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Civil Aeronautics Manual 41

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

Revised February 1956

U. S. DEPARTMENT OF COMMERCE
Sinclair Weeks, Secretary
Louis S. Rothschild, Under Secretary for Transportation

CIVIL AERONAUTICS ADMINISTRATION
Charles J. Lowen, Administrator

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



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Civil Aeronautics Manual 41

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Introductory Note

Civil Aeronautics Manual 41 contains the rules, policies, and interpretations issued by the Administrator in application to the various sections of Part 41, Certification and Operations Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States, adopted by the Civil Aeronautics Board.

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.

Rules, policies, or interpretations are identified by consecutive dash numbers appended to the regulation section number.

This manual supersedes Civil Aeronautics Manual 41 dated April 1954, and Supplements 1 and 2 to that manual.

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

Certificate

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

(a) *General.*

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

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

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

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

APPLICATION FOR AIR CARRIER OPERATING CERTIFICATE

(Outline)

TO: The 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 weaether reporting services considered essential should be made coincidental with this application to the Civil Aeronautics 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 two certified copies of operating agreement.) List the following details for each station:

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

1. Make and model number.
2. Remotely or locally controlled.
3. Types of emission and antenna power for each type of emission.
4. Number of frequency channels provided and actual frequencies in kilocycles proposed to be used.
5. Method of frequency change (quick shift or manual tuning).
6. Primary power source, voltage, phase, etc., and whether commercial source or locally generated.
7. Auxiliary power source.
8. Functional purpose of transmitter. If transmitter is used for more than one function, list in order of primary and secondary functions as:

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

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

Receivers.

1. List each receiver by type or model number and state its primary function, i. e., plane-to-ground guard, point-to-point C. W. or point-to-point radiotelephony.
2. List frequency range of each receiver and state which frequencies in each receiver are crystal controlled, if any.
3. Describe receiver installation to show number of receivers locally controlled and number remotely controlled.

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

1. Type of facility, i. e., ILS, GCA, Non-Directional Radio Beacon, LF Radio Range, VAR, VOR, Loran, etc.
2. Estimated effective range (in miles).
3. Coordinates and location with respect to field or landing area.
4. Power supply; i. e., commercial or locally generated.
5. Auxiliary power supply.
6. Operating frequency or frequencies.

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

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

SECTION V. *Weather minimums.*

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

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

SECTION VI. *Aircraft.*

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

1. The name of the manufacturer.
2. Certification basis and category.
3. Manufacturer's model number.
4. Name of the manufacturer and type number of engines.
5. Name of manufacturer and type number of propellers.
6. N registration number and aircraft designation.
7. Type of service in which aircraft will be used (carriage of persons, property, mail, or combination thereof).
8. Will aircraft be used in regular or reserve service?
9. What type of operation (day, night, visual flight rules, instrument, over-the-top) will be conducted with this aircraft?
10. List each route or portion thereof over which this aircraft is to be operated and the maximum gross weight proposed for each route or portion thereof.
11. What is the service ceiling of each type aircraft with one engine inoperative?
12. List and describe installation and location of all lifesaving equipment and emergency supplies carried aboard each aircraft, such as life rafts, life preservers, portable emergency transmitters, Very pistols, and emergency rations. (If the same equipment is not carried during all seasons of the year, and on all routes, list and explain the difference.)

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

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

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

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

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

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

1. Disassembly and overhaul of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).

2. Periodic inspection and check of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).

3. Routine inspection of aircraft components, engines, propellers, instruments, and accessories (aircraft and engine).

4. En route replacements at intermediate and overnight stops.

5. Refueling.

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

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

1. Aircraft (list quantity, make, and model).

2. Engines (list quantity, make, and model).

3. Propellers (list quantity, make, and model).

4. Instruments (list quantity, make, and model).

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

1. Number, type (elevated or underground), and capacity of each fuel and oil storage tank.

2. List octane ratings of fuels available.

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

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

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

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

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

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

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

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

1. Hangars:

a. Number.

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

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

d. Dimensions of hangar doors.

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

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

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

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

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

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

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

3. Equipment replacement at intermediate and overnight stops.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SECTION X. *Additional data.*

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

Each application shall be concluded with a statement as follows:

I certify that the above statements are true.

Signed this _____ day of _____ 19 _____.

_____
(Name of applicant)

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

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

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

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

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

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

(d) Amendments to the air carrier operating certificate and the operations specifications are usually initiated by the air carrier. However, if the Administrator considers that the need for an amendment is essential for safe operations, and no application has been received from the air carrier, 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 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.

