in regular or reserve service?
9. What type of operation (day, night, visual flight rules, instrument, over-the-top) will be conducted with this aircraft?

10. List each route or portion thereof over which this aircraft is to be operated and the maximum gross weight proposed for each route or portion thereof.

11. What is the service ceiling of each type aircraft with one engine inoperative?

12. List and describe installation and location of all lifesaving equipment and emergency supplies carried aboard each aircraft, such as life rafts, life preservers, portable emergency transmitters, Very pistols, and emergency rations. (If the same equipment is not carried during all seasons of the year, and on all routes, list and explain the difference.)

SECTION VII. *Maintenance: Aircraft, engines, and accessories.*

A. Furnish an organization chart indicating the authority and the duties of the maintenance and inspection personnel employed by the applicant.

B. Furnish an outline of overhaul, periodic inspections, and check periods relative to the following listed aircraft and engine components (if more than on make, type and model aircraft used, indicate separately).

1. Aircraft components:
   a. Wings.
   b. Fuselage.
   c. Empennage.
   d. Landing gear.
   e. Wheels and brakes.
   f. Center section.
   g. Nacelles.
   h. Control system.
   i. Hydraulic system.
   j. Accessories (aircraft).
   k. Fuel and oil system (aft of firewall).
   l. Fuel tanks.
   m. Cabin pressurizing and heating systems.
2. Engine components:
   a. Engine.
   b. Accessories (engine).
   c. Propellers.
   d. Fuel and oil system (forward of firewall).
   e. Oil tanks.
3. Instruments:
   a. Flight instruments.
   b. Aircraft and engine instruments.

When maintenance functions are performed by outside agencies, copies of the maintenance agreement regarding the extent of such services to be furnished should be attached to the application, as provided for in subparagraph (a) (2) of this section. The agreement should specify that services furnished should conform to the standards approved for the operator, and does not release the operator from responsibility for airworthiness of the aircraft or components.

C. Indicate type of maintenance operations that will be accomplished at each terminal, intermediate and overnight stop, relative to the following:

1. Disassembly and overhaul of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).
2. Periodic inspection and check of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).
3. Routine inspection of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).
4. En route replacements at intermediate and overnight stops.
5. Refueling.

D. Indicate the number of certificated and noncertificated mechanics, helpers, etc., including their company designation (foreman, inspectors, crew chiefs, etc.) located at the main overhaul base and each terminal and intermediate stop.

E. Indicate the distribution of the following items of spare equipment:

1. Aircraft (list quantity, make, and model).
2. Engines (list quantity, make, and model).
3. Propellers (list quantity, make, and model).
4. Instruments (list quantity, make, and model).

F. For each terminal, and intermediate stop at which refueling operation will be performed, describe the following:

1. Number, type (elevated or underground), and capacity of each fuel and oil storage tank.
2. List octane ratings of fuels available.

3. List S. A. E. rating or viscosity of oil available.

4. List facilities for preventing entrance of water into aircraft fuel tanks.

5. Outline method used to check for presence of water in storage tanks.

6. List facilities or method used to remove water from the storage tanks.

7. Outline method and procedure with reference to recording water checks.

8. Type of covered container used to convey oil from storage tank to aircraft.

9. Outline method and procedure of grounding aircraft in protection of fire.

G. For each terminal and intermediate stop, describe the following facilities:

1. Hangars:

a. Number.

b. Dimensions and number of square feet available for aircraft storage.

c. Dimensions and number of square feet available for shop space.

d. Dimensions of hangar doors.

e. Number of largest sized aircraft of applicant which may be housed.

2. Equipment for ground handling of aircraft, as may be required for the proposed operation.

SECTION VIII. *Maintenance: Radio and electrical equipment.*

A. Briefly describe the functional operation of the radio maintenance organization, indicating the number and scope of responsibility of supervisory personnel and the number and distribution of qualified radio mechanics.

B. Indicate the following with respect to aircraft radio equipment maintenance procedures:

1. Disassembly and overhaul periods of aircraft radio equipment and station at which accomplished.

2. Periodic inspection and check periods of aircraft radio equipment and stations at which accomplished.

3. Equipment replacement at intermediate and overnight stops.

C. Indicate whether overhaul, periodic inspection and routine inspection of aircraft electrical equipment are under the jurisdiction of the radio maintenance department or the aircraft, engine, and accessories maintenance department.

D. Indicate the following with respect to aircraft electrical equipment maintenance procedures:

1. Disassembly and overhaul periods of aircraft electrical equipment and stations at which accomplished.

2. Periodic inspection and check periods of aircraft electrical equipment and stations at which accomplished.

3. Routine inspection periods of aircraft electrical equipment and stations at which accomplished.

E. Indicate the distribution of the following items of spare equipment:

1. Radio equipment (list quantity, make, and model).

2. Electrical equipment (list quantity, make, and model).

3. Other electronic equipment (list quantity, make, and model).

SECTION IX. *Airmen.* Indicate the composition of the flight crew. If the composition is different in different aircraft or on different routes, so indicate and show the composition of the flight crew under each different condition. List the following information with respect to the airmen to be employed in the proposed operation:

1. Show the number of first, second, third, etc., pilots to be employed in the proposed operation, and specify the certificate and ratings to be held by each.

2. Show the number of pilots for whom designation "check pilot" will be requested, and specify the certificate and ratings to be held by each.

3. Show the number of flight engineers to be employed in the proposed operation.

4. Show the number of flight radio operators to be employed in the proposed operation.

5. Show the number of flight navigators to be employed in the proposed operation.

6. Show the number of dispatchers to be employed in the proposed operation.

SECTION X. *Additional data.*

A. Furnish such additional information and substantiating data as may serve to implement this application.

Each application shall be concluded with a statement as follows:

I certify that the above statements are true.
Signed this _____ day of _____ 19 ____.

_____
(Name of applicant)

By _____
(Name and capacity of person duly authorized to execute this application on behalf of the applicant)

(Published in 18 F. R. 6750, October 24, 1953, effective December 1, 1953.)

41.1–2 *Amendment of air carrier operating certificate (FAA rules which apply to sec. 41.1).*

(a) The usual procedure by which a change is made in an air carrier operating certificate and operations specifications, which are made a part thereof, is by an amendment. Thus, where the air carrier desires the addition or deletion of an airport, revision of landing or takeoff minimums, changes in approach procedures, minor route changes, etc., such changes may be made by an amendment. Application for such amendments shall be submitted to the aviation safety agent or adviser, operations, assigned to the particular air carrier.

(b) Amendments concerning revisions of maintenance time limitations shall be submitted to the aviation safety agent or adviser, maintenance, assigned to the air carrier.

(c) Details with respect to applications for amendment, number of copies, etc., shall be furnished by the aviation safety agent or adviser concerned upon request.

(d) Amendments to the air carrier operating certificate and the operations specifications are usually initiated by the air carrier. However, if the Administrator considers that the need for an amendment is essential for safe operations, and no application has been received from the air carrier, Federal Aviation Agency personnel authorized to approve any portion of their operating certificate or operations specifications issued thereunder, shall notify the air carrier that an application for such an amendment should be made. This notification shall include full particulars regarding the need for the amendment.

(e) An application to amend an air carrier operating certificate for a new route extension, which has been authorized in a Certificate of Convenience and Necessity, or a new type aircraft to be used, shall be submitted at least 15 days prior to the proposed date for inauguration of service, unless permission for a shorter filing period is approved by the Administrator. The application for such an amendment shall be executed in accordance with the applicable provisions of section 41.1–1.

(Published in 18 F. R. 7650, October 24, 1953, effective December 1, 1953; amended in 19 F. R. 7339, November 13, 1954, effective November 15, 1954.)

41.1–3 *Preface pages to operations specifications (FAA policies which apply to sec. 41.1).* Preface pages to the operations specifications, which are a part of the air carrier operating certificate issued by the Administrator, shall be prepared by the air carrier on a Form ACA–1014. This form is prescribed by the Administrator, and copies of it may be obtained from the aviation safety agent or advisor assigned to the air carrier or from a district or regional office of the Federal Aviation Agency.

(Published in 18 F. R. 6750, October 24, 1953, effective December 1, 1953.)

41.1–4 *Ceiling and visibility minimums (FAA policies which apply to sec. 41.1).*

(a) *General.* The ceiling and visibility minimums authorized by the Administrator for operations into or from airports will be included in the operations specifications issued to the air carrier. The policies set forth in paragraphs (b) and (c) will be used by the Federal Aviation Agency in establishing ceiling and visibility minimums with the following exceptions:

(1) *Military airports.* When an air carrier is authorized to use a military airport, the ceiling and visibility minimums for takeoff and landing at that airport will be not less than those agreed upon by the military authorities having jurisdiction over the facility.

(2) *Foreign airports.* Ceiling and visibility minimums for takeoff and landing at a foreign airport will be not less than those prescribed by the country in which the airport is located. If no minimums have been prescribed by the foreign government, the authorized minimums will be consistent with the policies set forth in paragraphs (b) and (c).

(b) *Takeoff minimums.*

(1) *Regular, provisional, or refueling airports.*

(i) *Twin-engine aircraft.*

(*a*) Takeoff minimums may be approved as low as 300 feet and 1 mile if, after a consideration of all obstructions in the immediate vicinity of the end of the runway used and of the facilities and procedures used to avoid all obstacles in the takeoff area, it is determined that a safe climb to the minimum en route altitude can be made. Takeoff minimum lower than 300–1 and as low as 200–½ may be approved when the air carrier is authorized landing minimums lower than 300–1 through utilization of the ILS or GCA facilities serving the airport, provided such takeoff minimum will not be less than the straight-in landing minimums approved for the particular airport and conditions are such that a straight-in ILS or GCA approach can be executed in accordance with the limitations set forth in the air carrier operating certificate.

(*b*) Takeoff minimums as low as 200–½ may also be approved at airports not served by ILS or GCA facilities, or at airports equipped with ILS or GCA when conditions are such that a straight-in ILS or GCA approach cannot be made in accordance with subdivision (*a*) of this subparagraph. Such approval, however, will be contingent upon the specification in the flight clearance of an alternate airport having an approved instrument approach procedure located within a distance equivalent to 15 minutes at 1 engine inoperative cruising flight in calm air from the airport of takeoff. In addition, at the time of departure, the weather at such alternate airport must be at or above alternate landing minimums. In submitting applications for approval of such minimums, the lowest takeoff minimums applicable without a takeoff alternate should be shown in the takeoff minimum column of the Operations Specifications—Airport. The takeoff minimums applicable when a takeoff alternate is specified in the flight clearance should be shown in the "Remarks" section of the Operations Specifications—Airport as follows: (Show minimums applicable) authorized in accordance with paragraph—Airport Preface Pages.

(ii) *Four-engine aircraft.* Takeoff minimums may be approved as low as 200 feet and ½ mile if, after a consideration of all obstructions in the immediate vicinity of the end of the runway used and of the facilities and procedures used to avoid all obstacles in the takeoff area, it is determined that a safe climb to the minimum en route altitude can be made. At airports, where takeoff minimums of 200–½ have been approved, takeoff minimums of 200–¼ may also be authorized on runways equipped with high intensity runway lights, provided such lights are on and in normal operation in order to insure that the pilot has adequate visual reference to the line of forward motion during the takeoff run.

(2) *Alternate airports.* Takeoff minimums, for both 2- and 4-engine aircraft may be approved as low as 300 feet and 1 mile, if, after a consideration of all obstructions in the immediate vicinity of the end of the runway used and of the facilities and procedures used to avoid all obstacles in the takeoff area, it is determined that a safe climb to the minimum en route altitude can be made. When an air carrier has been approved for takeoff minimums of 200–½ at an airport for regular, provisional or refueling use, this air carrier may have minimums of 200–½ authorized at the same airport when it is used as an alternate.

(c) *Landing minimums.* In the approval of ceiling and visibility minimums for landing, two methods of approach will be considered. These are: A regular approach, involving a maneuver of the aircraft or circling of the airport in order to effect a landing, and a straight-in approach from a navigational aid to a landing. A landing is considered as straight-in when the difference between the runway direction and the track from the navigation aid to the approach end of that runway is 30° or less.

(1) *Regular approach.* Where it is necessary to circle or maneuver to effect a landing, aircraft with higher maneuvering, approach, and landing speeds shall be operated with higher landing minimums than slower type aircraft. To effect this principle, the stall speed as established in the Airplane Flight Manual at maximum certificated landing weight with full flaps, landing gear extended, and power off

will be used to differentiate between the two types of aircraft. Regular approach minimums are generally the same for all instrument approach procedures without regard to the type of radio navigational facility serving the particular airport, and will be established in accordance with the following policy:

(i) For aircraft having stall speeds in excess of 75 m. p. h., the ceiling minimums will be at least 500 feet above the established elevation of the airport and not less than 300 feet above obstructions over which all turns about the airport will normally be made. In addition, the ceiling minimums will be 300 feet above all obstructions within 2 miles on either side of the centerline of the track from the facility to the end of the nearest usable runway. To determine the obstruction clearance, the normal area for all turns about the airport will be considered as extending for 2 miles in all directions from the boundary of the airport, exclusive of any areas over which flight is prohibited. However, in certain cases where the location and characteristics of prominent obstructions within the normal turning area about the airport is such that they can easily be seen and avoided, ceiling minimums may be established, taking into account the aircraft's ability to maneuver around these obstructions. Normally, visibility minimums for such aircraft will be not less than 1½ miles except that visibility minimums of not less than 1 mile may be authorized for twin-engine aircraft having a stall speed in excess of 75 m. p. h. but, which can be safely maneuvered with a radius of turn of not more than ½ mile.

(ii) Aircraft having stall speeds of 75 m. p. h. or less will normally be authorized to operate into airports with ceiling minimums 100 feet lower and visibility minimums of ½ mile less than established for the faster type of aircraft, but in no case will the ceiling be less than 400 feet and the visibility less than 1 mile. The criteria with respect to obstruction clearance will be the same as in subdivision (i) of this subparagraph except that the normal area about the airport for all turns will be considered as extending 1½ miles in all directions from the boundary of the airport.

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(2) *Straight-in approaches using a radio range or comparable radio facility (i. e., ADF, VOR, localizer).*[1] Where a radio facility is so located that the difference between the direction of the runway to be used for landing, and the track between the radio facility and the approach end of that runway is less than 30°, straight-in approach minimums lower than the regular approach minimums may be authorized when a rate of descent of not more than 500 feet per minute will bring the aircraft from its final approach altitude over the radio facility to the end of the runway at zero altitude. In this configuration, the speed of the aircraft, having a stall speed in excess of 75 m. p. h. will be considered to be not less than 120 m. p. h. in still air, and the speed of the aircraft, having a stall speed of less than 75 m. p. h., will be considered to be not less than 90 m. p. h. in still air. For both classes of aircraft, the ceiling minimums will not be less than 400 feet, and the visibility minimums not less than 1 mile. The yardstick set forth above will be applied to each airport as a guide, and, where its rigid application would result in unrealistic or unreasonable minimums, such practical adjustment will be allowed as will still provide adequate safety. In such cases, the air carrier's application shall include a full explanation of the reason for a deviation from the yardstick and must be concurred in by the aviation safety agent or adviser, operations, approving the minimums.

When an ADF or comparable facility is located on an airport, the ceiling minimums will not be less than 500 feet.

The use of facilities such as low frequency radio ranges, automatic direction finding facilities (ADF), high frequency radio range facilities (VAR), and omnirange facilities (VOR), is predicated on dependability of operation, location of the facility with respect to the airport, and monitoring of the facility in the case

[1] An ILS localizer course which has a suitable fix, is considered as a facility comparable to a radio range. A fix formed by the intersection of a localized course and a range leg or radio bearing will be considered as being suitable if:

(1) The fix is located, either on the front or back course of the localizer, within 7 miles of the airport, and

(2) The radio range station or source of the radio bearing is within 25 miles of the fix, and

(3) The range leg or bearing intersects the localizer course at an angle greater than 45°.

of a high frequency radio range or VOR. In exceptional cases, however, an approach may be authorized utilizing a radio facility which is deficient in some respects, such as its location in reference to the airport it is intended to serve, when the ceiling and visibility minimums are adjusted commensurate with the deficiency. In such case complete justification for the authorization of an approach using a low or high frequency radio range or automatic direction finding facility which is located more than 7 miles from the airport must be furnished by the air carrier. The ceiling and visibility minimums in such case will not be less than (i) 500 feet and 2 miles when the facility is located from 7 to 10 miles from the airport, (ii) 700 feet and 2 miles when the facility is located from 10 to 12 miles from the airport, and (iii) visual flight rules will be observed from the radio facility when such facility is more than 12 miles from the airport. At the present time, and until more operational experience has been gained utilizing VOR facilities for letdowns, the above-mentioned limitations will also apply with respect to the use of VOR facilities. When a high frequency radio range (VAR) or omnirange facility (VOR) is not adequately monitored, the ceiling and visibility minimums will be at least 1,000 feet and 1 mile unless lower minimums can be fully justified.

(3) *Straight-in approaches using ILS or GCA facilities.* Ceiling and visibility minimums established pursuant to this policy are for straight-in approaches only, utilizing ILS or GCA facilities.

(i) *Components of an ILS.*

(*a*) The components which make up the instrument landing systems are: (*1*) Localizer, (*2*) glide path, (*3*) outer marker, (*4*) middle marker, and (*5*) approach lights.

(*b*) Compass locator stations may be installed at the sites of the outer and middle markers of an instrument landing system, but are not considered a component of the ILS. However, when so installed, they may be used in lieu of the outer or middle marker for establishing a definite position over the fix, provided the aircraft is equipped with dual automatic direction finding receivers. If an aircraft is equipped with a single ADF receiver, only one compass locator may be used in lieu of the marker at the corresponding position.

(ii) *Components of a GCA system.* The components which make up the ground controlled approach system include (*a*) surveillance radar (PPI), (*b*) altitude and azimuth control radar (PAR), and (*c*) approach lights.

(iii) *Demonstration of ability.* Approval of minimums for utilization of ILS or GCA, whichever is proposed for use, will be predicated on satisfactory demonstration of ability by the air carrier to use the proposed facilities. An air carrier will have demonstrated such ability when (*a*) the aircraft has installed and properly functioning, approved airborne receiving equipment and associated controls, indicators and antenna, (*b*) the air carrier's training program includes a satisfactory familiarization program in the use of the proposed facilities and procedures, for all flight personnel to be engaged in the operation, and (*c*) the flight personnel concerned have demonstrated under simulated instrument conditions the ability to safely accomplish the ILS or GCA approach and landing procedures down to the proposed minimums.

(iv) *Transition to lower minimums.* The transition to lower minimums will be made in increments of 100 feet ceiling and ¼-mile visibility from the straight-in minimums which could be authorized at a particular airport for a radio range or comparable facility procedure, as set forth in this section. The first reduction of minimums by these increments will be based on satisfactory demonstration of ability by the air carrier as outlined under subdivision (iii) of this subparagraph. Subsequent reduction in minimums will be based on satisfactory operation by the air carrier at the authorized minimums for an approximate period of 6 months using the particular facilities, unless it is deemed necessary for an air carrier to demonstrate ability either as specified in subdivision (iii) (*c*) of this subparagraph or under actual instrument conditions. The pattern of reduction in minimums is illustrated as follows: When present straight-in approach minimums are 400–1 the initial minimums for ILS or GCA will be 300–¾ and at the end of an approximate 6-month period of satisfactory operation using

the particular facilities, the next reduction would be to 200–½.

(v) *Lowest landing minimums.* Where no adjustment to the ceiling minimums is necessary for obstruction clearance as explained in (*a*) of this subdivision, landing minimums of 200–½ are the lowest minimums which may be approved at the present time with all components of the ILS or GCA facilities in operation. Exception to these minimums may be made at specific locations where the installation of improved navigational aids so warrants.

(*a*) *Adjustment of ceiling minimums for obstruction clearance.* When the minimum obstruction clearance as described in section 609.10 or section 609.12 of Chapter II (i. e., Regulations of the Administrator) of this title cannot be met in the approach area, consideration will be given to establishing ceiling minimums which will afford comparable safety. In this event, the ceiling minimums will be determined by the application of the following formula to all obstructions projecting above the established slope line and located, in the case of an ILS procedure, in the approach area between the outer marker and the end of the runway, or in the case of a GCA procedure, in the approach area within a distance of 5 miles, outward from the end of the runway:

(*1*) Extend a line horizontally outward from the top of each obstruction and parallel with the runway centerline to a point of intersection with the established slopeline, and from that point extend a line vertically to a point of intersection with the glide path. The point of intersection at the highest level of the glide path as established by the foregoing formula will determine the minimum ceiling that may be considered.

(*2*) Where minimum obstruction clearances cannot be met in the transitional and horizontal surfaces immediately adjacent to the approach area and when deemed necessary, consideration will be given to an adjustment in the ceiling minimums commensurate with the degree of interference presented by the particular obstruction or obstructions.

(*3*) When application of the formula set forth in the preceding subparagraphs to an obstruction projecting above the established slope surface indicates a ceiling of less than 300 feet, the ceiling will not be reduced below 300 feet until it has been determined by flight checks that the lower ceiling may be authorized.

(4) *Lowest landing minimums utilizing back course of the ILS.* Straight-in approach minimums of 300–1 or 400–¾ may be approved on the back course of the ILS provided (i) the criteria outlined in section 609.10 of Chapter II (i. e., Regulations of the Administrator) of this title is complied with, (ii) the approach is monitored by surveillance radar, (iii) high-intensity runway lights or approach lights are in operation on the runway to which the approach is being conducted, (iv) the obstruction clearance criteria is complied with as outlined in section 609.10, and (v) the establishment of such a procedure will not adversely affect traffic at the airport concerned.

(5) *PPI approach.* Minimums for a PPI approach will be established in the same manner as outlined in subparagraphs (1) (i) and (ii) of this paragraph for a regular or circling approach.

(6) *Airports not served by a radio navigational or letdown facility.*

(i) *Takeoff minimums.* Takeoff minimums for both 2- and 4-engine aircraft may be approved as low as 300–1 if, after a consideration of all obstructions in the immediate vicinity of the end of the runway used, and of the facilities and procedures used to avoid all obstacles in the takeoff area, it is determined that a safe climb to the minimum enroute altitude can be made.

(ii) *Landing minimums.* Landing minimums as low as 1,000–1 may be approved for airports located outside of control zones; and as low as 1,000–3 for airports located in control zones if, after consideration of the terrain in the vicinity of the airport and the traffic density in that area, the Administrator deems that operations at these minimums assure an adequate level of safety.

(7) *Application of obstruction clearance criteria in determining landing ceiling minimums.* Unless safety requires otherwise, landing ceiling minimums for approaches using a radio range or comparable facility will be shown

on the Operations Specifications—Airport to the nearest 100 feet. For example, assuming that the controlling obstruction at an airport is 249 feet high, a ceiling minimum of 500 feet will normally be considered as meeting the obstruction clearance criteria outlined in subparagraph (1) (i). If, on the other hand, such obstruction were 250 feet high, minimums of 600 feet will normally apply. In cases where the ILS obstruction clearance criteria cannot be met, the ceiling arrived at by application of the formula contained in subparagraph (3) (v) (*a*) will normally be shown to the nearest 100 feet; except that a flight check is required where application of the formula indicates a ceiling of less than 300 feet.

(Published in 18 F. R. 6750, October 24, 1953, effective December 1, 1953.)

(d) *Establishment of alternate airport landing minimums at airports served by ILS.* Alternate airport landing minimums of 600–2, 700–1½, or 800–1 may be authorized at airports where the ILS is not equipped with approach lights.

(Published in 21 F. R. 4999, July 6, 1956, effective July 12, 1956.)

41.1–5 *Form of application for issuance of initial or revised Operations Specifications, Aircraft Maintenance (FAA rules which apply to sec. 41.1).* Applications by the air carrier for new or amended Operations Specifications, Aircraft Maintenance, shall be made on Operations Specifications Form ACA–1014 or equivalent.

Those pages of the Operations Specifications, Aircraft Maintenance, which contain the list of aircraft components, inspections, checks and overhauls, and time limitations therefor, shall be prepared by the air carrier on a Form ACA–1014 or equivalent. Such pages shall be prepared to permit insertion in a suitable loose-leaf binder. Each page shall be consecutively numbered and identified as an Operations Specifications, Aircraft Maintenance.

The air carrier shall list the aircraft components and the overhauls, inspections, checks, and time limitations therefor either on separate pages in the Operations Specifications, Aircraft Maintenance, or together on the same pages. If listed separately, the overhauls, inspections, and checks shall be appropriately and thoroughly identified, by number and/or nomenclature, to include any applicable abbreviations. The list of individual aircraft components shall show proper reference to the overhauls, inspections or checks by means of the applicable number, nomenclature or abbreviation thereof. When so listed, it shall mean that such components are overhauled, inspected or checked at the times identified in the Operations Specifications.

Four copies of the application [3] and attachments shall be submitted to the assigned agents, the first copy of the application bearing the signature of a duly authorized representative of the air carrier. Approval or disapproval shall be indicated on the first and second copies of the application and attachments which will be returned to the air carrier. The air carrier shall, in turn, indicate receipt in the space provided on the second copy and return it to the assigned agent.

(Published in 19 F. R. 7339, November 13, 1954, effective November 15, 1954.)

41.1–6 *Form of application for issuance of initial or revised Operations Specifications, Aircraft Weight and Balance Control (FAA rules which apply to sec. 41.1).* Applications by the air carrier for new or amended Operations Specifications, Aircraft Weight and Balance Control,[4] shall be made on Operations Specifications Form ACA–1014 or equivalent.

Four copies of the application shall be submitted, the first copy of the application bearing the signature of a duly authorized representative of the air carrier. Approval or disapproval of the carrier's application shall be indicated on the first and second copies of the application which will be returned to the air carrier. The air carrier shall, in turn, indicate receipt in

[3] Application for initial time limitations applicable to new aircraft, engines, propellers or appliances, not previously used in air carrier service may require Washington concurrence prior to final issuance by the FAA regional office and therefore, should be submitted as soon as possible, but not later than 15 days prior to the date that the aircraft or component is to be placed into service.

[4] The Operations Specifications, Aircraft Weight and Balance Control, may combine weight control procedures common to more than one aircraft or they may separate weight and balance procedures specifically adapted to a particular aircraft type and model.

space provided on the second copy and return it to the assigned agent.

(Published in 19 F. R. 7339, November 13, 1954, effective November 15, 1954.)

