CIVIL AERONAUTICS MANUAL 50

U. S. Department of Commerce — Civil Aeronautics Administration

Civil Aeronautics Manuals and supplements thereto are issued by the Office of Aviation Safety, Civil Aeronautics Administration, for the guidance of the public and are published in the Federal Register and the Code of Federal Regulations.

Supplement No. 1 — August 15, 1955

SUBJECT: Revisions to Civil Aeronautics Manual 50 dated July 1, 1954.

The standards for the certification of air agencies are revised to provide a more realistic and workable standard for such agencies. These revisions were developed by the Administrator as a result of the experience gained during the field usage of Civil Aeronautics Manual 50 since its publication in July 1955. In addition to changes to the commercial and private flying school curriculums, which are necessary to bring the CAA standards in line with the ICAO standards, this supplement includes the following revisions: (1) clarification of standards by which applicants may determine whether airports provide minimum clearance and operating distances (section 50.12–1); (2) clarification of flight equipment requirements (section 50.12–3); (3) addition of a requirement that the chief flight instructor for the commercial course hold an instrument rating (section 50.12–5); and a new section which permits agencies to use the minimum curriculum set forth in the manual, or submit their own proposed curriculum for approval by the Administrator (section 50.20–2); (4) clarification of flight test requirements for approved school graduates (section 50.26–2); and (5) changes in the paragraph designations to coincide with the Federal Register codification system.

New and revised material is indicated by brackets [ ], and shall become effective August 15, 1955.

Remove and destroy the following pages:
- iii and iv
- 3 and 4
- 9 through 16

Insert in lieu thereof the following pages (Rev. 8/1/55):
- iii and iv
- 3 and 4–1
- 9 through 16–7
- 21 through 25

The following ink corrections should be made to paragraph designations:

Page 5:
- Change "(2)" to read "(ii)."
- Change "(3)" to read "(iii)."
- Change "(4)" to read "(iv)."

Page 6:
- Change "(5)" to read "(v)."
- Change "(6)" to read "(vi)."
- Change "(7)" to read "(vii)."
- Change "(8)" to read "(viii)."

Page 7:
- Change "(9)" to read "(ix)."
- Change "(10)" to read "(x)."

Page 8:
- Change "(11)" to read "(xi)."
- Change "(12)" to read "(xii)."

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Appendices

Introductory Note

Civil Aeronautics Manual 50 contains in a consolidated form Airman Agency Certificate rules adopted by the Civil Aeronautics Board and the policies and interpretations issued by the Administrator in application to the various sections of the regulations.

CAA *policies* provide detailed technical information on recommended methods of complying with the Civil Air Regulations.

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 Administrator in determining compliance with the regulations.

The manual is arranged to show the number of each section of the regulations followed by the title of the particular section. Any policies or interpretations follow the pertinent section of the regulations and are identified by consecutive dash numbers appended to the regulation section number.

This manual supersedes Civil Aeronautics Manual 50 dated August 1951 and Supplement No. 1 dated July 17, 1952. Moreover, the contents of this manual supersede any contradictory material which may be found in any Aviation Safety Release or like publication outstanding on the issue date of this manual.

room instruction in the following subjects and for successful accomplishment of an examination on each subject:

(a) *Civil Air Regulations.* Instruction will be given in the regulations enumerated in section 50.11–1. However, instruction in these regulations must be sufficiently detailed and thorough to equip the student with information he may need and use as a commercial pilot with an unrestricted certificate. In addition, instruction will be given on Part 42. Also, particular stress will be placed on airport and air route traffic control procedures in connection with operations thereunder.

(b) *Meteorology.* Instruction on subjects outlined in section 50.11–1 (b) will be given. The detail and thoroughness with which the instruction is given will exceed that necessary for basic ground school curriculums. It will go go beyond the teaching of elementary phases and will include the cause and effect aspects of weather in relation to safe and successful flight operation.

(c) *Aerial navigation, including radio aids to navigation.* Instruction will be given on pilotage and dead reckoning techniques and radio aids to navigation. Instruction should include a practical demonstration to provide familiarization with L/MF and VOR/VHF techniques and with the preparation and use of IFR flight plans.

(d) *General service and safety practices.* Instruction will be given on the servicing and safety practices specified in section 50.11–1 (d), plus

(1) Servicing and safety practices, theory of flight, lift-gravity-thrust-drag forces, characteristics of air as a fluid mass, and performance characteristics of aircraft including ground effect, design, gust load safety factors, and operating limitations.

(2) Care and maintenance of equipment, including pressure, quantity, and rate instruments; radio and electronic equipment; flotation devices; fire extinguishers; safety belts; windshields, windows, and canopies; emergency exits; and parachutes.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

[50.12–1 *Airport (CAA policies which apply to sec. 50.12 (a)).* At least one runway or takeoff area should be provided which will permit the training aircraft used by the air agency to make a normal takeoff at full gross weight, under calm wind (not in excess of 5 m. p. h.) conditions and temperatures equal to the mean high temperature for the hottest month of the year for the operating area, and clear all obstacles in the takeoff flight path by at least 50 feet. The powerplant operation and the landing gear and flap operation, if applicable, should be that recommended by the manufacturer. There should be a smooth transition made from liftoff to the best rate of climb airspeed, and no exceptional piloting skills or techniques should be required. These standards also apply to any outlying fields utilized for training purposes other than those that may be used for training in the principles and procedures to follow in coping with critical situations.]

50.12–2 *Office, rest room, and ready room facilities (CAA interpretations which apply to sec. 50.12 (c)).* Permanent type office, rest room, and ready room facilities must be located at the airport or base of operations and must be constructed in accordance with pertinent local building, sanitation, and health codes. Ready rooms must contain chairs, clothesracks or lockers, and bulletin boards.

(Published in 19 F. R. 2463 on Apirl 28, 1954, effective July 1, 1954.)

[50.12–3 *Flight equipment (CAA policies which apply to sec. 50.12 (d)).*

[(a) All airplanes used for flight instruction of students enrolled in an approved air agency course should be properly certificated under Part 3 or Part 4 of this subchapter; maintained in accordance with Part 43 of this subchapter; registered in the name of the agency or operated under a lease. In addition, airplanes must be provided which are equipped with instrumentation appropriate to applicable requirements of section 50.13 of this part. At least one airplane must be provided for each fifteen (or fraction) students enrolled in the flight course, and a sufficient number of airworthy airplanes must be available at the training location for the flight training periods.

altitude fields, and under high temperature conditions.