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

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

(a) *General.* The ceiling and visibility minimums authorized by the Administrator for operations into or from airports will be included in the operations specifications issued to the air carrier. The policies set forth in paragraphs (b) and (c) will be used by the 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 minimum lower than 300–1 and as low as 200–½ may be approved when the air carrier is authorized landing minimums lower than 300–1 through utilization of the ILS or GCA facilities serving the airport, provided such takeoff minimum will not be less than the straight-in landing minimums approved for the particular airport and conditions are such that a straight-in ILS or GCA approach can be executed in accordance with the limitations set forth in the air carrier operating certificate.

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

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

are on and in normal operation in order to insure that the pilot has adequate visual reference to the line of forward motion during the takeoff run.

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

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

(1) *Regular approach.* Where it is necessary to circle or maneuver to effect a landing, aircraft with higher maneuvering, approach, and landing speeds shall be operated with higher landing minimums than slower type aircraft. To effect this principle, the stall speed as established in the Airplane Flight Manual at maximum certificated landing weight with full flaps, landing gear extended, and power off will be used to differentiate between the two types of aircraft. Regular approach minimums are generally the same for all instrument approach procedures without regard to the type of radio navigational facility serving the particular airport, and will be established in accordance with the following policy:

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

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

(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

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

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

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

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

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

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

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

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

(i) *Components of an ILS.*

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

[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, 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.

lance 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 ¼-mile visibility from the straight-in minimums which could be authorized at a particular airport for a radio range or comparable facility procedure, as set forth in this section. The first reduction of minimums by these increments will be based on satisfactory demonstration of ability by the air carrier as outlined under subdivision (iii) of this subparagraph. Subsequent reduction in minimums will be based on satisfactory operation by the air carrier at the authorized minimums for an approximate period of 6 months using the particular facilities, unless it is deemed necessary for an air carrier to demonstrate ability either as specified in subdivision (iii) (*c*) of this subparagraph or under actual instrument conditions. The pattern of reduction in minimums is illustrated as follows: When present straight-in approach minimums are 400–1 the initial minimums for ILS or GCA will be 300–¾ and at the end of an approximate 6-month period of satisfactory operation using the particular facilities, the next reduction would be to 200–½.

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

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

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

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

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

[2] (See footnote on page 9.)

flight checks that the lower ceiling may be authorized.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(b) *Procedure for establishing new or revised time limitations.* Time limitations may be established in terms of hours of operation, multiples of engine overhaul periods, or multiples of inspection periods. Time limitations for components on which deterioration is not necessarily a function of operating hours, such as electronic units, pitot tubes, and emergency flotation equipment, may be established in terms of calendar months. Certain items may be maintained on an on-condition overhaul basis.

On-condition overhaul is applicable to components on which a determination of airworthiness may be made by visual inspection, measurements, tests, or other means without a teardown inspection or overhaul.

(c) *Airframe—initial time limitations.* The initial time limitations for overhauls, inspections, or checks of airframe may be established on a recurrent fixed time basis or by adoption of a structural inspection specification covering procedures such as pattern inspections, block overhauls, or progressive inspections. Regardless of the basis upon which the time

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

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

limitations are established, the same basic standards will be applicable. The maintenance program must specify checks, inspections, and overhauls to be performed and times at which they will be performed.

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

(e) *Powerplants—initial time limitations.* The initial overhaul time limitations for any engine which has never been used in air carrier service will tentatively be established at 1,000 hours. However, the operations specifications will require sample overhaul of a representative number of engines, but not less than three, to be accomplished at each increment of 100 hours, beginning at 800 hours, unless such new model engine incorporates certain unconventional features not previously employed in air carrier operations, in which case, the initial overhaul period will be established by the Administrator. Satisfactory teardown inspection will be necessary before increasing the fleet overhaul period to the next higher increment. This sample overhaul procedure and evaluation of service experience will provide the operator with necessary information to substantiate the basic 1,000-hour overhaul.

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

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

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

(2) *Powerplants and associated mechanical appliances—revision of time limitations.* Increases in engine overhaul periods will not be approved in increments greater than 100 hours.

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

(3) *Appliances, general—revision of time limitations.* Increases in established times for inspections, bench tests, or overhaul periods will be based on consideration of the following factors: (i) Geographical area or areas of operation; (ii) number of landings, long haul versus short haul; (iii) maintenance organization and inspection procedures; (iv) manufacturers' recommendations; (v) service history, particularly of known or evident trends toward malfunctioning. When electrical/electronic appliances are overhauled on an on-condition basis, special consideration will be given to the continued airworthiness of mechanical components of such equipment.

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

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

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

When coded identifications or titles, such as "operation #1, #2, #3, etc." or "line check, intermediate check, base inspection, etc.," are used in connection with specified time limitations in the operations specifications, a brief

description of such terms will be included which identifies the operation concerned.

