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



April 1954

U. S. DEPARTMENT OF COMMERCE
Sinclair Weeks, Secretary
CIVIL AERONAUTICS ADMINISTRATION
F. B. Lee, Administrator

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



April 1954

Civil Aeronautics Manual 41

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Introductory Note

Civil Aeronautics Manual 41 contains in a consolidated form (1) the certification and operation rules for scheduled air carrier operations outside the continental limits of the United States adopted by the Civil Aeronautics Board and (2) the rules, policies, and interpretations issued by the Administrator in application to the various sections of the regulations.

CAA *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.

CAA *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.

CAA *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 Administration in determining compliance with the regulations.

The manual is arranged to show the number of each section of the regulations followed by the title of the particular section in italic letters. Any rules, policies, or interpretations follow the pertinent section of the regulations and are identified by consecutive dash numbers appended to the regulation section number with the title in bold type letters.

This manual includes and supersedes supplements number 1 through number 15 issued on or prior to October 28, 1952. Moreover, the contents of this manual supersede any contradictory material found in any Aviation Safety Release or like publication outstanding on the issuance date of 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.

"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 Territory 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. The Administrator shall promptly notify the Board of any deviations included in the air carrier operating certificates and the reasons therefor."

41.1–1 *Application for air carrier operating certificate (CAA rules which apply to section 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 of 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 CIVIL AERONAUTICS ADMINISTRATION, *Washington, D. C.*

In accordance with section 604 of the Civil Aeronautics Act of 1938, 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 CivilAeronautics Administration.

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 Civil Aeronautics Administration 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 2 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, L. F. 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 one 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, engine, 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)

41.1–2 *Amendment of air carrier operating certificate (CAA rules which apply to section 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, and deletion or

addition of aircraft 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, Civil Aeronautics Administration 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 fifteen (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.

41.1–3 *Preface pages to operations specifications (CAA policies which apply to section 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 Civil Aeronautics Administration.

41.1–4 *Ceiling and visibility minimums (CAA policies which apply to section 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 Civil Aeronautics Administration 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 minimums 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 minimums 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 ap-

proval, 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 one-half 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 mph, 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 mph but which can be safely maneuvered with a radius of turn of not more than one-half mile.

(ii) Aircraft having stall speeds of 75 mph or less will normally be authorized to operate into airports with ceiling minimums 100 feet lower and visibility minimums of one-half 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.

(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 mph, will be considered to be not less than 120 mph in still air, and the speed of the aircraft, having a stall speed of less than 75 mph, will be considered to be not less than 90 mph 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 one 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 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 respect, 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 seven (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 seven (7) to ten (10) miles from the airport, (ii) 700 feet and 2 miles when the facility is located from ten (10) to twelve (12) miles from the airport, and (iii) visual flight rules will be observed from the radio facility when such facility is more than twelve 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*

[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 localizer 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 seven (7) miles of the airport, and

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

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

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.[2]

(*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.[2]

(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 one-fourth 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

[2] The above specified approach lights may be the high-intensity slope line system, the regular neon bar approach light system, or other approved approach light system.

In the event that the length of runway available exceeds by 3,000 feet, the landing distance required by section 41.33 (a) and (b) of this subchapter (i. e. the Civil Air Regulations), and high intensity runway lights are installed and operative on the entire length of the runway, this extra length of runway may be substituted in lieu of the approach lights as a component of the ILS or GCA.

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 center line to a point of intersection with the established slope line, 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 let-down 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.

"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 (i. e. the Civil Air Regulations) and the Civil Aeronautics Act of 1938, as amended."

Passenger Operation Rules

Route Requirements

"41.10 *Airport spacing.* In the case of operations employing aircraft having 2 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 (CAA policies which apply to section 41.13 (a)).*

(a) *General.* The following policies will be applied by the Civil Aeronautics Administration 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.

"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 (i. e. the Civil Air Regulations) 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.

"(e) Operations which do not comply with the requirements of this part will be permitted to continue for the duration of the war and 12 months thereafter if the Administrator finds that such continuation is necessary to the maintenance of an established service and that it will create no undue hazard under the particular conditions existing.

"(f) 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:

"(1) Sections 4b.58 and 4b.447 (a) of this subchapter (i. e. the Civil Air Regulations).

"(2) At the first major fuselage overhaul subsequent to May 1, 1947, but in any case not later than November 1, 1948, sections 4b.442, 4b.445, 4b.447 (b), (c), (d), 4b.448 (b), and 4b.448 (c) of this subchapter (i. e. the Civil Air Regulations).

"NOTE: All references in this section to sections of part 4b are those sections in effect on October 1, 1949.

"(3) At the first major wing centersection overhaul subsequent to May 1, 1947, but in any case not later than November 1, 1948, sections 4b.478, 4b.484, 4b.503, 4b.516 through

4b.518, 4b.556, 4b.557, 4b.560, 4b.561, 4b.586 and 4b.621 through 4b.624, 4b.651 through 4b.655, 4b.661 (a) and (c), and 4b.662 through 4b.676 of this subchapter (i. e. the Civil Air Regulations).