41.1-7 *Policies, procedures, and limitations governing issuance and amendment of Operations Specifications, Aircraft Maintenance (FAA policies which apply to sec. 41.1).*

(a) *General.* The Administrator will issue and amend Operations Specifications, Aircraft Maintenance, in accordance with the following policies, procedures, and limitations. The criteria hereinafter set forth will be followed by the Administrator in fixing time limitations for the performance of overhaul, inspections, and checks, or in permitting or requiring revisions thereto. The basic principle followed by the Administrator will be that the inspections, checks, maintenance, or overhaul be performed at times well within the expected or proven service life of each component of the aircraft. In determining what the expected or proven service life of an aircraft or any of its components might be, the Administrator will consider the following factors: (1) Geographical area or areas of operation; (2) engine operating powers, procedures, etc.; (3) number of landings, long haul versus short haul, etc.; (4) maintenance organization and inspection procedures; (5) other operators' service experience records; (6) manufacturers' recommendations; (7) service history, particularly of known or evident trends toward malfunctioning. Special reliance will be placed on service experience, including the information obtained from such tests, inspections, or measurements as have been performed in accumulating such service experience.

(b) *Procedure for establishing new or revised time limitations.* Time limitations may be established in terms of hours of operation, multiples of engine overhaul periods, or multiples of inspection periods. Time limitations for components on which deterioration is not necessarily a function of operating hours, such as electronic units, pitot tubes, and emergency flotation equipment, may be established in terms of calendar months. Certain items may be maintained on an on-condition overhaul basis. On-condition overhaul is applicable to components on which a determination of airworthiness may be made by visual inspection, measurements, tests, or other means without a teardown inspection or overhaul.

(c) *Airframe—initial time limitations.* The initial time limitations for overhauls, inspections, or checks of airframe may be established on a recurrent fixed time basis or by adoption of a structural inspection specification covering procedures such as pattern inspections, block overhauls, or progressive inspections. Regardless of the basis upon which the time limitations are established, the same basic standards will be applicable. The maintenance program must specify checks, inspections, and overhauls to be performed and times at which they will be performed.

(d) *Appliances—initial time limitations.* Initial time limitations for inspections, bench checks, major inspections, or overhaul, as applicable, to the appliance involved, shoud not be greater than those limitations applicable to the same or similar appliances used in existing aircraft operated by the air carrier. When the usage or installation of such appliances differs to a substantial extent from the previous usage or installation, the time limitations shall be adjusted to reflect the extent of such difference. When new usage or installation is involved, conservation time limitations should be established until service experience shows that more liberal time limits can be used. In those cases where an appliance has a subcomponent which is subject to wear with time in service, the air carrier will establish maintenance procedures for periodic inspection of such subcomponent to insure its continued airworthiness.

(e) *Powerplants—initial time limitations.* The initial overhaul time limitations for any engine which has never been used in air carrier service will tentatively be established at 1,000 hours. However, the operations specifications will require sample overhaul of a representative number of engines, but not less than three, to be accomplished at each increment of 100 hours, beginning at 800 hours, unless such new model engine incorporates certain unconventional features not previously employed in air carrier

operations, in which case, the initial overhaul period will be established by the Administrator. Satisfactory teardown inspection will be necessary before increasing the fleet overhaul period to the next higher increment. This sample overhaul procedure and evaluation of service experience will provide the operator with necessary information to substantiate the basic 1,000-hour overhaul.

The initial time limitations for overhaul of an engine model which has received substantial air carrier service experience, but not by the applicant, will tentatively be established at 1,000 hours. An engine model will not be considered as having substantial air carrier service experience unless it has been satisfactorily operated by another carrier on an approved 1,000-hour or higher overhaul period. However, the operations specifications will require that the basic 1,000-hour overhaul period be substantiated on the same basis as outlined for a new engine except that sample overhauls of a representative number of engines will be accomplished in increments of 100-hour periods beginning at 900 hours. The initial time limitations for overhaul of accessories which are a part of the power package, including propellers, will be established at the overhaul period fixed for the engine itself, unless service experience permits or requires higher or lower overhaul periods.

(f) *Revision of time limitations—general.* The inspection and overhaul time limitations applicable to airframes, powerplants, propellers, and appliances will be revised on the basis of service experience. Increases in such time limitations may be made when the record of service experience for the previous 90 days indicates that such increase will not adversely affect the continuous condition of airworthiness. When the service records indicate that any component or subcomponent consistently requires repair, adjustment, or other maintenance because of damage, wear, or deterioration, within the current time limitations, the air carrier will be responsible for initiating corrective action.

(1) *Airframe—revision of time limitations.* The increases of time limitations for overhaul (or major inspection in case of pattern system, etc.) of airframes will be based on evaluation of all pertinent service records and examination of at least one aircraft, of the model involved, that has been overhauled at the currently approved time limitations. When a pattern or block overhaul type of maintenance system is used, it will be permissible to reschedule individual items in another block or pattern, if performance and condition of the specific item warrants such an increase.

(2) *Powerplants and associated mechanical appliances—revision of time limitations.* Increases in engine overhaul periods will not be approved in increments greater than 100 hours. Increases in time limitations above the 1,000-hour basic engine overhaul period will be considered on the basis of satisfactory service experience at the currently approved time limitations. The operator may request amendment to the currently approved time limitations by submitting a letter to the assigned FAA agent, indicating the desired time limitations on the particular engines involved, and designating three to five engines for disassembly inspection by the FAA agent. The engines chosen for exhibit must have operated in a satisfactory manner for the maximum time permissible, under currently approved time limitations. If, after disassembly and inspection of the exhibit engines and related components, it is found that the new time limitations are justified, the air carrier may then submit a formal application for an amendment in the routine manner requesting the extension of the overhaul period on the entire fleet of engines and related components of the same type and model. Engine accessories may be operated to double or triple the approved engine overhaul time limitations if it is found that previous satisfactory service and overhaul experience, including the service to be performed at each engine change period, would justify the increase as not adversely affecting the continuous condition of airworthiness of the component involved. The procedure for requesting and granting increases in overhaul time limitations for such component will be the same as used for the basic engine.

(3) *Appliances, general—revision of time limitations.* Increases in established times for inspections, bench tests, or overhaul periods

will be based on consideration of the following factors: (i) Geographical area or areas of operation; (ii) number of landings, long haul versus short haul; (iii) maintenance organization and inspection procedures; (iv) manufacturers' recommendations; (v) service history, particularly of known or evident trends toward malfunctioning. When electrical/electronic appliances are overhauled on an on-condition basis, special consideration will be given to the continued airworthiness of mechanical components of such equipment.

(4) *Emergency equipment.* The inspection periods for first aid kits, flotation equipment, and other emergency equipment will assure the continued serviceability and immediate readiness of such equipment for its intended emergency purposes. Major inspection periods will be established for the purpose of determining that all components of the emergency equipment are complete and airworthy and may be expected to remain in this condition until the next major inspection or actual use under emergency conditions. Routine inspection periods will be established to assure that such equipment (or any component thereof) is installed or stored properly, has not been tampered with, damaged, or had articles removed since the last inspection. All inspection periods will be adjusted in accordance with service experience and pertinent operating conditions.

(Published in 19 F. R. 7339, November 13, 1954, effective November 15, 1954.)

41.1–8 *Content of Operations Specifications, Aircraft Maintenance (FAA policies which apply to sec. 41.1).* The Administrator will issue Operations Specifications, Aircraft Maintenance, which have the following minimum contents:

(a) The Operations Specifications, Aircraft Maintenance, will contain a listing of the components of airframes, engines, propellers, and appliances, and the time limitations for checks, inspections and overhauls applicable to each listed component. The list of components will be complete and inclusive except that subcomponents which are subject to check, inspection, and overhaul at the same time limitations as the components to which they are related may be omitted from the listing (e. g., that form commonly called the "short form"). When this is done, the operations specifications will bear a statement to the effect that parts and subcomponents not listed will be checked, inspected, and overhauled at the same time limitations specified for the component or assembly to which such components are related.

When coded identifications or titles, such as "operation #1, #2, #3, etc." or "line check, intermediate check, base inspection, etc.," are used in connection with specified time limitations in the operations specifications, a brief description of such terms will be included which identifies the operation concerned.

(b) If the carrier proposes Operations Specifications, Aircraft Maintenance, which would permit for all or any part of an aircraft a block overhaul system, a sampling inspection and overhaul system, or any other maintenance system which either (1) does not prescribe a fixed period for overhaul, inspection, or check of each component of an aircraft, or (2) includes alternative standards and procedures under which the air carrier may be given authority to establish and adjust such time limitations, the air carrier will fully define and describe the manner in which such a special maintenance program will be performed.

(c) Operations specifications identified as Operations Specifications, Aircraft Maintenance—General, will contain conditions uniformly applicable to all Operations Specifications, Aircraft Maintenance.

(Published in 19 F.R. 7339, November 13, 1954, effective November 15, 1954.)

41.1–9 *Content of Operations Specifications, Aircraft Weight and Balance Control (FAA policies which apply to sec. 41.1).* The Operations Specifications, Aircraft Weight and Balance Control, as submitted by an air carrier, will contain an accurate description of the procedures used to maintain control of weight and balance of all aircraft operated under the terms of the operating certificates which will insure that the aircraft, under all operating conditions, is loaded within the gross weight and center of gravity limitations. This description should include procedures used for determining weight of passengers, weight of baggage, peri-

odic aircraft weighing, type of loading devices, and identification of aircraft concerned.

(Published in 19 F.R. 7339, November 13, 1954, effective November 15, 1954.)

41.2 *Compliance.* All operations shall be conducted in accordance with the specifications of the air carrier operating certificate and the rules contained in this part.

41.3 *Duration.* An air carrier operating certificate will continue in effect until canceled, suspended, or revoked, after which it shall be surrendered to any officer or employee of the Administrator upon request.

41.4 *Display.* The air carrier operating certificate shall be available at the appropriate operations office for inspection by any authorized representative of the Administrator or Board.

41.5 *Inspection.* An authorized representative of the Administrator shall be permitted at any time and place to make inspections or examinations to determine the operator's compliance with the appropriate requirements of the regulations in this subchapter and the Federal Aviation Act of 1958, as amended.

Passenger Operation Rules

Route Requirements

41.10 *Airport spacing.* In the case of operations employing aircraft having two engines, airports adequate for the aircraft used shall be located so that the aircraft, when flying along the route, will at no time be at a greater distance therefrom than 45 minutes flying at normal cruising speed, except where the Administrator finds that because of the character of the terrain, the type of operation, and the performance of aircraft used adequate safety will be provided with airports spaced at greater distances.

41.11 *Communications facilities.* A two-way ground-to-aircraft radio communications system shall be available at such points as are necessary to insure adequate communication between plane and ground over the entire route.

41.12 *Weather reporting services.* Weather reporting services shall be available at such points along the route as are necessary to insure sufficient weather reports prepared from observations made and released by a source acceptable to the Administrator.

41.13 *Navigational facilities.*

(a) *Short distance operation.* Except in the case of a day contact operation where the characteristics of the terrain are such that navigation can be accomplished by reference to landmarks, each route shall be equipped with radio navigational facilities so located as to permit navigation by such facilities over the entire route. For instrument operation a facility shall be so located with respect to each scheduled stop and required alternate airport as to provide adequate means for making an instrument approach. In day instrument operation such a facility is not required at an alternate used only when the weather conditions are as good as or better than: broken clouds, ceiling 1,000 feet, visibility 2 miles, with conditions stable or improving.

(b) *Long distance operation.* Each route shall be equipped with radio navigational facilities so located as to permit the obtaining of reliable radio bearings when within 200 miles of any regular or approved alternate airport and a facility shall be so located with respect to each such airport as to provide adequate means for making an instrument approach: *Provided,* That the Administrator, at particular airports, may approve facilities which provide less coverage than that required in this section if he finds that adequate safety is provided.

41.13–1 *Day over-the-top short distance operation (FAA policies which apply to sec. 41.13 (a)).*

(a) *General.* The following policies will be applied by the Federal Aviation Agency in authorizing day over-the-top short distance

operations by scheduled United States flag air carriers in certain localities outside the continental limits of the United States where the characteristics of the terrain are such that navigation during such operations can be accomplished by reference to landmarks.

(b) *Areas of application.* In certain localities beyond the continental limits of the United States, en route operations are restricted to day flight, providing 3-mile visibility or better exists, because of the characteristics of the terrain, the operating limits of the aircraft being used, or the en route navigational facilities. On some of the routes so restricted, the terminals and/or intermediate stops are equipped with adequate instrument approach facilities, and instrument departures and approaches have been or can be authorized.

(c) *Provisions for authorization of the operations.* Where the conditions outlined in the preceding paragraph exist, a day over-the-top operation with instrument departures and approaches will be authorized if 3-mile visibility or better exists: *Provided,*

(1) Currently approved and established instrument procedures are in effect at all airports where instrument departures and/or approaches are anticipated, and these procedures are included in the operations specifications of the air carrier.

(2) The segment or segments of the route for which instrument operations are authorized, namely, the departure from and/or arrival at the terminals, are defined as prescribed in section 41.137 (q), (2) or (3), and included in the operations specifications of the air carrier.

(3) Operations over the route segment or segments other than those for which instrument operations are authorized will be conducted entirely during the hours of daylight, providing 3 miles' visibility or better exists.

(4) All arrivals at and departures from the terminals and/or intermediate stops will be made during the hours of daylight, except where otherwise provided in the operations specifications of the air carrier.

(5) Visual aids or nonvisual navigation facilities along each route segment are such that at all times a course can be identified and maintained without deviation of more than 10 miles from the centerline of the route.

(6) The aircraft equipment, reserve fuel, flight altitude rules, and alternate airport requirements are met as specified for IFR flights.

(Published in 14 F. R. 5745, September 20, 1949, effective upon publication in the Federal Register.)

41.14 ***Airport lighting facilities.*** **For night operation each scheduled stop and required alternate airport shall be equipped with adequate lighting facilities.**

Aircraft Requirements

41.20 *General.*

(a) Aircraft shall be certificated and equipped in accordance with the airworthiness requirements of this subchapter applicable to the type of operation conducted.

(b) Airplanes not certificated under the transport category requirements shall have such characteristics as to permit safe operation over the routes on which such airplanes will be operated.

(c) Land aircraft operated over water beyond gliding distance from shore without the aid of power shall be equipped with retractable landing gear.

(d) Multiengine airplanes shall be so equipped that engine rotation may be promptly stopped during flight, except that for turbine engine installations means for completely stopping the rotation need be provided only if the Administrator finds that rotation could jeopardize the safety of the airplane.

(e) Irrespective of the basis for certification all aircraft possessing engine(s) rated at more than 600 h.p. (each) for maximum continuous operation shall comply with the following, except that, if the Administrator finds that in particular types of existing aircraft literal compliance with specific items of these requirements might be extremely difficult of accomplishment and that such compliance would not contribute materially to the objective sought, he may accept such measures of compliance as he finds will effectively accomplish the basic objectives of this part: Sections 4b.58, 4b.442, 4b.445, 4b.447, 4b.448 (b) and (c), 4b.478, 4b.484, 4b.503, 4b.516 through 4b.518, 4b.556, 4b.557, 4b.560, 4b.561, 4b.586, 4b.621 through 4b.624, 4b.651

through 4b.655, 4b.661 (a) and (c), and 4b.662 through 4b.676 of this subchapter except that fire detectors of the heat type shall be acceptable in lieu of smoke detectors for installation in Class "B" and "C" cargo compartments.

(f) In determining compliance with the applicable airworthiness requirements and operating limitations, a weight and balance control system approved by the Administrator based upon average, assumed, or estimated weights may be utilized.

Note: All references in this section to sections of Part 4b of this subchapter are those sections in effect on October 1, 1949 (14 F.R. 4102, July 16, 1949).

41.21 *Radio equipment; short distance operation.*

(a) For day contact operations over routes on which navigation can be accomplished by visual reference to landmarks, each aircraft shall be equipped with such radio facilities as are necessary to accomplish the following:

(1) Transmit communications and meteorological information to at least one ground station from any point on the route and transmit, from a distance of not less than 25 miles, to airport traffic control towers located at airports approved for the route;

(2) Receive communications at any point on the route;

(3) By either of two independent means, receive meteorological information at any point on the route and receive instructions from airport traffic control towers located at airports approved for the route.

If appropriate, one of the means provided for compliance with subparagraph (3) of this paragraph may be employed for compliance with subparagraph (2).

(b) For day contact operations over routes on which navigation cannot be accomplished by visual reference to landmarks and for night contact, day or night instrument operations, each aircraft shall be equipped with such radio facilities as are necessary to accomplish the following:

(1) Transmit communications and meteorological information to at least one ground station from any point on the route and transmit, from a distance of not less than 25 miles, to airport traffic control towers located at airports approved for the route;

(2) Receive communications at any point on the route;

(3) By either of two independent means, receive meteorological information at any point on the route and receive instructions from airport traffic control towers located at airports approved for the route;

(4) By either of two independent means, satisfactorily receive radio navigational signals from any radio aid to navigation required by section 41.13(a).

If appropriate, one of the means provided for compliance with subparagraph (3) of this paragraph may be employed for compliance with subparagraph (2) of this paragraph or the means provided for compliance with subparagraph (4) of this paragraph may be employed for compliance with subparagraph (3) of this paragraph.

41.22 *Radio equipment; long distance operation.* Each aircraft shall be equipped with such radio facilities as are necessary to accomplish the following:

(a) By either of two independent means, transmit communications and meteorological information to at least one ground station from any point on the route and transmit, from a distance of not less than 25 miles, to airport traffic control towers located at airports approved for the route;

(b) By either of two independent means, receive communications at any point on the route;

(c) By either of two independent means, receive meteorological information at any point on the route and receive instructions from airport traffic control towers located at airports approved for the route;

(d) By either of two independent means, satisfactorily receive radio navigational signals from any radio aid to navigation required by section 41.13(b).

If appropriate, equipment provided for compliance with paragraph (c) of this section may be employed for compliance with either paragraph (b) or this paragraph.

Instruments and Equipment

41.23 *Emergency and safety equipment.* After May 31, 1957, the equipment required in sections 41.23b, 41.23c, and 41.23d shall be approved by the Administrator.

41.23–1 *First-aid kits (FAA policies which apply to sec. 41.23).* Each first-aid kit should be dust and moistureproof, should contain only materials which meet Federal Specifications GGK 391, as revised, and should include at least the following items or their equivalent:

(a) *No. 1 kit for aircraft of 1–5 persons capacity.*

Adhesive bandage compress, 1″ (16 per unit)	1
Antiseptic swabs, 10 mm. (10 per unit)	1
Ammonia inhalants, 6 mm. (10 per unit)	1
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	1
2″ bandage compress (4 per unit)	1
4″ bandage compress (1 per unit)	1
Triangular bandage compressed, 40″ (1 per unit)	1
Burn compound, ⅛ oz. (6 per unit)	1
Tourniquet, forceps, and scissors (1 each per double unit container)	1

(b) *No. 2 kit for aircraft of 6–25 persons capacity.*[5]

Adhesive bandage compresses, 1″ (16 per unit)	2
Antiseptic swabs, 10 mm. (10 per unit)	2
Ammonia inhalants, 6 mm. (10 per unit)	1
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	2
2″ bandage compresses (4 per unit)	2
4″ bandage compresses (1 per unit)	2
Triangular bandage compressed, 40″ (1 per unit)	1
Burn compound, ⅛ oz. (6 per unit)	1
Tourniquet, forceps, and scissors (1 each per double unit container)	1
Eye dressing packet (3 each per unit) (ophthalmic ointment, ⅛ oz.; eye pads; eye strips)	1

(c) *No. 3 kit for aircraft of more than 25-persons capacity.*

Adhesive bandage compresses, 1″ (16 per unit)	4
Antiseptic swabs, 10 mm. (10 per unit)	2
Ammonia inhalants, 6 mm. (10 per unit)	2
Ammonia, aromatic spirits, 2 cc. with drinking cups (4 each per unit)	2
2″ bandage compresses (4 per unit)	3
4″ bandage compresses (1 per unit)	3
Triangular bandage compressed, 40″ (1 per unit)	3
Burn compound, ⅛ oz. (6 per unit)	2
Tourniquet, forceps, scissors (1 each per double unit container)	1
Eye dressing packet (3 each per unit) (ophthalmic ointment, ⅛ oz.; eye pads; eye strips)	1

(Published in 17 F. R. 2748, March 29, 1952; amended in 18 F. R. 1433, March 13, 1953, effective March 15, 1953.)

41.23a *Safety belts.* Aircraft shall have installed a safety belt for each occupant. Safety belts shall be of an approved type. In no case shall the rated strength of a safety belt be less than that corresponding with the ultimate load factors specified in the pertinent currently effective aircraft airworthiness parts of this subchapter, taking due account of the dimensional characteristics of the safety belt installation for the specific seat or berth arrangement. The webbing of safety belts shall be subject to periodic replacement as prescribed by the Administrator.

41.23b *First-aid kits and emergency equipment.* Each airplane shall be equipped with a conveniently accessible first-aid kit adequate for the type of operation involved. Airplanes scheduled over routes requiring flights for long distances over uninhabited terrain must carry such additional emergency equipment as appropriate for the particular operation involved.

41.23c *Equipment for overwater operations.*

(a) The following equipment shall be required for all extended overwater operations: *Provided,* That the Administrator, after appropriate investigation, may require the carriage of all of the prescribed equipment, or any item thereof, for any operation over water, or upon application of an air carrier, permit deviation from these requirements for a particular extended overwater operation:

[5] Kit No. 2 in canvas may also be used for liferafts.

(1) Life vest or other adequate individual flotation device for each occupant of the airplane;

(2) Life rafts sufficient in number and of such rated capacity and buoyancy as to accommodate all occupants of the airplane;

(3) Suitable pyrotechnic signaling devices; and

(4) One portable emergency radio signaling device, capable of transmission on the appropriate emergency frequency or frequencies, which is not dependent upon the airplane power supply and which is self-buoyant and water-resistant.

(b) All required life rafts, life vests, and signaling devices shall be easily accessible in the event of a ditching without appreciable time for preparatory procedures. After May 31, 1957, this equipment shall be installed in conspicuously marked locations approved by the Administrator.

(c) A survival kit, appropriately equipped for the route to be flown, shall be attached to each required life raft.

41.23d *Emergency evacuation equipment.*

(a) *Means for emergency evacuation.* After August 31, 1957, on all passenger-carrying airplanes, at all emergency exits which are more than 6 feet from the ground with the airplane on the ground and with the landing gear extended, means shall be provided to assist the occupants in descending from the airplane. At floor level exits approved as emergency exits, such means shall be a chute or equivalent device suitable for the rapid evacuation of passengers. During flight time this means shall be in a position for ready use: *Provided,* That the requirements of this paragraph do not apply to emergency exits over the wing where the greatest distance from the lower sill of the exit to the wing surface does not exceed 36 inches.

(b) *Interior emergency exit markings.*

(1) After May 31, 1957, all passenger emergency exits, their means of access, and their means of opening shall be marked conspicuously. The identity and location of emergency exits shall be recognizable from a distance equal to the width of the cabin. The location of the emergency exit operating handle and the instructions for opening shall be marked on or adjacent to the emergency exit and shall be readable from a distance of 30 inches by a person with normal eyesight.

[(2) In all passenger-carrying airplanes, a source or sources of light with an energy supply independent of the main lighting system shall be installed to illuminate all passenger emergency exit markings. Such lights shall be designed to function automatically in a crash landing and to continue to function thereafter, and shall also be operable manually, or shall be designed only for manual operation and also to continue to function following a crash landing. When such lights require arming of the system to function automatically, the system shall be armed prior to each takeoff and landing. When such lights require manual operation to function, they shall be turned on prior to each takeoff and landing.]

[(Amendment 41-44, published in 27 F.R. 1453, Feb. 16, 1962, effective Mar. 20, 1962.)]

41.24 Supplemental oxygen; reciprocating-engine-powered airplanes. Except where supplemental oxygen is provided in accordance with the requirements of section 41.24a, supplemental oxygen shall be furnished and used as set forth below. The amount of supplemental oxygen required for a particular operation to comply with the rules in this part shall be determined on the basis of flight altitudes and flight duration consistent with the operating procedures established for such operation and route. As used in the oxygen requirements hereinafter set forth, "altitude" shall mean the pressure altitude corresponding with the pressure in the cabin of the airplane, and "flight altitude" shall mean the altitude above sea level at which the airplane is operated.

(a) *Crew members.* (1) At altitudes above 10,000 feet to and including 12,000 feet oxygen shall be provided for, and used by, each member of the flight crew on flight deck duty, and provided for all other crew members, during the portion of the flight in excess of 30 minutes within this range of altitudes.

(2) At altitudes above 12,000 feet oxygen shall be provided for, and used by, each

member of the flight crew on flight deck duty, and provided for all other crew members, during the entire flight time at such altitudes.

(b) *Passengers.* Each air carrier shall provide a supply of oxygen for passenger safety as approved by the Administrator in accordance with the following requirements:

(1) For flights of over 30-minute duration at altitudes above 8,000 feet to and including 14,000 feet a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be required.

(2) For flights at altitudes above 14,000 feet to and including 15,000 feet a supply of oxygen sufficient to provide oxygen for the duration of the flight at such altitudes for 30 percent of the number of passengers carried shall generally be considered adequate.

(3) For flights at altitudes above 15,000 feet a supply of oxygen sufficient to provide oxygen for each passenger carried during the entire flight at such altitudes shall be required.

41.24–1 *Supplemental oxygen for crew members (FAA interpretations which apply to sec. 41.24 (a) (1)).*

(a) The phrase, "during the portion of flight in excess of 30 minutes within this range of altitudes" applies to all crew members including the flight crew members on flight deck duty. Thus, oxygen is required to be provided for, and used by, each member of the flight crew on flight deck duty only during the portion of the flight in excess of 30 minutes within this range of altitudes.

(b) The words "and used by" mean continuous use of the oxygen by a crew member during the required periods, except when it is necessary for the crew member to remove the oxygen mask in connection with his regular duties.

(Published in 19 F. R. 549, Feb. 2, 1954, effective Feb. 15, 1954; 21 F. R. 5437, July 20, 1956, effective July 31, 1956).