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

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

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

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Passenger Operation Rules

Route Requirements

41.13–1 *Day over-the-top short distance operation (CAA policies which apply to sec. 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, enroute operations are restricted to day flight, providing 3-mile visibility or better exists, because of the characteristics of the terrain, the operating limits of the aircraft being used, or the en route navigational facilities. On some of the routes so restricted, the terminals and/or intermediate stops are equipped with adequate instrument approach facilities, and instrument departures and approaches have been or can be authorized.

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

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

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

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

(4) All arrivals at and departures from the terminals and/or intermediate stops will be made during the hours of daylight, except

where otherwise provided in the operations specifications of the air carrier.

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

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

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

Instruments and Equipment

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

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

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

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

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

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

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

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

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

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

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

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

flight, they must be considered as passengers with regard to supplemental oxygen.

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

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

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

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

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

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

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

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

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

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

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

(1) The supply of oxygen which should be provided for all crew members for the duration of the flight should be computed on the basis of the cabin pressure altitude which would exist after cabin depressurization has occurred and the aircraft has descended to the altitude which would permit safe flight with respect to terrain clearance. (See sec. 41.24a (c).)

(2) The operator may use the supply furnished for protective breathing purposes for compliance with the 2-hour requirement for supplementary breathing oxygen. For example, the 300 liter STPD supply per flight crew member, which is the protective breathing supply when demand (or diluter-demand) systems are used, will provide a 2-hour supplementary

breathing supply for one flight crew member at 20,000 feet, so that both the minimum 2-hour supplementary breathing requirement and the protective breathing requirement would be fulfilled under most emergency conditions resulting from loss of cabin pressure or from contamination of cabin air with smoke or poisonous gases.

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

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

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

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

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

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

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

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

(b) *Cabin altitudes greater than 10,000 feet.* When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude greater than 10,000 feet, the following policies should be considered: When the cabin pressure altitude is above 10,000 feet to and including 14,000 feet, sufficient oxygen shall be provided for 10 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 14,000 feet to and including 15,000 feet, sufficient oxygen shall be provided for 30 percent of the number of passengers for the duration of flight between such cabin pressure altitudes. When the cabin pressure altitude is above 15,000 feet, sufficient oxygen shall be provided for each passenger for the duration of flight above such a cabin pressure altitude. In addi-

tion to the above supply of oxygen, in order to provide for loss of cabin pressure, the supplementary oxygen required by whatever portions of section 41.24a (b) are applicable, shall be provided except that in no case will it be necessary to furnish a supply of oxygen in excess of that necessary to supply oxygen to 100 percent of the passengers for the maximum possible duration of flight at the maximum cabin altitude which could be attained under either of the normal operating or emergency conditions whichever is greater.

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

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

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

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

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

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

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

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

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

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

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

Maintenance

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

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

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

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

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

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

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

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

(iii) Crew and baggage.

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

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

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

(vii) Other equipment, variable for flights.

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

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

(i) Normal oil quantity.

(ii) Antidetonant injector and deicing (winter) fluids.

(iii) Crew and baggage.

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

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

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

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

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

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

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

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

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

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

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

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

(4) *Periodic weighing—aircraft using individual weights.* Aircraft operated under a loading schedule utilizing individual aircraft weights in computing the gross weight will be weighed at intervals of 24 calendar months. An air carrier may, however, apply for extension of this weighing period for a particular model aircraft, when pertinent records and actual routine weighing during the preceding 24 months of air carrier operation show that weight and balance records maintained are sufficiently accurate to indicate aircraft weights within the established limitations. Such ap-

plication should be limited to increases in increments of 12 months and will be substantiated in each instance with at least two aircraft weighings. Increases may not be granted which exceed a time which is equivalent to the aircraft overhaul period.

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

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

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

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

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

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

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

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

(3) *Nonstandard weight groups of passengers.* The average passenger weight method will not be used in the case of flights carrying large groups of passengers whose average weight obviously does not conform with the normal standard weight. Actual weights will be used when a passenger load consists to a large extent of athletic squads or other special group which is smaller or larger than the U. S. average. Where such a group forms only a part of the total passenger load, the actual weights may be used for such group and average weights used for the balance of the passenger load. In such instances, a notation will be made on the load manifest, indicating number of persons in

the special group and identifying the group (i. e. football squad, Blank Nationals, etc.).

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

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

(2) All other crew members 170 pounds.

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

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

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

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

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

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

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

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

(Published in 19 F. R. 7342, November 13, 1954; amended in 20 F. R. 3675, May 26, 1955, effective upon publication in the Federal Register.)

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

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

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

The checklist provided by an air carrier should include all applicable items but should not necessarily be limited thereto.

PRIOR TO STARTING ENGINE

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

Hydraulic system:[7]
- Brakes—set.

Electrical system:
- Battery switch—proper position.

PRIOR TO TAKEOFF

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

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

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

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

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

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

Heaters. Checked and set.