"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 1 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 *First-aid and emergency equipment.* Each aircraft shall be equipped with a conveniently accessible first-aid kit adequate for the type of operation involved. Aircraft scheduled over routes requiring flights for long distances over uninhabited terrain must carry such additional emergency equipment as the Administrator designates for the particular operation involved.

All aircraft operated over water shall be equipped with life preservers or flotation devices readily available for each person aboard and with a Very pistol or equivalent signal equipment, except that this requirement will not apply when such operations consist only of landings, takeoffs, or flights for short distances over water and the Administrator finds in each case that such equipment is not necessary. In addition, all aircraft operated for long distances over water shall be equipped with a sufficient number of liferafts to accommodate adequately all occupants and such additional emergency equipment as may be required by the Administrator."

41.23–1 *First-aid kits (CAA policies which apply to section 41.23).* Each first-aid kit should be dust and moisture proof, 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.*[3]

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

"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 (i. e. the Civil Air Regulations), 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.

"41.24 *Supplemental oxygen.* 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: *Provided,* That upon application by an air carrier prior to March 1, 1950, the Administrator may authorize such air carrier to operate without

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

full compliance with the following requirements where the Administrator finds that the air carrier has made a diligent effort to meet such requirements by March 1, 1950, and that the air carrier has shown that it will comply with such requirements by a date certain. 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 (CAA interpretations which apply to section 41.24 (a) (1)).* 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.

41.24–2 *Oxygen requirements for standby crew members (CAA interpretations which apply to section 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.

41.24–3 *Operating instructions (CAA policies which apply to section 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.

41.24–4 *Oxygen requirements for jump seat occupant (CAA policies which apply to section 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.

41.24–5 *Oxygen requirements for infants-in-arms (CAA policies which apply to section 41.24 (b)).* Provisions should be made for administering oxygen to infants-in-arms and ad-

ditional 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.

41.24–6 *Oxygen requirements for clinical purposes (CAA policies which apply to section 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.

"41.24a *Supplemental oxygen requirements for pressurized cabin 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: *Provided,* That upon application by an air carrier prior to March 1, 1950, the Administrator may authorize such air carrier to operate without full compliance with such requirements where the Administrator finds that the air carrier has made a diligent effort to meet such requirements by March 1, 1950, and that the air carrier has shown that it will comply with such requirements by a date certain.

"(a) *For 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 2-hour supply of oxygen shall be provided for the flight crew members on flight deck duty. (The oxygen supply required by 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) *For 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 (CAA policies which apply to section 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 section 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.

41.24a–2 *Computation of supply for passengers in pressurized cabin aircraft (CAA policies which apply to section 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.

41.24a–3 *Oxygen requirements for clinical purposes (CAA policies which apply to section 41.240 (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.

41.24a–4 *Oxygen requirements for infants-in-arms (CAA policies which apply to 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.

"41.24b *Equipment standards.* 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 (i. e. the Civil Air Regulations): *Provided,* That where full compliance with such standards is found by the Administrator to be impractical, he may authorize such changes in these standards as he finds will provide an equiv-

alent level of safety: *And provided further,* That upon application by an air carrier prior to March 1, 1950, the Administrator may authorize such air carrier to operate without full compliance with such requirements where the Administrator finds that the air carrier has made a diligent effort to meet such requirements by March 1, 1950, and that the air carrier has shown that it will comply with such requirements by a date certain.

"NOTE: All references in this section to sections of Part 4b are those sections in effect on October 1, 1949.

"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 (CAA policies which apply to section 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 (i. e. the Civil Air Regulations).

41.24c-2 *Requirement of protective breathing equipment in nonpressurized cabin airplanes (CAA rules which apply to 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 (i. e. the Civil Air Regulations) and found to be less than 3 percent by volume (corrected to standard sea-level conditions).

"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:

"(a) One air-speed indicator and 1 sensitive type altimeter (contact operation); 2 air-speed indicators and 2 sensitive type altimeters (instrument operation),

"(b) One approved compass,

"(c) A tachometer for 1 engine, 1 fuel pressure gauge with warning indicator, 1 oil pressure gauge with warning indicator, and 1 oil temperature or cylinder temperature gauge for each engine,

"(d) A manifold pressure gauge for 1 engine,

"(e) In addition to fire-detecting and fire-extinguishing equipment necessitated as a result of compliance with section 41.20 (f) (2) and (3), a minimum of 2 hand fire extinguishers of an approved type with an approved extinguishing agent, 1 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 (f) (2).

"(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, 2 landing lights, 1 set of instrument lights, and 2 landing flares each rated for at least 3-minute duration (night operation),

"(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.

"(l) An electrically heated pitot tube serving each pilot's 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."