41.24–2 *Oxygen requirements for standby crew members (FAA interpretations which apply to sec. 41.24 (a)).* Standby crew members who are on call or are definitely going to have flight deck duty prior to the completion of a flight must be provided with the same amount of supplemental oxygen as that provided for crew members on duty other than on flight deck duty. However, if the standby crew members are not on call and will not be on flight deck duty during the remainder of the flight, they must be considered as passengers with regard to supplemental oxygen.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24–3 *Operating instructions (FAA policies which apply to sec. 41.24).* Operating instructions appropriate to the type of system and masks installed should be provided for the flight crew in the appropriate air carrier manual. These operating instructions should contain a graph or a table which will show the duration of the oxygen supply for the various bottle pressures and pressure altitudes.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24–4 *Oxygen requirements for jump seat occupant (FAA policies which apply to sec. 41.24).* When the jump seat is occupied by a check pilot, a crew member, or a flight crew member, as defined by section 41.137 (h), (j), and (i), respectively, oxygen should be provided in accordance with the requirements of section 41.24. The provision of oxygen at the jump seat location may be accomplished either by a portable oxygen unit or an outlet in a fixed system.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24–5 *Oxygen requirements for infants-in-arms (FAA policies which apply to sec. 41.24 (b)).* Provisions should be made for administering oxygen to infants-in-arms and additional oxygen should be carried whenever an unusually large number of infants is carried. This additional oxygen is needed only when there is a passenger or infant for each seat position and the number of infants not provided for exceeds 50 percent of the seat positions. Acceptable methods of administering the oxygen to infants and now used by many operators are: (a) A disposable plastic mask which can be fitted to the face; (b) an infant size BLB oronasal mask and (c) semirigid paper cups, specifically reserved for the purpose, which can be fitted over the infant's nose and mouth, with a hole punched through the bottom through

which an oxygen tube or a Y-connector can be inserted. Any other acceptable method may also be used.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24–6 *Oxygen requirements for clinical purposes (FAA policies which apply to sec. 41.24 (b)).* The regulations do not require that oxygen be provided for clinical purposes; hence, if the air carrier believes that such oxygen is to be desired, he should provide oxygen for this purpose. It is suggested that portable units of any size the air carrier desires be used for this purpose in order that the minimum supply required for supplementary breathing purposes will be preserved. If, however, the operator wishes to use a common source of supply for the oxygen required by the regulations and for clinical purposes, he may do so if he provides an amount of oxygen sufficiently greater than that required by the regulations. A quantity of 300 liters STPD would probably be considered as satisfying reasonable needs.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24–T ***Supplemental oxygen for sustenance; turbine-powered airplanes.***

(a) *General.* Prior to November 30, 1959, turbine-powered airplanes shall comply with the provisions of section 41.24 or, alternatively, with the provisions of this section except that effective November 30, 1959, all turbine-powered airplanes shall comply with the provisions of this section. Sustaining oxygen and dispensing equipment shall be furnished by the air carrier for use as set forth in this section. The amount of oxygen provided shall be at least that quantity which will be necessary to comply with paragraphs (b) and (c) of this section. As used in the oxygen requirements hereinafter set forth, "cabin pressure altitude" shall mean the pressure altitude corresponding with the pressure in the cabin of the airplane, and "flight altitude" shall mean the altitude above sea level at which the airplane is operated; for airplanes not equipped with pressurized cabins, "cabin pressure altitude" and "flight altitude" shall be considered identical. The amount of sustaining and first-aid oxygen required for a particular operation to comply with the rules in this part shall be determined on the basis of cabin pressure altitudes and flight duration consistent with the operating procedures established for each such operation and route. The requirements for airplanes with pressurized cabins shall be determined on the basis of cabin pressure altitude and the assumption that a cabin pressurization failure will occur at that altitude or point of flight which is most critical from the standpoint of oxygen need, and that after such failure the airplane will descend in accordance with the emergency procedures specified in the Airplane Flight Manual without exceeding its operating limitations to a flight altitude that will permit successful termination of the flight. Following such a failure the cabin pressure altitude shall be considered to be the same as the flight altitude unless it can be shown that no probable failure of the cabin or pressurization equipment will result in a cabin pressure altitude equal to the flight altitude, under which circumstances the maximum cabin pressure altitude attained may be used as a basis for certification and/or determination of oxygen supply.

(b) *Crew members.* A supply of oxygen for crew members shall be provided in accordance with the following requirements:

(1) At cabin pressure altitudes above 10,000 feet to and including 12,000 feet, oxygen shall be provided for and used by each member of the flight crew on flight deck duty and provided for all other crew members during the portion of the flight in excess of 30 minutes within this range of altitudes.

(2) At cabin pressure altitudes above 12,000 feet, oxygen shall be provided for and used by each member of the flight crew on flight deck duty and provided for all other crew members during the entire flight at such altitudes.

(c) *Passengers.* A supply of oxygen for passengers shall be provided in accordance with the following requirements:

(1) For flights at cabin pressure altitudes above 10,000 feet to and including 14,000 feet, oxygen shall be provided for the

duration of flight in excess of 30 minutes for 10 percent of the number of passengers carried.

(2) For flights at cabin pressure altitudes above 14,000 feet to and including 15,000 feet, oxygen shall be provided for the duration of flight at such altitude for 30 percent of the number of passengers carried.

(3) For flights at cabin pressure altitudes above 15,000 feet, oxygen shall be provided for each occupant carried for the duration of flight at such altitude.

41.24a *Supplemental oxygen requirements for pressurized cabin airplanes; reciprocating-engine-powered airplanes.* When operating pressurized cabin airplanes, the air carrier shall so equip such airplanes as to permit compliance with the following requirements in the event of cabin pressurization failure.

(a) *Crew members.* When operating such airplanes at flight altitudes above 10,000 feet, the air carrier shall provide sufficient oxygen for all crew members for the duration of the flight at such altitudes: *Provided*, That not less than a two-hour supply of oxygen shall be provided for the flight crew members on flight deck duty. (The oxygen supply required by section 41.24c may be considered in determining the supplemental breathing supply required for flight crew members on flight deck duty in the event of cabin pressurization failure.)

(b) *Passengers.* When operating such airplanes at flight altitudes above 8,000 feet, the air carrier shall provide the following amount of oxygen:

(1) Where an airplane is not flown at a flight altitude of over 25,000 feet a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be considered adequate, if at any point along the route to be flown the airplane can safely descend to a flight altitude of 14,000 feet or less within 4 minutes.

(2) In the event that such airplane cannot descend to a flight altitude of 14,000 feet or less within 4 minutes, the following supply of oxygen shall be provided:

(i) For the duration of the flight in excess of 4 minutes at altitudes above 15,000 feet, a supply sufficient to comply with section 41.24(b)(3);

(ii) For the duration of the flight at altitudes above 14,000 feet to and including 15,000 feet, a supply sufficient to comply with section 41.24(b)(2); and

(iii) For flight at altitudes above 8,000 feet to and including 14,000 feet, a supply sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried.

(3) Where an airplane is flown at an altitude above 25,000 feet sufficient oxygen shall be furnished in accordance with the following requirements to permit the airplane to descend to an appropriate flight altitude at which the flight can be safely conducted. Sufficient oxygen shall be furnished to provide oxygen for 30 minutes to 10 percent of the number of passengers carried for the duration of the flight above 8,000 feet to and including 14,000 feet and to permit compliance with section 41.24(b) (2) and (3) for flight above 14,000 feet.

(c) For purposes of this section it shall be assumed that the cabin pressurization failure will occur at a time during flight which is critical from the standpoint of oxygen need and that after such failure the airplane will descend, without exceeding its normal operating limitations, to altitudes permitting safe flight with respect to terrain clearance.

41.24a–1 *Computation of supply for crew members in pressurized cabin aircraft (FAA policies which apply to sec. 41.24a (a)).*

(a) *Cabin altitudes less than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude no greater than 10,000 feet, only the supply of oxygen stipulated by section 41.24a (a) need be provided for crew members. In determining this supply the following policies should be considered:

(1) The supply of oxygen which should be provided for all crew members for the duration of the flight should be computed on the basis of the cabin pressure altitude which would

exist after cabin depressurization has occurred and the aircraft has descended to the altitude which would permit safe flight with respect to terrain clearance. (See sec. 41.24a (c).)

(2) The operator may use the supply furnished for protective breathing purposes for compliance with the 2-hour requirement for supplementary breathing oxygen. For example, the 300 liter STPD supply per flight crew member, which is the protective breathing supply when demand (or diluter-demand) systems are used, will provide a 2-hour supplementary breathing supply for one flight crew member at 20,000 feet, so that both the minimum 2-hour supplementary breathing requirement and the protective breathing requirement would be fulfilled under most emergency conditions resulting from loss of cabin pressure or from contamination of cabin air with smoke or poisonous gases.

(b) *Cabin altitudes greater than 10,000 feet.* When operating a pressurized cabin aircraft which is certificated to fly with a cabin pressure altitude greater than 10,000 feet, a supply of oxygen computed on the basis of the requirements of section 41.24 (a) should be provided.

(1) The oxygen supply required for protective breathing purposes, as defined in section 41.24c, should be provided in addition to the above supply for the flight crew members on flight deck duty. This emergency supply may be used in the event of cabin pressurization failure. In the event that operations occur over terrain which require flights of such duration and altitude as to use up the emergency oxygen supplied either for protective breathing purposes or for the 2-hour supply following pressurization failure, the supply should be increased to provide for this difference, computing it for crew members on the basis of section 41.24a (a).

(2) To provide oxygen for crew members other than the flight crew members on flight deck duty in the event of cabin pressurization failure, a supply of oxygen in addition to the supplies mentioned above should be provided in accordance with the requirements of section 41.24a (a) except that the total supply for these other crew members need not exceed that provided on the basis of section 41.24 (a) for cabin pressure altitudes in excess of 10,000 feet plus an additional supply necessary to satisfy the increased oxygen flow which might be needed following a pressurization failure; this supplement to the section 41.24 (a) supply should be based on the duration of flight at the altitudes which would permit safe flight with respect to terrain clearance.

(3) During normal operation at cabin pressure altitudes above 10,000 feet oxygen should be used by each member of the flight crew on flight deck duty for the duration of the flight in excess of 30 minutes at the cabin pressure altitudes between 10,000 and 12,000 feet and for the duration of the flight at cabin pressure altitudes in excess of 12,000 feet. In the event of the loss of cabin pressurization, oxygen should continue to be used by the flight crew members on flight deck duty for the duration of flight at cabin pressure altitudes greater than 10,000 feet. All other crew members may use oxygen according to their individual needs.

(Published in 19 F. R. 547, February 2, 1954, effective February 15, 1954.)

41.24a–2 *Computation of supply for passengers in pressurized cabin aircraft (FAA policies which apply to sec. 41.24a (b)).*

(a) *Cabin altitudes less than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude no greater than 10,000 feet, only the supply of oxygen stipulated by section 41.24 (b) need be provided for passengers. In determining this supply the following policies should be considered:

(1) The altitude which should be used in computing the supply of oxygen required by this section should be the altitude to which the aircraft would descend following a cabin pressurization failure, considering terrain clearance and operation limitations.

(2) Relative to section 41.24a (b) (1) and (2), no oxygen need be provided for the first 4 minutes following a cabin pressurization failure.

(b) *Cabin altitudes greater than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude greater than 10,000 feet, the following policies should be considered: When the cabin pressure altitude is above 10,000 feet to and including 14,-

000 feet, sufficient oxygen shall be provided for 10 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 14,000 feet to and including 15,000 feet, sufficient oxygen shall be provided for 30 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 15,000 feet, sufficient oxygen shall be provided for each passenger for the duration of flight above such a cabin pressure altitude. In addition to the above supply of oxygen, in order to provide for loss of cabin pressure, the supplementary oxygen required by whatever portions of section 41.24a(b) are applicable, shall be provided except that in no case will it be necessary to furnish a supply of oxygen in excess of that necessary to supply oxygen to 100 percent of the passengers for the maximum possible duration of flight at the maximum cabin altitude which could be attained under either of the normal operating or emergency conditions whichever is greater.

(Published in 19 F.R. 547, February 2, 1954, effective February 15, 1954.)

41.24a–3 *Oxygen requirements for clinical purposes (FAA policies which apply to sec. 41.24a(b)).* The regulations do not require that oxygen be provided for clinical purposes; hence, if the air carrier believes that such oxygen is to be desired, he should provide oxygen for this purpose. It is suggested that portable units of any size the air carrier desires be used for this purpose in order that the minimum supply required for supplementary breathing purposes will be preserved. If, however, the operator wishes to use a common source of supply for the oxygen required by the regulations and for clinical purposes, he may do so if he provides an amount of oxygen sufficiently greater than that required by the regulations. It is suggested that a quantity of 300 liters may be considered as satisfying reasonable needs.

(Published in 19 F.R. 547, February 2, 1954, effective February 15, 1954.)

41.24a–4 *Oxygen requirements for infants-in-arms (FAA policies which apply to sec. 41.24a(b)).* Provisions should be made for administering oxygen to infants-in-arms, and additional oxygen over that required by section 41.24a(b) should be carried whenever an unusually large number of infants is carried. This additional oxygen is needed only when there is a passenger or infant for each seat position and the number of infants not provided for exceeds 50 percent of the seat positions. Acceptable methods of administering the oxygen to infants and now used by many operators are: (a) A disposable plastic mask which can be fitted to the face; (b) an infant size BLB oronasal mask and (c) semirigid paper cups, specifically reserved for the purpose, which can be fitted over the infant's nose and mouth, with a hole punched through the bottom through which an oxygen tube or Y-connector can be inserted. Any other acceptable method may also be used.

(Published in 19 F.R. 547, February 2, 1954, effective February 15, 1954.)

41.24a–T *Supplemental oxygen for emergency descent and for first aid; turbine-powered airplanes with pressurized cabins.*

(a) *General.* Prior to November 30, 1959, turbine-powered airplanes with pressurized cabins shall comply with the provisions of section 41.24a, with the additional requirement that, when operating at flight altitudes above 25,000 feet, all flight crew members on flight deck duty shall be provided with oxygen masks, connected to appropriate supply terminals, which shall be immediately available for use; or, alternatively, with the provisions of this section except that effective November 30, 1959, all such turbine-powered airplanes shall comply with the provisions of this section. When operating pressurized cabin airplanes, the air carrier shall furnish oxygen and dispensing equipment necessary to permit compliance with the requirements set forth in this section in the event of cabin pressurization failure.

(b) *Crew members.* When operating at flight altitudes above 10,000 feet, oxygen shall be provided to permit compliance with section 41.24–T except that not less than a 2-hour supply shall be provided for the flight crew members on flight deck duty. The oxygen required by section 41.24c may be included in determining the supply required

for flight crew members on flight deck duty in the event of cabin pressurization failure.

(c) *Use of oxygen masks by flight crew members.* [(1) When operating above flight level 250, each flight crewmember on flight deck duty shall be provided with an oxygen mask so designed that it is capable of being rapidly placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand; and so designed that upon completion of the donning action the oxygen mask does not prevent the flight crewmember from being able immediately to communicate with other crewmembers over the airplane intercommunication system. When not being used above flight level 250, the oxygen mask shall be kept at all times in a condition for ready use and so located as to be within the immediate reach at all times of the flight crewmember while at his duty station.

[(2) When operating above flight level 250, one pilot at the controls of the airplane shall at all times wear and use an oxygen mask secured, sealed, and supplying oxygen: *Provided,* That the one pilot need not wear and use an oxygen mask while at or below flight level 350 if each flight crewmember on flight deck duty is provided with a quick-donning type of oxygen mask which the air carrier has demonstrated to the satisfaction of a representative of the Administrator is capable of being placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand and within 5 seconds. The air carrier shall also demonstrate that the donning of the mask can be accomplished without disturbing eye glasses and without delaying the flight crewmember from proceeding with his assigned emergency duties. Upon completion of the donning action, the oxygen mask shall not prevent the flight crewmember from being able immediately to communicate with other crewmembers over the airplane intercommunication system.

[(3) Notwithstanding the provisions in subparagraph (2) of this paragraph, when operating above flight level 250, if at any time it is necessary for one pilot to leave his station at the controls of the airplane for any reason, the remaining pilot at the controls shall don and use his oxygen mask until the other pilot has returned to his duty station.

[(4) Prior to takeoff of a flight, each flight crewmember shall personally preflight his oxygen equipment to insure that the oxygen mask is functioning, fitted properly, connected to appropriate supply terminals, and that the oxygen supply and pressure is adequate for use.]

(Amendment 41-30, published in 24 F.R. 9840, Dec. 8, 1959, effective Nov. 30, 1959; Amendment 41-32, published in 25 F.R. 798, Jan. 30, 1960, effective Feb. 1, 1960; [Amendment 41-36, published in 26 F.R. 1057, Feb. 3, 1961, effective Mar. 3, 1961].)

(d) *Use of portable oxygen equipment by cabin attendants.* Portable oxygen equipment of not less than a 15-minute oxygen supply shall be carried by each attendant during the entire time flight is conducted above 25,000 feet flight altitude, unless it is shown that sufficient portable oxygen units equipped with masks or spare outlets and masks are distributed throughout the cabin to insure immediate availability of oxygen to the cabin attendants regardless of their location at the time of cabin depressurization.

(e) *Passenger cabin occupants.* When operating at flight altitudes above 10,000 feet, the following supply of oxygen shall be provided for the use of passenger cabin occupants:

(1) When an airplane is certificated to operate at flight altitudes to and including 25,000 feet, and if at any point along the route to be flown the airplane can descend safely to a flight altitude of 14,000 feet or less within 4 minutes, oxygen shall be available at the rate prescribed by this part for a 30-minute period for not less than 10 percent of the number of passenger cabin occupants carried.

(2) When an airplane is operated at flight altitudes to and including 25,000 feet and cannot descend safely to a flight altitude of 14,000 feet within 4 minutes, or when

an airplane is operated at flight altitudes above 25,000 feet, oxygen shall be available at the rate prescribed by this part for not less than 10 percent of the number of passenger cabin occupants carried for the duration of flight following cabin depressurization at cabin pressure altitudes above 10,000 feet to and including 14,000 feet and, as applicable, to permit compliance with section 41.24–T (b) (2) and (3), except that not less than a 10-minute supply for all passenger cabin occupants shall be provided.

(3) For first-aid treatment of occupants who for physiological reasons might require undiluted oxygen following descent from cabin pressure altitudes above 25,000 feet, a supply of oxygen in accordance with the requirements of section 4b.651(b)(4) (see section 41.24b) shall be provided for 2 percent of the occupants for the duration of flight following cabin depressurization at cabin pressure altitudes above 8,000 feet, but in no case to less than one person. An appropriate number of acceptable dispensing units, but in no case less than 2, shall be provided. Means shall be provided to enable the cabin attendants to use this supply.

(f) *Passenger briefing.* Before flight is conducted above 25,000 feet, a crew member shall give instructions and demonstrations to the passengers sufficient to insure that all passengers are adequately informed regarding the location and operation of the oxygen-dispensing equipment and the necessity of using oxygen in the event of cabin depressurization.

41.24b *Equipment standards.*

(a) *Reciprocating-engine-powered airplanes.* The oxygen apparatus, the minimum rates of oxygen flow, and the supply of oxygen necessary to comply with the requirements of section 41.24 shall meet the standards established in section 4b.651 of this subchapter effective July 20, 1950: *Provided,* That where full compliance with such standards is found by the Administrator to be impracticable, he may authorize such changes in these standards as he finds will provide an equivalent level of safety.

(b) *Turbine-powered airplanes.* Prior to November 30, 1959, turbine-powered airplanes shall comply with the provisions of paragraph (a) of this section or, alternatively, with the provisions of this paragraph except that effective November

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30, 1959, all turbine-powered airplanes shall comply with the provisions of this paragraph. The oxygen apparatus, the minimum rate of oxygen flow, and the supply of oxygen to comply with the requirements of sections 41.24–T and 41.24a–T shall meet the standards established in section 4b.651 of this subchapter effective September 1, 1958: *Provided*, That where full compliance with such standards is found by the Administrator to be impracticable, he may authorize such changes in these standards as he finds will provide an equivalent level of safety.

41.24c *Protective breathing equipment for the flight crew.*

(a) *Pressurized cabin airplanes.* Each flight crew member on flight deck duty shall have easily available at his station protective breathing equipment covering the eyes, nose, and mouth, or the nose and mouth where accessory equipment is provided to protect the eyes, to protect him from the effects of smoke, carbon dioxide, and other harmful gases.

(1) Not less than a 300-liter STPD supply of oxygen for each flight crew member on flight deck duty shall be provided for this purpose.

(b) *Nonpressurized cabin airplanes.* The requirement stated in paragraph (a) of this section shall apply to nonpressurized cabin airplanes, if the Administrator finds that it is possible to obtain a dangerous concentration of smoke, carbon dioxide, or other harmful gases in the flight crew compartments in any attitude of flight which might occur when the aircraft is flown in accordance with either the normal or emergency procedures approved by the Administrator.

41.24c–1 *Protective breathing equipment and installation (FAA policies which apply to sec. 41.24c).* Protective breathing equipment for the flight crew and its installation should comply with sections 4b.651–1 and 4b.651–2 of this subchapter.

(Published in 15 F.R. 8924, December 15, 1950, effective January 1, 1951.)

41.24c–2 *Requirement of protective breathing equipment in nonpressurized cabin airplanes (FAA rules which apply to sec. 41.24c(b)).* Protective breathing equipment for the flight crew shall be required in nonpressurized cabin aircraft having built-in carbon dioxide fire extinguisher systems in fuselage compartments (for example, cargo or combustion heater compartments); except that protective breathing equipment shall not be required where:

(a) Not more than 5 pounds of carbon dioxide will be discharged into any one such compartment in accordance with established fire control procedures, or

(b) The carbon dioxide concentration of the flight crew stations has been determined in accordance with section 4b.484–1 of this subchapter and found to be less than 3 percent by volume (corrected to standard sea level conditions).

(Published in 15 F.R. 8924, December 15, 1950, effective January 1, 1951.)

41.25 *Instruments and equipment required for continuance of flight.* If any required instrument or item of equipment in an aircraft becomes unserviceable in flight, a landing must be made at either the nearest suitable landing area or at the next point of intended landing whichever, in the opinion of the pilot, is the safer procedure, unless the equipment specified in this section for the type of operation indicated is in serviceable condition, in which case the flight may continue as scheduled to the nearest point where repairs or replacements can be made. The items listed in this section are required for all types of operation unless otherwise specified, except that the Administrator may permit or require different instrumentation or equipment for turbine-powered aircraft to provide equivalent safety:

(a) One air-speed indicator and one sensitive type altimeter (contact operation); two air-speed indicators and two sensitive type altimeters (instrument operation),

(b) One approved compass,

(c) A tachometer for one engine, one fuel pressure gauge with warning indicator, one oil pressure gauge with warning indicator, and one oil temperature or cylinder temperature gauge for each engine,

(d) A manifold pressure gauge for one engine,

(e) In addition to fire detecting and fire extinguishing equipment necessitated as a result of compliance with section 41.20(e), a minimum of two hand fire extinguishers of an approved type with an approved extinguishing agent, one of which installed in the crew compartment, others readily accessible to the passengers. Such additional hand fire extinguishers as the Administrator finds necessary for compliance with section 41.20(e),

(f) One landing gear position indicator or equivalent facility, if equipment includes a retractable landing gear,

(g) One or more storage batteries or other source of electrical supply sufficient to operate all radio and electrical equipment necessary for the flight.

(h)

(1) Two of the following three units of radio equipment:

(i) One transmitter for two-way communication,

(ii) One receiver for two-way communication,

(iii) One receiver capable of receiving navigational signals.

(2) In addition to the instruments named in subparagraph (1) of this paragraph, one of the radio navigational systems required by section 41.21(b), if navigational facilities on the route are required by section 41.13,

(i) All radio equipment required by these regulations (night and instrument operation),

[(j) Forward position and tail lights, two landing lights, and one set of instrument lights for night operations.

[(Amendment 41-38, published in 26 F.R. 8881, Sept. 21, 1961, effective Sept. 21, 1961.)]

(k) Fuel quantity indicators indicating the amount of fuel in each tank to be used for the remainder of the flight, or, in the case of aircraft having a third flight crew member assigned as a member of the operating crew, an alternate means approved by the Administrator for determining the amount of fuel in each tank (night and instrument operation),

(l) An electrically heated pitot tube serving each pilots air-speed indicator (night and instrument operation),

(m) One gyro rate-of-turn indicator combined with a bank indicator, one artificial horizon indicator, and one gyro direction indicator (night and instrument operation),

(n) One outside air temperature gauge with indicating dial in the pilot compartment and one carburetor air temperature indicator or equivalent approved device (night and instrument operation),

(o) If vacuum system is used, one vacuum gauge with warning indicator on the instrument panel installed in lines leading to the rate-of-turn and artificial horizon indicators and the gyro direction indicator (night and instrument operation),

(p) One clock with sweep second hand (night and instrument operation),

(q) Three spare fuses of each capacity, or 25 percent of the number of each capacity, whichever is the greater,

(r) After May 31, 1956, an approved anticollision light for aircraft having a maximum certificated weight of more than 12,500 pounds; except that in the event of failure of such light, the aircraft may continue flight to the next stop where repairs or replacements can be made (Night),

(s) Effective July 1, 1956, a means shall be provided for each reversible propeller on airplanes equipped with reversible propellers, which will indicate to the pilots when the propeller is in reverse pitch. Such means may be actuated at any point in the reversing cycle between the normal low pitch stop position and full reverse pitch. No indication shall be given at or above the normal low pitch stop position. The source of indication shall be actuated by the propeller blade angle or be directly responsive to the propeller blade angle.

41.25–1 *Warning lights for reversible propellers (FAA policies which apply to sec. 41.25(s)).* In the interest of cockpit uniformity, when warning lights are used to indicate to the pilot that a reversible propeller is in reverse pitch, such warning lights should be amber in color.

(Published in 21 F.R. 4312, June 20, 1956, effective July 1, 1956.)

41.25a Flight recorders.

(a) An approved flight recorder which records at least time, altitude, airspeed, ver-

tical acceleration, and heading shall be installed in accordance with the following requirements:

[(1) On all airplanes of more than 12,500 pounds maximum certificated takeoff weight which are certificated for operations above 25,000 feet altitude; and

[(2) On and after November 1, 1960, on all turbine-powered airplanes of more than 12,500 pounds maximum certificated takeoff weight: *Provided*, That, the Director, Bureau of Flight Standards, or his authorized representative, may extend the November 1, 1960, compliance date for any air carrier who prior to September 1, 1960, submits to the Federal Aviation Agency, in writing, a request for approval for such an extension, together with substantiating data, which shows to the satisfaction of the Director or his authorized representative:

[(i) That the air carrier will be unable to comply with the November 1, 1960, date due to flight recorder procurement or installation problems; and

[(ii) The action the air carrier has undertaken to insure that a progressive installation of the required flight recorder equipment will be completed at the earliest practicable date following November 1, 1960. In no event will the November 1, 1960, compliance date be extended beyond May 1, 1961.