Instruments—Engine:
- Oil—quantity, temperature and pressure—normal for takeoff.
- Fuel pressure—normal for takeoff.
- Carburetor—temperature—normal for takeoff.
- Cylinder head—temperature—checked.

Instruments—flight:
- Static and vacuum selectors—checked.
- Directional gyro—set.
- Altimeter—set.
- Horizon—uncaged.
- Turn and bank—checked.
- Clock—set.

Pressurization.[7] Checked.

Flaps:[7]
- Wing flaps—takeoff position.
- Cowl flaps—takeoff position.

Controls:[7]
- Auto pilot—off.
- Trim tabs—set for takeoff.
- Gust locks—off.
- Free and tested for through full limit of travel.

PRIOR TO LANDING

Fuel system:[8]
- Proper tank selection—checked.
- Mixtures—landing position.
- Fuel booster pumps—as required.
- Cross feeds—as required.

Weight and balance:
- Maximum landing gross weight—checked.

Hydraulic system:[8]
- Hydraulic pressure—checked.
- Brakes—checked and off.
- Hydraulic selector valves—checked.

Anti-icing and de-icing equipment[8]—checked.

Power plants and propellers:
- Propellers—as required.
- Super chargers—as required.
- Manual reverse pitch actuator or indicator[8]—checked.

Heaters[8]—checked.

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

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

Instruments:
Static and vacuum selectors—checked.
Altimeter—set.
Directional gyro—set.
Pressurization [8]—checked.
Controls:
Auto pilot—off.
Trim tabs—as desired.
Landing gear: [7]
Down and locked—checked.
Flaps: [8]
Wing flaps—as desired.
Cowl flaps—as desired.

POWERPLANT EMERGENCIES

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

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

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

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

Airman Rules

Pilot

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

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

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

41.53–2 *General standards (CAA policies which apply to sec. 41.53).* Section 41.53–6 prescribes the minimum checks which should be given by an air carrier in determining the proficiency of a pilot-in-command. The air carrier may undertake these checks in any order or arrangement that will achieve complete coverage of the proficiency check in a minimum amount of flight time. Where demonstrated

performance is unsatisfactory, additional training may be given during the check or later, and the unsatisfactory item rechecked during the check or later for satisfactory performance. The extent of this additional training should depend on the applicant's satisfactory flight proficiency demonstrated in other phases of the check which, in the opinion of the check pilot, would warrant such additional training. In addition, the air carrier should, where a particular type or condition of operation prevails, add to the checks listed in section 41.53–6.

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

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

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

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

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

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

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

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

imum speed), approach procedures, handling under regular approach conditions, and takeoff and landings, with engine failures as outlined in section 41.53–6 (g), (q), (u), and (v), respectively.

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

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

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

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

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

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

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

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

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

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

(g) *Maneuvers (minimum speeds).* Maneuvers at minimum speed should be accomplished while using the prescribed flap settings as set forth in the Airplane Flight Manual. In addition, attention should be directed to air-

plane performance as related to use of flaps versus clean configuration while operating at minimum speeds. Attention should be directed towards the pilot's ability to recognize and hold minimum controllable airspeed to maintain altitude and heading, and to avoid unintentional approaches to stalls.

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

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

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

(k) *Rapid descent and pullout.* This maneuver should consist of the following steps: While the aircraft is under the normal approach configuration and being flown at a predetermined altitude, it will be assumed that the aircraft has arrived at a navigational fix and is cleared to descend immediately to a lower altitude. (The lower altitude should be one which permits a descent of at least 1,000 feet.) Upon reaching the lower altitude, the aircraft should be recovered from the rapid descent and flown on a predetermined heading and altitude for a predetermined period of time. At the end of the time interval, an emergency pullout should be executed which will involve a change of direction of at least 180°. Performance should be judged on the basis of ability to establish a rapid descent at constant airspeed, stopping the descent at the minimum altitude specified without going below it, holding heading and altitude, and smooth pullup and climb.

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

(m) *Orientation.*[9]

(n) *Beam bracketing.*[9]

(o) *Cone identification.*[9]

(p) *Loop orientation.*[9]

(q) *Approach procedures.* An approach procedure should be made in the aircraft on the letdown aid for which the lowest minimums on a systemwide basis are authorized and include, where possible, holding patterns and air traffic control instructions which might be used by the pilot in day-to-day operations. If at the time of the proficiency flight the letdown aid affording the lowest minimums is not in operation at the point the check is given, the landing aid which affords the next lowest minimums on a systemwide basis should be used. Where a particular air carrier is authorized landing minimums based on instrument landing systems and ground control approach, the predominate landing aid on a systemwide basis should be utilized. In some cases a particular air carrier may be authorized its lowest landing minimums on a

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

letdown aid which is not installed and operating at locations where the air carrier's pilots are based. In this case the air carrier should conduct the proficiency flights at locations where such an aid is installed and operating. All other approaches for which a particular operator may be authorized to use, such as ADF, LF/MR range, VOR, and VAR should be made and may be conducted in a simulator or other approved type trainer. A record should be maintained in the pilot's file which will indicate the date that these approaches were performed and the grade received. If these approaches (ADF, LF/MR range, VOR, and VAR) are not performed in a simulator or other approved type trainer, they should be accomplished on the proficiency flight.