Curriculum: Course will include thorough instruction in flight at minimum controllable and flyable airspeeds, stalls, and slips. Instruction in takeoff technique should include holding the aircraft on the brakes while the engine is revved up to takeoff r. p. m.; and starting the takeoff roll at an angle to the actual desired path of takeoff in order to enter the actual takeoff path with some forward speed, which will expedite becoming airborne.

[(XIII) *Cross-country flying.*

[*Objective:* To develop the student's ability to pilot aircraft safely and expeditiously from one location or point to another location or point by means of various piloting and navigational techniques.

[*Standard:* Student will demonstrate: familiarity with weather reporting facilities, aeronautical charts, the Airman's Guide, Flight Information Manual, and Aircraft Flight Manual; and ability to correctly plan a cross-country flight to a destination not less than 200 miles distant from the base airport, and to make correct estimates of arrival times based on available data. Also, the student will be expected to start the cross-country flight that he has planned, establish the correct compass heading required to maintain his desired track; identify preselected check points en route; establish his ground speed at the time of passing the second check point, and estimate arrival time, within ±5 minutes, at the next check point or at destination. En route, a student will demonstrate his ability to make good the desired track within ±1 mile and maintain a preselected altitude within ±200 feet. Also, the student will demonstrate ability to properly file, use, and close a VFR flight plan.

[*Curriculum:* Course will include not less than 5 hours of solo cross-country flying, in which at least one solo flight is made to a destination not less than 200 miles from the base airport. The course will also include instruction in preflight preparation, such as proper loading in accordance with the aircraft operating limitations, proper fueling, thorough check of all available weather information which may be pertinent to the flight proposed, check of facilities and services required and available, check of landing area conditions at destination, and potential alternate landing areas. Student should also be given operational experience into and out of surfaced and unsurfaced landing areas, landing strips, small fields, fields at high or simulated high elevations, and fields where heavy traffic conditions exist. (A heavy traffic condition will be considered to exist where at least four aircraft are in the traffic pattern at the same time.)]

(XIV) *Radio.*

Objective: To instruct in the proper use of two-way radio equipment in order to expedite the safe and orderly movement of air traffic on, and in the vicinity of, airports; and to enable the student to avail himself of at least the basic radio aids to navigation.

Standard: The student will demonstrate ability to contact a control tower and/or communications station and accurately interpret instructions or information received. He will also demonstrate ability to execute at least one recommended method of orientation, either with L/MF or VOR equipment and, after orienting himself, either fly to the range station from which signals emanate, or indicate his position correctly within 10 miles on an aeronautical chart.

Curriculum: Course will include instructions in airport traffic control procedures; voice procedure; the proper use of flight plans as discussed in the current Flight Information Manual; basic radio aids to navigation, including orientation procedures; and flying a range.

[(b) ***Commercial flying school curriculum.***

(1) To be acceptable, the required curriculum will provide at least 160 hours of flying,[6] of which at least 100 hours will be solo flight. At least 20 hours of the solo flight time will be acquired in cross-country flying. The curriculum will include at least the training phases or maneuvers listed below, and a demonstration of student knowledge and performance to the standards indicated. For instruc-

[6 Student progress or stage flight checks may be credited toward total required time *provided* they are conducted by an agency employed flight instructor or by a CAA Aviation Safety Agent.]

tor-student preflight and postflight discussion, total time will be provided at the rate of not less than 15 minutes for each hour of flight.

[(2) The flight maneuver tolerances, for determination of a trainee's ability, are those that are expected in smooth air and which can be attained on a repeated basis. Allowance is to be made for gusty air or other extenuating circumstances.

[(3) Training items and maneuvers will include, but not be limited to, the following:]

(i) *Aircraft equipment familiarization.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum.

Curriculum: Same as primary flying school curriculum, but instruction will be given in greater detail than is required for primary flying schools. Explanation of controls should include their purpose, effect, and means by which effect is achieved. Thus, instruction should include fundamental aerodynamics pertinent to flight control effects; carburetor heat and mixture controls explained in mechanical-physical terms as to what actually happens as a result of operating these controls, etc.

(ii) *Preflight preparatory procedures.*

Objective: Same as primary flying school curriculum.

Stardard: Same as primary flying school curriculum.

Curriculum: Same as primary flying school curriculum, but instruction will be given in greater detail than is required for primary flying schools. The why of each, and what the procedure accomplishes should be included.

(iii) *Taxiing and parking* (*sailing and docking*).

Objective: Same as primary flying school curriculum.

Standard: Same as required in the primary flying school curriculum.

Curriculum: Same as primary flying school curriculum. Seaplane training should include, where practicable, operation on water subject to tidal or current action; sailing; beaching; docking; and mooring.

(iv) *Takeoffs and landings.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum, except as follows: precision landings are to be beyond, and within 200 feet of, a spot or line.

Curriculum: Same as the primary flying school curriculum, but with additional, special emphasis on crosswind and gusty air operational techniques; small, soft, and high altitude field operations; and power-off and power-on precision landings, including correct slipping approaches. Seaplane training should include, where practicable, operation from water affected by tide and current.

(v) *Straight and level flight.*

Objective: Same as primary flying school curriculum.

Standard: The student will demonstrate ability to establish a preassigned heading with no more than three initial directional adjustments or corrections and thereafter maintain the heading within ±5°; maintain normal cruising speed ±5 m. p. h. for a period of at least 5 minutes at a preassigned altitude within ±150 feet. For this purpose, the airplane will be trimmed for level flight and for existing power conditions. The airplane will be fully loaded.

Curriculum: Same as primary flying school curriculum.

(vi) *Turns.*

Objective: Same as primary flying school curriculum.

Standard: The student will demonstrate ability to effect a smooth transition from a stabilized turn to a preassigned heading, bank, or rate of ascent or descent; to maintain a preassigned altitude within ±50 feet for 10°–60° banked turns; to maintain airspeed within ±5 m. p. h. and maintain banked altitudes within ±5°. In addition, the student will demonstrate ability to recover from a 720° turn on the preassigned heading, within ±15° and without noticeable slips or skids.

Curriculum: Same as primary flying school curriculum but with additional, special emphasis upon precise and smooth turning flight transitions, including a knowledge of the aerodynamic forces involved and available for turning

purposes under full load and varying power conditions.

(vii) *Climbs and glides.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum, except that the student will demonstrate ability to maintain a bank within ±5° during a 1080° turn, and airspeed within ±5 m. p. h. of that recommended respectively for the best rate of climb and for approach glides to landings.

Curriculum: Same as primary flying school curriculum but with additional, special emphasis on power and speed control in glides and climbs to maintain preassigned rates of descent and ascent.

(viii) *Stalls.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum.

Curriculum: Same as primary flying school curriculum.

(ix) *Flight at minimum controllable airspeed.*

Objective: Same as primary flying school curriculum.