Limitations

"41.26 *Aircraft certification limitations.*

"(a) Aircraft certificated as a basic type after June 30, 1942, shall be certificated in accordance with part 4b of this subchapter (i. e. the Civil Air Regulations), or the transport category requirements of part 4a of this subchapter (i. e. the Civil Air Regulations), and shall meet the requirements of section 41.27 over each route to be flown.

"(b) Aircraft certificated as a basic type prior to June 30, 1942, shall either:

"(1) Retain their present airworthiness certification status and meet the requirements of 41.36 except that until July 1, 1954, these aircraft may be operated in accordance with such operating limitations as the Administrator finds will provide a safe relation between the performance of the aircraft and the dimensions of airports and terrain; or

"(2) Qualify by showing compliance with either the performance requirements contained in section 4a.737–T through 4a.750–T, or the requirements contained in Part 4b of this subchapter (i. e. the Civil Air Regulations), and when so qualified shall meet the requirements of section 41.27 over each route to be flown: *Provided,* That should any type be so qualified all aircraft of any one operator of the same or related types shall be similarly qualified and operated.

"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 (i. e. the Civil Air Regulations), or of sections 4a.737–T through 4a.750–T of this subchapter (i. e. the Civil Air Regulations), the provisions of sec-

tions 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 takeoff 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 takeoff shall not exceed the certificated maximum takeoff weight for the altitude of the airport from which the takeoff is made.

"(c) The weight at takeoff 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 takeoff runway limitations of the transport category operating rules, after taking into account the temperature operating correction factors required by sections 4a.749a–T or 4b.117 of this subchapter (i. e. the Civil Air Regulations), and set forth in the Airplane Flight Manual for the airplane.

"41.29 *Takeoff limitations to provide for engine failure.* Takeoff 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 (i. e. the Civil Air Regulations) and set forth in the airplane operating manual:

"(a) From any point on the takeoff 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 takeoff and attain a height of 50 feet, as indicated by the takeoff path data, before passing over the end of the takeoff area. Thereafter it must be possible to clear all obstacles either by at least 50 feet vertically, as shown by the takeoff 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 takeoff 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 takeoff surface. To allow for wind effect, takeoff data based on still air may be corrected by not more than 50 percent of the reported wind component along the takeoff path if opposite to the direction of takeoff, and shall be corrected by not less than 150 percent of the reported wind component if in the direction of takeoff.

"NOTE: All references in this section to sections of Part 4b of this subchapter (i. e. the Civil Air Regulations) are those sections in effect on October 1, 1949.

"41.30 *En route limitations.*

"(a) *All airplanes; all engines operating.* Airplanes shall be dispatched only at such takeoff 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 (i. e. the Civil Air Regulations))."

"(b) *All airplanes; one engine inoperative.* Airplanes shall be dispatched only at such takeoff 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 1 engine inoperative (as set forth in the Airplane Flight Manual) shall be, in feet per minute

$$\left(0.06-\frac{0.08}{N}\right)V_{s_0}^2,$$

where N is the number of engines installed and V_{s_0} is expressed in miles per hour, 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 for airplanes certificated under the performance requirements of Part 4a of this subchapter (i. e. the Civil Air Regulations) the above rate-of-climb value shall be 0.22 $V_{s_0}^2$ irrespective of the number of engines installed.

"(c) *Airplanes with 4 or more engines; 2 engines inoperative.* If from any point along the track flown, more than 90 minutes at 'all-engines-operating' cruising speed is required to reach an available landing area where the provisions of section 41.33 as modified by section 41.34 can be met at the airplane weight estimated to exist upon arrival there, an aircraft with 4 or more engines shall not be dispatched over such track unless its weight is such as to permit a rate of climb with 2 engines inoperative (as set forth in the airplane operating manual), in feet per minute, of 0.01 $V_{s_0}^2$ 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 to the landing area, or at 5,000 feet, whichever is higher; 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 (i. e. the Civil Air Regulations)). This specified rate of climb shall correspond to the airplane's weight attained at the moment of failure of the second engine (assumed to occur 90 minutes from time of departure), or to the weight which may be attained by dumping fuel at the moment of failure of the second engine, provided that sufficient fuel is retained aboard the airplane to reach a point 1,000 feet directly above 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 (i. e. the Civil Air Regulations), or section 4a.750–T of this subchapter (i. e. the Civil Air Regulations) 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 41.35 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 below, 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 below. 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 centerline coinciding with and prolonging the centerline of the runway, except that where there is a multiplicity of parallel runways or a large area continuously available for landing, the centerline 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 centerline 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 centerline 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 centerline 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 centerline thereafter.

"41.36 *Nontransport category airplane operating limitations.* In operating any nontransport category airplane in passenger service on or after July 1, 1954, 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. Prior to that date such airplanes shall be operated either in accordance with sections 41.36a through 41.36d or in accordance with such operating limitations as the Administrator determines will provide a safe relation between the performance of the airplanes and the airports to be used and the areas to be traversed. Performance data published or approved by the

Administrator for each such nontransport category airplane shall be used in determining compliance with the provision of sections 41.36a through 41.36d.