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

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

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

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

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

(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.

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

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

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

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

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

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41.56–1 *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 sec. 41.56 (d)).* The term "in any 12-month period" as used in section 41.56 (d) is interpreted as meaning any 12 consecutive months computed as any given day of any month to the day of the corresponding number of the same named month of the following or previous year.

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

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

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

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

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

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

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

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

Flight Radio Operator

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

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

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

Flight Engineer

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

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

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

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

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

Flight Navigator

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

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

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

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

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

Flight Operation Rules

Instrument Approach and Landing Rules

41.119–1 *Standard instrument approach procedures (CAA rules which apply to sec. 41.119).* Standard instrument approach procedures prescribed by the Administrator are published in Part 609 of Chapter II (i. e., Regulations of the Administrator) of this title.

(Published in 16 F. R. 7351, July 27, 1951, effective upon publication in the Federal Register.)

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

(a) *General.* The ceiling and visibility con-

tained in the main body of the latest weather report furnished by the U. S. Weather Bureau or a source approved by the Weather Bureau shall be used for instrument approach and landings or takeoff for all runways of an airport except as provided in paragraph (b).

(b) *Runway visibility.* Whenever the latest weather report furnished by the U. S. Weather Bureau or a source approved by the Weather Bureau, including an aural report from the control tower, contains a visibility value specified as runway visibility for a particular runway of an airport, such visibility shall be used for a straight-in approach and landing or takeoff for that runway only.[10]

(Published in 20 F. R. 9039. December 9, 1955, effective December 15, 1955.)

Miscellaneous Operation Rules

41.120–1 *Copies of operations manual (CAA rules which apply to sec. 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.

(Published in 19 F. R. 2442, April 27, 1954.)

41.121–1 *Pilot's compartment (CAA interpretations which apply to sec. 41.121).* Sections 4a.509 and 4b.350 (e) of this subchapter 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.

(Published in 15 F. R. 620. February 4, 1950, effective upon publication in the Federal Register.)

41.128–1 *Route proving flights (CAA rules which apply to sec. 41.128).*

(a) *Introduction.* The Administrator has the responsibility of determining when route proving flights are necessary. When an air carrier believes that actual route proving flights are not required by the regulations in this subchapter, its officials must submit to the 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 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

[10] Information respecting the official runway visibility observations reported by the control tower operator may be obtained from the Office of the U. S. Weather Bureau for the airport concerned. Such office maintains a continuous graph recording of the runway visibility shown on the visibility meter in the control tower.

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 Adminsitrator that it is competent to conduct a safe operation over the entire route to be flown in air transportation.

(f) *Conclusion.* On completion of the route proving flights, a reasonable period of time will be required in order that the information gained during the flights can be compiled by the field office and submitted, with recommendations regarding approval, to appropriate supervisory personnel of the Civil Aeronautics Administration.

(Published 18 F. R. 6753, October 24, 1953, effective December 1, 1953.)

41.129–1 *Aircraft proving tests (CAA rules which apply to sec. 41.129).*

(a) *Purpose.* The purpose of aircraft proving tests is to determine the air carrier's ability to conduct the proposed operation in compliance with applicable provisions of the regulations in this subchapter and in accordance with the minimum safety requirements of the 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 aricraft 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.

(Published in 18 F. R. 6753, October 24, 1953, effective December 1, 1953.)

41.130–1 *Mechanical hazard and difficulty reports (CAA rules which apply to sec. 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) Catagory, "N" 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) Aparent 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.

(Published in 18 F. R. 6753, October 24, 1953, effective December 1, 1953.)

Definitions

41.137–1 *Definitions; route segment (CAA interpretations which apply to sec. 41.137 (q)).* The term "continental or insular geographic location" is a means for identifying a route segment where navigation can be accomplished by visual reference for the conduct of (a) day VFR operations, and (b) night VFR operations provided the geographic landmarks afford adequate visual reference during the hours of darkness.

The terms "a point at which some specialized aid to air navigation is located" and "a point at which a definite radio fix is located" are means for identifying a route segment where adequate navigational aids are available for day or night IFR operations.