[(b) When a flight recorder is installed it shall be operated continuously from the instant the airplane commences the takeoff roll until it has completed the landing roll at an airport.

[(c) Recorded information shall be retained by the air carrier for a period of at least 60 days. For a particular flight or series of flights, the information shall be retained for a longer period if requested by an authorized representative of the Administrator or the Civil Aeronautics Board.

[(d) In the event of failures of the flight recorder, the airplane may continue flight to the next stop where repairs or replacements can be made.

[(Amendment 41-34, published in 25 F.R. 6827, July 19, 1960, effective Aug. 18, 1960.)]

Limitations

41.26 *Airplane certification requirements.*

(a) *Airplanes certificated on or before June 30, 1942.* Airplanes certificated as a basic type on or before June 30, 1942, shall either:

(1) Retain their present airworthiness certification status and meet the requirements of section 41.36, or

(2) Comply with either the performance requirements of sections 4a.737–T through 4a.750–T of this subchapter or the performance requirements of sections 4b.110 through 4b.125 of this subchapter and in addition shall meet the requirements of section 41.27: *Provided*, That should any type be so qualified, all airplanes of any one operator of the same or related types shall be similarly qualified and operated.

(b) *Airplanes certificated after June 30, 1942.* Airplanes certificated as a basic type after June 30, 1942, and used in passenger operation shall be certificated as transport category airplanes and shall meet the requirements of section 41.27.

41.27 *Operating limitations upon airplanes certificated under transport category requirements.* When operating any airplane certificated in accordance with the provisions of Part 4b of this subchapter, or of sections 4a.737–T through 4a.750–T of this subchapter, the provisions of sections 41.28–41.35 shall apply unless deviations therefrom are specifically authorized by the Administrator when he finds that, due to a peculiarity of a specific case, such application is unnecessary for safety.

In determining compliance with these provisions the data obtained in testing the airplane for type certification may be applied, by interpolation or by computation of the effects of changes in specific variables, to conditions differing from those for which specific tests were made, where such interpolations or computations will give results substantially equalling in accuracy the results of a direct test.

41.28 *General limitations.*

(a) Airplanes shall be operated only from airports at altitudes within the altitude range for which maximum take-off weights

have been determined and set forth in the airplane operating manual and shall be dispatched only to airports of intended destination, or to airports specified as alternates, which are at altitudes within the range for which maximum landing weights have been determined and set forth in the airplane operating manual.

(b) The weight of an airplane at take-off shall not exceed the certificated maximum take-off weight for the altitude of the airport from which the take-off is made.

(c) The weight at take-off shall be such that, allowing for the consumption of the amount of fuel and oil which would normally be consumed in flight to the intended destination, the weight on arrival at the destination will not exceed the certificated maximum landing weight for the altitude of the airport of intended destination.

(d) No airplane shall be taken off at a weight which exceeds the allowable weight for the runway being used as determined in accordance with the take-off runway limitations of the transport category operating rules, after taking into account the temperature operating correction factors required by section 4a.749a–T or section 4b.117 of this subchapter, and set forth in the Airplane Flight Manual for the airplane.

41.29 *Take-off limitations to provide for engine failure.* Take-off shall be made only from such airports, in such directions, and under such weight limitations that the following conditions are fulfilled as shown by the performance data determined under section 4a.747–T or section 4b.91 of this subchapter and set forth in the airplane operating manual:

(a) From any point on the take-off up to the time of attaining the critical-engine-failure speed set forth in the airplane operating manual it shall be possible to bring the airplane to a safe stop within the landing area, as shown by the accelerate-and-stop distance data.

(b) If the critical engine should fail at any instant after the airplane attains the critical-engine-failure speed, it shall be possible to proceed with the take-off and attain a height of 50 feet, as indicated by the take-off path data, before passing over the end of the take-off area. Thereafter it must be possible to clear all obstacles either by at least 50 feet vertically, as shown by the take-off path data, or by at least 200 feet horizontally within the airport boundaries and 300 feet horizontally after passing beyond such boundaries.

In determining the allowable deviation of the flight path in order to avoid obstacles, it is assumed that the airplane is not banked before reaching a height of 50 feet, as shown by the take-off path data, and that the maximum bank thereafter does not exceed 15°.

(c) In applying the requirements of paragraphs (a) and (b) of this section, corrections shall be made for any gradient of the take-off surface. To allow for wind effect, take-off data based on still air may be corrected by not more than 50 percent of the reported wind component along the take-off path if opposite to the direction of take-off, and shall be corrected by not less than 150 percent of the reported wind component if in the direction of take-off.

Note: All references in this section to sections of Part 4b of this subchapter are those sections in effect on October 1, 1949 (14 F.R. 4102, July 16, 1949).

41.30 *En route limitations.*

(a) *All airplanes; all engines operating.* Airplanes shall be dispatched only at such take-off weights that, in proceeding along the intended track with the weight of the airplane progressively reduced by the anticipated consumption of fuel and oil, the rate of climb with all engines operating (as set forth in the airplane operating manual), shall be, in feet per minute, 6 V_{s_0} at an altitude at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track; except that this requirement need not apply to airplanes certificated under the performance requirements of the regulations issued prior to November 9, 1945 (Part 4a of this subchapter).

(b) *All airplanes; one engine inoperative.*

(1) No airplane shall be taken off at a weight in excess of that which would permit

a rate of climb (expressed in feet per minute), with one engine inoperative, of at least $\left(0.06-\frac{0.08}{N}\right) V_{s_0}^2$ (when N is the number of engines installed and V_{s_0} is expressed in miles per hour) at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles on either side of the intended track, except that for transport category airplanes certificated under Part 4a of this subchapter, the rate of climb shall be $0.02\ V_{s_0}^2$.

(2) As an alternative to the provisions of subparagraph (1) of this paragraph, an air carrier may utilize an approved procedure whereby its airplanes are operated at an all-engine-operating altitude such that in the event of an engine failure the airplane can continue flight to an alternate airport where a landing can be made in accordance with the provisions of section 41.34, the flight path clearing all terrain and obstructions along the route within 5 miles on either side of the intended track by at least 2,000 feet. In addition, if such a procedure is utilized, subdivisions (i) through (vi) shall be complied with:

(i) The rate of climb (as presented in the Airplane Flight Manual for the appropriate weight and altitude) used in calculating the airplane's flight path shall be diminished by an amount, in feet per minute, equal to $\left(0.06-\frac{0.08}{N}\right) V_{s_0}^2$ (when N is the number of

engines installed and V_{s_0} is expressed in miles per hour) for airplanes certificated under Part 4b of this subchapter, and by 0.02 $V_{s_0}^2$ for airplanes certificated under Part 4a of this subchapter.

(ii) The all-engine-operating altitude shall be such that, in the event the critical engine becomes inoperative at any point along the route, the flight will be capable of proceeding to a predetermined alternate airport by use of this procedure. For the purpose of determining the take-off weight, the airplane shall be assumed to pass over the critical obstruction following engine failure at a point no closer to the critical obstruction than the nearest approved radio navigational fix: *Provided,* That the Administrator may authorize a procedure established on a different basis where adequate operational safeguards are found to exist.

(iii) The airplane shall meet the provisions of subparagraph (1) of this paragraph at 1,000 feet above the airport used as an alternate in this procedure.

(iv) The procedure shall include an approved method of accounting for winds and temperatures which would otherwise adversely affect the flight path.

(v) In complying with this procedure fuel jettisoning shall be permitted if the Administrator finds that the air carrier has an adequate training program, proper instructions are given to the flight crew, and all other precautions are taken to insure a safe procedure.

(vi) The alternate airport shall be specified in the dispatch release and shall meet the provisions of section 41.96.

(3) For the purposes of this paragraph it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by normal consumption of fuel and oil.

(c) *Airplanes with four or more engines; two engines inoperative.* The provisions of this paragraph shall apply only to airplanes certificated in accordance with the performance requirements of Part 4b of this subchapter. No airplane having four or more engines shall be flown along an intended track except under the conditions of either subparagraph (1) or subparagraph (2) of this paragraph.

(1) No place along the intended track shall be more than 90 minutes away from an available landing area at which a landing can be made in accordance with the requirements of section 41.34, assuming all engines to be operating at cruising power.

(2) The take-off weight shall not be greater than that which would permit the airplane, with the two critical engines inoperative, to have a rate of climb in feet per minute equal to 0.01 $V_{s_0}^2$ (V_{s_0} being expressed in miles per hour) along all points of the route, from the point where the two engines are assumed to fail simultaneously to the landing area, either at an altitude of 1,000 feet above the elevation of the highest ground or obstruction within 10 miles on either side of the intended track or at an altitude of 5,000 feet, whichever is higher. The point where the two engines are assumed to fail shall be that point along the route which is most critical with respect to the take-off weight. In showing compliance with this prescribed rate of climb, the following shall apply:

(i) It shall be permissible to consider that the weight of the airplane as it proceeds along its intended track is progressively reduced by normal consumption of fuel and oil with all engines operating up to the point where the two engines are assumed to fail and with two engines operating beyond that point.

(ii) Where the engines are assumed to fail at an altitude above the prescribed minimum altitude, compliance with the prescribed rate of climb at the prescribed minimum altitude need not be shown during the descent from the cruising altitude to the prescribed minimum altitude if, at the end of the descent and during the subsequent portion of the flight, the prescribed rate of climb is met at the prescribed minimum altitudes. The descent shall be assumed to be along a net flight path and the rate of descent for the appropriate weight and altitude shall be assumed to be 0.01 $V_{s_0}^2$ greater than indi-

cated by the performance information approved by the Administrator.

(iii) If fuel jettisoning is provided, the airplane's weight at the point where the two engines are assumed to fail shall be considered to be not less than that which would include sufficient fuel to proceed to an available landing area at which a landing can be made in accordance with the requirements of section 41.34 and to arrive there at an altitude of at least 1,000 feet directly over the landing area.

(d) *Special air navigation facilities.* Where special air navigation facilities provide for reliable and accurate identification of high ground or obstruction extending for less than 20 miles along the track, the lateral distance of 10 miles specified in section 41.30 (a), (b), (c) may be reduced to 5 miles.

41.33 *Landing distance limitations.*

(a) An airplane shall be dispatched only under such conditions that it would be possible, as shown by the still-air landing data obtained in section 4b.122 of this subchapter, or section 4a.750–T of this subchapter and set forth in the airplane operating manual, at a weight corresponding to the maximum weight expected to exist at the time of arrival at the airport of intended destination, and under standard air conditions for the altitude of such airport, to bring the airplane to rest from a point 50 feet directly above the intersection of the obstruction clearance line (as defined in section 41.35) and the landing surface, within a total distance not in excess of 60 percent of the effective length of the landing area (as defined in section 41.35) most suitable for landing in still air.

(b) For every probable condition of wind velocity and direction and the corresponding landing direction at the airport of intended destination required either by the ground handling characteristics of the airplane type involved or by other conditions (e.g., landing aids, terrain, etc.) the ratio of landing distance to effective length of landing area shall not be greater than that as specified in paragraph (a) of this section, after allowing for the effect on landing path and roll of not more than 50 percent of the wind component along the landing path if opposite to the direction of landing, or not less than 150 percent of the wind component if in the direction of landing.

(c) If the requirement of paragraph (a) of this section can be met, but the requirement of paragraph (b) of this section cannot be fully met, at an airport of intended destination, a flight to such airport may be dispatched if at least one approved alternate airport is designated in the flight plan at which the requirements of paragraphs (a) and (b) of this section, as modified by section 41.34, are met.

41.34 *Landing distance at alternate fields.* The conditions of section 41.33 will apply with respect to alternate airports specified in the flight plan, except that in the case of alternate airports the landing distance as defined in that section shall not exceed 70 percent of the effective length of the landing area.

41.35 *Definition of effective length of landing area.* The effective length of the landing area is the distance from the point where the obstruction clearance line, as defined in this section, intersects the landing surface to the far end of the landing area.

The obstruction clearance line is a line drawn tangent to or clearing all obstructions showing in a profile of the approach area as defined in this section. The obstruction clearance line is further limited by having a slope to the horizontal of 1:20 as it approaches the landing area.

The approach area, as used in this section, shall be an area symmetrical about a center line coinciding with and prolonging the center line of the runway, except that where there is a multiplicity of parallel runways or a large area continuously available for landing, the center line of the approach area shall coincide with the most probable landing path for instrument approaches. The approach area shall be considered as extending longitudinally from the landing area out to the most remote obstacle touched by the obstruction clearance line, assuming the center line of the approach area in plan view

to be straight for at least 1,500 feet from the intersection of the obstruction clearance line with the landing surface and thereafter continuing in a path consistent with the instrument approach procedures for the runway in question, or, where such procedures are not specified, consistent with turns of at least 4,000 feet in radius; and as extending laterally to a distance of 200 feet on either side of its center line at the point of intersection of the obstruction clearance line with the landing surface, with this distance increasing uniformly to 500 feet on either side of the center line of the area at a longitudinal distance of 1,500 feet from the intersection of the obstruction clearance line with the landing surface, and maintaining a distance of 500 feet from the center line thereafter.

41.36 *Nontransport category airplane operating limitations.* In operating any nontransport category airplane in passenger service, the provisions of sections 41.36a through 41.36d shall be complied with, unless deviations therefrom are specifically authorized by the Administrator on the ground that the special circumstances of a particular case make a literal observance of the requirements unnecessary for safety. Performance data published or approved by the Administrator for each such nontransport category airplane shall be used in determining compliance with the provisions of sections 41.36a through 41.36d.

41.36a *Take-off limitations.* No take-off shall be made at a weight in excess of that which will permit the airplane to be brought to a safe stop within the effective length of the runway from any point during the take-off up to the time of attaining 105 percent of minimum control speed or 115 percent of the power-off stalling speed in the take-off configuration, whichever is the greater. In applying the requirements of this section:

(a) It may be assumed that take-off power is used on all engines during the acceleration;

(b) Account may be taken of not more than 50 percent of the reported wind component along the take-off path if opposite to the direction of take-off, and account shall be taken of not less than 150 percent of the reported wind component if in the direction of the take-off;

(c) Account shall be taken of the average runway gradient when the average gradient is greater than ½ percent. The average runway gradient is the difference between the elevations of the end points of the runway divided by the total length;

(d) It shall be assumed that the airplane is operating in the standard atmosphere.

41.36b *En route limitations; one engine inoperative.*

(a) No take-off shall be made at a weight in excess of that which will permit the airplane to climb at a rate of at least 50 feet per minute with the critical engine inoperative at an altitude of at least 1,000 feet above the elevation of the highest obstacle within 5 miles on either side of the intended track or at an altitude of 5,000 feet, whichever is the higher: *Provided,* That in the alternative an air carrier may utilize a procedure whereby the airplane is operated at an altitude such that, in event of an engine failure, the airplane can clear the obstacles within 5 miles on either side of the intended track by 1,000 feet, if the air carrier can demonstrate to the satisfaction of the Administrator that such a procedure can be used without impairing the safety of operation. If such a procedure is utilized, the rate of descent for the appropriate weight and altitude shall be assumed to be 50 feet per minute greater than indicated by the performance information published or approved by the Administrator. Before approving such a procedure, the Administrator shall take into account, for the particular route, route segment, or areas concerned, the reliability of wind and weather forecasting, the location and types of aids to navigation, the prevailing weather conditions, particularly the frequency and amount of turbulence normally encountered, terrain features, air traffic control problems, and all other operational factors which affect the safety of an operation utilizing such a procedure.

(b) In applying the requirements of paragraph (a) of this section, it shall be assumed that:

(1) The critical engine is inoperative;

(2) The propeller of the inoperative engine is in the minimum drag position;

(3) The wing flaps and landing gear are in the most favorable positions;

(4) The operative engine or engines are operating at the maximum continuous power available;

(5) The airplane is operating in the standard atmosphere;

(6) The weight of the airplane is progressively reduced by the weight of the anticipated consumption of fuel and oil.

41.36c *Landing distance limitations; airport of intended destination.* No take-off shall be made at a weight in excess of that which, allowing for the anticipated weight reduction due to consumption of fuel and oil, will permit the airplane to be brought to a stop within 60 percent of the effective length of the most suitable runway at the airport of intended destination.

(a) This weight shall in no instance be greater than that permissible if the landing were to be made:

(1) On the runway with the greatest effective length in still air, and

(2) On the runway required by the probable wind, taking into account not more than 50 percent of the probable headwind component and not less than 150 percent of the probable tailwind component.

(b) In applying the requirements of this section it shall be assumed that:

(1) The airplane passes directly over the intersection of the obstruction clearance plane and the runway at a height of 50 feet in a steady gliding approach at a true indicated air speed of at least 1.3 V_{s_0};

(2) The landing is made in such a manner that it does not require any exceptional degree of skill on the part of the pilot;

(3) The airplane is operating in the standard atmosphere.

41.36d *Landing distance limitations; alternate airports.* No airport shall be designated as an alternate airport in a dispatch release unless the airplane at the weight anticipated at the time of arrival at such airport can comply with the requirements of section 41.36c: *Provided,* That the airplane can be brought to rest within 70 percent of the effective length of the runway.

Maintenance

41.38 *Maintenance organization.* The air carrier is responsible for the continuous airworthiness of all aircraft, engines, propellers, and appliances. Unless maintenance is performed by another agency under a contract approved by the Administrator, it is responsible for maintaining adequate maintenance facilities, the adequacy and competence of maintenance personnel, and for the preparation of such maintenance reports as are required by the Administrator.

41.39 *Alterations and repairs.* Aircraft, engines, propellers, and appliances must be altered or repaired only in conformity with the procedures and, insofar as they apply, the methods provided for in Part 18 of this subchapter. Reports of such alterations or repairs must be submitted promptly to the Administrator.

41.40 *Inspection.* The air carrier shall maintain an inspection organization which is responsible for determining that all maintenance conforms to at least the minimum standards prescribed by the Administrator as to workmanship, methods employed, and materials used. Each inspector must hold a valid mechanic certificate and rating for the type of inspection involved.

41.41 *Maintenance manual.* The air carrier shall prepare and maintain a manual for the use and guidance of maintenance personnel which contains full information pertaining to the repair and service of flight equipment and clearly outlines the responsibilities of maintenance personnel. It must be in a form approved by the Administrator and copies furnished to all persons designated by the Administrator or Board. All copies in the hands of designated company personnel must be kept up to date.

(a) *Changes.* The extension of any overhaul, check, or inspection period must have

the written approval of the Administrator. Other changes in the maintenance manual may be made without the prior approval of the Administrator, if such changes are not inconsistent with any Federal regulation, the air carrier operating certificate, or safe maintenance practice.

41.41–1 *Contents of manual—methods and procedures for maintaining weight and balance control (FAA policies which apply to sec. 41.41).*

(a) *General.* The air carrier may utilize any loading schedule, procedure, or means by which the air carrier can show that the aircraft is properly loaded and will not exceed authorized weight and balance limitations during operation.

By whatever method used, the air carrier should account for all probable loading conditions which may be experienced in service and show that the loading schedule will provide satisfactory loading. Loading schedules may be applied to individual aircraft or to a complete fleet. Unless otherwise authorized, a copy of pertinent loading data should be carried in each aircraft. When an air carrier operates several types of models of aircraft, the loading schedule, which may be index type, tabular type or a mechanical computer, will be identified with the type or model of aircraft for which it is designed.

(b) *Loading provisions.* All seats, compartments, and other loading stations will be properly marked, and the identification used will correspond with the instructions established for computing the weight and balance of the aircraft. When the loading schedule provides blocking off of seats or compartments in order to remain within the center of gravity limits, effective means will be provided to assure that such seats or compartments are not occupied during operations specified. Cargo compartments will be placarded showing the maximum weight of each compartment, and such placards will be readily legible to the loading personnel. Instructions will be prepared for crew members, cargo handlers, and other personnel concerned, giving complete information necessary regarding distribution of passengers, cargo, fuel, and other items. Information relative to maximum capacities and other pertinent limitations affecting the weight or balance of the aircraft will be included in these instructions. When it is possible by adverse distribution of passengers to exceed the approved c. g. limits of the aircraft, special instructions will be issued to the appropriate crew members so that the load distribution can be maintained within the approved limitations.

(c) *Terms, descriptions, and general standards.* For the purpose of weight and balance control, the following terms, descriptions, and general standards will apply. Deviations from these standards by the individual operator due to the nature of his operation will be acceptable.

(1) *Empty weight.* The empty weight of an aircraft is considered to be the maximum gross weight less the following:

(i) All fuel and oil, excepting system fuel and oil.[6]

(ii) Drainable antidetonant injector and de-icing fluids.

(iii) Crew and baggage.

(iv) Passengers and cargo (revenue and nonrevenue).

(v) Removable passenger service equipment, food, magazines, etc., including drainable washing and drinking water.

(vi) Emergency equipment (overwater, tropical, frigid).

(vii) Other equipment, variable for flights.

(viii) Flight spares (spark plugs, wheel, cylinder, etc.).

(2) *Operating weight.* The basic operating weight established by the air carrier for a particular model aircraft will include the following standard items of the operator in addition to the empty weight of the aircraft unless otherwise specified:

(i) Normal oil quantity.

(ii) Antidetonant injector and de-icing (winter) fluids.

(iii) Crew and baggage.

(iv) Passenger service equipment, including washing and drinking water, magazines, etc.

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[6] System fuel and oil is that amount required to fill both systems and the tanks, where applicable, up to the tank outlets to the engines. When oil is used for propeller feathering, such oil is included as system oil.

(v) Emergency equipment, if required for all flights.

(vi) All other items of equipment considered standard by the air carrier concerned.

(3) *Aircraft, zero fuel weight.* The zero fuel weight of an aircraft is the maximum weight authorized for such aircraft without fuel. The weight of fuel carried in the fuselage, or equivalent locations, will be deducted from such maximum. When zero fuel weight limitations or equivalent restrictions are specified, proper provision for loading will be made by the operator so that such structural limitations are not exceeded.

(d) *Aircraft weights.* Aircraft weight and balance control will contain provisions for determining aircraft weights in accordance with the following procedures:

(1) *Individual aircraft weights and changes.* The loading schedule may utilize the individual weight of the aircraft in computing pertinent gross weight and balance. The individual weight and balance of each aircraft will be reestablished at the specified reweighing periods. It also will be reestablished whenever the accumulated changes to the operating weight exceeds plus or minus one-half of 1 percent of the maximum landing weight or the cumulative change in c. g. position exceeds one-half of 1 percent of the MAC.

(2) *Fleet weights, establishment and changes.* For a fleet or group of aircraft, of the same model and configuration, an average operating fleet weight may be utilized if the operating weights and c. g. positions are within the limits established herein. The fleet weight will be calculated on the following basis:

(i) An operator's empty fleet weight will be determined by weighing aircraft according to the following table: For fleet of 1 to 3, weigh all aircraft; for fleet of 4 to 9, weigh 3 aircraft plus at least 50 percent of the number over 3; for fleet of over 9, weigh 6 aircraft plus at least 10 percent of the number over 9.

(ii) In choosing the aircraft to be weighed, the aircraft in the fleet having the highest time since last weighing should be selected. When the average empty weight and c. g. position has been determined for aircraft weighed and the basic operating fleet weight (winter and summer, as applicable) established, necessary data should be computed for aircraft not weighed but which are considered eligible under such fleet weight. If the basic operating weight of any aircraft weighed or the calculated basic operating weight of any of the remaining aircraft in the fleet varies by an amount more than plus or minus one-half of 1 percent of the maximum landing weight from the established basic operating fleet weight or the c. g. position varies more than plus or minus one-half of 1 percent of the MAC from the fleet weight c. g., that airplane will be omitted from that group and operated on its actual or calculated operating weight and c. g. position. If it falls within the limits of another fleet or group, it may then become part of that operating fleet weight. In cases where the aircraft is within the operating fleet weight tolerance but the c. g. position varies in excess of the tolerance allowed, the aircraft may still be utilized under the applicable operating fleet weight but with an individual c. g. position.

(iii) Reestablishment of the operator's empty fleet weight or the operating fleet weight and corresponding c. g. positions may be accomplished between weighing periods by calculation based on the current empty weight of the aircraft previously weighed for fleet weight purposes. Weighing for reestablishment of all fleet weights will be conducted on a 2-year basis unless shorter periods are desired by the air carrier.

(3) *Establishing initial weight before use in air carrier service.* Prior to being used in air carrier service, each aircraft will be weighed and the empty weight and center of gravity location established. New production transport category aircraft delivered to air carriers normally are weighed at the factory and are eligible for air carrier operations without reweighing if the weight and balance records have been adjusted for alterations or modifications to the aircraft. Aircraft transferred from one air carrier to another need not be weighed prior to utilization by the latter unless more than 24 calendar months have elapsed since last weighing.

(4) *Periodic weighing—aircraft using individual weights.* Aircraft operated under a loading schedule utilizing individual aircraft weights in computing the gross weight will be weighed at intervals of 24 calendar months. An air carrier may, however, apply for extension of this weighing period for a particular model aircraft, when pertinent records and actual routine weighing during the preceding 24 months of air carrier operation show that weight and balance records maintained are sufficiently accurate to indicate aircraft weights within the established limitations. Such application should be limited to increases in increments of 12 months and will be substantiated in each instance with at least two aircraft weighings. Increases may not be granted which exceed a time which is equivalent to the aircraft overhaul period.

(5) *Periodic weighing, aircraft using "fleet weights."* Aircraft operating under fleet weights should be weighed in accordance with procedures outlined for the establishment of fleet weights. Since each fleet weight will be reestablished every 2 years and a specified number of aircraft weighed at such periods, no additional weighing is considered necessary. A rotation program should, however, be incorporated so all aircraft in the fleet will be reweighed periodically.

(6) *Weighing procedure.* Normal precautions, consistent with good practices in the weighing procedure, such as checking for completeness of the aircraft and equipment, determining that fluids are properly accounted for, and that weighing is accomplished in an enclosed building preventing the effect of the wind, will prevail. Any acceptable scales may be used for weighings provided they are properly calibrated, zeroed and used in accordance with the manufacturer's instructions. Each scale should have been calibrated, either by the manufacturer or by a civil Department of Weights and Measures, within 1 year prior to weighing any aircraft for this purpose unless the air carrier can show evidence which warrants a longer period between calibrations.