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

"(a) It may be assumed that takeoff 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 takeoff path if opposite to the direction of takeoff, and account shall be taken of not less than 150 percent of the reported wind component if in the direction of the takeoff;

"(c) Account shall be taken of the average runway gradient when the average gradient is greater than one-half 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 takeoff 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 takeoff 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 (i. e. the Civil Air Regulations). 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.

"41.42 *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 checklist.*

"(a) The air carrier shall provide for each type aircraft a cockpit checklist, approved by the Administrator, adapted to each operation in which the aircraft is to be utilized. An approved checklist 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 checklist shall include procedures prior to starting engines, prior to takeoff, prior to landing, and for powerplant emergencies."

41.44–1 *Air carrier cockpit checklist (CAA policies which apply to section 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 aircraft 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: [4]
- Brakes—set.

Electrical system:
- Battery switch—proper position.

PRIOR TO TAKEOFF

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

Fuel system: [4]
- Quantity—rechecked.
- Proper tank selection—rechecked.
- Mixtures—takeoff position.
- Fuel booster pumps—as required.
- Cross feeds—as required.

Hydraulic system: [4]
- Hydraulic pressures and quantity—checked.
- Brakes—checked.
- Hydraulic selector valves—checked.

Anti-icing and de-icing equipment.[4] Checked and set.

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

Power plants and propellers: [4]
- 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.
- 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.[4] Checked.

Flaps: [4]
- Wing flaps—takeoff position.
- Cowl flaps—takeoff position.

Controls: [4]
- Auto pilot—off.
- Trim tabs—set for takeoff.
- Gust locks—off.

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

Free and tested for through full limit of travel.

PRIOR TO LANDING

Fuel system: [5]
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: [5]
Hydraulic pressure—checked.
Brakes—checked and off.
Hydraulic selector valves—checked.
Anti-icing and de-icing equipment [5]—checked.
Power plants and propellers:
Propellers—as required.
Super chargers—as required.
Manual reverse pitch actuator or indicator[5]—checked.
Heaters [5]—checked.
Instruments:
Static and vacuum selectors—checked.
Altimeter—set.
Directional gyro—set.
Pressurization [5]—checked.
Controls:
Auto pilot—off.
Trim tabs—as desired.
Landing gear: [4]
Down and locked—checked.
Flaps: [5]
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.

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: *Provided*, That until June 1, 1946, any pilot may serve as

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

[5] Items thus marked should be doublechecked as prescribed in footnote 4: 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.

second in command in an aircraft requiring three or more pilots, if he holds at least a commercial pilot certificate and instrument rating and has 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.

"(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.

"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 (CAA rules which apply to sections 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.

"41.50 *Requirements for pilot route qualification.* The air carrier shall be responsible for insuring that each pilot is thoroughly qualified for the route over which he is to serve as pilot in command in scheduled air transportation. The qualifying procedure shall be established by the air carrier in the air carrier operations manual and shall include at least the following:

"(a) A written or oral examination on:

"(1) Weather conditions peculiar to the route,

"(2) Navigational facilities,

"(3) Instrument approach procedures,

"(4) Communication procedures,

"(5) Minimum safe flight levels,

"(6) Position reporting points,

"(7) Holding procedures, and

"(8) All other traffic control procedures for the route.

"(b) Familiarization with the terrain, obstructions, or congested areas and physical layout for the airport and approaches at each regular, provisional, refueling, and alternate airport approved for the route.

"(c) Flying through the letdown procedures at each regular, provisional, or refueling airport specified for use on the trip to which the pilot is or is to be assigned. Such letdown procedures should be made under visual flight conditions whenever possible. Compliance with this paragraph will not be required, provided the pilot makes his first entry into an airport under visual flight rules or is accompanied by a check pilot.

"(d) Demonstration of ability either under instrument flight rule conditions or on a synthetic instrument trainer to accomplish letdowns for all airports approved for the route.

"(e) Making at least 1 round trip or 2 one-way trips over the route with 1 of the carrier's check pilots. When, in the opinion of the check pilot, the pilot is qualified for the route, the check pilot shall so certify to the carrier, and this certification shall be made a matter of record by the carrier. Compliance with this paragraph will not be required when qualifying over extensions to, or modifications of, an existing route, provided the pilot makes his first flight under visual flight rules or is accompanied by a check pilot.

"41.51 *Maintenance of pilot route qualification.* A pilot in command shall not serve as such over a particular route unless he has either:

"(a) Made at least 1 one-way trip over the route as pilot in command or second in command within the preceding 12 calendar months, or

"(b) After an absence from the route of more than 12 consecutive months, requalified

in accordance with the appropriate provisions of section 41.50.