Standard: Student will demonstrate ability to maintain control of the airplane in sustained flight attitudes for not less than 3 minutes at an airspeed within 5 m. p. h. of the stalling speed without allowing any unintentional stalls to occur; maintain level flight, in 10°–30° banked turns, using power as required, at a preassigned altitude within ±25 feet; maintain a 10°–30° banked climb, with normal climb power and in cruising airplane configuration; and maintain a 10°–30° banked glide, with normal low gliding power and airplane in landing configuration.

Curriculum: Same as primary flying school curriculum.

(x) *Pattern and track flying.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum.

Curriculum: Same as primary flying school curriculum.

(xi) *Emergencies and critical situations.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum. In addition, the student should demonstrate his ability to determine and execute a course of action that, if carried through, would most likely result in a safe landing with minimum, if any, damage to the airplane and its occupants.

Curriculum: Same as primary flying school curriculum, with special emphasis upon those critical situations most likely to occur under marginal and adverse atmosphereic weather conditions.

(xii) *Small, soft, and high altitude/temperature field operations.*

Objective: Same as primary flying school curriculum.

Standard: Same as primary flying school curriculum. In addition, the student is expected to conduct such operations smoothly and with evidence of good judgment.

Curriculum: Same as primary flying school curriculum.

[(xiii) *Cross-country flying and radio navigation.*

[*Objective:* To develop the student's ability to safely and expeditiously pilot aircraft from one location or point to another location or point by means of various piloting and navigational techniques; to properly and effectively utilize radio aids to navigation; and to make proper use of flight plans.

[*Standard:* Same as primary flying school curriculum. In addition, a student will demonstrate at least two standard radio range orientation procedures, one of which may utilize VHF/VOR equipment; ability to identify radio stations; follow a radio range leg and/or radial; locate the cone of silence and/or station; and ability to proceed to the associated landing area from the station, in accordance with the published Final Approach Procedure, as set forth in the Flight Information Manual or the Radio Facility Charts.

[*Curriculum:* Course will include all items covered in the cross-country phase of the primary flying school curriculum. The commer-

cial curriculum will also include at least 20 hours of cross-country solo flying time which will include at least one cross-country flight to a destination at least 350 miles from the base airport, and flights requiring the setting up and accurate execution of flight plans; the use of one or more radio aids to navigation; the proper procedures for flight in Air Defense Identification Zones; and dead reckoning procedures.]

[(xiv) *Basic instrument flying.*

[*Objective:* To develop in the student the ability to maintain correct airplane basic flight attitudes, while encountering unexpected adverse atmospheric conditions, solely by reference to instruments; and to meet the international (ICAO) instrument flight experience standards for an unrestricted commercial pilot certificate.

[*Standard:* The student will demonstrate ability to execute the following maneuvers under simulated instrument conditions: maintain an assigned heading within ±5° in cruising level flight and at cruising speeds and configurations recommended for rough air operations, for a period of at least 5 minutes, while maintaining an assigned altitude within ±100 feet; execute controlled climbs and descents at the recommended best rate of climb and glide speeds, within ±10 m. p. h., maintaining a heading within ±10° and climbing or descending to a preassigned altitude, including a smooth transition to level flight cruising without passing the altitude in excess of 100 feet; execute timed turns (both by clock and by count) in level flight to assigned headings within ±20° for a 360° turn and while maintaining altitude within ±100 feet; execute a 720° turn, in level flight, with a 45° bank, ±10°; and execute recovery from unusual attitudes to straight and level flight on assigned headings.

[*Curriculum:* Course will include not less than 10 hours of instrument flight experience of which at least 5 hours must be instrument flight instruction given under simulated instrument flight conditions by a pilot holding currently valid commercial, flight instructor, and instrument ratings. The remaining time may be given under the above conditions, or under simulated instrument flight conditions in an airplane with a flight instructor safety pilot, or by an appropriately rated ground instructor, in a mechanical trainer acceptable to the Administrator. Emphasis is to be placed on attitude flying rather than on navigation.

[Instruction will cover proper utilization of such instruments as the bank and turn indicator, the gyroscopically operated direction indicator, gyroscopically operated pitch and bank indicator, sensitive altimeter, and sweep second clock.

[The course will also include instruction on procedures to follow, with particular emphasis on recommended airspeeds, airplane configurations, and power settings to be used upon encountering turbulent air or other unfavorable flying conditions.]

[(xv) *Night flying.* All required night flying must be performed in accordance with the provisions of Parts 43 and 60 of this subchapter.

[*Objective:* To develop in the student the necessary skills, techniques, and judgment which will enable him to safely conduct flight operations under conditions of darkness or under conditions of restricted visibility; and to meet the international (ICAO) standards for an unrestricted commercial pilot certificate.

[*Standard:* Same standard of performance as required for basic instrument flying relating to taxiing, takeoff and landings, straight and level flight, turns, climbs and glides, and emergencies.

[*Curriculum:* Course will include at least 5 hours of night flying including not less than 10 takeoffs and landings to complete stops with the student as pilot-in-command and sole manipulator of the controls.]

[(xvi) *Transition to and operation of representative current type transportational airplanes.*

[*Objective:* To develop student adaptability to and employment of correct operating practices applicable to current type transportational airplanes.

[*Standard:* The student will demonstrate ability to solo two different types of airplanes as set forth in section 50.12–3 of this part. The demonstration will include at least the following: determination of the airplane's readiness for flight, by correctly completing the preflight

preparatory procedures; display of accurate knowledge of the airplane's operating characteristics, limitations, and performance; powerplant operational limitations; operating procedures and limitations of radio navigation and communication equipment, and emergency procedures; actual operation demonstrating the correct procedures and practices involved in takeoff and departure; in-flight maneuvers at minimum controllable airspeed, and also at maximum structural cruising airspeed;[6a] approach, landing, and post-flight procedures. For this demonstration the airplane will be loaded to full gross weight.

[*Curriculum:* Course will include at least 5 hours of solo operation in each of two or more types of airplanes required under the provisions of section 50.12–3 of this part. The course will also include instruction on procedures to be followed in the critical and emergency situations specified under section 50.13–1 (b) (3) (xi), and manual operation of gear and flaps where appropriate; replacement of fuses in electrical systems controlling gear, flaps, or propeller, where appropriate; correct use of fuel tanks, tank selector(s) and fuel quantity indicator(s); recommended use of flaps for takeoff and landing under various configurations and conditions of loading, and temperature/field elevation; landings to complete stops with and without use of flaps and/or brakes; proper loading, weight and balance; significance of placard speeds; cross-country operation; and operational use of navigational aids, communications, and flight instrumentation equipment.]

