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CIVIL AERONAUTICS MANUAL 40

U. S. Department of Commerce — Civil Aeronautics Administration

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Supplement No. 5 — December 15, 1955

SUBJECT: Revisions to Civil Aeronautics Manual 40 dated April 1954.

This supplement is issued to provide subscribers to CAM 40 with the following revised material:

(1) Section 40.406.1. This section has been revised to permit greater flexibility in the operational use of runway weather observations. These revised rules become effective December 15, 1955.

(2) Section 40.406–2 (c) (3). As presently written this subparagraph could be interpreted to mean that the CAA may establish circling minimums of 500–1 for four engine aircraft with stall speeds in excess of 75 m. p. h. Such an interpretation was not intended. Therefore, to eliminate any possibility of such an interpretation, section 40.406–2 (c) (3) is revised to read that when a non-directional L/MF radio facility is located on an airport, the minimum ceiling will be not less than 500 feet and the visibility minimum will be those specified in section 40.406–2 (c) (3) for circling approaches. This revision becomes effective December 30, 1955.

Remove and destroy the following pages:	*Insert in lieu thereof the following pages:*
63 through 66	63 through 66—1

NOTE: Revised material is indicated by brackets [ ].

John F. Werlich

For William B. Davis
Acting Director,
Office of Aviation Safety.

Attachments.

370001—56

visibility is less than specified below: *Provided,* That where a local surface restriction to visibility exists, such as smoke, dust or blowing snow or sand, the visibility for both day and night operations may be reduced to one-half mile, if all turns after take-off and prior to landing and all flight beyond a mile from the airport boundary can be accomplished above or outside, the area so restricted.

"(a) For day operations: 1,000-foot ceiling and one-mile visibility;

"(b) For night operations: 1,000-foot ceiling and two-mile visibility."

"40.406 *Take-off and landing weather minimums; IFR.*

"(a) Except as provided in paragraphs (c) and (d) of this section, irrespective of any clearance which may be obtained from air traffic control, no airplane shall take off or land under IFR when the reported ceiling or ground visibility is less than that approved for the airport when used as a regular airport.

"(b) Except as provided in paragraphs (c) and (d) of this section, no instrument approach procedure shall be executed when the latest weather report furnished by a source authorized in accordance with the provisions of section 40.35 indicates the ceiling or visibility is less than the landing minimum approved for the airport when used as a regular airport.

"(c) An instrument approach procedure may be executed when the weather report indicates that the ceiling or visibility is less than approved minimum for landing, if the airport is served by ILS and GCA in operative condition and both are used by the pilot, and thereafter a landing may be made, if weather conditions equal to or better than the prescribed minimums are found to exist by the pilot in command upon reaching the authorized landing minimum altitude.

"(d) If an instrument approach procedure is initiated when the current U. S. Weather Bureau report indicates that the prescribed ceiling and visibility minimums exist and a later weather report indicating below minimum conditions is received after the airplane (1) is on an ILS final approach and has passed the outer marker, or (2) is on a final approach using a radio range station or comparable facility and has passed the appropriate facility and has reached the authorized landing minimum altitude, or (3) is on GCA final approach and has been turned over to the final approach controller, such ILS, Range, or GCA approach may be continued and a landing may be made in the event weather conditions equal to or better than the prescribed minimums for the airport are found to exist by the pilot in command of the flight upon reaching the authorized landing minimum altitude."

[40.406–1 *Takeoff and landing weather minimums (CAA rules which apply to sec. 40.406 (b)).*

(a) *General.* The ceiling and visibility contained 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 landing 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 instrument approach and landing or takeoff for that runway only.[6a]]

40.406–2 *Ceiling and visibility minimums—IFR (CAA policies which apply to 40.406.)*

(a) *General.* The policies set forth in this section will be used by the Civil Aeronautics Administration in authorizing the ceiling and visibility minimums contained in the operations specifications issued to scheduled air carriers. Specific deviations from these policies may be

[6a 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.]

approved in instances where CAA and industry representatives concur that the safety of the operation would not be prejudiced.

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

(b) *Takeoff minimums.*

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

(i) *General; all aircraft.* In approving takeoff minimums for scheduled air carriers, consideration will be given to the following factors:

(*a*) Obstructions and terrain in the vicinity of the airport.

(*b*) Effective length of each runway to be used by the air carrier.

(*c*) The performance characteristics of each type aircraft to be used by the air carrier at the airport.

(*d*) IFR departure procedures in use at the airport.

(*e*) Runway lighting facilities and runway pavement marking available at the airport.

(*f*) Radio navigation facilities serving the airport.