"41.52 *Maintenance of pilot technique.* If within any 90-day period a pilot in command or second in command has not made at least 3 takeoffs and landings in aircraft of a particular type, such person shall not thereafter serve as a pilot in command or second in command in aircraft of that type in scheduled air transportation without having made at least 3 takeoffs and landings in such aircraft with not less than one-half the maximum useful load. If he is to serve in air transportation at night at least 1 of the 3 takeoffs and landings specified above must have been made at night.

"41.53 *Periodic flight checks and instruction.* Each air carrier must provide a sufficient number of check pilots to insure that each pilot in command employed continues to meet the minimum requirements both with regard to route competency and technique. Each of these checks must be accomplished twice each year at intervals of not less than 4 months. Periodic instruction must be given all pilots. In the case of pilot in command, instruction must include the obtaining of optimum performance under simulated maximum authorized weight conditions with one engine inoperative and instrument approach procedures and landings under the same conditions in the type aircraft in which such pilots serve in scheduled air transportation. In the case of all pilots other than pilots in command, instruction must include familiarization with the operations manual, with the types of equipment used, and with the duties of a second in command."

41.53–1 *Failure to complete instrument competency check (CAA policies which apply to section 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.

41.53–2 *General standards (CAA policies which apply to section 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.

41.53–3 *Purpose of observing performance (CAA policies which apply to section 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 command 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.

41.53–4 *Aircraft used in flight check (CAA policies which apply to section 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 1 type of such aircraft, he should take his proficiency check in 1 of the larger and more complicated type of aircraft; or if only 1 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 1 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 1 make or model of such seaplanes, he should take his proficiency check in 1 of the larger and more complicated type of seaplane; or if only 1 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 1 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.

41.53–5 *Flight simulator (CAA policies which apply to section 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.

41.53–6 *Proficiency checks (CAA policies which apply to section 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 (1 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 1 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; to 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 pre-

determined 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.*[6]

(m) *Orientation.*[6]

(n) *Beam bracketing.*[6]

(o) *Cone identification.*[6]

(p) *Loop orientation.*[6]

(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) *Cross-wind landing.* A cross-wind landing should be performed when practicable. Traffic conditions and wind velocities will dictate whether a cross-wind 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

[6] 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.

time after the aircraft has passed the V_2 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.

(w) *Judgment.* The pilot should demonstrate judgment commensurate with experience required of a pilot in command of air carrier aircraft.

(x) *Emergency procedures.* The emergency procedures should be applicable to the type of aircraft being flown and in accordance with the emergency procedures prescribed by the air carrier. A record should be maintained in the pilot's file which will list the emergency procedures accomplished, date performed, and grade received.

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: *Provided,* That the Administrator is authorized, during the present war and until 6 months after the termination thereof, to permit the maximum of 100 hours to be exceeded to the extent necessary to complete a particular flight for military purposes.

"(e) A pilot shall not fly as a member of the crew more than 1,000 hours in any 12-month period: *Provided,* That this limitation will not be effective during the present war and until 6 months after the termination thereof, and that during this period the maximum flying hours permitted in any 12-month period will be controlled by the provisions of paragraph (d) of this section."

41.54–1 *Flight time limitations for a crew of 1 or 2 pilots; 1 month (CAA interpretations which apply to section 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.

41.54–2 *Flight time limitations for a crew of 1 or 2 pilots; 12-month period (CAA interpretations which apply to section 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.

"41.55 *Flight time limitations for aircraft having 2 pilots and 1 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: *Provided*, That the Administrator is authorized, during the present war and until 6 months after the termination thereof, to permit the above maximums of 120 or 300 hours to be exceeded to the extent necessary to complete a particular flight for military purposes.

"(d) A pilot shall not fly as a member of the flight crew more than 1,000 hours in any 12-month period: *Provided*, That this limitation will not be effective during the present war and until 6 months after the termination thereof and that during this period a maximum of 1,200 flying hours will be permitted.

"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 section 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 section 41.137 (q), 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 section 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 2 pilots and 1 additional flight crew member; 12-month period (CAA interpretations which apply to section 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.

"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: ***Provided,*** That this limitation will not be effective during the present war and until 6 months after the termination thereof, and that during this period a maximum of 1,200 flying hours will be permitted."

41.56–1 *Flight time limitations for a crew of three or more pilots and an additional flight crew member; 12-month period (CAA interpretations which apply to section 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.

"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.

"41.62 *Pilots at controls.* In the case of aircraft requiring 2 or more pilots, 2 pilots shall remain at the controls at all times while the aircraft is taking off, landing, and while en route, except when the absence of one is necessary in connection with his regular duties or when he is replaced by a person authorized under the provisions of section 41.121.

"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 (CAA interpretations which apply to section 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.

"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 herein 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 (CAA rules which apply to section 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 carrier 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–514–A 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–514–A 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.

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 (CAA rules which apply to section 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.