(c) ***Instrument flying school curriculum.*** To be acceptable, the required curriculum of at least 30 hours of instrument flying instruction (20 in flight) and 30 hours of ground instruction will include the training phases listed below, and a demonstration of student performance to the standards indicated. The flight maneuver tolerances, for determination of a student's ability, are those that are expected in smooth air and which can be attained on a repeated basis. Allowance is to be made for gusty air or other extenuating circumstances.

Objective: To develop in the student the ability to fly an airplane solely by reference to instruments and to safely and expeditiously navigate an airplane from point to point solely by utilization of radio aids to navigation.

Standards: Student will demonstrate ability to execute the following maneuvers solely by reference to instruments and utilization of radio aids:

(1) *Straight and level flight.* The student will maintain an assigned heading within ±5° for a period of at least 10 minutes while maintaining altitude within ±50 feet and cruising airspeed within ±10 m. p. h. In addition, the student will be expected to demonstrate similar performance when operating at the recommended speed for turbulent air, with the airplane in the corresponding recommended configuration.

(2) *Turns.* The student will execute turns, at cruising airspeed and at the recommended airspeed for rough air, in level flight, to preassigned headings, while maintaining altitude within ±50 feet, a preassigned bank (up to 45°) within ±5°, and to level out on the predesignated heading within ±10° (for a 360° turn) without further correction. In addition, the student is expected to demonstrate similar performance for timed turns to preassigned headings, both at cruising and turbulent air airspeeds.

(3) *Climbs, descents, and spirals.* The student will execute climbs and descents straight ahead, to the right, and to the left at uniform rates of turn while maintaining the recommended climb and descent airspeed, within ±5 m. p. h., producing a change of heading within ±5° of 90° for each 30 seconds of turn, and reaching an assigned altitude within ±10 seconds of an estimated time.

(4) *Stalls.* (i) The student will execute partial and full stalls (full stalls not required in multiengine airplanes).

(ii) A partial stall is considered to exist when the instruments reflect a noticeable decrease in rate of climb or a noticeable increase in the rate of descent, as the airplane's attitude approaches a maximum angle of attack. A full stall is considered to occur when the airplane

[6a For this figure see CAA Aircraft Specifications which may be obtained from any CAA agent or DAMI.]

[(c) Hand signals for ground operations.

[(d) Equipment checks.

[(e) Local taxiing and traffic rules.

[(iii) *Taxiing and parking.*

[(a) Principles of and safety practices in taxiing and parking, including engine operation and speed control under typical wind and surface conditions.

[(b) Taxiing and parking operations, including airplane response to engine and flight controls under typical wind and surface conditions.

[(c) (If seaplane training). Principles, procedures and operations on water bodies (calm and choppy), involving taxiing, sailing, beaching, docking, and mooring.

[(iv) *Takeoffs and landings.*

[(a) Principles and procedures for obtaining ground path control; takeoff and climb-outs at the best angle of climb speed, approaches at recommended speed, and flared landings, transition to touchdown without gear side loads.

[(b) Operations on hard surfaced runways.

[(c) Operations on sod surfaced areas.

[(d) Operations at controlled airports.

[(e) Operations at uncontrolled airports.

[(f) Operations in heavy local traffic.

[(g) Operations in crosswinds.

[(h) Operations in gusty winds.

[(i) Landings using power-on approaches and slips.

[(j) (If seaplane training). Principles, procedures and operations involving takeoffs and landings.

[(v) *Straight and level flight.*

[(a) Principles for attitude maintenance in gusty air, momentary deviations, etc.

[(b) Maintenance of airplane attitude by visual reference (wing tips to horizon, etc.).

[(c) Maintenance of flight path over ground.

[(vi) *Turns.*

[(a) Flight control functions.

[(b) Principles in overbanking tendencies.

[(c) Principles for obtaining and maintaining a desired bank (ref. to wing tips), and a desired altitude (angle of attack, power, etc.)

[(d) Transitions to and maintenance of desired banks and altitudes.

[(vii) *Climbs and glides.*

[(a) Principles of attaining and maintaining a normal angle in climbs and descents.

[(b) 10°−30° banked turns.

[(c) 30°−60° banked turns.

[(d) Spirals with bank at least 45°, through 720°−1080°.

[(viii) *Stalls.*

[(a) Principles for detection of incipient stalls and effecting recovery to straight and level flight with minimum loss of altitude.

[(b) Stalls and recoveries from takeoff and departure configurations.

[(c) Stalls and recoveries from approach and landing configurations.

[(d) Stalls and recoveries from accelerated maneuvering.

[(e) Fully developed stalls and recoveries, including correct power usage to level flight.

[(ix) *Flight at minimum controllable airspeed (slow flight).*

[(a) Principles for establishing and maintaining slow flight.

[(b) Stabilized slow flight in turns at constant altitude.

[(c) Stabilized slow flight in turning climbs and descents.

[(d) Effects of power usage during slow flight.

[(2) PHASE II—*Navigational and Critical Situations*

[(i) *Pattern and track flying.*

[(a) Principles for establishing and maintaining a track over the ground.

[(b) Constant radius turns about a point.

[(c) "8's" around pylons.

[(d) "S" turns across a road.

[(e) Making good a desired track for

a prolonged period (traffic patterns, rectangular areas, etc.)

[(ii) *Emergencies and critical situations.*

[(*a*) Principles and safe flying practices involved, when encountering items below:

[(*1*) Being lost.

[(*2*) Low on fuel.

[(*3*) Turbulent air.

[(*4*) Adverse flight visibility conditions.

[(*5*) Radio station shutdowns.

[(*6*) Motor trouble.

[(*7*) Loss of performance due to high altitudes, high temperatures, downdrafts in mountainous terrain.

[(*8*) Instrument / communication / navigational equipment trouble.

[(*9*) Icing conditions (carburetor, wings, propeller).

[(iii) *Small, soft and high altitude/temperature field operations.*

[(*a*) Principles and safe flying practices for effecting takeoffs and landings, climbout and approach flight plans.

[(*b*) Takeoffs and landings at small fields (includes operation over obstacles).

[(*c*) Takeoffs and landings on soft surfaces.

[(*d*) Takeoffs and landings under conditions of high density/operational altitudes.

[(iv) *Cross-country flying (5 hours solo minimum).*

[(*a*) Principles and safe flying practices for preflight preparations, operations within airplane's operational limitations, use of CAA facilities, and compliance with Parts 43, 60, and 62 of this subchapter.

[(*b*) Loading of airplane.

[(*c*) Weather information.

[(*d*) Facilities to be used.

[(*e*) Operations to strange airports of varying size, altitudes, traffic conditions, 200 miles distant, etc.