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

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-368A	SR-368	8/1/54	7/31/57
SR-373A	SR-373	6/10/54	6/9/57
SR-380A	SR-380	3/31/55	4/1/58
SR-386C	SR-386B	9/19/55	9/30/56
SR-389	SR-387	10/27/52	Indefinite.
SR-392A	SR-392	7/1/55	6/30/60
SR-394A	SR-394	5/25/54	5/24/57
SR-395A	SR-395	2/20/55	
SR-401A	SR-401	8/25/55	4/1/59
SR-406A	SR-406	6/7/55	
SR-411	--------	7/1/55	6/30/57
SR-413	--------	9/23/55	9/23/56

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CIVIL AERONAUTICS MANUALS—Volume VI

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Supplement No. 3 — November 25, 1957

SUBJECT: Revisions to CAM 40 dated April 1, 1956, and CAM 41 dated February 1956.

On February 8, 1957, the Civil Aeronautics Board adopted an amendment to Parts 40 and 41 concerning the use of aircraft simulators in training programs and proficiency checks. These amendments authorized a pilot-in-command to substitute the satisfactory completion of an approved course of training in an aircraft simulator for one of the pilot proficiency checks required during each 12 months. These CAM revisions contain the rules which set forth the minimum requirements for an aircraft simulator approved training course. These revisions also contain the policies which describe the systems or conditions which aircraft simulators should simulate when used in approved training courses.

New or revised material is indicated by black brackets.

Remove and destroy the following pages:	*Insert the following new pages:*
CAM 40—ix and x	CAM 40—ix and x
31 and 32	31 through 32–1
CAM 41—v and vi	CAM 41—v and vi
29 and 30	29 through 30–1

Roy Keeley

ROY KEELEY,
Director, Office of Flight Operations and Airworthiness.

Attachments.

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pilot's file which will list the emergency procedures accomplished, date performed, and grade received.

(y) *Additional training.* If performance of any of the above items is unsatisfactory in the judgment of the check pilot he may, at his discretion, give additional training to the pilot during the course of the proficiency check. If after such training, the pilot being checked is still unable to demonstrate satisfactory performance to the check pilot, he shall not be used in scheduled operation until such time as he shall have demonstrated proficiency.

(Published in 18 F. R. 8682, December 24, 1953, effective January 1, 1954.)

40.302–2 *Frequency of pilot checks (CAA interpretations which apply to sec. 40.302).*

(a) The carrier shall establish a base check month for each pilot used as a pilot-in-command. In the case of new pilots in command, this base check month will be the month in which the initial qualifying line and proficiency checks are given. In the event that the line and proficiency checks are not both given in the same calendar month, the base check month shall be the month in which the first of such initial qualifying checks was given. In the case of pilots who were currently qualified as pilots-in-command on January 1, 1954, such base check month shall be the month in which the last 6-month check required under section 61.112 was given.

(b) The subsequent line checks required by section 40.302 (a) must be given not later than the end of the same calendar month as the base month in each succeeding calendar year.

(c) The first of the two proficiency checks required by section 40.302 (b) shall be given not sooner than the first day of the fourth full month following the month in which the last proficiency check was given and shall be given not later than the end of the eighth full month following the month in which the last proficiency check was given. The second of the two proficiency checks required by section 40.302 (b) must be given not later than the end of the same calendar month as the base month each succeeding calendar year. In no event shall a pilot be eligible to serve as pilot-in-command unless he has been given such a proficiency check within the last 8 months.

(d) When a pilot for any reason has not met the pilot check requirements of this section, he must be given re-qualifying line and proficiency checks prior to being used as pilot-in-command. In this case, the base check month shall be re-established the same as though such pilot was a new pilot-in-command.

Example 1. A pilot took a proficiency check on August 30, 1953. His base month, therefore, is August 1953. The earliest date for his next proficiency check is December 1, 1953, and the latest date for the second proficiency check in the 12-month period is August 30, 1954. However, instead of December, this pilot could have taken a proficiency check in January, February, March or April, provided the second proficiency check is taken in August 1954.

Example 2.—A pilot was not currently qualified with respect to proficiency checks on April 1, 1954. His initial proficiency check qualification date is April 3, 1954, and April 1954 becomes his base month. The earliest date on which he can take the first of the two required proficiency checks is August 1, 1954, but not later than December 31, 1954. If he is given a proficiency check in August 1954, the earliest possible time for his second check will be December 1954 and the latest permissible time, April 1955. However, if he takes his second check in December 1954, then his next proficiency check must come within 8 months of that period or not later than the end of August 1955.

(Published in 18 F. R. 6619, October 17, 1953, effective January 1, 1954.)

40.302–3 *Pilot checks use of synthetic trainer (CAA policies which apply to sec. 40.302 (b) (2) (ii)).* 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 applicable 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 40.302–1, paragraphs (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, (c) certain critical maneuvers which demonstrate the instrument 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 circling approach conditions, and takeoff and landings, with engine failures as outlined in section 40.302–1, paragraphs (g), (q), (u), and (v), respectively.