"41.69 *Certificate.* Effective November 15, 1947, each flight radio operator shall hold a valid flight radio operator certificate issued in accordance with the provisions of Part 33 of this subchapter (i. e. the Civil Air Regulations).

"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 1 flight radio operator, 1 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 (i. e. the Civil Air Regulations).

Flight Engineer

"41.73 *Flight engineer; when required.* After December 1, 1948, an airman holding a flight engineer certificate shall be required on all 4-engine aircraft certificated for more than 80,000 pounds maximum takeoff weight, and on all other 4-engine aircraft certificated for more than 30,000 pounds maximum takeoff 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 (CAA rules which apply to sections 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.

"41.74 *Certificate.* Effective November 15, 1947, each flight engineer shall hold a valid flight engineer certificate issed in accordance with the provisions of Part 35 of this subchapter (i. e. the Civil Air Regulations).

"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.

"41.76 *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 1 flight engineer, 1 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 (CAA rules which apply to section 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."

"41.81 *Flight time limitations.* 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 acordance with the provisions of Part 27 of this subchapter (i. e. the Civil Air Regulations).

"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 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, 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.

"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."

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. 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.

"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 2 hours at normal cruising consumption. An aircraft may be redispatched to re-

turn 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 2 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 and duplicate copies kept in the station file for at least 90 days.

"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.

"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 Takeoff 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 takeoff."

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 conditions 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 takeoffs 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 and instrument operation.* Except during takeoffs 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.

"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 on initial approach.* When making an initial approach to a radio station on instruments or on top of overcast, an aircraft shall not be operated below the initial approach altitude specified for such station until arrival over the station has been definitely established, except where a marker facility is available and a procedure for a straight-in approach is authorized.

"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 flight specified shall be strictly observed.

"41.119 *Approach and landing limitations.* 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: *Provided,* That, 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 aircraft (a) is on an ILS final approach and has passed the outer marker, or (b) 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 (c) is on CCA 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."

41.119–1 *Standard instrument approach procedures (CAA rules which apply to section 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.

41.119–2 *Takeoff and landing weather minimums (CAA rules which apply to section 41.119).*

(a) Whenever the latest weather report, furnished by the U. S. Weather Bureau or a source approved by the Weather Bureau contains a visibility value specified as a runway visibility for a particular runway of an airport, such visibility shall be used for straight-in instrument approach and landing or takeoff for that runway only. The terminal visibility as reported in the main body of such weather report shall be used for instrument approach and landing or takeoff for all other runways.

(b) The ceiling value reported in the main body of such weather report shall constitute the ceiling for both circling and straight-in instrument approach and landing or takeoff for all runways.

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 or Board. 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 (CAA rules which apply to section 41.120).* A copy of the operations manual shall be delivered to the Aviation Safety Agent or Advisor assigned to the air carrier by the Administrator. Upon receipt of the copy of the manual, the Aviation Safety Agent or Advisor will inform the air carrier if additional copies are required and the persons to whom they shall be delivered.

"41.121 *Admission to pilot compartment.*

"(a) No person except a member of the operating crew or an air carrier inspector of the Administrator may be admitted to the pilot compartment during flight unless his admission is approved by the pilot in command after he has identified himself as one of the following:

"(1) An employee of the Federal Government, of an air carrier, or other aeronautical enterprise whose duties are such that his presence in the compartment is necessary or advantageous to the conduct of safe air carrier operations or the improvement of the safety of such operations;

"NOTE: Federal employees who deal responsibly with matters relating to air carrier safety and such air carrier employees as pilots, dispatchers, meteorologists, communi-

cation operators, and mechanics whose efficiency would be increased by familiarity with flight conditions in the pilot compartment may be considered eligible for admission to the pilot compartment 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 section 41.121 (a) (2).

"(2) A person whose presence in such compartment has been specifically authorized by the management of the air carrier operating the aircraft and by the Administrator.

"(b) No person may occupy a seat in the pilot compartment or the companionway thereto unless such seat is securely attached to the structure of the aircraft and is provided with a safety belt which shall be kept fastened by the occupant throughout his occupancy of such seat.

"(c) Unless a seat is also available for his use in the passenger compartment, no person may be admitted to the pilot compartment during flight except:

"(1) Air carrier inspectors engaged in checking flight operations; and

"(2) Certificated airmen of the air carrier and certificated airmen of another air carrier who have been authorized by the air carrier concerned and the Administrator to make specific trips over the route.

"(d) An air carrier inspector of the Administrator must be admitted to the pilot compartment of an air carrier aircraft at any time while performing his official duty."

41.121–1 *Pilot's compartment (CAA interpretations which apply to section 41.121).* Sections 4a.509 and 4b.350 (e) of this subchapter (i. e. the Civil Air Regulations) provide that a door or an adequate openable window will be provided between the pilot compartment and the passenger compartment. The "pilot compartment", as used in section 41.121, will be regarded by the Administrator as all of that area forward of such door or window.