[(v) *Radio.*

[(*a*) Airport traffic control procedures.

[(*b*) Preparing, filing and closing flight plans.

[(*c*) Use of radio aids to navigation.

[(3) *Minimum total course times.*

[(i) *Flight time*_____ 35 hours.

[(ii) *Ground instruction time*__8 hours, 45 minutes.

[(4) *Progress checks.* (Ref. sec. 50.12–5 of this part.)

[(i) *Solo.*

[(ii) *Basic flying phase.*

[(iii) *Navigational and critical situations phase.*

[(iv) *Final (for CAA certificate).*

[(b) *Commercial curriculum.*

[(1) PHASE I—*Basic Flying*

[(i) *Aircraft equipment familiarization and procedures for control and use.*

[(*a*) Principles and procedures for control and use of flight force(s) effects on wing/tail surface, flight controls and for control and use of power effects through mixture, carburetor heat, etc.

[(*b*) Use of cockpit controls.

[(*c*) Fuel system operation, octane required.

[(*d*) Fire extinguisher, first aid kit, etc.

[(ii) *Preflight preparatory procedures.*

(*a*) Principles involved in each preparatory procedure.

[(*b*) Use of checklist.

[(*c*) Safety principles for engine.

[(*d*) Hand signals for ground operations.

[(*e*) Equipment checks.

[(*f*) Local taxiing and traffic rules.

[(iii) *Taxiing and parking.*

[(*a*) Principles and safety practices in taxiing and parking, including engine operation and speed control under typical wind and surface conditions.

[(*b*) Taxiing and parking operations, including airplane response to engine and flight controls under typical wind and surface conditions.

[(*c*) (If seaplane training.) Principles, procedures and operations on water bodies (calm and choppy), involving taxiing; sailing; beaching; docking; and mooring.

[(*d*) (If seaplane training.) Principles, procedures and operations on water sub-

ject to tidal or current action involving sailing and beaching; docking; and mooring.

[(iv) *Takeoffs and landings.*

[(*a*) Principles and procedures for obtaining ground path control; takeoff and climb-outs at the best angle of climb speed, approaches at recommended speed, and flared landings, transition to touchdown without gear side loads.

[(*b*) Operations on hard surfaced runways.

[(*c*) Operations on sod surfaced areas.

[(*d*) Operations at controlled airports.

[(*e*) Operations at uncontrolled airports.

[(*f*) Operations in heavy local traffic.

[(*g*) Operations in crosswinds.

[(*h*) Operations in gusty winds.

[(*i*) Landings using power-on approaches and slips.

[(*j*) (If seaplane training.) Principles and procedures and operations involving takeoffs and landings.

[(*k*) (If seaplane training.) Operations from water affected by tide and current.

[(v) *Straight and level flight.*

[(*a*) Principles for attitude maintenance in gusty air, momentary deviations, etc.

[(*b*) Maintenance of airplane attitude by visual reference (wing tips to horizon, etc.).

[(*c*) Maintenance of flight path over ground.

[(vi) *Turns.*

[(*a*) Principles of and familization with aerodynamic forces involved and available for turning purposes under full load and varying power conditions.

[(*b*) Flight control functions.

[(*c*) Principles in overbanking tendencies.

[(*d*) Principles for establishing and maintaining a desired bank (ref. to wing tips), and a desired altitude (angle of attack, power, etc.).

[(*e*) Transitions to and maintenance of desired banks and altitudes.

[(vii) *Climbs and glides.*

[(*a*) Principles of establishing and maintainig a normal angle in climbs and descents.

[(*b*) 10°–30° banked turns.

[(*c*) 30°–60° banked turns.

[(*d*) Spirals with bank at least 45°, through 720°–1080°.

[(*e*) Use of power and speed control to maintain preassigned rates of descent and ascent.

[(viii) *Stalls.*

[(*a*) Principles for detection of incipient stalls and effecting recovery to straight and level flight with minimum loss of altitude.

[(*b*) Stalls and recoveries from takeoff and departure configurations.

[(*c*) Stalls and recoveries from approach and landing configurations.

[(*d*) Stalls and recoveries from accelerated maneuvering.

[(*e*) Fully developed stalls and recoveries, including correct power usage, to level flight.

[(ix) *Flight at minimum controllable airspeed (slow flight).*

[(*a*) Principles for establishing and maintaiinng slow flight.

[(*b*) Stabilized slow flight in turns at constant altitude.

[(*c*) Stabilized slow flight in turning climbs and descents.

[(*d*) Effects of power usage during slow flight.

[(2) PHASE II—*Navigational and Critical Situations.*

[(i) *Pattern and track flying.*

[(*a*) Principles for establishing and maintaing a track over the ground.

[(*b*) Constant radius turns about a point.

[(*c*) "8's" around pylons.

[(*d*) "S" turns across a road.

[(*e*) Making good a desired track for a prolonged period (traffic patterns, rectangular areas, etc.)

[(ii) *Emergencies and critical situations.*

[(*a*) Principles and safe flying practices involved, when encountering items below:

[(*1*) *Being lost.*

[(*2*) Low on fuel.

[(*3*) Turbulent air.

[(*4*) Adverse flight visibility conditions.

[(*5*) Radio station shutdowns.

[(*6*) Motor trouble.

[(*7*) Loss of performance due to high altitudes, high temperatures, downdrafts in mountainous terrain.

[(*8*) Instrument / communication/ navigational equipment trouble.

[(*9*) Icing conditions (carburetor, wings, propeller).

[(*b*) Principles and procedures for determining and executing a course of action for forced landings that, if carried through, would most likely result in a safe landing with minimum, if any, damage to the airplane or injury to occupants.

[(iii) Small, soft and high altitude/ temperature field operations.

[(*a*) Principles and safe flying practices for effecting takeoffs and landings, climb-out and approach flight plans.

[(*b*) Takeoffs and landings at small fields (includes operation over obstacles).

[(*c*) Takeoffs and landings on soft surfaces.

[(*d*) Takeoffs and landings under conditions of high density/operational altitudes.

[(iv) *Cross-country flying and radio navigation (20 hours).*

[(*a*) Principles and safe flying practices for preflight preparations, operations within airplane's operational limitations, use of CAA facilities and compliance with CAR 43, CAR 60, and CAR 62.

[(*b*) Loading of airplane.

[(*c*) Weather information.

[(*d*) Facilities to be used

[(*e*) Operations to strange airports of varying size, altitudes, traffic conditions, 350 miles distant, etc.

[(*f*) Operations to airports in which flight plans are filed, followed, and closed, one or more radio aids to navigation are used; and dead reckoning navigation employed. Procedures for operations in Air Defense Identification Zones.