(e) *Passenger weights.* The air carrier may elect to use either the actual passenger weight or the average passenger weight to compute passenger loads over any route, except in those cases where nonstandard weight passenger groups are carried. Both methods may be used interchangeably provided only one method is used for any flight from originating to terminating point of the particular trip or flight involved, except as indicated in subparagraph (3). Provisions will be incorporated in the load manifest to clearly indicate to personnel concerned whether actual or average passenger weights are to be used in computing the passenger load.

(1) *Actual passenger weight.* Actual passenger weight may be determined by scale weighing of each passenger prior to boarding the aircraft, and such weight is to include minor articles carried on board by the passenger. If such articles are not weighed, the estimated weight is to be accounted for. The actual passenger weight may also be determined by asking each passenger his weight and adding thereto a predetermined constant to provide for hand-carried articles and also to cover possible seasonal effect upon passenger weight due to variance in clothing weight. The constant may be approved for an air carrier on the basis of a detailed study conducted by the operator over the particular routes involved and during the extreme seasons when applicable.

(2) *Average passenger weight.* An average weight of 160 pounds (summer) may be used for each adult passenger during the calendar period of May 1 through October 31.

An average weight of 165 pounds (winter) may be used for each adult passenger during the calendar period from November 1 through April 30.

An average weight of 80 pounds may be used for children between the ages of 3 and 12. Children above 12 years of age are classified as adults for the purpose of weight and balance computations. Children less than 3 years old are considered "babes in arms."

The average passenger weight includes minor items normally carried by a passenger.

(3) *Nonstandard weight groups of passengers.* The average passenger weight method will not be used in the case of flights carrying large groups of passengers whose average weight obviously does not conform with the

normal standard weight. Actual weights will be used when a passenger load consists to a large extent of athletic squads or other special group which is smaller or larger than the U. S. average. Where such a group forms only a part of the total passenger load, the actual weights may be used for such group and average weights used for the balance of the passenger load. In such instances, a notation will be made on the load manifest, indicating number of persons in the special group and identifying the group (i. e. football squad, Blank Nationals, etc.).

(f) *Crew weight.* The actual weight of crew members may be used or the following approved average weights may be utilized:

(1) Male cabin attendants 150 pounds; female cabin attendants 130 pounds.

(2) All other crew members 170 pounds.

(g) *Passenger and crew baggage.* Procedures should be provided so that all baggage, including that carried on board by the passengers, is properly accounted for. If desired by the air carrier, a standard crew baggage weight may be used.

(h) *Center of gravity travel during flight.* The air carrier will show that the procedures fully account for the extreme variations in center of gravity travel during flight caused by all or any combination of the following variables:

(1) The movement of a number of passengers and cabin attendants equal to the placarded capacity of the lounges or lavatories from their normal position in the aircraft cabin to such lounge or lavatory. If the capacity of such compartment is one, the movement of either one passenger or one cabin attendant, whichever most adversely affects the c. g. condition will be considered. When the capacity of the lavatory or lounge is two or more, the movement of that number of passengers or cabin attendants from positions evenly distributed throughout the aircraft may be used. Where seats are blocked off, the movement of passengers and/or cabin attendants evenly distributed throughout only the actual loaded section of the aircraft will be used. The extreme movements of the cabin attendants carrying out their assigned duties within the cabin will be considered. The various conditions will be combined in such a manner that the most adverse effect on the c. g. will be obtained and so accounted for in the development of the loading schedule to assure the aircraft being loaded within the approved limits at all times during flight.

(2) *Landing gear retraction.* Possible change in c. g. position due to landing gear retraction will be investigated and results accounted for.

(3) *Fuel.* The effect on the c. g. travel of the aircraft during flight due to fuel used down to the required reserve fuel or to an acceptable minimum reserve fuel established by the air carrier will be accounted for.

(i) *Fuel allowance for taxiing and runup.* The weight and balance system may provide for a weight allowance of 3 pounds of fuel for each 100 horsepower (maximum continuous) available to the aircraft from all of its engines to be added to the maximum gross weight of the aircraft to compensate for fuel used during runup and taxiing.

(j) *Records.* The weight and balance system will include methods by which the air carrier will maintain a complete, current, and continuous record of the weight and center of gravity of each aircraft. Such records should reflect all alterations and changes affecting either the weight or balance of the aircraft, and will include a complete and current equipment list. When fleet weights are used, pertinent computations should also be available in individual aircraft files.

(k) *Weight of fluids.* The weight of all fluids used in aircraft may be established on the basis of actual weight, a standard volume conversion, or a volume conversion utilizing appropriate temperature correction factors to accurately determine the weight by computation of the quantity of fluid on board.

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41.42 ***Training program.*** **The air carrier must provide for the proper and periodic instruction of all maintenance personnel, particularly in connection with the introduction into service of new or unfamiliar equipment.**

41.43 ***Records.*** **Current records shall be kept of the total time in service, the time since last overhaul, and the time since last**

inspection on all aircraft components, engines, propellers, and, where practicable, on instruments, equipment, and accessories, except that in the case of a propeller for which there is no previous operating history, the Administrator may authorize the use of a new record if the hub is rebuilt and is fitted with blades which are free from defects and within the manufacturer's production tolerances. Such rebuilding of the propeller shall be accomplished by the manufacturer or by a certificated repair station having the proper rating. The new record shall be signed by the manufacturer or by the repair agency, giving the date the propeller hub or blade was rebuilt and such other information as the Administrator may require.

41.44 ***Cockpit check list.***

(a) The air carrier shall provide for each type aircraft a cockpit check list, approved by the Administrator, adapted to each operation in which the aircraft is to be utilized. An approved check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be appropriately used by the flight crew for each flight.

(b) The cockpit check list shall include procedures prior to starting engines, prior to take-off, prior to landing, and for powerplant emergencies.

41.44–1 *Air carrier cockpit checklist (FAA policies which apply to sec. 41.44).*

(a) *General.* The policies set forth in this section are issued pursuant to section 41.44 (a) so as to provide a guide in the approval of an air carrier cockpit checklist by the Administrator and to assist an air carrier in providing a cockpit checklist which will meet with such approval and will comply with the provisions of section 41.44 (b).

The checklist which follows has been prepared in general terms and is considered a normal checklist for compliance with section 41.44 except that those items not applicable to a particular aricraft may be deleted and the order of arrangement for the individual items may be changed at the discretion of the air carrier. The checklist provided by an air carrier should include all applicable items but should not necessarily be limited thereto.

PRIOR TO STARTING ENGINE

Fuel system:
- Quantity—checked.
- Proper tank selection—checked.
- Mixtures—as required.
- Fuel booster pumps—as required.
- Cross feeds—as required.

Hydraulic system:[7]
- Brakes—set.

Electrical system:
- Battery switch—proper position.

PRIOR TO TAKEOFF

Weight and balance:
- Pilot is aware of weights and takeoff limitations.

Fuel system:[7]
- Quantity—rechecked.
- Proper tank selection—rechecked.
- Mixtures—takeoff position.
- Fuel booster pumps—as required.
- Cross feeds—as required.

Hydraulic system:[7]
- Hydraulic pressures and quantity—checked.
- Brakes—checked.
- Hydraulic selector valves—checked.

Anti-icing and de-icing equipment.[7] Checked and set.

Electrical system:
- Battery switch—proper position.
- Inverters—as required.
- Ignition—checked.
- Generators—checked.
- Radio—checked.

Power plants and propellers:[7]
- Propellers—checked and set in takeoff position.
- All engines—checked for proper functioning and required power.
- Super chargers—checked and set in proper takeoff position.

Heaters. Checked and set.

Instruments—Engine:
- Oil—quantity, temperature and pressure—normal for takeoff.

[7] Items thus marked will be doublechecked such as by challenge and response, or positively checked such as by a mechanical method.

Fuel pressure—normal for takeoff.
Carburetor—temperature—normal for takeoff.
Cylinder head—temperature—checked.
Instruments—flight:
Static and vacuum selectors—checked.
Directional gyro—set.
Altimeter—set.
Horizon—uncaged.
Turn and bank—checked.
Clock—set.
Pressurization.[7] Checked.
Flaps:[7]
Wing flaps—takeoff position.
Cowl flaps—takeoff position.
Controls:[7]
Auto pilot—off.
Trim tabs—set for takeoff.
Gust locks—off.
Free and tested for through full limit of travel.

PRIOR TO LANDING

Fuel system:[8]
Proper tank selection—checked.
Mixtures—landing position.
Fuel booster pumps—as required.
Cross feeds—as required.
Weight and balance:
Maximum landing gross weight—checked.
Hydraulic system:[8]
Hydraulic pressure—checked.
Brakes—checked and off.
Hydraulic selector valves—checked.
Anti-icing and de-icing equipment[8]—checked.
Power plants and propellers:
Propellers—as required.
Super chargers—as required.
Manual reverse pitch actuator or indicator[8]—checked.
Heaters[8]—checked.
Instruments:
Static and vacuum selectors—checked.
Altimeter—set.
Directional gyro—set.
Pressurization[8]—checked.
Controls:
Auto pilot—off.
Trim tabs—as desired.
Landing gear:[7]
Down and locked—checked.
Flaps:[8]
Wing flaps—as desired.
Cowl flaps—as desired.

POWERPLANT EMERGENCIES

Fuel system:
Mixtures—idle cutoff on dead engine—required position on all others.
Fuel selector valve—dead engine—off.
Fuel booster pumps—dead engine—off.
Cross feeds—as required.
Throttle—dead engine—closed.
Hydraulic system:
Hydraulic selector valve—set on proper engine.
Hydraulic pressures—checked.
Brakes—checked.
Ignition—off—dead engine.
Generators—off—dead engine.
Power plants and propellers:
Propellers—Low r.p.m. and feathered on dead engine—set as required on all live engines.
Engines—All live engines set for proper functioning and required power.
Superchargers—checked and set in proper position.
Heaters. Checked and set in safe operation position.
Instruments:
Engine—oil temperature and pressure checked.
Engine—fuel supply and pressure checked.
Carburetor—temperature checked.
Cylinder head—temperature checked.
Flight instruments. Checked and reset if necessary.
Pressurization. Checked.

(Published in 18 F.R. 6752, October 24, 1953, effective December 1, 1953.)

[7] Items thus marked will be doublechecked such as by challenge and response, or positively checked such as by a mechanical method.

[8] Items thus marked should be doublechecked as prescribed in footnote 7; except that when the aircraft requires a flight crew of only two pilots, one pilot should call out the item to be checked, either pilot should perform the operation, and the pilot not performing the operation should make a momentary visual check after the operation is completed.

41.45 *Airspeed indicators, limitations, and related information.*

(a) Air-speed limitations and related information contained in the Airplane Flight Manual and pertinent placards shall be expressed in the same units as used on the airspeed indicator.

(b) When more than one air-speed indicator is required, all such indicators shall be calibrated to read in the same units.

(c) When an air-speed indicator is calibrated in statute miles per hour, a readily usable means shall be provided for the flight crew to convert statute miles per hour to knots.

(d) On and after April 1, 1956, all air-speed indicators shall be calibrated in knots, and all air-speed limitations and related information contained in the Airplane Flight Manual and pertinent placards shall be expressed in knots.

41.45–1 *Airspeed limitations and related information contained in the Airplane Flight Manual (FAA policies which apply to sec. 41.45(d)).* The airspeeds shown in the Performance Information Section only, of an Airplane Flight Manual approved prior to April 1, 1956, may continue to be expressed in statute miles per hour, provided that a table converting statute miles to knots is incorporated therein, and a cautionary note is placed on each page and chart where airspeeds are denoted indicating that the statute miles shown must be converted to knots when determining performance information. A similar note should be placed in the Operations Limitations Section, indicating that airspeeds shown in the Performance Information Section are in statute miles and must be converted to knots when determining performance information.

(Published in 21 F.R. 4312, June 20, 1956, effective July 1, 1956.)

Airman Rules

Pilot

41.48 *Certificate.*

(a) Any pilot serving as pilot in command shall hold a valid airline transport pilot certificate and a rating for the aircraft in which he is to serve.

(b) Any pilot serving as second in command in an aircraft requiring two pilots shall hold at least a commercial pilot certificate and instrument rating and must have demonstrated to an air carrier inspector of the Administrator, or to an authorized check pilot of the air carrier, his ability to take off and land aircraft in which he is to serve.

(c) Any pilot serving as second in command in an aircraft requiring three or more pilots shall meet the requirements of paragraph (a) of this section.

(d) Any pilot serving in a pilot capacity other than as pilot in command or second in command shall meet the requirements of paragraph (b) of this section.

[(e) No individual who has reached his 60th birthday shall be utilized or serve as a pilot on any aircraft while engaged in air carrier operations.

[(Amendment 41–29, published in 24 F.R. 9772, Dec. 5, 1959, effective Mar. 15, 1960.)]

41.49 *Number of pilots required.* The number of pilots required shall be sufficient to provide adequate safety. The type of aircraft used, the type of operation involved, and the duration of flights between points where flight crews are changed shall be the basis for making this determination.

41.49–1 *Crew complement; number of pilots required (FAA rules which apply to secs. 41.49 and 41.65).* The number of pilots required on aircraft certificated in accordance with T-category requirements shall not be less than the pilot personnel specified in the minimum crew as set forth in the airplane flight manual of the particular aircraft. In the case of aircraft certificated in accordance with non T-category requirements, not less than two pilots shall be required when (a) the aircraft incorporates multiengine features combined with retractable landing gear or wing flaps, or (b) in the conduct

of a flight, the duties of a pilot serving as pilot in command would be unduly interfered with through the necessity of performing other duties usually performed by the second in command.

(Published in 15 F.R. 9232, December 23, 1950, effective upon publication; amended in 18 F.R. 6753, October 24, 1953, effective December 1, 1953.)

41.50 *Pilot route and airport qualification requirements.*

(a) An air carrier shall not utilize a pilot as pilot in command until he has been qualified for the route on which he is to serve in accordance with the provisions of this section and the appropriate instructor or check pilot has so certified.

(b) Each such pilot shall demonstrate adequate knowledge concerning the subjects listed below with respect to each route to be flown. Those portions of the demonstration pertaining to holding procedures and instrument approach procedures may be accomplished in a synthetic trainer which contains the radio equipment and instruments necessary to simulate the navigational and let-down procedures approved for use by the air carrier:

(1) Weather characteristics,

(2) Navigational facilities,

(3) Communication procedures,

(4) Type of en route terrain and obstruction hazards,

(5) Minimum safe flight levels,

(6) Position reporting points,

(7) Holding procedures,

(8) Pertinent traffic control procedures, and

(9) Congested areas, obstructions, physical layout, and all instrument approach procedures for each regular, provisional, and refueling airport approved for the route.

(c) Each such pilot shall make an entry as a member of the flight crew at each regular, provisional, and refueling airport into which he is scheduled to fly. Such entry shall include a landing and take-off. The qualifying pilot shall occupy a seat in the pilot compartment and he shall be accompanied by a pilot who is qualified at the airport.

(d) Such pilot shall not be required to meet the entry requirements of paragraph (c) of this section when:

(1) The initial entry is made under VFR weather conditions at the particular airport involved; or

(2) The air carrier shows that the pilot airport qualification can be accomplished by an approved pictorial means; or

(3) The air carrier notifies the Administrator that it intends to conduct operations at an airport in close proximity to an airport into which the pilot involved is presently qualified by entry, and the Administrator finds that such pilot is adequately qualified at the new airport. The Administrator, in making such finding, shall take into consideration at least the familiarity of the pilot with the layout, surrounding terrain, location of obstacles, and instrument approach and traffic control procedures at the new airport.

(e) On routes or route segments on which navigation must be accomplished by pilotage and on which flight is to be conducted at or below the level of the adjacent terrain which is within a horizontal distance of 25 miles on either side of the center line of the route to be flown, the pilot shall be familiarized with such route or route segments by not less than two one-way trips on the flight deck over the route or route segments under VFR weather conditions to permit the qualifying pilot to observe terrain along the route.

41.51 *Maintenance and re-establishment of pilot route and airport qualification for particular trips.*

(a) To maintain pilot route and airport qualifications, each pilot being utilized as pilot in command, within the preceding 12-month period, shall have made at least one trip as pilot or other member of the flight crew between terminals into which he is scheduled to fly and shall have complied with the provisions of section 41.50(e), if applicable.

(b) In order to re-establish pilot route and airport qualifications after absence from a route for a period in excess of 12 months, a

pilot shall comply with the appropriate provisions of section 41.50.

41.52 *Initial pilot flight training and recent experience.*

(a) Deleted.

[(Deleted by amendment 41-28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

(b) No air carrier shall schedule a pilot in command or second in command to serve as such in scheduled air transportation unless within the preceding 90 days he has made at least three take-offs and three landings in the airplane of the particular type on which he is to serve.

[41.53 *Training requirements.*

[(a) Each air carrier shall establish a training program sufficient to insure that each crewmember and dispatcher used by the air carrier is adequately trained to perform the duties to which he is to be assigned. The initial training phases shall be satisfactorily completed prior to serving in scheduled operations.

[(b) Each air carrier shall be responsible for providing adequate ground and flight training facilities and properly qualified instructors. There also shall be provided a sufficient number of check airmen to conduct the flight checks required by this part. Such check airmen shall hold the same airman certificates and ratings as are required for the airman being checked.

[(c) The training program for each flight crewmember shall consist of appropriate ground and flight training including proper flight crew coordination. Procedures for each flight crew function shall be standardized to the extent that each flight crewmember will know the functions for which he is responsible and the relation of those functions to those of other flight crewmembers. The initial program shall include at least the appropriate requirements specified in sections 41.53a through 41.53e.

[(d) The crewmember emergency procedures training program shall include at least the requirements specified in section 41.53e.

[(e) The appropriate instructor, supervisor, or check airman responsible for the particular training or flight check shall certify to the profficiency of each crewmember and dispatcher upon completion of his training, and such certification shall become a part of the individual's record.

[(Amendment 41-28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

41.53-1 *Failure to complete instrument competency check (FAA policies which apply to sec. 41.53).* A scheduled air carrier should not utilize as a pilot-in-command in scheduled air transportation any pilot who has failed to perform satisfactorily any of the proficiency checks set forth in section 41.53-6.

(Published in 17 F.R. 8471, September 23, 1952, effective October 20, 1952.)

41.53-2 *General standards (FAA policies which apply to sec. 41.53).* Section 41.53-6 prescribes the minimum checks which should be given by an air carrier in determining the proficiency of a pilot-in-command. The air carrier may undertake these checks in any order or arrangement that will achieve complete coverage of the proficiency check in a minimum amount of flight time. Where demonstrated performance is unsatisfactory, additional training may be given during the check or later, and the unsatisfactory item rechecked during the check or later for satisfactory performance. The extent of this additional training should depend on the applicant's satisfactory flight proficiency demonstrated in other phases of the check which, in the opinion of the check pilot, would warrant such additional training. In addition, the air carrier should, where a particular type or condition of operation prevails, add to the checks listed in section 41.53-6.

(Published in 17 F.R. 8471, September 23, 1952, effective October 20, 1952.)

41.53-3 *Purpose of observing performance (FAA policies which apply to sec. 41.53).* When an agent of the Administrator is observing the performance of a proficiency flight, his primary objectives will be: (a) An evaluation of the air carrier's pilot flight proficiency training program, and (b) a determination as to whether the air carrier's check pilot is requiring demonstrated performance by the pilot-in-com-

mand as set forth in section 41.53–6 and the air carrier's pilot flight proficiency training program. Any problem pertaining to the performance of the pilot-in-command during the proficiency flight should be discussed only between the air carrier's check pilot and the agent of the Administrator. In the event there is a difference of opinion between the air carrier's check pilot and the agent as to methods of performing the required maneuvers, such differences of opinion should be resolved between the agent and the air carrier and should not be discussed on the flight deck during the proficiency flight.

(Published in 17 F.R. 8471, September 23, 1952, effective October 20, 1952.)

41.53–4 *Aircraft used in flight check (FAA policies which apply to sec. 41.53).*

(a) Where a pilot-in-command is scheduled to fly only one type of land aircraft or one type of seaplane, he should be given his proficiency checks in that type of aircraft he is scheduled to fly.

(b) Where a pilot-in-command is scheduled to fly more than one type of land aircraft and/or seaplane, his proficiency should be checked in all types of aircraft he is scheduled to fly. However, the following exceptions will be allowed:

(1) If a pilot is scheduled to fly 2-engine, 3-engine, and 4-engine land aircraft or any combination thereof, and/or more than one type of such aircraft, he should take his proficiency check in one of the larger and more complicated type of aircraft; or if only one of the smaller type aircraft is available, he may take his check immediately due in that aircraft, but his next

check should be accomplished in one of the larger and more complicated type of aircraft.

(2) If a pilot is scheduled to fly 2-engine, 3-engine, and 4-engine seaplanes or any combination thereof, and/or more than one make or model of such seaplanes, he should take his proficiency check in one of the larger and more complicated type of seaplane; or if only one of the smaller type of seaplane is available, he may take his check immediately due in that seaplane, but his next check should be made in one of the larger and more complicated type of seaplane.

(3) If a pilot is scheduled to fly both land aircraft and seaplanes, his check should include a demonstration of proficiency in both land aircraft and seaplane in accordance with subparagraphs (1) and (2) of this paragraph.

(Published in 17 F.R. 8472, September 23, 1952, effective October 20, 1952.)

41.53–5 *Flight simulator (FAA policies which apply to sec. 41.53).* An air carrier using a flight simulator in its pilot's training program may be approved to utilize such a device for certain maneuvers in conducting proficiency checks: *Provided*, That (a) the training device accurately simulates the flight characteristics and the performance of the appliable aircraft through all ranges of normal and emergency operation: (b) the maneuvers to be conducted in the simulator other than those specifically authorized in section 41.53–6 (l), (m), (n), (o), (p), and (q), are submitted to the Washington office for approval by the region in which the headquarters of the air carrier is located: and (c) certain critical maneuvers which demonstrate the proficiency of a pilot are executed in an aircraft of the type flown by the pilot in air carrier service. The proficiency flight in the aircraft should include at least maneuvers (minimum speed), approach procedures, handling under regular approach conditions, and takeoff and landings, with engine failures as outlined in section 41.53–6 (g), (q), (u), and (v), respectively.

(Published in 17 F. R. 8472, September 23, 1952, effective October 20, 1952.)

41.53–6 *Proficiency checks (FAA policies which apply to sec. 41.53).* The following checks are prescribed by the Administrator to determine the proficiency of the pilot-in-command:

(a) *Equipment examination (oral or written).*

(1) The equipment examination should be pertinent to the type of aircraft to be flown by the pilot-in-command and may be given (i) in the air carrier's ground school, (ii) during a routine line check under the supervision of an authorized company check pilot, or (iii) during the proficiency check.

(2) The examination should at least contain questions relative to engine power settings, airplane placard speeds, critical engine failure speeds, control systems, fuel and lubrication systems, propeller and supercharger operations, hydraulic systems, electric systems, antiicing, heating, and ventilating, and pressurization system (if pressurized). A record should be maintained in the pilot's file which will indicate the date, condition under which equipment examination was given, and grade received.

(b) *Taxiing, sailing, or docking.* Attention should be directed to (1) the manner in which the pilot-in-command conducts taxiing, sailing, or docking with reference to the taxi instruction as issued by airport traffic control or other traffic control agency, (2) any taxi instruction which may be published in the air carrier's operations manual, and (3) general regard for the safety of the air carrier's and other equipment which may be affected by taxiing, sailing, or docking operation.

(c) *Run-up.* Attention to detail in the use of cockpit checklist and cockpit procedure should be observed on all proficiency flights.

(d) *Takeoff.* For those air carriers authorized takeoff minimums of 200–½, the pilot being examined should whenever practicable execute a takeoff solely by reference to instruments, or at the option of the check pilot, a contact takeoff may be made following which instrument conditions should be simulated at or before reaching 100 feet with the subsequent climb conducted solely by reference to instruments. The check pilot should observe the pilot's ability to maintain a constant heading during the takeoff run, his proficiency in handling power, flap and gear operation during the critical period between takeoff (off ground) and reaching 500 feet. If it becomes necessary for the check pilot to give assistance after becoming airborne, the

maneuver should be considered as unsatisfactory.

(e) *Climbs and climbing turns.* Climbs and climbing turns should be performed in accordance with the airspeeds and power settings as prescribed by the air carrier or those set forth in the Airplane Flight Manual. The use of proper climb speeds and designated rates of climb should be considered in determining the satisfactory performance of this phase of the proficiency flight.

(f) *Steep turns.* Except as provided hereinafter, steep turns should consist of at least 45 degrees of bank. The turns should be at least 180° of duration, but need not be more than 360°. Smooth control application, and ability to maneuver aircraft within prescribed limits, should be the primary basis for judging performance. When information is available on the relation of increase of stall speeds versus increase in angle of bank, such information should be reviewed and discussed. As a guide. the tolerances of 100 feet plus or minus a given altitude should be considered as acceptable deviation in the performance of steep turns. Consideration may be given to factors other than pilot proficiency which might make compliance with the above tolerances impractical. For example, where the range of vision from the safety observers' position is obstructed in certain types of aircraft while in a steep left turn, the degree of left bank in such instances may be reduced to not less than 30°.

(g) *Maneuvers (minimum speeds).* Maneuvers at minimum speed should be accomplished while using the prescribed flap settings as set forth in the Airplane Flight Manual. In addition, attention should be directed to airplane performance as related to use of flaps versus clean configuration while operating at minimum speeds. Attention should be directed towards the pilot's ability to recognize and hold minimum controllable airspeed to maintain altitude and heading, and to avoid unintentional approaches to stalls.

(h) *Approach to stalls.* Approach to stalls should be demonstrated from straight flight and turns, with and without power. An approach to stall should be executed in landing or approach configuration. The extent to which the approach to stall will be carried and the method of recovery utilized should be dictated by (1) the type of aircraft being flown, (2) its reaction to stall conditions, and (3) the limitation established by the air carrier. Performance should be judged on ability to recognize the approaching stall, prompt action in initiating recovery, and prompt execution of proper recovery procedure for the particular make and model (i. e., type) of aircraft involved.