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 takeoffs 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 *Marking emergency exits.* Emergency exits shall be clearly marked as such with luminous paint in letters not less than three-fourths of an inch high, such markings to be located either on or immediately adjacent to the pertinent exits and readily visible to passengers. The location and method of operation of the handles shall be marked with luminous paint.

"41.127 *Use of emergency equipment.* The emergency equipment required by section 41.23 must be periodically inspected and tested in accordance with specifications issued by the Administrator. The crew of aircraft used in overwater flights shall be drilled periodically in "abandon ship" procedures. Passengers shall be acquainted

with the location of emergency exits, with emergency equipment provided for individual use, and with the procedure to be followed in the case of an emergency landing on the water.

"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 (CAA rules which apply to section 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 (i. e. the Civil Air Regulations), its officials must submit to the Civil Aeronautics Administration 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 (i. e. the Civil Air Regulations) and in accordance with the minimum safety requirements of the Civil Aeronautics Administration. 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 Civil Aeronautics Administration office handling its operations specifications, a written request for the assignment of Civil Aeronautics Administration 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.

"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 the preceding paragraph shall be required, of which at least 25 hours shall be flown over authorized routes.

"(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 (CAA rules which apply to section 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 (i. e. the Civil Air Regulations) and in accordance with the minimum safety requirements of the Civil Aeronautics Administration.

(b) *Application.* At least 30 days prior to the scheduling of aircraft proving tests, officials of the air carrier shall submit to the Civil Aeronautics Administration office handling its operations specifications, a written request for the assignment of Civil Aeronautics Administration 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 Civil Aeronautics Administration 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 Civil Aeronautics Administration.

"41.130 *Reports.* Each air carrier shall furnish the Administrator the following reports:

"(a) A monthly operations report shall be submitted on and in accordance with the form supplied or approved by the Administrator for the purpose not later than the 20th day of the next succeeding month.

"(b) A mechanical interruption report shall be submitted on the form supplied for the purpose not later than 10 days after the return of the aircraft to its operating base. Any partial or complete instrument or equipment mechanical failure which occurs during flight shall be reported. The records of such mechanical failure must be made available to any authorized representative of the Administrator or Board on request."

41.130–1 *Mechanical hazard and difficulty reports (CAA rules which apply to section 41.130).*

(a) *Daily mechanical reports.* Whenever a failure, malfunctioning, or other defect is detected in flight or on the ground in an aircraft or aircraft component which may reasonably be

expected by the air carrier to cause a serious hazard in the operation of any aircraft, notice thereof shall be transmitted through the air carrier's principal maintenance base to the aviation safety agent or adviser, maintenance, assigned to the air carrier.

NOTE: Failures, malfunctionings, or other defects required to be reported under this part comprise generally the following basic items:

Fire hazards.

Structural hazards.

Serious system or component malfunctioning or failure.

Unsafe procedures or conditions, and

Defects in design or quality of parts and materials found installed on aircraft or intended for such installation.

Such daily reports shall be required only where mechanical hazards have been detected; shall cover the 24-hour period from midnight to midnight of each day; and shall be transmitted to the assigned aviation safety agent or adviser, maintenance, before noon of the following working day, except that reports for Fridays, Saturdays, and Sundays may be submitted not later than noon of the following Mondays.

Such reports may be transmitted in a manner and on a form convenient to the air carrier's system of communications and procedures.

(1) *Guide for preparation of daily reports.* Whenever practicable, the following guide for each aircraft category should be used by the air carrier in the preparation of the daily reports:

(i) Category, "X" identification of aircraft, airline and trip number.

(ii) Emergency procedure effected (unscheduled landing, dumped fuel, etc.).

(iii) Nature of condition (fire, structural failure, etc.).

(iv) Identification of part and system involved.

(v) Apparent cause of trouble (wear, cracks, design, personnel error, etc.).

(vi) Disposition (repaired, replaced, aircraft grounded, etc.).

(vii) Brief narrative summary to supply any other pertinent data required for more complete identification, determination of seriousness, etc.

The daily reports should not be withheld pending presentation of all specific details pertaining to such items of information. As soon as the additional information is obtained it may be submitted as a supplement to the report.

(b) *Monthly report of mechanical difficulties.*

(1) *General.* The following procedures are to be utilized in compliance with the requirement of a monthly report of chronic mechanical difficulties.