[(v) *Basic instrument flying (minimum 10 hours, 5 hours instrument instruction).*

[(*a*) Principles and procedures for maintaining and controlling airplane flight attitudes and speeds, solely by reference to instruments, and maintaining flight within airplane's operational limitations.

[(*b*) Operations using a gyroscopically operated bank and direction indicator, a gyroscopically operated rate of turn indicator, a gyroscopically operated pitch indicator, a sensitive altimeter, and a sweep second clock.

[(*c*) Principles and procedures for coping with turbulent air conditions, including recommended airspeed, airplane configuration and power settings.

[(*d*) Operations (solely by reference to instruments) in turbulent air.

[(vi) *Night flying (minimum 5 hours) (10 takeoffs and landings).*

[(*a*) Principles and procedures for conduct of night flights from takeoff to destination and landing, including procedures for coping with critical and including emergency situations.

[(*b*) Operations at night (during the period from one hour after sunset to one hour before sunrise) must include at least 10 takeoffs and landings to complete stops with student as pilot-in-command and sole manipulator of the controls.

[(vii) *Transition to and operation of representative current type transportational airplanes (5 hours solo minimum).*

[(*a*) Principles and procedures to be followed in making a transition from a familiar type airplane to one with significantly different flight performance and operating characteristics. Includes determination of the correct fuel consumption and use of fuel system tanks, selector(s) and indicator(s), use of flaps for takeoff and landing under various configurations and conditions of loading, loading to be within CG limits, operational recommended speeds and limitations for the engine and airplane, procedures for use of communication, navigation and flight instrumentation equipment, and pro-

cedures to be used under the emergency situations of section 50.13–1 (b) (3) (xi) and for normal gear extension (if applicable).

[(*b*) Operation of different type transportational airplane at gross weight, which will include preflight procedures, takeoffs and departures, inflight maneuvers at minimum controllable airspeed, the design maximum structural cruising speed, best angle and rate of climb airspeed(s) and configuration(s); approaches and landings using recommended approach speed and configuration, and postflight procedures.

[(3) *Minimum total course times.*

[(i) *Flying time*_____ 160 hours.

[(*a*) Solo flight_____ 100 hours.

[(*b*) Cross-country solo__ 20 hours.

[(ii) *Ground instruction*___ 40 hours.

[(4) Progress checks. (Ref sec. 50.12–5 of this part.)

[(i) *Solo.*

[(ii) *Basic flying phase.*

[(iii) *Navigation and critical situations phase.*

[(*a*) VFR operations.

[(*b*) Basic instrument flying.

[(*c*) Night flying.

[(iv) *Final (for CAA certificate).*

[(c) *Instrument Curriculum.*

[(1) PHASE I—*Basic Flying.*

[(i) Straight and level flight.

[(*a*) Principles, procedures and operating limitations for all flight instruments for control of attitude, altitude, direction and speed.

[(*b*) Smooth air operation at cruising speed.

[(*c*) Turbulent air operation at recommended rough air speed.

[(ii) *Turns.*

[(*a*) Principles, procedures and operating limitations for control of rate of turn to predetermined headings (including timed turns).

[(*b*) Smooth air operation at cruising speed.

[(*c*) Turbulent air operation at recommended rought air speed.

[(iii) *Climbs, descents and spirals.*

[(*a*) Principles, procedures and operating limitations for control of rate of climb and descent to predetermined altitudes.

[(*b*) Smooth air operation at recommended best rate of climb and glide speeds and airplane configurations.

[(*c*) Same as *b*, but in rough air.

[(iv) *Stalls.*

[(*a*) Principles and procedures for detection of and recovery from partial and full stalls.

[(*b*) Stall detection and recoveries.

[(*c*) Full stall recoveries.

[(v) *Recovery from unusual attitudes.*

[(*a*) Principles and procedures for coping with unusual attitudes and for critical engine inoperative situations on multiengine airplanes (including effecting recoveries within operating and structural limitations).

[(*b*) Recoveries to level flight attitudes and speeds.

[(*c*) Operation with critical engine inoperative. (Multiengine airplanes only).

[(2) *PHASE II—IFR Communications, Navigation and Approaches*

[(i) *Estimation of arrival times.*

[(*a*) Principles and procedures for preparing a complete flight plan and the correct computation of estimated arrival times over check points, at destination, and at an alternate airport.

[(*b*) Flight planning. (Weather data, navigational procedures, airplane performance data, flight charts, approach procedures, etc.)

[(*c*) Flight from point to point.

[(ii) *Tuning radio equipment.*

[(*a*) Principles and procedures for selection of frequencies, use of volume control, use of voice and range filters, use of dual equipment—when installed.

[(*b*) Use of equipment in flight.

[(iii) *Orientation.*

[(*a*) Principles and procedures for orienting on a range leg, or radial, and identification of position.

[(*b*) Range orientation and identification from an unknown position.

[(iv) *Following a range leg or radial.*

[(*a*) Principles and procedures for aligning with and maintaining flight path and altitude along range leg or radial.

[(*b*) Range leg or radial alignment and following.

[(v) *Locating range stations.*

[(*a*) Principles and procedures for locating and identifying arrival over station.

[(*b*) Location and identification of station.

[(vi) *Instrument approach procedures.*

[(*a*) Principles and procedures for execution of the correct approach procedure for the station and airport involved. (Includes familiarization with radio facility charts, radio range charts and terminal charts.)

[(*b*) Execution of approaches to standard minimums for airport involved. (Also to 500 feet and 1 mile at some other airport if local airport has higher minimums.)

[(vii) *Missed approach procedures.*

[(*a*) Principles and procedures for execution of the correct missed approach procedures.

[(*b*) Execution of missed approach procedures for airport involved.

[(viii) Air traffic control procedures.

[(*a*) Familiarization with and procedures for compliance with ATC clearances and/or instructions, including holding and emergency procedures.

[(*b*) Receipt and execution of ATC clearances and/or instructions.

[(3) *Minimum total course times.*

[(i) *Ground instruction*_____ 30 hours.

[(ii) *Flying time* (20 hours in flight)_____ 30 hours.

[(4) *Progress checks.* (Ref. sec. 50.12–5 of this part.)

[(i) *Phase I—Basic instrument flying.*

[(ii) *Phase II—IFR communications, navigation and approaches.*

[(d) *Flight instructor curriculum.*

[(1) *Flight portion*—25 hours of flying.

[(i) *Phase I—Performance skills.*

[(*a*) All items and maneuvers listed in CAM 20 for private, commercial, and flight instructor flight tests; all items and maneuvers listed in CAM 50 private, and commercial flying school curriculum; lazy 8's, and chandelles.