(ii) *Two-engine aircraft.* The lowest takeoff minimums for two-engine aircraft normally will be 300–1. However, minimums as low as 200–½ may be approved in accordance with certain specific conditions and limitations prescribed in the air carrier's operations specifications.

(iii) *Four-engine aircraft.* The lowest takeoff minimums for four-engine aircraft will normally be 200–½. However, takeoff minimums as low as 200–¼ may be approved in accordance with certain specific conditions and limitations prescribed in the air carrier's operations specifications.

(2) *Alternate airports.* Takeoff minimums for both two- and four-engine aircraft may be approved as low as 300–1 when the air carrier is authorized to use a particular airport as an alternate airport only. When an airport is used as an alternate airport and such airport is also authorized in the air carrier's operations specifications as a regular, refueling, or provisional airport, the takeoff minimums shown on the applicable Form ACA–511 may be used; *Provided*, That the pilot-in-command is currently qualified into the airport in accordance with the applicable Civil Air Regulations, otherwise, takeoff minimums of 300–1 or the takeoff minimums shown on the Form ACA–511, whichever are greater, will be applicable.

(c) *Landing minimums, regular, refueling, or provisional airports.*

(1) *Circling approach.* When it is necessary to circle an airport to effect a landing, higher landing minimums are required for aircraft with higher maneuvering, approach, and landing speeds than are required for slower type aircraft. The stall speed 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. Circling approach minimums are normally the same for all instrument approach procedures without regard to the type of radio navigational facility used to conduct the instrument approach, and will be established in accordance with the following:

(i) *Aircraft with stall speed in excess of 75 MPH.* The minimum ceiling will be, (*a*) at least 500 feet above the established elevation of the airport, (*b*) not less than 300 feet above all obstructions within a radius of two miles from the airport boundary and (*c*) 300 feet above all obstructions within a distance of two miles on each side of the final approach course from the radio facility to the airport. The minimum visibility that will be authorized for such aircraft will normally be one and one-half miles. However, a minimum visibility of not less than one mile may be authorized by application of the sliding scale authorized in the air carrier's operations specifications. A minimum visibility of one mile may also be authorized for those two-engine aircraft having a stall speed in excess of 75 MPH, which can be safely maneuvered within a radius of not more than one-half mile.

(ii) *Aircraft with stall speed of 75 mph or less.* Such aircraft will normally be author-

ized to operate into airports with minimums of 100—½ lower than the minimums established for the faster type aircraft. However, the ceiling will not be less than 400 feet and the visibility not less than 1 mile, except that the visibility may be reduced to ½ mile by application of the sliding scale authorized in the air carrier's operations specifications. The criteria with respect to obstruction clearance will be the same as in (i) above; except that the minimum ceiling will be at least 300 feet above all obstructions within a radius of 1½ miles from the airport boundary.

(2) *Straight-in approaches using a radio range (L/MF or VOR) or non-directional L/MF facility.* When a ratio facility is within 7 miles from an airport and is so located that the magnetic bearing from the facility to the end of the runway to be used for a straight-in instrument approach procedure does not diverge more than thirty degrees from the magnetic direction of such runway, straight-in approach minimums as low as 400—1 may be authorized for all types of aircraft. By application of the sliding scale authorized in the air carrier's operations specifications, the visibility minimum may be reduced to one-half mile. The ceiling minimum will be at least 300 feet above all obstructions within a distance of 2 miles on each side of the final approach course from the radio facility to the airport. Consideration will also be given to the rate of descent required from the final approach altitude over the radio facility to the approach end of the runway at zero altitude. Normally, lower minimums for a straight-in approach will not be authorized when a rate of descent greater than 600 feet per minute in still air is required at the aircraft's normal approach speed in its approach configuration, unless it can be shown, in specific cases, that a slightly higher rate of descent will not adversely affect safety and is compensated for by other factors such as additional runway length, high intensity runway lights, approach lights, additional approach aids such as radar, and an "obstruction-free" approach area.

[(3) *Straight-in approaches using non-directional L/MF radio facility.* When a non-directional L/MF radio facility is located on an airport, the minimum ceiling will not be less than 500 feet and the visibility minimum as specified in subparagraph (1) of this paragraph for circling approaches.]

(4) *Straight-in approaches using ASR.* The minimums for straight-in ASR instrument approach procedures will be established in accordance with subparagraph 2 above.

(5) *Straight-in approaches using TVOR.* The minimums for straight-in approaches using TVOR will be not less than 400–1.