(i) *Propeller feathering.* Propeller feathering should be performed. Such propeller feathering should be accomplished in accordance with instructions set forth by the air carrier and be exercised at sufficient altitude to insure adequate safety for the performance of the operation. The pilot's ability to maintain altitude, directional control, and satisfactory airspeed should be the desired prerequisites in accomplishing this maneuver. The manner in which the pilot manages his cockpit during propeller feathering should also be noted.

(j) *Maneuvers (one or more engines out).* When performing maneuvers (one or more engines out) the aircraft should be maneuvered with a loss of 50 percent of its power units, such loss to be concentrated on one side of the aircraft. The loss of these power units may be simulated either by retarding throttles or by following approved feathering procedures. The pilot in command should be required to maintain headings and altitude and to make moderate turns both toward and away from the dead engine or engines. Proficiency should be judged on the basis of the pilot's ability to maintain engine-out airspeed, heading and altitude; trim the airplane; and to adjust necessary power settings.

(k) *Rapid descent and pullout.* This maneuver should consist of the following steps: While the aircraft is under the normal approach configuration and being flown at a predetermined altitude, it will be assumed that the aircraft has arrived at a navigational fix and is cleared to descend immediately to a lower altitude. (The lower altitude should be one which permits a descent of at least 1,000 feet.) Upon reaching the lower altitude, the aircraft should be recovered from the rapid descent and flown on a predetermined heading and altitude for a predetermined period of time. At the end of the time interval, an emergency pullout

should be executed which will involve a change of direction of at least 180°. Performance should be judged on the basis of ability to establish a rapid descent at constant airspeed, stopping the descent at the minimum altitude specified without going below it, holding heading and altitude, and smooth pullup and climb.

(l) *Ability to tune radio.*[9]

(m) *Orientation.*[9]

(n) *Beam bracketing.*[9]

(o) *Cone identification.*[9]

(p) *Loop orientation.*[9]

(q) *Approach procedures.* An approach procedure should be made in the aircraft on the letdown aid for which the lowest minimums on a systemwide basis are authorized and include, where possible, holding patterns and air traffic control instructions which might be used by the pilot in day-to-day operations. If at the time of the proficiency flight the letdown aid affording the lowest minimums is not in operation at the point the check is given, the landing aid which affords the next lowest minimums on a systemwide basis should be used. Where a particular air carrier is authorized landing minimums based on instrument landing systems and ground control approach, the predominate landing aid on a systemwide basis should be utilized. In some cases a particular air carrier may be authorized its lowest landing minimums on a letdown aid which is not installed and operating at locations where the air carrier's pilots are based. In this case the air carrier should conduct the proficiency flights at locations where such an aid is installed and operating. All other approaches for which a particular operator may be authorized to use, such as ADF, LF/MR range, VOR, and VAR should be made and may be conducted in a simulator or other approved type trainer. A record should be maintained in the pilot's file which will indicate the date that these approaches were performed and the grade received. If these approaches (ADF, LF/MR range, VOR, and VAR) are not performed in a simulator or other approved type trainer, they should be accomplished on the proficiency flight.

(r) *Missed approach procedures.* (See par. (s) of this section.)

(s) *Traffic control procedures.* Missed approach procedures and traffic control procedures should be accomplished in a manner satisfactory to the authorized check pilot. The degree of satisfactory or unsatisfactory performance should be predicated on the pilot's ability to (1) maneuver the aircraft while performing these procedures, and (2) follow instructions either verbal or written which may be pertinent to the accomplishment of these procedures. Paragraphs (r) and (s) of this section may be accomplished while performing paragraph (q) of this section.

(t) *Crosswind landing.* A crosswind landing should be performed when practicable. Traffic conditions and wind velocities will dictate whether a crosswind landing is practicable. Performance should be judged on the technique used in correcting for drift on final approach, judgment in the use of flaps, and directional control during roll-out.

(u) *Landing under regular approach conditions.* Landing under regular approach conditions will necessitate a path of flight around the landing area of not more than a 180° turn but not less than a 90° turn. The pilot should be judged on the basis of altitude and airspeed control and his ability to maneuver under the minimum ceiling and visibility conditions prescribed.

(v) *Takeoffs and landings (with engine(s) failures).* If it is consistent with safety, traffic patterns, local rules, and laws, a simulated engine failure should be experienced during takeoff. The simulated failure should occur at any time after the aircraft has passed the V_1 speed pertinent to the particular takeoff and when practicable before reaching 300 feet. When performing the landing, the aircraft should be maneuvered to a landing while utilizing 50 percent of the available power units. The simulated loss of power should be concentrated on one side of the aircraft. The pilot's ability to satisfactorily perform this maneuver should be evaluated in the manner stated under paragraph (i) of this section.

[9] Paragraphs (l), (m), (n), (o), and (p) of this section should be accomplished in a satisfactory manner either (1) during a routine line check under the supervision of an authorized company check pilot, (2) in a simulated or synthetic trainer, or (3) during the proficiency flight. A record should be maintained in the pilot's file which will indicate the date, method utilized, and grade received in the performance of these items.

Deicing and anti-icing systems.
Oxygen system for the flight crew.

(Published in 22 F. R. 8998, November 9, 1957, effective November 25, 1957.)

[41.53a *Initial pilot ground training.* Ground training for all pilots shall include instruction in at least the following:

[(a) The appropriate provisions of the air carrier operations specifications and appropriate provisions of the regulations of this subchapter with particular emphasis on the operation and dispatching rules and airplane operating limitations;

[(b) Dispatch procedures and appropriate contents of the manuals;

[(c) The duties and responsibilities of crewmembers;

[(d) The type of airplane to be flown, including a study of the airplane, engines, all major components and systems, performance limitations, standard and emergency operating procedures, and appropriate contents of the approved Airplane Flight Manual;

[(e) The principles and methods of determining weight and balance limitations for takeoff and landing;

[(f) Navigation and use of appropriate aids to navigation, including the instrument approach facilities and procedures which the air carrier is authorized to use;

[(g) Airport and airways traffic control systems and procedures, and ground control letdown procedures if pertinent to the operation;

[(h) Meteorology sufficient to insure a practical knowledge of the principles of icing, fog, thunderstorms, and frontal systems; and

[(i) Procedures for operation in turbulent air and during periods of ice, hail, thunderstorms, and other potentially hazardous meteorological conditions.

[(Amendment 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

[41.53b *Initial pilot flight training.*

[(a) Flight training for each pilot shall include at least takeoffs and landings, during day and night, and normal and emergency flight maneuvers in each type of airplane to be flown by him in scheduled operations, and flight under simulated instrument flight conditions.

[(b) Flight training for a pilot qualifying to serve as pilot in command or as second in command in a crew requiring three or more pilots shall include flight instruction and practice in at least the following maneuvers and procedures:

[(1) In each type of airplane to be flown by him in scheduled operations:

[(i) At the authorized maximum takeoff weight, takeoff using maximum takeoff power with simulated failure of the critical engine. For transport category airplanes the simulated engine failure shall be accomplished as closely as possible to the critical engine failure speed (V_1), and climbout shall be accomplished at a speed as close as possible to the takeoff safety speed (V_2). Each pilot shall ascertain the proper values for speeds V_1 and V_2;

[(ii) At the authorized maximum landing weight, flight in a four-engine airplane, where appropriate, with the most critical combinations of two engines inoperative or operating at zero thrust, utilizing appropriate climb speeds as set forth in the Airplane Flight Manual;

[(iii) At the authorized maximum landing weight, simulated pullout from the landing and approach configurations accomplished at a safe altitude with the critical engine inoperative or operating at zero thrust;

[(iv) Suitable combinations of airplane weight and power less than those specified in subdivisions (i), (ii), and (iii) of this subparagraph may be employed if the performance capabilities of the airplane under the above conditions are simulated.

[(2) Conduct of flight under simulated instrument conditions, utilizing all types of navigational facilities and the letdown procedures used in normal operations. If a particular type of facility is not available in the training area, such training may be accomplished in a synthetic trainer.

[(c) Flight training for a pilot qualifying to serve as second in command in a crew re-

quiring two pilots shall include flight instruction and practice in at least the following maneuvers and procedures:

[(1) In each type of airplane to be flown by him in scheduled operation:

[(i) Assigned flight duties as second in command, including flight emergencies,

[(ii) Taxiing,

[(iii) Takeoffs and landings,

[(iv) Climbs and climbing turns,

[(v) Slow flight,

[(vi) Approach to stall,

[(vii) Engine shutdown and restart,

[(viii) Takeoff and landing with simulated engine failure,

[(ix) Conduct of flight under simulated instrument conditions including instrument approach at least down to circling approach minimum and missed-approach procedures.

[(2) Conduct of flight under simulated instrument conditions, utilizing all types of navigational facilities and the letdown procedures used in normal operations. Except for those approach procedures for which the lowest minimums are approved, all other letdown procedures may be given in a synthetic trainer which contains the radio equipment and instruments necessary to simulate other navigational and letdown procedures approved for use by the air carrier.

[(Amendment 41–28, published in 25 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

[41.53c *Initial flight navigator training.*

[(a) The training for flight navigators shall include the applicable portions of at least paragraphs (a) through (d), and (f) through (h) of section 41.53a.

[(b) Prior to serving as a required flight crewmember each flight navigator shall be given sufficient ground and flight training to become proficient in those duties assigned him by the air carrier. The flight training may be accomplished during scheduled flight under the supervision of a qualified flight navigator.

[(Admendment 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

[41.53d *Initial flight engineer training.*

[(a) The training for flight engineers shall include at least the instruction specified in section 41.53a (a) through (e).

[(b) Flight engineers shall be given sufficient training in flight to become proficient in those duties assigned them by the air carrier. Except for emergency procedures, this training may be accomplished during scheduled flight under the supervision of a qualified flight engineer.

[(Admendment 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)]

[41.53e *Initial crewmember emergency training.*

[(a) The training in emergency procedures shall be designed to give each crewmember appropriate individual instruction in all emergency procedures, including assignments in the event of an emergency, and proper coordination between crewmembers. At least the following subjects as appropriate to the individual crewmember shall be taught: The procedures to be followed in the event of the failure of an engine, or engines, or other airplane components or systems, emergency decompression, fire in the air or on the ground, ditching, evacuation, the location and operation of all emergency equipment, and power setting for maximum endurance and maximum range.

[(b) Synthetic trainers may be used for training of crewmembers in emergency procedures where the trainers sufficiently simulate flight operating emergency conditions for the equipment to be used.

[(c) All crewmembers performing duties on pressurized airplanes operated above flight level 250, shall, as a part of their approved emergency procedure training, receive instructions by means of lectures and films covering at least: respiration, hypoxia, duration of consciousness at altitude when supplemental oxygen is not supplied, gas expansion, gas bubble formation, physical phenomena and incidents of decompression; and receive actual training and practice in the donning of the oxygen mask and operation of the oxygen equipment. In lieu of the required films, the air carrier may use any other equivalent means of visual presentation which, after demonstration, meets with

the approval of a representative of the Administrator.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961; Amended by Amdt. 41–36, published in 26 F.R. 1057, Feb. 3, 1961, effective Mar. 3, 1961.)

41.53f *Initial aircraft dispatcher training.*

(a) The training program for aircraft dispatchers shall provide for training in their duties and responsibilities and shall include a study of the flight operation procedures, air traffic control procedures, the performance of the airplanes used by the air carrier, navigational aids and facilities, and meteorology. Particular emphasis shall be placed upon the procedures to be followed in the event of emergencies, including the alerting of proper governmental, company, and private agencies to render maximum assistance to an airplane in distress.

(b) Each aircraft dispatcher shall, prior to initially performing the duty of an aircraft dispatcher, satisfactorily demonstrate to the supervisor or ground instructor authorized to certify to his proficiency, his knowledge of the following subjects:

(1) Contents of the air carrier operating certificate;

(2) Appropriate provisions of the air carrier operations specifications, manual, and regulations of this subchapter;

(3) Characteristics of the airplanes operated by the air carrier;

(4) Cruise control data and cruising speeds for such airplanes;

(5) Maximum authorized loads for the airplanes for the routes and airports to be used;

(6) Air carrier radio facilities;

(7) Characteristics and limitations of each type of radio and navigational facility to be used;

(8) Effect of weather conditions on airplane radio reception;

(9) Airports to be used and the general terrain over which the airplanes are to be flown;

(10) Prevailing weather phenomena;

(11) Sources of weather information available;

(12) Pertinent air traffic control procedures; and

(13) Emergency procedures.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)

41.53g *Recurrent training.*

(a) Each air carrier shall provide such training as is necessary to insure the continued competence of each crewmember and dispatcher and to insure that each possesses adequate knowledge of and familiarity with all new equipment and procedures to be used by him.

[(b) Each air carrier shall, as a part of the training program, check the competence of each crewmember and dispatcher each 12 months with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. The competence check may be given at any time during the month preceding or following the month in which it becomes due. The effective date of the check, if given within the preceding or following month, shall be the same as if given within the month in which it became due. Where the check of the pilot in command or second in command requires actual flight, such check shall be considered to have been met by the checks accomplished in accordance with sections 41.53j and 41.53k, respectively.]

(c) The appropriate instructor, supervisor, or check airman shall certify as to the proficiency demonstrated, and such certification shall become a part of the individual's record.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.) [Amended by Amdt. 41–45, published in 27 F.R. 7673, Aug. 3, 1962, effective Aug. 3, 1962.]

41.53h *Approval of training program.* The training program established by the air carrier under the provisions of sections 41.53 through 41.53g shall meet with the approval of an authorized representative of the Administrator: *Provided,* That the curriculum of such training program shall be submitted in appropriate form to an authorized representative of the Administrator not later than May 1, 1960.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961, except as noted in proviso.)

41.53i *Qualification requirements.*

(a) No air carrier shall utilize any flight crewmember or dispatcher, nor shall any such airman perform the duties authorized by his airman certificate, unless he satisfactorily meets the appropriate requirements of sections 41.48, 41.50, 41.51; 41.53 or 43.53g; and 41.53j through 41.53k; and 41.68 through 41.88.

(b) Check airmen shall certify as to the proficiency of the pilot being examined, as required by sections 41.50, 41.53j, and 41.53k, and such certification shall be made a part of the airman's record.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)

41.53j *Pilot checks; pilot in command.*

(a) *Line check.* Prior to serving as pilot in command, and at least once each 12 months thereafter, a pilot shall satisfactorily accomplish a line check in one of the types of airplanes normally to be flown by him. The line check may be given at any time during the month preceding or following the month in which it becomes due. The effective date of the check, if given within the preceding or following month, shall be the same as if given within the month in which it became due. This check shall be given by a check pilot who is qualified for the route. It shall consist of at least a scheduled flight over a typical portion of the air carrier's routes to which the pilot is normally assigned, and shall be of sufficient duration for the check pilot to determine whether the individual being checked satisfactorily exercises the duties and responsibilities of pilot in command.

(b) *Proficiency check.*

(1) An air carrier shall not utilize a pilot as pilot in command until he has satisfactorily demonstrated to a check pilot of a representative of the Administrator his ability to pilot and navigate airplanes to be flown by him. Thereafter, he shall not serve as pilot in command unless each 6 months he successfully completes a similar pilot proficiency check. The proficiency check may be given at any time during the month preceding or following the month in which it becomes due. The effective date of the check, if given within the preceding or following month, shall be the same as if given within the month in which it became due. Where such pilots serve in more than one airplane type, at least every other successive proficiency check shall be given in flight in the larger airplane type.

(2) The pilot proficiency check shall include at least the following:

(i) The flight maneuvers specified in section 41.53b(b)(1), except that the simulated engine failure during takeoff need not be accomplished at speed V_1, nor at actual or simulated maximum authorized weight.

(ii) Flight maneuvers approved by the Administrator accomplished under simulated instrument conditions utilizing the navigational facilities and letdown procedures normally used by the pilot: *Provided,* That maneuvers other than those associated with approach procedures for which the lowest minimums are approved may be given in a synthetic trainer which contains the radio equipment and instruments necessary to simulate other navigational and letdown procedures approved for use by the air carrier.

(3) Subsequent to the initial pilot proficiency check, an approved course of training in an aircraft simulator, if satisfactorily completed, may be substituted at alternate 6-month intervals for the proficiency check required by subparagraph (1) of this paragraph. The air carrier shall show that the flight characteristics, performance, instrument reaction, and control loadings of the applicable aircraft are accurately simulated in the aircraft simulator through all ranges of normal and emergency operations in accordance with subdivisions (i) through (vii) of this subparagraph.

(i) The simulator shall represent a full-scale mockup of the cockpit interior, including normal flight crew stations and accommodations for the instructor or check airman.

(ii) The effect of changes on the basic forces and moments shall be introduced for all combinations of drag and thrust nor-

mally encountered in flight. The effect of changes in airplane attitude, power, drag, altitude, temperature, gross weight, center of gravity locations, and configuration shall be included.

(iii) In response to control movement by a flight crewmember, all instrument indications involved in the simulation of the applicable airplane shall be entirely automatic in character unless otherwise specified. The rate of change of simulator instrument readings and of control forces shall correspond to the rate of change which would occur on the applicable airplane under actual flight conditions, for any given change in the applied load on the controls, in the applied power or in aircraft configuration. Control forces and degree of actuating control travel shall correspond to that which would occur in the airplane under actual flight conditions.

(iv) Through the medium of instrument indication, it shall be possible to use the simulator for the training and checking of a pilot in the operational use of controls and instruments on the applicable airplane model during the simulated execution of ground operation, takeoff, landing, normal flight, unusual attitudes, navigation problems and instrument approach procedures. In addition, the simulator shall be designed so that malfunction of aircraft engines, propellers and primary systems may be presented and corrective action taken by the crew to cope with such emergencies.

(v) Suitable course and altitude recorders shall be included.

(vi) Communication and navigation aids of the applicable airplane shall be simulated for on-the-ground and inflight operations.

(vii) Other aircraft systems and components shall be simulated to the extent found necessary by the Administrator.

(c) Prior to serving as pilot in command in a particular type of airplane, a pilot shall have accomplished during the preceding 12 months either a proficiency check or a line check in that type of airplane.

(Added by Amdt. 41–28, published in 24 F.R. 9768, Dec. 5, effective Jan. 1, 1961; Amended by Amdt. 41–33, published in 25 F.R. 3850, May 4, 1960, effective June 1, 1960.)

41.53k *Proficiency checks; second in command.*

(a) An air carrier shall not utilize a pilot as second in command until he has satisfactorily demonstrated to a check pilot or a representative of the Administrator his ability to pilot and navigate airplanes to be flown by him and to perform his assigned duties. Thereafter, he shall not serve as second in command unless each 12 months he successfully completes a similar pilot proficiency check. The proficiency check may be given at any time during the month preceding or following the month in which it becomes due. The effective date of the check, if given within the preceding or following month, shall be the same as if given within the month in which it became due. Where such pilots serve in more than one airplane type, at least every other successive proficiency check shall be given in flight in the larger airplane type. The pilot proficiency check shall include at least an oral or written equipment examination, and the procedures and flight maneuvers specified in section 41.53b(c)(1). The pilot proficiency check may be demonstrated from either the right or left pilot seat.

(b) The proficiency check for the second in command of a crew requiring 3 or more pilots shall be the same as required under section 41.53j(b).

(c) Subsequent to the initial pilot proficiency check, an approved course of training in an aircraft simulator which meets the requirements of section 41.53j(b)(3), if satisfactorily completed, may be substituted at alternate 12-month intervals for the proficiency check required by paragraph (a) of this section.

(d) Satisfactory completion of the proficiency check in accordance with the requirements of section 41.53j(b) will also meet the requirements of this section.

(Added by Amdt. 41–38, published in 24 F.R. 9768, Dec. 5, 1959, effective Jan. 1, 1961.)

41.54 *Flight time limitations for aircraft having a crew of one or two pilots.*

(a) A pilot may be scheduled to fly 8 hours or less during any 24 consecutive hours without a rest period during such 8 hours. If a pilot is scheduled to fly in excess of 8 hours during any 24 consecutive hours, he shall be given an intervening rest period at or before the termination of 8 scheduled hours of flight duty. Such rest period must equal at least twice the number of hours flown since the last preceding rest period and in no case will such rest period be less than 8 hours. During such rest period the pilot must be relieved of all duty with the air carrier.

(b) When a pilot has flown in excess of 8 hours during any 24 consecutive hours he must receive at least 18 hours of rest before being assigned any duty with the air carrier.

(c) A pilot shall not fly in excess of 32 hours during any 7 consecutive days. Relief from all duty for not less than 24 consecutive hours must be provided for and given to a pilot at least once during any 7 consecutive days.

(d) A pilot shall not fly as a member of the crew more than 100 hours during any one month.

(e) A pilot shall not fly as a member of the crew more than 1,000 hours in any 12-month period.

41.54–1 *Flight time limitations for a crew of one or two pilots; 1 month (FAA interpretations which apply to sec. 41.54(d)).* The term "in any 1 month" as used in section 41.54 (d) is interpreted as meaning a month of the calendar year commencing on the first day and ending on the last day thereof.

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41.54–2 *Flight time limitations for a crew of one or two pilots; 12-month period (FAA interpretations which apply to sec. 41.54(e)).* The term "in any 12-month period" as used in section 41.54 (e) is interpreted as meaning any 12 consecutive months computed as any given day of any month to the day of the corresponding number of the same named month of the following or previous year.

Example: January 24, 1950, would extend to and include January 23, 1951.

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41.55 *Flight time limitations for aircraft having two pilots and one additional flight crew member.*

(a) A pilot may not be scheduled to fly a total of more than 12 hours during any 24 consecutive hours.

(b) When a pilot has flown 20 hours or more during any 48 consecutive hours, or 24 hours or more during any 72 consecutive hours, he must receive at least 18 hours of rest before being assigned to any duty with the air carrier. In any case each pilot shall be relieved from all duty for not less than 24 consecutive hours during any 7 consecutive days.

(c) A pilot shall not fly as a member of the flight crew more than 120 hours in any 30 consecutive days or 300 hours in any 90 consecutive days.

(d) A pilot shall not fly as a member of the flight crew more than 1,000 hours in any 12-month period.

Note: Interpretation 1, 14 F.R. 1409, March 30, 1949, provides as follows:

Minimum crew complement; flight radio operators. We have been asked for an interpretation of the effect of Civil Air Regulations Amendment 41–1, dated October 5, 1948, on the minimum number of flight radio operators required on a scheduled flight of over 12 hours from airport to airport, where radiotelegraphy is necessary for communication with ground stations over a route segment of the flight which is less than 12 hours in length.

Section 41.70 of the Civil Air Regulations provides that, "when one flight radio operator is required the flight-time limitations prescribed in section 41.55 apply. When two or more flight radio operators are required, the flight-time limitations of section 41.56 apply." Section 41.55 states that where a crew consists of two pilots and an additional flight crew member, a "pilot may not be scheduled to fly more than 12 hours during any 24 consecutive hours." Since aircraft with which the regulation is concerned require two pilots at the controls at practically all times, the phrase "scheduled to fly" as used in this section does not necessitate precise definition with respect to the

flight time of pilots since they are on duty throughout the flight. However, the expression is ambiguous when applied to radio operators whose duty watch, from a safety standpoint, need not in all instances be continuous from airport to airport while the aircraft is in the air. As applied to such airmen the term "to fly" when used as part of the phrase "scheduled to fly," may be interpreted in two possible ways—it may mean the entire time the aircraft is in the air, or it may mean the time the radio operator is on flight duty on the aircraft.

In dealing with this problem it is necessary to bear in mind that the Board's power over maximum hours of service of airmen derives from section 601(a) of the Civil Aeronautics Act and relates solely to promoting safety of flight in air commerce. It is evident that the Board does not consider that an airman's being in the air for more than 12 hours creates a hazardous condition in and of itself, for exactly such a situation is contemplated in § 41.56 with respect to pilots. In effect, what is required by that section is that when the flight is to be of more than 12 hours' duration, provision be made for a relief pilot to permit the captain and first officer to be relieved from time to time of the strain of a continuous flight watch. The same principle is applicable to radio operators. Where the radio operator's flight watch is scheduled for more than 12 hours in a given 24, it is apparent that a second operator must be carried to relieve the first. However, what is essential is that after 12 hours of duty the radio operator be relieved, not that he be relieved by another operator, and consequently, if such relief is afforded by reason of the fact that the radio operator's services are not required for the operation of the aircraft for more than 12 hours, the same safety standard would appear to have been met.

Prior to the adoption of Amendment 41–1 on October 5, 1948, which specifically defined what was intended by "route segment," it may not have been clear in all cases when a radio operator was required to be on flight duty under the regulation. However, since the adoption of the definition of "route segment," the Administrator is permitted to specify the exact limits of a route segment, which may be considerably more confined than the route between the airports of takeoff and landing for the flight. Thus, under the regulations, the time scheduled over the route segment or segments for which the Administrator has determined radio telegraphy is necessary represents the minimum on-duty time for which a flight radio operator is required. If the air carrier desires to maintain a radio flight watch beyond the minimum time thus prescribed or to utilize the services of the airmen in some other certificated capacity on the flight, of course, the time so spent must be included as part of the airman's on-duty flight time.

Accordingly, we interpret "scheduled to fly" as used in § 41.55 and as applied to radio operators as meaning "scheduled for flight duty on the aircraft." Thus, only one flight radio operator is required on a scheduled flight over 12 hours from airport to airport where such operator is only required or assigned for duty as an airman over a route segment which is less than 12 hours in length.

41.55–1 *Flight time limitations for a crew of two pilots and one additional flight crew member; 12-month period (FAA interpretations which apply to sec. 41.55(d)).* The term "in any 12-month period" as used in section 41.55 (d) is interpreted as meaning any 12 consecutive months computed as any given day of any month to the day of the corresponding number of the same named month of the following or previous year.

Example: January 24, 1950, would extend to and include January 23, 1951.

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41.56 ***Flight time limitations for aircraft having three or more pilots and an additional flight crew member.***

(a) Flight hours shall be scheduled in such a manner as to provide for adequate rest periods on the ground while the pilot is away from his base. Adequate sleeping quarters on the aircraft must be provided in all cases

where a pilot is scheduled to fly more than 12 hours during any 24 consecutive hours.

(b) A pilot, upon return to his base from any flight or series of flights, shall receive a rest period of not less than twice the total number of hours flown since the last rest period at his base and during such period will not be required to perform any duty for the company. When the required rest period exceeds 7 days, that portion of the rest period in excess of 7 days may be given at any time before the pilot is again scheduled for flight duty on any route.