[(ii) *Phase II—Instructional skills.*

[(*a*) Development of methods, skills, and techniques of imparting knowledge skills, etc., to students, in all of the items and maneuvers of Phase I.

[(2) *Ground instruction portion*—40 hours.

[(i) *Fundamentals of flight instruction.*

[(*a*) Basic learning characteristics.

[(*b*) Determination of objectives, or aims.

[(*c*) Instructional management (preparation and execution).

[(*d*) Teaching methods and techniques.

[(*e*) Evaluation techniques.

[(ii) *Analysis of flight maneuvers and flight techniques.*

[(*a*) Theory of flight.

[(*b*) Control functions and effects.

[(*c*) Common student errors—causes and remedies.

[(*d*) Common flight instructor deficiencies—causes and remedies.

[(*e*) Principles of safety.]

50.22–1 *Duration of certificate (CAA interpretations which apply to sec. 50.22).* An airman agency certificate will expire 24 months from the last day of the month in which issued.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.23–1 *Renewal of certificate (CAA policies which apply to sec. 50.23).* (a) Application for renewal of the airman agency certificate and rating will be made to the local Aviation Safety District Office on a form furnished by that office. It is the responsibility of the agency to request renewal of its certificate at least 30 days in advance of the expiration date to allow the CAA Aviation Safety District Office sufficient time to arrange for the required renewal inspection.[9]

(b) An agency found eligible for renewal of its certificate, any time within 90 days in advance of the certificate's expiration date, will have its certificate renewed to expire 24 months from the existing expiration date.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

[9] An agency which has allowed its certificate to expire will be required to make an application, and to meet the same requirements as for original issuance.

50.24–1 *Change in agency ownership (CAA policies which apply to sec. 50.24).* An airman agency certificate expires automatically with a change in ownership of the agency. When the new owner desires certification, he should submit to the local Aviation Safety District Office an application for an airman agency certificate and rating which will be processed as an original application in accordance with section 50.20–1.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.24–2 *Change of agency name (CAA policies which apply to sec. 50.24).* A change in the name of an airman agency without a change of ownership will not invalidate the airman agency certificate. However, such a change of name should be reported within 15 days by the owner to the local Aviation Safety District Office, and a new airman agency certificate will be issued bearing the old certificate number, the new name, and the ratings formerly held by the agency.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.25–1 *Voluntary surrender of certificate (CAA policies which apply to sec. 50.25).* The holder of an airman agency certificate may voluntarily surrender such certificate by submitting to the CAA his current, or latest issuance of the air agency certificate, and a letter stating that the certificate is being voluntarily surrendered.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.25–2 *Involuntary surrender of certificate (CAA policies which apply to sec. 5025).* In cases of suspension, revocation, expiration, or cancellation of an airman agency certificate, the holder of such certificate will surrender it to an authorized representative of the Administrator upon written request.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

[50.26–1 *Student flight checks (CAA policies which apply to sec. 50.26).*

[(*a*) The holder of an airman agency certificate will, upon request of the local Aviation Safety District Office, submit students for flight proficiency checks which are intended to determine the quality of instruction and compliance with the curriculum. Not less than 10 percent of all approved school students will be flight checked by CAA agents after completion of at least 50 percent of the flight curriculum. The flight test for the pilot certificate appropriate to the curriculum from which the student has graduated may be substituted for the above flight check provided such flight test is conducted by an Aviation Safety Agent. In order to facilitate scheduling of these spot flight checks, the agency will notify the local Aviation Safety District Office of the names of all students whom they expect to graduate. This notice should be submitted in writing at least 15 days in advance of the date on which the graduation certificate is to be issued.

[(*b*) Any flight check given by a CAA Agent, designated flight examiner, or chief flight instructor for determination of quality of instruction being given, or for determination of agency compliance with its curriculum, will be based on the standards set forth in CAM 50 for each item of the appropriate curriculum. Applicants for pilot certificates or ratings will be flight tested in accordance with the appropriate performance standards set forth in CAM 20.]

[50.26–2 *Student ground instruction checks (CAA policies which apply to sec. 50.26).* A CAA Aviation Safety Agent may, at any reasonable time, question or examine an airman agency student on appropriate subjects or items which are a part of the curriculum in a course in which the student is enrolled and which have, according to the school course schedule and records, been covered. Such check is for the purpose of determining compliance with the curriculum, and quality of instruction being given.]

50.27–1 *Composition of student examinations (CAA interpretations which apply to sec. 50.27).* The holder of an airman agency certificate must devise and administer written or practical examinations to each student upon completion of each subject covered in the curriculum. These examinations will be of such

coverage and degree of difficulty that a student who has successfully accomplished the school examination may reasonably assume himself to be qualified to achieve success, on his first attempt, in passing required CAA examinations pertinent to the subject, in the rating sought.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.28–1 *Attendance and accomplishment records (CAA interpretations which apply to sec. 50.28)*. The school must maintain a current record of each student's participation and accomplishments during course enrollment. Upon course completion or graduation, the entire record or file will be certified by an authorized representative of the agency. This student record, or file folder, will be retained for a period of at least one year, and made available for inspection by authorized representatives of the Administrator upon reasonable demand.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.29–1 *Graduation certificate form and conditions for issuance (CAA policies which apply to sec. 50.29)*. A graduation certificate (see appendix) will be made available upon request from the local Aviation Safety District Office. An approved school will not issue a graduation certificate to a student unless he has successfully completed at least 90 percent of the curriculum required for graduation, as a bona fide enrolled student in an approved school.[10]

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.30–1 *Frequency and extent of inspections (CAA policies which apply to sec. 50.30)*. At varying time intervals CAA representatives will spot check, reinspect, or examine each operation including students, instructors, records, facilities, and equipment.[11] Arrangements for these inspections will be made on a mutually agreeable basis, and every effort will be made to minimize interruptions to normal training schedules.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.31–1 *Written notice of curriculum changes (CAA policies which apply to sec. 50.31)*. Proposed changes in any approved curriculum will be submitted in writing to the local Aviation Safety District Office. This notification will state specfically which portions of the previously approved curriculum are to be changed, and will specifically set forth the proposed changes.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.32–1 *Maintenance of certificating qualifications (CAA policies which apply to sec. 50.32)*. Any qualitative or quantitative deviation in the agency personnel, facilities, or equipment, which results in the agency furnishing less than the requirements for original certification, may result in the suspension of the airman agency certificate.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

50.34–1 *Notice of change of location (CAA policies which apply to sec. 50.34)*. The intention of an approved airman agency to change location will be reported in advance to the local Aviation Safety District Office from which forms may be obtained for this purpose. Upon receipt of such notification of intent, the local Aviation Safety District Office will ascertain, within 30 days after transfer, that original certification requirements are met at the new location, prior to approval. If the inspection shows the new facilities to be satisfactory, a new airman agency certificate will be issued showing the previously held number, the new location, ratings issued, and the date of reinspection. If the results of this inspection are not satisfactory, the agency will be notified in writing of the deficiencies found by the Aviation Safety District Office. Immediate action will be taken by the agency to eliminate the deficiencies, or steps will be taken to revoke or suspend the certificate for failure to meet minimum requirements of CAR/CAM 50.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954.)