(Published in 18 F. R. 6619, October 17, 1953, effective January 1, 1954.)

[40.302–4 *Requirements for approved training course—aircraft simulator (CAA rules which apply to sec. 40.302 (b) (3)).*

[(a) *Application for approval.* An applicant desiring approval of an aircraft simulator training course shall submit his application in triplicate to the local Air Carrier Safety Inspector. The application shall contain a training course, including a description of the equipment, facilities, and material to be used, together with a letter to the Administrator of Civil Aeronautics requesting approval [7a] of the course. The application shall be prepared in looseleaf form, shall include a table of contents, time required for each phase of the course; and procedures for administering the following training course:

[(1) *Training course.* Flight equipment used shall be identical to that used in actual flight operations and the course [7b] shall incorporporate at least the following subjects:

[(i) All of the required maneuvers in section 40.282 (b) (1) and section 40.302–1 except the visual flight maneuvers performed around the airport.

[(ii) A detailed description of the procedures to be employed in performing each of the required maneuvers applicable to the type aircraft being simulated.

[(iii) Emergency procedures concerned with aircraft performance and also all emergency procedures outlined in the approved flight manual.

[(b) *Revision of training course.* Requests for revisions of the approved training course, facilities, equipment, and material shall be accomplished in the manner established for securing approval of the original training course. Three copies of the revision shall be submitted in such form that entire pages of the approved course can be removed and replaced by the revision.

[(c) *Satisfactory completion of course.* Determination of satisfactory completion of the approved aircraft simulator training course shall be made by an authorized representative of the Administrator or a check airman.

[(d) *Cancellation of approval.* Failure to meet or maintain any of the standards established for the approval of a training course shall be considered sufficient reason for cancellation of approval.]

(Published in 22 F. R. 8997, November 9, 1957, effective November 25, 1956.)

[40.302–5 *Simulation requirements of aircraft simulators used in an approved training course (CAA policies which apply to sec. 40.302 (b) (3)).* The aircraft simulator should fully simulate the following systems or conditions:

All normal cockpit noises (adjustable volume is permissible).
All surface controls.
Gust locks.
Trim tabs.
Landing gear operation.
Wheel brakes.
Steering mechanism used on the ground.
Wing flaps.
Powerplants.
Propellers.
Fuel and oil systems (constant rate of depletion is permissible).
Cockpit and circuit breaker station (circuit breakers relating to nonessential flight equipment need not be operable).
Hydraulic system.
Interior cockpit lights.
Fire detection and extinguishing systems.

(Rev. 11/25/57)

[7a] The Administrator will review the training course, and if it is found adequate, will return an approved copy of the application to the applicant.

[7b] Any logical arrangement of the training course material will be acceptable, if all the required maneuvers are included, with appropriate description of techniques and procedures.

Pressurization system for aircraft intended to operate above 25,000 feet.
De-icing and anti-icing systems.
Oxygen system for the flight crew.]

(Published in 22 F. R. 8997, November 9, 1957, effective November 25, 1957.)

40.303–1 *Pilot route and airport qualification requirements (CAA interpretations which apply to sec. 40.303).* In order to meet the knowledge requirements of section 40.303 (b), the pilot-in-command must demonstrate adequate knowledge of the subjects listed in section 40.303 (b) for a route on which he is to serve between the regular, refueling, or provisional airports listed in the air carrier's operations specifications and any major differences which may exist between that route and any other route over which he may serve between such airports. In such case, the pilot is considered qualified over any off-airway route listed in the Form 514A or a civil airway, control area extension, or control zone between such airports if he has also met the provisions of sections 40.303 (c) and (d) where applicable.

(Published in 18 F. R. 6619, October 17, 1953, effective January 1, 1954.)

40.307–1 *Flight engineer qualifications for duty (CAA interpretations which apply to sec. 40.307).* An airman assigned to flight-check other flight engineers must meet the recent experience requirements of this part before serving as a flight engineer in air transportation. However, the time spent in giving flight engineer checks may be applied toward the 50-hour recent experience requirements on a particular type of aircraft. Unless such experience has been obtained within the preceding 6-month period, a check by the air carrier or an authorized representative of the Administrator is required.

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

Flight Operations

40.355–1 *Manipulation of controls (CAA interpretations which apply to sec. 40.355).* The phrase "qualified on the airplane" means a certificated pilot holding a type rating for the aircraft utilized, or a copilot, not holding a type rating if he has met the qualification requirements of the Civil Air Regulations: *Provided,* That a certificated pilot with at least a commercial rating may, at the discretion of the pilot in command, manipulate the controls except during takeoff and landing.