(c) A pilot shall not fly as a member of the flight crew more than 350 hours in any 90 consecutive days.

(d) A pilot shall not fly as a member of the flight crew more than 1,000 hours in any 12-month period.

41.56–1 *Flight time limitations for a crew of three or more pilots and an additional flight crew member; 12-month period (FAA interpretations which apply to sec. 41.56(d)).* The term "in any 12-month period" as used in section 41.56 (d) is interpreted as meaning any 12 consecutive months computed as any given day of any month to the day of the corresponding number of the same named month of the following or previous year.

Example: January 24, 1950, would extend to and include January 23, 1951.

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41.57 ***Flight time limitations for pilots not regularly assigned.*** A pilot not regularly assigned as a flight crew member for an entire month under the provisions of section 41.55 or section 41.56 must not fly in excess of 100 hours in any 30 consecutive days.

41.58 ***Deadhead transportation.*** The time spent in deadhead transportation to or from duty assignment will not be considered a part of any rest period.

41.59 ***Other commercial flying.*** A pilot shall not do other commercial flying while employed by an air carrier when such flying, in addition to that in scheduled air transportation service, will exceed any flight time limitations specified herein.

41.60 ***Logging flight time.***

(a) A pilot in command may log the total flight time elapsing during his command of the aircraft.

(b) A second in command holding an airline transport pilot certificate and rating for the aircraft flown may log the total time during which he serves as second in command.

(c) A second in command not holding an airline transport pilot certificate and rating for the aircraft flown may log 50 percent of the total flight time.

(d) Additional pilots when required, and serving as such, may log 50 percent of the total flight time.

41.61 ***Logging instrument flight time.*** Instrument flight time may be logged as such by the pilot actually manipulating the controls only when the aircraft is flown solely by reference to instruments either under actual or properly simulated flight conditions.

41.63 ***Pilot in command rules.***

(a) ***Pilot in command.*** The pilot in command is in command of the aircraft at all times during flight and is responsible for the safety of persons and goods carried and for the conduct and safety of members of the crew.

(b) ***Emergency decisions.***

(1) The pilot in command is authorized to follow any course of action which appears necessary in emergency situations which, in the interest of safety, require immediate decision and action. He may, in such situations, deviate from prescribed methods, procedures, or minimums to the extent required by considerations of safety. When such emergency authority is exercised the pilot shall keep the proper control station fully informed regarding the progress of the flight. He shall submit a written report of any such deviation to the Administrator of Civil Aeronautics within 7 days after the completion of the trip.

(2) In an emergency requiring either the dumping of fuel or a landing at a weight in excess of the authorized landing weight the pilot in command may elect to follow whichever procedure he considers safer.

(c) *Flight equipment.* Before any flight is started the pilot in command shall have readily available in the aircraft appropriate and current flight and navigational facility maps, including instrument procedures when instrument flight is authorized, and such other equipment as may be necessary to properly conduct the proposed flight.

41.63–1 *Emergency decisions (FAA interpretations which apply to sec. 41.63(b)(1)).* The term "emergency situations," as used in this section, is interpreted to mean an unexpected occurrence or condition requiring immediate action to meet its danger. Under certain circumstances, an unexpected occurrence or condition might include icing conditions, engine or structural failure, weather conditions, danger of collision, etc. It is not intended that such an occurrence or condition must become critical before emergency authority is exercised. The pilot shall make a common sense evaluation of the factors and information available to him. If, after such an evaluation, he reasonably believes that an emergency exists or will be created, he is permitted to exercise his emergency authority and deviate from prescribed regulations and procedures to the extent required by considerations of safety.

(Published in 16 F. R. 4524, May 16, 1951, effective May 15, 1951.)

41.64 *Compliance with foreign air traffic rules and local airport rules.* Pilots flying in the airspace of any foreign country shall, at all times, comply with the air traffic rules of the foreign government and with local airport rules, except where any rule prescribed in this part is more restrictive and may be followed without violating the laws or rules of such country.

41.65 *Composition of flight crew.*

(a) No air carrier shall operate an aircraft with less than the minimum flight crew required for the type of operation and the type aircraft as determined by the Administrator in accordance with the standards prescribed in this part and specified in the air carrier operating certificate for each route or route segment.

(b) Where the provisions of this part require for a particular route, route segment, or aircraft the performance of two or more functions for which an airman certificate is necessary, such requirement shall not be satisfied by the performance of multiple functions at the same time by any airman over such route or route segment.

41.65–1 *Composition of flight crew (FAA rules which apply to sec. 41.65).*

(a) *General.* The minimum flight crew as determined by the Administrator, and specified in the air carrier operating certificate, shall be the type and number of flight crew members required on the flight deck for the operation of the aircraft over a particular route or route segment specified in the operating certificate. It is the responsibility of the air carrier to assign such additional flight crew members as necessary for compliance with flight time limitations and the performance of all required functions in accordance with section 41.65 (b).

(b) *Listing of flight crew members in the air carried operating certificate.* The minimum number of flight crew members serving in the capacity of pilots and the minimum number of flight crew members serving in the capacity of flight engineers required for duty on the flight deck of an aircraft as prescribed in sections 41.49–1 and 41.73–1 respectively are dependent on the type of aircraft authorized for use by the air carrier. As the minimum number of such crew members does not vary with the route or route segment over which the aircraft is flown, this shall be specified in the air carrier operating certificate on Form ACA–514a by the following provisions: "Flight crew members holding pilot and flight engineer certificates shall be those prescribed in sections 41.49–1 and 41.73–1."

The functional requirements of radiotelegraphy and celestial or other specialized means of navigation, as prescribed in sections 41.68–1 and 41.80–1, respectively, are dependent on the particular route or route segment over which the aircraft is flown. When a flight crew member is required to perform one of such functions on the flight deck of the aircraft over a route or route segment, this shall be specified in the air carrier operating certificate on Form ACA–514a by indicating the function required. This

will be accomplished by the air carrier's inserting the letter "Y" on a line with the particular route or route segment under the required function; namely, radiotelegraphy—specialized means of navigation.

(Published in 15 F.R. 9232, December 23, 1950, effective upon publication in the Federal Register.)

Flight Radio Operator

41.68 ***Flight radio operator; when required.*** **An airman holding a flight radio operator certificate shall be required for flight over any area, route, or route segment over which the Administrator has determined that radiotelegraphy is necessary for communication with ground stations during flight.**

41.68–1 *Crew complement; flight radio operator (FAA rules which apply to sec. 41.68).*

(a) *Determination of need.* Radiotelegraphy shall be required over any area, route or route segment where it has been determined that this means of communication is necessary to insure adequate air-ground communication over the area, route or route segment under normal operating conditions.

(Published in 15 F.R. 9232, December 23, 1950, effective upon publication in the Federal Register.)

41.69 ***Certificate.*** **Each flight radio operator shall hold a valid flight radio operator certificate issued in accordance with the provisions of Part 33 of this subchapter.**

41.70 ***Flight time limitations.*** **When one flight radio operator is required the flight time limitations prescribed in section 41.55 apply. When two or more flight radio operators are required the flight time limitations of section 41.56 apply.**

41.71 ***Other flight crew members to be qualified.*** **In all flights requiring only one flight radio operator, one other flight crew member must be capable of operating the equipment in an emergency.**

41.72 ***Qualification for duty.*** **No individual shall perform, or be assigned to perform, the duties of a flight radio operator unless he has met the recent experience requirements specified in Part 33 of this subchapter.**

Flight Engineer

41.73 ***Flight engineer; when required.*** **An airman holding a flight engineer certificate shall be required on all four-engine aircraft certificated for more than 80,000 pounds maximum take-off weight, and on all other four-engine aircraft certificated for more than 30,000 pounds maximum take-off weight where the Administrator finds that the design of the aircraft used or the type of operation is such as to require a flight engineer for the safe operation of the aircraft.**

41.73–1 *Crew complement; flight engineer (FAA rules which apply to secs. 41.65 and 41.73).*

(a) *Design of aircraft.* A flight crew member serving in the capacity of a flight engineer shall be required on all 4-engine aircraft certificated for more than 80,000 pounds maximum takeoff weight as prescribed in section 41.73, and on all other 4-engine aircraft certificated for more than 30,000 pounds maximum takeoff weight when so specified in the airplane flight manual for the particular aircraft.

(b) *Type of operation.* The Administrator has considered the type of operation presently being conducted in aircraft of the 30,000–80,000 pound weight category and has determined that a flight engineer is not required as a result of such operation.

(Published in 15 F.R. 9232, December 23, 1950, effective upon publication in the Federal Register.)

41.74 ***Certificate.*** **Each flight engineer shall hold a valid flight engineer certificate issued in accordance with the provisions of Part 35 of this subchapter.**

41.75 ***Qualification for duty.*** **A certificated flight engineer shall not be assigned to nor perform duties for which he is required to be certificated unless, within the preceding 12-month period, he has had at least 50 hours of experience as a flight engineer on the type aircraft on which he is to serve; or until the air carrier has checked the airman and determined that he is (a) familiar with all current information and operating procedures relating to the type aircraft to which he is to be assigned and (b) competent with respect to such aircraft.**

41.75–1 *Flight engineer qualifications for duty (FAA interpretations which apply to sec. 41.75).* An airman assigned to flight-check other flight engineers must meet the recent experience requirements of this part before serving as a flight engineer in air transportation. However, the time spent in giving flight engineer checks may be applied toward the 50-hour recent experience requirements on a particular type of aircraft. Unless such experience has been obtained within the preceding 12-month period, a check by the air carrier or an authorized representative of the Administrator is required.

(Published in 21 F.R. 678, January 31, 1956; amended in 21 F.R. 678, effective February 15, 1956.)

41.76 *Flight time limitations.* When one flight engineer is required, the flight time limitations prescribed in section 41.55 apply. When two or more flight engineers are required, the flight time limitations prescribed in section 41.56 apply.

41.77 *Other flight crew members to be qualified.* In all flights requiring the use of only one flight engineer, one other flight crew member must be capable of performing the duties of such engineer in an emergency during flight.

Flight Navigator

41.80 *Flight navigator; when required.* An airman holding a flight navigator certificate shall be required for flight over any area, route, or route segment when the Administrator has determined either that celestial navigation is necessary or that other specialized means of navigation necessary for the safe conduct of flight cannot be adequately accomplished from the pilot station.

41.80–1 *Crew complement; flight navigator (FAA rules which apply to sec. 41.80).* The rules hereinafter set forth have been issued pursuant to section 41.80 and shall be followed in determining when celestial navigation or other specialized means of navigation are necessary.

(a) *Determination of need.* Where the desired precision and reliability in air navigation, i.e., accurate line of position or fixes available, cannot normally be achieved from the pilot's station by visual or nonvisual ground aids for a period of:

(1) More than 1 hour, celestial or other specialized means of navigation shall be required;

(2) One hour or less, determination shall be made by the Administrator as to the need for celestial or other specialized means of navigation, taking into consideration such factors having a bearing on safety as weather, air traffic control, traffic congestion, size of land at destination and fuel requirements, whether or not sufficient fuel is carried for return to point of departure, or whether flight is predicated upon operation "beyond point of no return."

(Published in 15 F.R. 1565, March 31, 1950, effective April 18, 1950; amended in 18 F.R. 6783, October 24, 1953, effective December 1, 1953.)

41.81 *Flight time limitations.* When one flight navigator is required, the flight time limitations prescribed in section 41.55 apply. When two or more flight navigators are required, the flight time limitations prescribed in section 41.56 apply.

41.82 *Qualification for duty.* A certificated flight navigator shall not be assigned to nor perform duties for which he is required to be certificated unless, within the preceding 12-month period, he has had at least 50 hours' experience as a flight navigator; or until the air carrier has checked the airman and determined that he is (a) familiar with all current navigational information pertaining to the routes to be flown and (b) competent with respect to the operating procedures and navigational equipment to be used.

Dispatcher

41.84 *Number and location.* The air carrier shall provide an adequate number of certificated aircraft dispatchers located at such points as may be necessary to insure safe operations.

41.85 *Certificate.* Each dispatcher shall hold a valid aircraft dispatcher certificate

issued in accordance with the provisions of Part 27 of this subchapter.

41.86 *Qualification for route.* Each dispatcher within 6 months immediately preceding his qualification for a route, or part thereof, shall have made at least one trip over the route [, or part thereof,] on which he is to serve prior to dispatching any aircraft. In addition he must be familiar with:

(a) The contents of the air carrier operations manual;

(b) The radio facilities in the aircraft used; and

(c) With respect to the route, [or part thereof,] the following:

(1) The prevailing weather phenomena,

(2) The sources of weather information available,

(3) All phases of the air carrier operation,

(4) The maximum authorized loads for the aircraft used,

(5) The peculiarities and limitations of each radio navigational facility and similar information with regard to such additional facilities located off the route as are approved for use in obtaining fixes by means of cross bearings, and

(6) The effect of weather conditions on the radio reception of the aircraft used.

[(Amendment 41-35, published in 25 F.R. 12908, Dec. 16, 1960, effective Dec. 8, 1960.)]

41.87 *Maintenance of qualification.* Each dispatcher shall maintain his familiarity with the route or routes on which he dispatches aircraft.

41.88 *Route qualification expiration.* After 24 consecutive months of absence from dispatching duty over a route or part thereof, a dispatcher will no longer be considered qualified to dispatch aircraft over such route [, or part thereof.]

[(Amendment 41-35, published in 25 F.R. 12908, Dec. 16, 1960, effective Dec. 8, 1960.)]

Flight Operation Rules

Dispatching Rules

41.92 *Dispatching rules.*

(a) *Short distance operation.* Flights may be dispatched over any approved route between two terminal points.

(b) *Long distance operation.* Flights may be dispatched over any track between two terminal points within the route approved by the Administrator for the operation.

41.93 *Dispatching authorization.* Flights shall be started only on the authority of an aircraft dispatcher qualified for the route: [*Provided,* That where an aircraft dispatcher is qualified only on a portion of the route, he may dispatch the flight, but only after coordinating with dispatchers who are qualified for the other portions of the route between the points to be served.] In short distance operation this authority is not required at intermediate points specified in the original clearance unless the flight is delayed more than 30 minutes at any such point. In long distance operation redispatch is not required unless the flight is delayed more than 6 hours.

[(Amendment 41-35, published in 25 F.R. 12908, Dec. 16, 1960, effective Dec. 8, 1960.)]

41.94 *Dispatcher duty period.* A dispatcher may clear a flight only when he has been on duty at the station from which the clearance is effected for a period of time sufficient to become familiar with existing conditions. He must continue on duty until the aircraft has landed in completion of a trip, or has proceeded beyond his jurisdiction, or until he has been properly relieved by another qualified dispatcher.

41.95 *Use of weather reports and forecasts in dispatch.*

(a) Weather reports used to control flight movements shall be prepared from observations made and released by a source acceptable to the Administrator.

(b) Weather reports used shall be the latest reports available. Weather reports,

other than off-course or on-call reports made a part of the clearance form, shall not be more than one hour and 30 minutes old at the time the aircraft departs.

(c) Weather forecasts made by the United States Weather Bureau, in the case of dispatch from points within the United States, or other sources acceptable to the Administrator, in the case of dispatch from points outside of the United States, shall be taken into account.

41.96 *Weather minimums.*

(a) *Dispatch under contact flight rules, short distance operations.* Aircraft may be dispatched only if current weather reports and forecasts show a trend indicating that the ceilings and visibilities along the route to be flown are, and will remain, at or above the minimums required for flight under contact flight rules until the flight arrives at the next point of intended landing specified in the clearance.

(b) *Instrument or over-the-top dispatch, short distance operations.* Aircraft may be dispatched only if the observed weather information and current weather forecasts pertaining to the next point of intended landing specified in the clearance show a trend indicating that the ceiling and visibility will be at or above the minimums specified when the flight is scheduled to arrive; and at least one alternate airport, meeting the minimum weather requirements for the airport when used as an alternate, is designated in the clearance.

(c) *Dispatch, long distance operation.* Aircraft may be dispatched only in compliance with the following conditions:

(1) The current weather forecasts must indicate that the ceiling and visibility either at the next point of intended landing or at any required alternate therefor will be at or above the approved minimums at the time the flight is estimated to arrive.

(2) In the case of overwater flights or any other flight where the point of intended landing has no available alternate, the current weather forecasts must also indicate that the ceiling and visibility either at the point of departure or at any required alternate therefor will be above the approved minimums at the time of arrival back to such point from any point along the route closer than the point-of-no-return.

41.97 *Icing conditions.* Aircraft shall not be dispatched or flown into known heavy icing conditions and may be dispatched or flown into any less serious icing condition only if the aircraft is equipped for de-icing wings, propellers, and such other parts of the aircraft as are essential to safety.

41.98 *Fuel supply.*

(a) *Short distance contact operation.* An aircraft may be dispatched or take off only if it carries sufficient fuel, considering the wind and other weather conditions expected, to (1) fly to the next point of landing specified in the clearance and thereafter (2) for a period of at least 45 minutes at normal cruising consumption.

(b) *Short distance instrument or over-the-top operation.* An aircraft may be dispatched or take off only if it carries sufficient fuel, considering the wind and other weather conditions expected, to fly to the next point of landing specified in the clearance; and thereafter (1) to fly to and land at the most distant alternate airport designated for that point in the clearance; and thereafter (2) to fly for a period of at least 45 minutes at normal cruising consumption.

(c) *Long distance operation.* An aircraft may be dispatched or take off only if it carries sufficient fuel, considering the wind and other weather conditions expected, to fly to the next point of landing specified in the clearance; and thereafter (1) to fly to and land at the most distant alternate airport designated for that point in the clearance; and thereafter (2) to fly for a period of at least two hours at normal cruising consumption. An aircraft may be redispatched to return to the point of departure or to an alternate airport for that point only when such redispatch is accomplished while the aircraft has sufficient fuel to return to such point and thereafter to fly for a period of at least two hours at normal cruising consumption. In the case of a route approved without

an available alternate for a particular stop, an aircraft dispatched to that point must carry sufficient fuel, considering wind and other weather conditions expected, to fly to that point and thereafter for at least 3 hours at normal cruising consumption. The Administrator may require fuel in excess of any of the minimums specified in this paragraph when he finds that additional fuel is necessary on a particular route in the interest of safety and, in the case of an overland operation where adequate intermediate airports and navigational facilities are available, may permit the operation to be conducted with the

fuel reserves specified in paragraph (b) of this section.

41.99 *Maintenance release, clearance, and load manifest forms.* All maintenance release, clearance, and load manifest forms used shall be approved by the Administrator. The original copies of such forms shall be given to the pilot in command. Duplicate copies of maintenance releases shall be kept for at least 2 months and duplicate copies of clearances and load manifests shall be kept for at least 3 months in the station file.

41.100 *Preparation of maintenance release form.* A maintenance release form shall be prepared for each aircraft delivered by the maintenance department to the operations department. This form must be signed by personnel of the air carrier charged with the duty of supervising the maintenance of the aircraft.

41.101 *Preparation of clearance form.* A clearance form shall be prepared for each flight between specified clearance points. The information for such clearance shall be prepared by the authorized aircraft dispatcher of the air carrier operating the aircraft. This form shall be signed by the pilot in command and by the authorized aircraft dispatcher only when both believe the flight may be made with safety. The authority to sign such clearance may be delegated for a particular flight by the authorized aircraft dispatcher, but the authority to dispatch cannot be delegated, and such dispatcher remains responsible for the dispatch and continued supervision of the flight.

41.102 *Preparation of load manifest form.* A load manifest form showing the loading of the aircraft shall be prepared and signed for each flight by qualified personnel of the air carrier charged with the duty of supervising the loading of the aircraft and the preparation of the load manifest forms, or by qualified persons authorized by the air carrier. The aircraft when loaded shall not exceed the center of gravity limits or maximum allowable weight limits set forth in the aircraft certificate for the particular aircraft.

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41.103 *Traffic conditions.* Immediately prior to departure it is the responsibility of the dispatcher, dispatching an instrument flight outside of an airway traffic control area, to ascertain from the best available information what other flights affecting the proposed flight are in progress over the route and to report this information to the pilot in command.

41.104 *Dispatcher emergency procedure.* In the event of inability to maintain two-way communication with the aircraft while it is in flight the dispatcher is responsible for notifying all other known traffic in the area of such failure, giving the last approved flight plan and the expected time of arrival at the destination.

41.105 *Redispatch from alternate airports.* Aircraft may be redispatched from any alternate airport. In the case of an off-route alternate, the return to the authorized route must be made in accordance with conditions specified by the Administrator.

Flight Preparation and Take-Off Rules

41.108 *Tests and checks.* Before departure the pilot in command is responsible for the testing or checking of each item in the check list approved by the Administrator, at the time and to the extent specified.

41.109 *View of traffic.* The pilot shall maneuver the aircraft to a position from which incoming and outgoing aircraft can be observed until immediately prior to take-off.

Flight Course and En Route Rules

41.110 *Continuance of flight, short distance operation.* No flight shall be continued toward any point to which it is cleared unless the weather conditions at alternate airports specified in the clearance remain at or above the minimums specified for each such airport when used as an alternate.

41.111 *Change in clearance en route.* The clearance may be amended en route by the substitution of another alternate airport within the fuel range of the aircraft, as outlined in section 41.98(b), where weather con-

ditions are at or above the minimums for such airport when used as an alternate. If a change in clearance is made while an aircraft is in flight, the two-way conversation shall be entered in the ground station radio log. After clearance for contact flight no aircraft shall be recleared en route for instrument flight, unless all instruments and items of equipment required by section 41.25 for the type of operation are in serviceable condition.

41.112 *Deviation from route.* No aircraft may deviate from the route over which it is dispatched except when circumstances render such deviation necessary as a safety measure. Any deviation from the route must be explained by the pilot in a written report dispatched to the Administrator within 7 days after return to his base.

41.113 *Reporting unusual conditions.* When an icing or other unusual meteorological condition is encountered in flight the pilot shall notify his company radio ground station as soon as practicable and such information shall be relayed to all flights which may be affected.

41.114 *Flight altitude rules.*

(a) *Day contact operation.* Except during take-offs and landings no aircraft shall be flown at an altitude less than 500 feet above the ground or water, or within 500 feet of any mountain, hill, or other obstruction to flight, except in such cases as may be specifically approved.

(b) *Night VFR or IFR operations (including over-the-top).* Except during take-offs and landings or when operating in accordance with specific procedures for definite localities approved by the Administrator, no aircraft shall be flown at an altitude of less than 1,000 feet above the highest obstacle located within a horizontal distance of 5 miles from the center of the course intended to be flown.

(c) *Daytime over-the-top operations below minimum en route altitudes.* Over-the-top operations may be conducted at flight altitudes lower than the minimum en route IFR altitudes by day only and in accordance with the following provisions:

(1) Such operations shall be conducted at least 1,000 feet above the top of lower broken or overcast cloud cover;

(2) The top of the lower cloud cover shall be generally uniform and level;

(3) Flight visibility shall be at least five miles;

(4) The base of any higher broken or overcast cloud cover shall be generally uniform and level and shall be at least 1,000 feet above the minimum en route IFR altitude for the route segment.

41.115 *Communication failure.* In the event of inability to maintain two-way radio communication, the pilot in command shall observe one of the following procedures in the order listed:

(a) Proceed according to current flight plan, maintaining the minimum instrument altitude or the last acknowledged assigned altitude, whichever is higher, to the airport of intended landing and commence descent at approach time last authorized or, if not received and acknowledged, at the estimated time of arrival specified in the flight plan; or

(b) If weather conditions permit, proceed in accordance with contact flight rules; or

(c) Land as soon as practicable.

Instrument Approach and Landing Rules

41.117 *Altitude maintenance on initial approach.*

(a) When making an initial approach to a radio navigational facility on instruments or on top of overcast (excluding over-the-top conducted in accordance with the provisions of section 41.114(c)), an airplane shall not descend below the pertinent minimum altitude for initial approach specified by the Administrator for such facility until arrival over the radio facility has been definitely established;

(b) When making an initial approach on a flight being conducted in accordance with the provisions of section 41.114(c), a pilot shall not commence an instrument approach until arrival over the radio facility has definitely been established. In executing an instrument approach procedure under such circumstances, the airplane shall not be flown at an altitude lower than 1,000 feet above the top of the lower cloud or the minimum altitude specified by the Administrator for that portion of the instrument approach procedure being flown, whichever is the lower.

41.118 *Letting-down-through procedure.* When instrument operation is authorized the standard instrument approach procedure, or the one authorized by the control tower if more than one procedure is specified for the airport, must be used for letting-down-through. The procedures and minimum altitudes of flights specified shall be strictly observed.

41.119 *Approach and landing limitations.*

(a) Except as provided in paragraphs (b) and (c) of this section, no instrument approach procedure shall be executed or landing made at an airport when the latest U.S. Weather Bureau weather report for that airport indicates the ceiling or visibility to be less than that prescribed by the Administrator for landing at such airport.

(b) An instrument approach procedure may be executed when the U.S. Weather Bureau weather report indicates that the ceiling or visibility is less than approved minimum for landing, if the airport is served by ILS and PAR in operative condition and both are used by the pilot, and thereafter a landing may be made, if weather conditions equal to or better than the prescribed minimums are found to exist by the pilot in command upon reaching the authorized landing minimum altitude.

(c) If an instrument approach procedure is initiated when the current U.S. Weather Bureau report indicates that the prescribed ceiling and visibility minimums exist and a later weather report indicating below minimum conditions is received after the airplane (1) is on an ILS final approach and has passed the outer marker, or (2) is on a final approach using a radio range station or comparable facility and has passed the appropriate facility and has reached the authorized landing minimum altitude, or (3) is on GCA final approach and has been turned over to the final approach controller, such approach may be continued and a landing may be made in the event weather conditions equal to or better than the prescribed minimums for the airport are found to exist by the pilot in command of the flight upon reaching the authorized landing minimum altitude.

[(d) The ceiling and visibility landing minimums prescribed in the air carrier's operations specifications for regular, provisional, or refueling airports shall be increased by 100 feet ceiling and ½ mile visibility whenever the pilot in command has not served 100 hours as pilot in command in air carrier or commercial operations in the particular type of airplane being operated by him. The ceiling and visibility minimums need not be increased above those applicable to the airport when used as an alternate airport. The sliding scale, when authorized in the air carrier's operations specifications, shall not be applied until the pilot in command has served 100 hours as pilot in command in air carrier or commercial operations in the particular type of airplane being operated by him.