(6) *Straight-in approaches using ILS or PAR.*

(i) *Components of an ILS.* The components which make up the instrument landing systems are (*a*) localizer, (*b*) glide slope, (*c*) outer marker, (*d*) middle marker, and (*e*) approach lights.[7] Compass locator stations may be installed at the sites of the outer and middle markers of an instrument landing system, but are not considered as components of the ILS. However, when installed and in normal operation they may be used in lieu of the outer or middle marker, 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 PAR system.* The ground facilities used for PAR approaches include (*a*) Surveillance radar (ASR), (*b*) altitude and azimuth control radar (PAR) and (*c*) approach lights.[7]

(iii) *Demonstration of ability.* Approval of minimums for utilization of ILS or PAR 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*) in the case of ILS, approved airborne navigational equipment is installed in the aircraft, (*b*) the air car-

[7] When the length of runway available, exceeds by 3,000 feet the runway length required by the applicable aircraft performance requirements of the CARs, and high intensity runway lights are installed and operative on the entire length of the runway, this extra length of runway may be substituted for the approach lights as a component of the ILS or PAR.

rier's pilot training program includes instruction in the limitations and operation of ILS or PAR and (*c*) the pilots concerned have satisfactorily demonstrated under simulated instrument flight conditions, their ability to accomplish the ILS or PAR instrument approach procedures down to the proposed minimums.

(iv) *Approval of lower minimums.* The transition from the lowest minimums authorized using a radio range or comparable facility to lower minimums based on the use of ILS or PAR will be made in increments of 100 feet ceiling and one-fourth mile visibility. Such reduction in minimums will be based on satisfactory demonstration of ability by the air carrier as outlined under subparagraph (iii) above. Subsequent reduction in minimums will be based on satisfactory operation for a period of approximately six months, unless further demonstration in accordance with subparagraph (iii) or under actual instrument conditions is deemed necessary.

(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 will normally be approved at the present time with all components of the ILS or PAR in operation. However, minimums lower than 200–½ may be authorized at specific locations where the installation of improved navigational aids and procedures so warrants. See subparagraph (8) of this paragraph regarding approaches when components of the ILS are inoperative.

(*a*) *Adjustment of Ceiling Minimums for Obstruction Clearance.* When the minimum obstruction clearance as described in Regulations of the Administrator 609.10 cannot be obtained in the approach area, consideration will be given to establishing ceiling minimums which will afford comparable safety. In such cases, the ceiling minimums will be determined by application of the following formula to all obstructions projecting above the established obstruction clearance 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 PAR procedure, in the approach area within a distance of five miles, outward from the end of the runway:

(*1*) Extend a line horizontally outward from the top of each obstruction and parallel with the runway center line to a point of intersection with the established obstruction clearance slope line. From that point extend a line vertically to a point of intersection with the ILS or PAR glide slope. The minimum ceiling will be the difference between the mean sea level elevation of the glide slope at such point of intersection, and the mean sea level elevation of the airport.

(*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 comensurate with the degree of interference presented by the particular obstruction or obstructions.

(*3*) When application of the formula, set forth in (*1*) and (*2*), to an obstruction projecting above the established obstruction clearance slope line indicates a ceiling of less than 300 feet, the ceiling will not be reduced below 300 feet until it has been determined by flight checks that such lower ceiling will provide adequate safety.

(7) *Lowest landing minimums utilizing back course of the ILS.* When the back course of an ILS is provided with all components of a complete ILS, minimums of 200½ may be authorized in accordance with subparagraph (6) (v).

(8) *Instrument approach procedures with inoperative ILS components.*

(i) *Straight-in approaches-one ILS component inoperative.* The air carrier operations specifications permit straight-in ILS approaches down to minimums of 300–¾ when any single component of the ILS, except the localizer, is inoperative or cannot be received; provided all other components and related airborne equipment are in normal operation. The following factors will be considered in approving landing minimums of 300–¾ under these conditions:

(*a*) *When glide slope inoperative.* Straight-in landing minimums of 300–¾ may be approved when approaching aircraft can clear by 300 feet all obstructions from the approach end of the ILS runway to the outer marker within the approach area described in Regulations of the Administrator 609.10 (f) (1) (i) and (iii). The ceiling minimum may be approved to the nearest 100 feet as provided by subparagraph 11 below, if a flight check has shown such ceiling minimum to be safe. The final approach altitude over the outer marker will provide at least 500 feet obstruction clearance for a distance of at least 10 miles outward from the outer marker within an area of 5 miles on each side of the center line of the localizer course.

(*b*) *When both outer marker and outer compass locator inoperative.* Straight-in landing minimums of 300–¾ may be approved when there is no fix, other than the middle marker or middle compass locator, available along the localizer course. When an instrument approach is conducted under these conditions aircraft

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