(Published in 18 F. R. 6619, October 17, 1953, effective January 1, 1954.)

40.356–1 *Admission to pilot compartment (CAA interpretations which apply to sec. 40.356).* The term "flight deck" as used in section 40.356 is interpreted to mean all of the area forward of the door or window required by Parts 4a and 4b of the Civil Air Regulations to be located between the pilot compartment and the passenger compartment.

(Published in 18 F. R. 6619, October 17, 1953, effective January 1, 1954.)

Dispatching Rules

40.390–1 *Alternate airport landing minimums for airports not served by a radio navigation facility (CAA policies which apply to sec. 40.390 c)).* When there is no minimum en route instrument altitude associated with an alternate airport, the approval of alternate airport landing minimums under overcast conditions will be contingent upon (a) the incorporation of appropriate minimum en route altitudes in the air carriers operations manual in order to provide a basis for establishing weather minimums in accordance with section 40.390 (c) and (b) the availability of radio navigation facilities of sufficient adequacy to permit safe navigation over such alternate airport. The latter may be accomplished by using

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letdown aid which is not installed and operating at locations where the air carrier's pilots are based. In this case the air carrier should conduct the proficiency flights at locations where such an aid is installed and operating. All other approaches for which a particular operator may be authorized to use, such as ADF, LF/MR range, VOR, and VAR should be made and may be conducted in a simulator or other approved type trainer. A record should be maintained in the pilot's file which will indicate the date that these approaches were performed and the grade received. If these approaches (ADF, LF/MR range, VOR, and VAR) are not performed in a simulator or other approved type trainer, they should be accomplished on the proficiency flight.

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

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

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

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

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

(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.

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

[41.53–7 *Requirements for approved training course—aircraft simulator (CAA rules which apply to sec. 41.53 (b)).*

[(a) *Application for approval.* An applicant desiring approval of an aircraft simulator training course shall submit his application in triplicate to the local Air Carrier Safety Inspector. The application shall contain a training course, including a description of the equipment, facilities, and material to be used, together with a letter to the Administrator of Civil Aeronautics requesting approval[9a] of the course. The application shall be prepared in looseleaf form, shall include a table of contents, time required for each phase of the course; and procedures for administering the following training course:

[(1) *Training course.* Flight equipment used shall be identical to that used in actual

[9a] The Administrator will review the training course, and if it is found adequate, will return an approved copy of the application to the applicant.

flight operations and the course[9b] shall incorporate at least the following subjects:

[(i) All of the required maneuvers in section 40.282 (b) (1) of this subchapter and section 41.53–6 except the visual flight maneuvers performed around the airport.

[(ii) A detailed description of the procedures to be employed in performing each of the required maneuvers applicable to the type aircraft being simulated.

[(iii) Emergency procedures concerned with aircraft performance and also all emergency procedures outlined in the approved flight manual.

[(b) *Revision of training course.* Requests for revisions of the approved training course, facilities, equipment, and material shall be accomplished in the manner established for securing approval of the original training course. Three copies of the revision shall be submitted in such form that entire pages of the approved course can be removed and replaced by the revision.

[(c) *Satisfactory completion of course.* Determination of satisfactory completion of the approved aircraft simulator training course shall be made by an authorized representative of the Administrator or a check airman.

[(d) *Cancellation of approval.* Failure to meet or maintain any of the standards established for the approval of a training course shall be considered sufficient reason for cancellation of approval.]

(Published in 22 F. R. 8997, November 9, 1957, effective November 25, 1957.)

[41.53–8 *Simulation requirements of aircraft simulators used in an approved training course (CAA policies which apply to sec. 41.53 (b)).* The aircraft simulator should fully simulate the following systems or conditions:

All normal cockpit noises (adjustable volume is permissible).
All surface controls.
Gust locks.
Trim tabs.
Landing gear operation.
Wheel brakes.
Steering mechanism used on the ground.
Wing flaps.
Powerplants.
Propellers.
Fuel and oil systems (constant rate of depletion is permissible).
Cockpit and circuit breaker station (circuit breakers relating to nonessential flight equipment need not be operable).
Hydraulic system.
Interior cockpit lights.
Fire detection and extinguishing systems.
Pressurization system for aircraft intended to operate above 25,000 feet.
Deicing and anti-icing systems.
Oxygen system for the flight crew.]

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

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

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

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

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

[9b] Any logical arrangement of the training course material will be acceptable, if all the required maneuvers are included, with appropriate description of techniques and procedures.

number of the same named month of the following or previous year.

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

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41.56–1 *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 sec. 41.56 (d)).* The term "in any 12-month period" as used in section 41.56 (d) is interpreted as meaning any 12 consecutive months computed as any given day of any month to the day of the corresponding number of the same named month of the following or previous year.

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

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

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

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

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

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

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

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