(2) *Scope of report.* The monthly report of chronic mechanical difficulties will be compiled by the Civil Aeronautics Administration from information furnished daily by the scheduled air carriers to the assigned aviation safety agents or advisers. This report will include all aircraft occurrences due to known or suspected malfunctions or mechanical difficulties which result in an interruption to a scheduled flight or a change of aircraft. The information required for the report shall be furnished to the CAA in the form of a daily summary of such occurrences. Any mechanical malfunction or suspected malfunction occurring in flight or on the ground during scheduled operation which results in a change in the aircraft schedule, regardless of cause, shall be included in the summary. The daily summary of mechanical delays, which is prepared for internal use by the air carriers, will in almost all cases, contain the information necessary for this requirement. Submission of copies of this report will be satisfactory, provided it contains sufficient information as outlined below. In some cases it may be necessary to make slight modifications or add further information if this report is to be used. The daily submission of information for compilation of the monthly chronic report does not affect, in any way, the reporting of items covered under the Daily Mechanical Report.

The summary shall also include the number of engines removed prematurely because of mechanical trouble, listed by make and model, and the number of propeller featherings for any reason indicating the flight attitude at the time of feathering, such as takeoff, climb, cruise, etc. A statement of cause is not required with the numerical report of engine removals and propeller featherings.

(3) *Submission.* The period covered by each daily summary shall be for the preceding 24 hours during which reports of pertinent occurrences are received by the air carrier's main base. No daily summary will be submitted for those periods during which no interruptions to schedule were experienced; however, engine removal and propeller feathering data should be included in the next summary submitted. Each summary should be identified numerically to maintain continuity.

(4) *Format.* The daily summary shall include as much as possible of the following data that apply to the individual occurrences reported:

(i) Identification of the daily summary, including a consecutive serial number of the summary, name of operator, and date of occurrence of the items reported.

(ii) Type and CAA identification of aircraft to which each item pertains.

(iii) Brief statement describing or identifying the difficulty experienced. This statement shall identify the parts and system involved and any available related information, where possible, which can reasonably be expected to add to the value of the report from an informative or analytic standpoint. Desirable information would include, where possible, such items as corrective action, extraordinary conditions, whether or not difficulty was induced by personnel error or other extraneous occurrence, and recommendations.

"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 *Flight records.* The air carrier shall maintain and make available to any authorized representative of the Administrator or Board, for not less than 1 year from the date of flight, the records pertaining to any flight which was interrupted because of weather conditions and failed to land at the point to which it was originally cleared. Such records shall include the flight plan, flight log, clearance, and any other data necessary to complete the record of the operation."

Definitions

"41.137 *Definitions.*

"(a) *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.

"(b) *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.

"(c) *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.

"(d) *Regular airport.* A regular airport is an airport used as a regular stop on a route.

"(e) *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.

"(f) *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.

"(g) *Refueling and holding airport.* A refueling and holding airport is an airport approved as a point to which flights may be cleared for refueling.

"(h) *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.

"(i) *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.

"(j) *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.

"(k) *Contact operation.* A contact operation is an operation conducted under contact flight rules as prescribed in Part 60 of this subchapter (i. e. the Civil Air Regulations).

"(l) *Instrument operation.* An instrument operation is an operation conducted under instrument flight rules as prescribed in Part 60 of this subchapter (i. e. the Civil Air Regulations).

"(m) *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.

"(n) *Pilot compartment.* The term 'pilot compartment' means that part of the aircraft designed for the use of the flight crew.

"(o) *Ceiling.* The term 'ceiling', as used in this part, means the height of the base of the lowest cloud layer reported as 'broken clouds' or 'overcast.'

"(p) *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.

"(q) *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.

"(r) *Category.* Category shall indicate a classification of aircraft such as airplane, helicopter, glider, etc.

"(s) *Class.* Class shall indicate a difference in basic design of aircraft within a category, such as single-engine land, multiengine sea, etc.

"(t) *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.

"(u) *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).

"(v) *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.

"(w) *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 (CAA interpretations which apply to section 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 land marks 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.

Appendix A

Special Civil Air Regulations

Appendix A is reserved for inclusion of those Special Civil Air Regulations issued by the Civil Aeronautics Board in application to this part. The special regulations listed below, as well as copies of subsequent issues of such regulations, may be obtained from the Publications Section, Civil Aeronautics Board, Washington 25, D. C. It is suggested that this listing of special regulations be maintained current by recording all changes and new issues.

Number	Supersedes	Effective date	Termination date
SR–356	----------	12/20/50	12/31/53
SR–368	SR–350	8/1/51	8/1/54
SR–375	SR–377	10/23/51	10/25/53
SR–380	SR–362	3/1/52	4/1/55
SR–385A	SR–385	8/1/53	11/1/53
SR–385B	----------	11/1/53	2/1/54
SR–386A	SR–386	9/19/53	9/19/54
SR–389	SR–387	10/27/52	Indefinite.
SR–391	SR–379 (suspended)	4/1/53	Indefinite.
SR–391A	----------	5/1/53	Indefinite.
SR–391B	----------	3/31/53	Indefinite.
SR–392	SR–390	5/16/53	6/30/55
SR–394	----------	5/25/53	5/25/54
SR–395	SR–378	6/1/53	2/20/55

AVIATION INFORMATION

U. S. GOVERNMENT PRINTING OFFICE: 1954