[(Amendment 41-37, published in 26 F.R. 3461, Apr. 22, 1961, effective May 23, 1961.)]

41.119-1 *Standard instrument approach procedures (FAA rules which apply to sec. 41.119).* Standard instrument approach procedures prescribed by the Administrator are published in Part 609 of Chapter II (i.e., Regulations of the Administrator) of this title.

(Published in 16 F.R. 7351, July 27, 1951, effective upon publication in the Federal Register.)

41.119-2 *Takeoff and landing weather minimums (FAA rules which apply to sec. 41.119).*

(a) *General.* The ceiling and visibility con-

tained in the main body of the latest weather report furnished by the U.S. Weather Bureau or a source approved by the Weather Bureau shall be used for instrument approach and landings or takeoff for all runways of an airport except as provided in paragraph (b).

(b) *Runway visibility.* Whenever the latest weather report furnished by the U.S. Weather Bureau or a source approved by the Weather Bureau, including an aural report from the control tower, contains a visibility value specified as runway visibility for a particular runway of an airport, such visibility shall be used for a straight-in approach and landing or take-off for that runway only.[10]

(Published in 20 F.R. 9039, December 9, 1955, effective December 15, 1955.)

[10] Information respecting the official runway visibility observations reported by the control tower operator may be obtained from the Office of the U.S. Weather Bureau for the airport concerned. Such office maintains a continuous graph recording of the runway visibility shown on the visibility meter in the control tower.

Miscellaneous Operations Rules

41.120 *Operations manual.*

(a) The air carrier shall prepare and maintain a manual for the use and guidance of operations personnel which contains full information necessary to guide flight and ground personnel in the conduct of flight operations and to inform such personnel regarding their duties and responsibilities. It must be in a form approved by the Administrator and furnished to all persons designated by the Administrator. All copies in the hands of company personnel must be kept up to date.

(b) Any changes issued by the Administrator shall be promptly incorporated in the manual. Other changes not inconsistent with any Federal regulation, the air carrier operating certificate, or safe operating practice may be made without the prior approval of the Administrator.

41.120–1 *Copies of operations manual (FAA rules which apply to sec. 41.120).* A copy of the operations manual shall be delivered to the Bureau of Flight Standards Inspector or Advisor assigned to the air carrier by the Administrator. Upon receipt of the copy of the manual, the Bureau of Flight Standards Inspector or Advisor will inform the air carrier if additional copies are required and the persons to whom they shall be delivered.

(Published in 19 F.R. 2442, April 27, 1954.)

41.120a *Airplane flight manual.*

(a) The air carrier shall keep current an approved Airplane Flight Manual for each type of transport category airplane which it operates.

(b) An approved Airplane Flight Manual or a manual complying with section 41.120 and containing information required for the Airplane Flight Manual shall be carried in each transport category airplane.

41.121 *Admission to flight deck.* **No persons, other than crew members, shall be admitted to the flight deck of an airplane except those authorized in paragraphs (a) and (b) of this section. For the purposes of this section, the Administrator shall determine what constitutes the flight deck.**

(a) FAA Bureau of Flight Standards Inspectors and authorized representatives of the Board while in the performance of official duties shall be admitted to the flight deck.

Note: **Nothing contained in this paragraph shall be construed as limiting the emergency authority of the pilot in command to exclude any person from the flight deck in the interest of safety.**

(b) The persons listed below may be admitted to the flight deck when authorized by the pilot in command:

(1) An employee of the Federal Government or of an air carrier or other aeronautical enterprise whose duties are such that his presence on the flight deck is necessary or advantageous to the conduct of safe air carrier operations, or

Note: **Federal employees who deal responsibly with matters relating to air carrier safety and such air car-**

rier's employees as pilots, dispatchers, meteorologists, communication operators, and mechanics whose efficiency would be increased by familiarity with flight conditions may be considered eligible under this requirement. Employees of traffic, sales, and other air carrier departments not directly related to flight operations cannot be considered eligible unless authorized under subparagraph (2) of this paragraph.

(2) Any other person specifically authorized by the air carrier management and the Administrator.

(c) All persons admitted to the flight deck shall have seats available for their use in the passenger compartment except:

(1) FAA Bureau of Flight Standards Inspectors or other authorized representatives of the Federal Aviation Agency or the Civil Aeronautics Board engaged in checking flight operations;

(2) Air traffic controllers who have been authorized by the Administrator to observe ATC procedures;

(3) Certificated airmen of the air carrier whose duties with the carrier require an airman certificate;

(4) Certificated airmen of another air carrier whose duties with such carrier require an airman certificate and who have

been authorized by the air carrier concerned to make specific trips over the route;

(5) Employees of the air carrier, whose functions are directly related to the conduct or planning of flight operations or the in-flight monitoring of aircraft equipment or operating procedures, but only when their presence in the cockpit is required in the furtherance of such functions and when specifically authorized in writing by a responsible supervisor in the operations department of the air carrier, who is listed in the Operations Manual as having such authority; and

(6) Technical representatives of the manufacturer of the airplane or its components whose functions are directly related to the in-flight monitoring of aircraft equipment or operating procedures, but only when their presence in the cockpit is required in the furtherance of such functions and only when specifically authorized in writing by the Administrator and by a responsible supervisor in the operations department of the air carrier, who is listed in the Operations Manual as having such authority.

41.121–1. *Admission to flight deck (FAA interpretations which apply to sec. 41.121).* The term "flight deck" as used in section 41.121 shall mean all of the area forward of the door or window required by Parts 4a and 4b of this subchapter to be located between the pilot compartment and the passenger compartment.

(Published in 15 F.R. 620, February 4, 1950, effective February 4, 1950, upon publication in the Federal Register; amended in 23 F.R. 2097, March 29, 1958, effective March 29, 1958.)

41.122 *Manipulation of controls.* No person other than a qualified pilot of the air carrier may manipulate the flight controls of an air carrier aircraft while in scheduled flight, except that at the discretion of the pilot in command such restriction will not apply to other pilots as follows:

(a) Authorized air carrier inspectors of the Administrator, or

(b) Properly qualified pilot personnel of another air carrier, if the pilot in command is at one set of controls.

41.123 *Smoking rules.* No smoking will be permitted in an aircraft:

(a) While on the ground or water,

(b) During take-offs and landings,

(c) In the berths of sleeper planes, or

(d) Elsewhere, unless suitable ash containers are provided.

41.124 *Passenger information signs.* Aircraft shall be equipped with the following signs so located as to be plainly visible to passengers:

(a) "No smoking" signs located in the cabin and in individual berths,

(b) "Fasten seat belt" signs located in cabin,

(c) "Use oxygen equipment" signs located in the cabin of aircraft not having pressurized cabins when operated at altitudes in excess of 12,000 feet above sea level for any period of time, unless a competent cabin attendant is provided to care for passengers.

41.125 *Marking door handles.* The latched and unlatched positions of door handles shall be plainly marked.

41.126 *Assignment of emergency evacuation functions for each crew member.* After May 31, 1956, each air carrier shall assign all necessary emergency functions for each crew member to perform in the event of circumstances requiring emergency evacuation. The air carrier shall show that functions so assigned are practicable of accomplishment. These functions shall be described in the air carrier manual.

41.127 *Briefing of passengers.* After May 31, 1956, each air carrier engaged in extended overwater operations shall assure that all passengers are briefed orally concerning the location and method of operation of life vests and emergency exits and the location of life rafts. The procedure to be followed in presenting this briefing shall be described in the air carrier manual. Such a briefing shall include a demonstration of the method of donning and inflating a life vest. Where the airplane proceeds directly over water after take-off, the briefing on location of the life vests and emergency exits shall be accomplished prior to take-off, and the remainder of the briefing shall be accom-

plished as soon thereafter as practicable. Where the airplane does not proceed directly over water after take-off, no part of the briefing need be accomplished prior to take-off but the entire briefing shall be accomplished prior to reaching the overwater portion of the flight.

41.128 ***Route operation proving flights.*** **Before passengers are carried on any new route or any extension of over 100 miles of a route previously authorized, the air carrier shall demonstrate ability to conduct a safe operation by making such flights over the route as the Administrator may require in the interest of safety.**

41.128–1 *Route proving flights (FAA rules which apply to sec. 41.128).*

(a) *Introduction.* The Administrator has the responsibility of determining when route proving flights are necessary. When an air carrier believes that actual route proving flights are not required by the regulations in this subchapter, its officials must submit to the Federal Aviation Agency office handling the air carrier's operating certificate, a written request for elimination of such flights. The Administration will undertake an investigation, during which consideration will be given to the nature of the operation to be conducted, and the personnel, equipment, and facilities involved. After investigation, the air carrier will be advised by the Administration that the proposed route modification is minor, and actual route proving flights are not essential to safety, or that actual route proving flights shall be required. (For example, a scheduled air carrier may have been granted a minor extension to an existing route, and the extension may be over an airway that is adequately implemented with conventional aids to air navigation. In many such instances, it might be obvious that the proposed operations could be conducted over such a route in accordance with existing safety standards, and in such cases the proving flights would serve no useful purpose.)

(b) *Purpose.* The purpose of route proving flights is to determine the air carrier's ability to conduct the proposed operation in compliance with applicable provisions of the regulations in this subchapter and in accordance with the minimum safety requirements of the Federal Aviation Agency. Such determination is predicated upon the adequacy of the facilities provided by, or available to, the air carrier, including, but not limited to, aircraft, airports, lighting facilities, maintenance facilities, communication and navigation facilities, fueling facilities, and ground and aircraft radio facilities, and upon the competency of the pilot, dispatcher, and other airmen or personnel.

(c) *Application.* At least 30 days prior to the scheduling of route proving flights, officials of the air carrier shall submit to the Federal Aviation Agency office handling its operations specifications, a written request for the assignment of Federal Aviation Agency personnel to observe the flights. This request must be accompanied by an original application and copies of pertinent proposed amendments to the operations specifications, and must include sufficient data pertaining to the route to satisfy the Administrator that the air carrier is prepared for the route proving flights. This will allow sufficient time for making any necessary additions or corrections, thus preventing delays or misunderstandings.

(d) *Conduct.* After the air carrier has made all the necessary preparations to conduct the route proving flights, duly designated representatives of the Civil Aeronautics Administration will be assigned to observe them. All route proving flights shall be undertaken exactly as the operator intends to operate in scheduled air transportation when carrying passengers, property, or mail, or any combination thereof. However, passengers who are not essential to conducting the proving flights must not be carried during such flights. Air carrier personnel assigned to conduct the route proving flights shall be regular crew members who, it is anticipated, will be assigned to the route.

(e) *Duration.* Route proving flights shall continue until the air carrier has demonstrated to the satisfaction of the Administrator that it is competent to conduct a safe operation over the entire route to be flown in air transportation.

(f) *Conclusion.* On completion of the route proving flights, a reasonable period of time will be required in order that the information gained

during the flights can be compiled by the field office and submitted, with recommendations regarding approval, to appropriate supervisory personnel of the Civil Aeronautics Administration.

(Published 18 F. R. 6753, October 24, 1953, effective December 1, 1953.)

41.129 *Aircraft proving tests.*

(a) A new type of air carrier aircraft shall have at least 100 hours of proving tests under the supervision of an authorized representative of the Administrator before authority for carrying passengers is issued. At least 50 hours of such tests shall be flown over authorized routes and shall include at least 10 hours of night operation.

(b) In a case of major changes on aircraft previously proved, or the use of the same aircraft on a substantially different operation, 50 hours of tests similar to those outlined in paragraph (a) of this section shall be required, of which at least 25 hours shall be flown over authorized routes, unless deviations are specifically authorized by the Administrator on the ground that the special circumstances of a particular case make a literal observance of the requirements of this paragraph unnecessary for safety.

(c) During the tests specified in paragraphs (a) and (b) of this section no person shall be carried other than those essential to the tests. Mail, express, and cargo may be carried at the discretion of the Administrator.

41.129–1 *Aircraft proving tests (FAA rules which apply to sec. 41.129).*

(a) *Purpose.* The purpose of aircraft proving tests is to determine the air carrier's ability to conduct the proposed operation in compliance with applicable provisions of the regulations in this subchapter and in accordance with the minimum safety requirements of the Federal Aviation Agency.

(b) *Application.* At least 30 days prior to the scheduling of aircraft proving tests, officials of the air carrier shall submit to the Federal Aviation Agency office handling its operations specifications, a written request for the assignment of Federal Aviation Agency personnel to observe the tests. The request must be accompanied by an original application and copies of pertinent proposed amendments to the operations specifications, and must include sufficient data pertaining to the aircraft to satisfy the Administrator that the air carrier is prepared for the aircraft proving tests. This will allow sufficient time for making any necessary additions or corrections, thus preventing delays or misunderstandings.

(c) *Conduct.* After the air carrier has made all the necessary preparations to conduct the aircraft proving tests, duly designated representatives of the Federal Aviation Agency will be assigned to observe them. Such portions of the aircraft proving tests as may be conducted under conditions of scheduled operation, shall be undertaken exactly as the operator intends to operate in scheduled air transportation when carrying passengers, property, or mail, or any combination thereof. Air carrier personnel assigned to conduct the aircraft proving tests shall be regular crew members who, it is anticipated, will be assigned to the aircraft.

(d) *Conclusion.* On completion of the aircraft proving tests, a reasonable period of time will be required in order that the information gained during the tests can be compiled by the field office and submitted, with recommendations regarding approval, to appropriate supervisory personnel of the Federal Aviation Agency.

(Published in 18 F. R. 6753, October 24, 1953, effective December 1, 1953.)

[41.30 *Mechanical reliability reports.*

[(a) Each air carrier shall report the occurrence or detection of those failures, malfunctions, or defects specified in paragraph (b) of this section. In addition, each air carrier shall report any other failure, malfunction, or defect which occurs or is detected at any time in an airplane or airplane component (including airplane systems, appliances, powerplants, and propellers) used by the air carrier, when, in the carrier's opinion, such failure, malfunction, or defect has endangered or may endanger the safe operation of an airplane used by the air carrier. The report shall be in written form covering

a period of 24 hours beginning at 0900 hours local time of each day and ending at 0900 hours local time the next day, and shall be submitted to the Federal Aviation Agency maintenance inspector assigned to the air carrier by 0900 hours local time of the following day: *Provided,* That reports which are due on Saturday or Sunday may be submitted on the following Monday and in case of legal holidays on the following workday.

[NOTE: Failures, malfunctions, or defects reported in accordance with the accident reporting provisions of Part 320 of the Regulations of the Civil Aeronautics Board need not be included.

[(b) The air carrier shall report each occurrence or detection of a failure, malfunction, or defect involving:

[(1) Fires during flight and whether the related fire-warning system functioned properly;

[(2) Fires during flight and whether the related fire-warning system did not function properly;

[(3) Fires during flight not protected by a related fire-warning system;

[(4) False fire warning during flight;

[(5) Engine exhaust systems which result during flight in damage to engine, adjacent structure, equipment, or components;

[(6) An airplane component which results during flight in the accumulation or circulation of smoke, vapor, or toxic or noxious fumes in the crew compartment or cabin;

[(7) Engine shutdown during flight due to engine flameout;

[(8) Engine shutdown during flight when external damage to the engine or to the airplane structure has occurred;

[(9) Engine shutdown during flight due to foreign object ingestion or icing;

[(10) Engine shutdown during flight of more than one engine on an airplane;

[(11) Propeller feathering system or ability of the system to control overspeeding during flight;

[(12) Fuel or fuel-dumping systems affecting fuel flow or causing hazardous leakage during flight;

[(13) Landing gear extension or retraction or opening or closing of landing-gear doors during flight;

[(14) Brake system components which result in loss of brake actuating force while the airplane is in motion on the ground;

[(15) Airplane structure which requires major repair;

[(16) Cracks, permanent deformation, or corrosion of airplane structure which exceed the maximum limits acceptable to the manufacturer or the Federal Aviation Agency; and

[(17) Airplane components or systems which result during flight in the taking of emergency actions; except that action taken to shutdown an engine need not be reported as an emergency under this provision.

[NOTE: Under the provisions of this paragraph, an airplane is in flight from the moment it leaves the surface of the earth on takeoff until it touches down at a place of landing.

[(c) Reports required by paragraph (a) of this section shall be transmitted in a manner and on a form convenient to the air carrier's system of communication and procedure, and shall include in the first daily report as much of the following information as is available:

[(1) Type and identification number of the airplane, name of the operator, date, flight number, and stage during which the incident occurred; e.g., preflight, takeoff, climb, cruise, descent, landing, inspection;

[(2) Emergency procedure effected; e.g., unscheduled landing, emergency descent;

[(3) Nature of condition; e.g., fire, structural failure;

[(4) Identification of part and system involved, including available information pertaining to type designation of the major component and time since overhaul;

[(5) Apparent cause of trouble; e.g., wear, crack, design deficiency, personnel error;

[(6) Disposition; e.g., repaired, replaced, airplane grounded, part sent to manufacturer; and

[(7) Brief narrative summary of other pertinent information necessary for more complete identification, determination of seriousness, and corrective action.

[(d) Reports required by paragraph (a) shall not be withheld pending accumulation of all information specified in paragraphs (b) and (c) of this section. When additional information is obtained relative to the incident, including any that may be furnished by the manufacturer or other outside agency, it shall be expeditiously submitted as a supplement to the first report, referencing the date and place of submission of such report.

[NOTE: The reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

[(Amendment 41-43, published in 27 F.R. 1244, Feb. 10, 1962, effective Mar. 12, 1962.)]

[*41.130a Mechanical interruption summary report.* Each air carrier shall submit regularly and promptly to the Administrator a summary report containing information on the following occurrences:

[(a) All interruptions to a scheduled flight, unscheduled changes of airplanes en route, and unscheduled stops and diversions from route which result from known or suspected mechanical difficulties or malfunctions that are not required to be included in mechanical reliability reports.

[(b) The number of engines removed prematurely because of mechanical trouble, listed by make and model of engine and the airplane type in which the engine was installed.

[(c) The number of propeller featherings in flight, listed by type of propeller and type of engine and the airplane on which the propeller is installed. Propeller featherings accomplished for training, demonstration, or flight check purposes need not be reported.

[NOTE: The reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

[(Amendment 41-43, published in 27 F.R. 1244, Feb. 10, 1962, effective Mar. 12, 1962.)]

41.131 *Irregularity report.* All airmen, including flight and ground personnel, shall immediately report to the operations manager any irregularity or hazard which in their opinion makes for unsafe operation. If such report is found to be justified, notice of the irregularity or hazard must be submitted to the Administrator at once.

41.132 *Communication priority.* Where a communications channel serves point-to-point contacts in addition to ground-to-plane, priority shall be given to plane-to-ground and ground-to-plane communications.

41.133 *Communication records.* Each air carrier shall maintain, and retain for a period of 30 days, records of radio contacts by or with pilots en route.

41.134 *Flight crew members at controls.* All required flight crew members when on flight deck duty shall remain at their respective stations while the airplane is taking off or landing, and while en route except when the absence of one such flight crew member is necessary for the performance of his duties in connection with the operation of the airplane. All flight crew members shall keep their seat belts fastened when at their respective stations.

41.135 *Drinking and serving of alcoholic beverages.*

(a) No person shall drink any alcoholic beverage aboard an air carrier aircraft unless such beverage has been served to him by the air carrier operating the aircraft.

(b) No air carrier shall serve any alcoholic beverage to any person aboard an air carrier aircraft if such person appears to be intoxicated.

(c) No air carrier shall permit any person to board an air carrier aircraft if such person appears to be intoxicated.

(d) An air carrier shall report to the Administrator within 5 days any incident in which a person aboard its aircraft refuses to comply with paragraph (a) of this section, or any disturbance caused by a person who appears to be intoxicated while aboard its aircraft.

(Amendment 41-31, published in 25 F.R. 169, Jan. 6, 1960, effective Mar. 10, 1960; Amendment 41-39, published in 26 F.R. 9907, Oct. 21, 1961, effective Nov. 21, 1961.)

[*41.136 Carriage of cargo in passenger compartments.* Cargo shall not be carried in the passenger compartment of an airplane except as provided in either paragraph (a) or (b) of this section.

[(a) Cargo carried aft of the foremost seated passengers shall be carried in an approved cargo bin. Approved cargo bins shall meet the requirements of subparagraphs (1) through (8) of this paragraph.

[(1) The bin shall be capable of withstanding the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed multiplied by a factor of 1.15. The combined weight of the bin and the maximum weight of cargo which may be carried in the bin shall be used to determine this strength.

[(2) The maximum weight of cargo which the bin is approved to carry and any instructions necessary to insure proper weight distribution within the bin shall be conspicuously marked on the bin.

[(3) The bin shall not impose any load on the floor or other structure of the airplane which exceeds the structural load limitations of such components.

[(4) The bin shall be attached to the seat tracks or to the floor structure of the airplane, and its attachments shall withstand the load factors and emergency landing conditions applicable to the passenger seats of the airplane in which the bin is installed multiplied by either the factor 1.15 or the seat attachment factor specified for the airplane, whichever is greater. The combined weight of the bin and the maximum weight of cargo which may be carried in the bin shall be used to determine this strength.

[(5) The bin shall not be installed in a position which restricts access to or use of any required emergency exit, or the use of the aisle in the passenger compartment.

[(6) The bin shall be fully enclosed and constructed of material which is at least flame resistant.

[(7) Suitable safeguards shall be provided within the bin to prevent the cargo from shifting under emergency landing conditions.

[(8) The bin shall not be installed in a position which obscures any passenger's view of the "seat belt" or "no smoking" sign, nor shall any required exit sign be blocked from view, unless an auxiliary sign or other approved means for proper notification of such passenger is provided.

[(b) Cargo carried forward of the foremost seated passengers shall be carried either in approved cargo bins as specified in paragraph (a) of this section, or in accordance with the following requirements:

[(1) It shall be properly secured by means of safety belts or other tiedowns having sufficient strength to eliminate the possibility of shifting under all normally anticipated flight and ground condtions;

[(2) It shall be packaged or covered in a manner to avoid possible injury to passengers;

[(3) It shall not impose any load on seats or the floor structure which exceeds the structural load limitation for those components;

[(4) It shall not be located in a position which restricts the access to or use of any required emergency or regular exit, or the use of the aisle in the passenger compartment; and

[(5) It shall not be located in a position which obscures any passenger's view of the "seat belt" or "no smoking" sign, nor shall any required exit sign be blocked from view, unless an auxiliary sign or other approved means for proper notification of such passenger is provided.

[(Amendment 41-40, published in 26 F.R. 11355, Dec. 1, 1961, effective Jan. 2, 1962; Amendment 41-41, published in 26 F.R. 12762, Dec. 30, 1961, effective Jan. 2, 1962; Amendment 41-42, published in 27 F.R. 650, Jan. 23, 1962, rescinded Amendment 41-40.)]

Definitions

41.137 *Definitions.* As used in this part, terms shall be defined as follows:

Alternate airport. An alternate airport is one listed in the clearance as a point to which a flight may be directed if, subsequent to departure, a landing at the point to which the flight is cleared becomes undesirable.

Broken clouds. The term "broken clouds" means a condition where more than 50 but less than 90 percent of the sky is covered by clouds.

Category. Category shall indicate a classification of aircraft such as airplane, helicopter, glider, etc.

Ceiling. The term "ceiling" means the height of the base of the lowest cloud layer reported as "broken clouds" or "overcast."

Check pilot. A check pilot is a pilot authorized by the Administrator to check pilots of the air carrier for familiarity with route procedures and for piloting technique.

Class. Class shall indicate a difference in basic design of aircraft within a category, such as single-engine land, multiengine sea, etc.

Contact operation. A contact operation is an operation conducted under contact flight rules as prescribed in Part 60 of this subchapter.

Crew member. Crew member means any individual assigned by an air carrier for the performance of duty on the aircraft other than as flight crew member during flight time.

Extended overwater operation. An extended overwater operation shall be considered an operation over water conducted at a distance in excess of 50 miles from the nearest shoreline.

Flight crew member. Flight crew member means a pilot, flight radio operator, flight engineer, or flight navigator assigned to duty on the aircraft during flight time.

Flight time. Flight time shall mean the total time from the moment the aircraft first moves under its own power for the purpose of flight until the moment it comes to rest at the end of the flight (block to block).

Instrument operation. An instrument operation is an operation conducted under instrument flight rules as prescribed in Part 60 of this subchapter.

Long distance operation. A long distance operation is one in which the time interval between stops is of sufficient duration to require that the dispatch be based entirely on forecasts of weather expected at the intended destination and alternates.

Pilot compartment. The term "pilot compartment" means that part of the aircraft designed for the use of the flight crew.

Pilot in command. Pilot in command shall mean the pilot responsible for the operation and safety of the aircraft during the time defined as flight time.

Point-of-no-return. The term "point-of-no-return" means that point at which the aircraft no longer has sufficient fuel, under existing conditions, to return to the point of departure or any alternate for that point.

Provisional airport. A provisional airport is an airport approved for the purpose of providing adequate service to a community when the regular airport serving that community is not available.

Refueling and holding airport. A refueling and holding airport is an airport approved as a point to which flights may be cleared for refueling.

Regular airport. A regular airport is an airport used as a regular stop on a route.

Route. A route is a path through the navigable airspace identified by an area on the surface of the earth, the boundaries of which are designated or approved by the Administrator.

Route segment. A route segment is a portion of a route, the boundaries of which are identified by:

(1) A continental or insular geographic location;

(2) A point at which some specialized aid to air navigation is located; or

(3) A point at which a definite radio fix is located.

Second in command. Second in command shall mean a pilot other than the pilot in

command who is designated by the air carrier to act as second in command of an aircraft.

Short distance operation. **A short distance operation is one which involves intermediate stops of sufficient frequency to permit the dispatch from each such stop to be based on spot weather reports or a combination of spot weather reports and forecasts.**

Type. **Type shall mean all aircraft of the same basic design including all modifications thereto except those modifications which result in a change in handling or flight characteristics.**

41.137–1 *Definitions; route segment (FAA interpretations which apply to sec. 41.137(q)).* The term "continental or insular geographic location" is a means for identifying a route segment where navigation can be accomplished by visual reference for the conduct of (a) day VFR operations, and (b) night VFR operations provided the geographic landmarks afford adequate visual reference during the hours of darkness.

The terms "a point at which some specialized aid to air navigation is located" and "a point at which a definite radio fix is located" are means for identifying a route segment where adequate navigational aids are available for day or night IFR operations.

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