[10] Credit for student attendance and accomplishment may be transferred from one approved school to another approved school. In such a case, the receiving school will determine by student flight check and/or written examination as appropriate, the amount of credit to be transferred, which may not in any case be greater than the amount of attendance and accomplishment credit compiled by the student in the approved school(s) from which he transfers.

[11] As agencies demonstrate ability to graduate competent students on a continuing basis, the frequency and extent of the inspections will be minimized.

Appendix A

FORMS

Forms to which reference has been made throughout Civil Aeronautics Manual 50.

STUDENT ACCOMPLISHMENT RECORD
(Ref. CAM 50.28-1)

Name of Student John R. Doe

Course Private

Date Enrolled January 10, 1955

Date Graduated April 18, 1955

Date	Instruction, Practice, or Progress Check (Curric.Item No.)	Instructor's Sign. - Dual Student's Sign. - Solo	Time Received			RESULTS (Instructor or Check Pilot Enters his Findings)
			Ground	Dual	Solo	
1-10-55	1a-b-c 2a-b-c-d-e 3a-b	V.C.Winters V.C.Winters	1:00	:30		Model building background Intelligent interest Asks good questions
1-11-55	2a-b-c-d-e 5b-c	V.C.Winters V.C.Winters	:20	1:00		Tense in air Trying too hard
1-12-55	2a-b-c-d-e 6a-b-c	V.C.Winters V.C.Winters	:15	1:00		Overcontrols where minor attitude corrections needed
2-5-55	4a-b 4a-b practice	V.C.Winters Solo John R. Doe	:15	:30	:30	Salvaged bad landing very well.OK-solo 3 T/O & Landings. Very good
2-6-55	Progress check CAM 50.12-5 Solo Phase	A.B.Brown A.B.Brown Ch.Fl.Instr.	:15	1:10		Good understanding of fundamentals Check satisfactory.
2-7-55	4a-b check 4a-b practice	V.C.Winters Solo John R. Doe	:15	:15	:45	3 good T/O & Lndgs. Flying OK. Needs review on traffic patterns
3-5-55	Check - all items to date Ref.CAM 50.26-1	M.D.Carter M.D.Carter CAA Agent	:20	:45		Rough on controls. Needs work on turns to headings
4-18-55	Pvt. Flight test	D.G.Adams Pr. Flight Exam.#1313	:30	1:50		All items/maneuvers satisfactorily accomplished
TOTAL TIME RECEIVED			9:45	17:50	18:10	

John R. Doe
Student's Signature

This Flying School Student Accomplishment Record is not available at CAA offices, but may be reproduced by agencies for their own needs.

(Rev. 8/1/55)

Appendix B

Reference Material

1. PUBLICATIONS

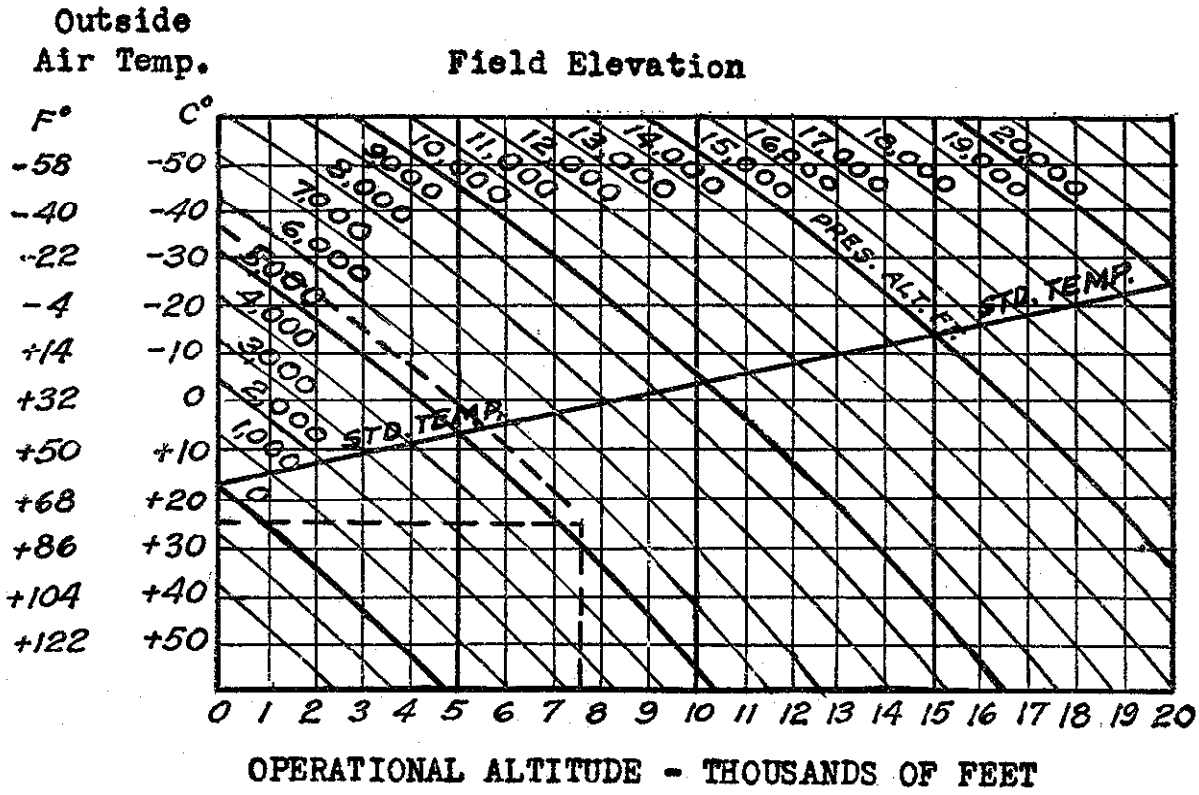
The publications listed below are basic sources of materials included in the CAA written examinations for private pilot, commercial pilot, instrument, and flight instructor ratings. These bulletins, manuals, and references are subject to revision at any time, and care should be taken to ensure use of current publications. These materials may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Prices listed for source materials are those which were in effect at the time of printing this revision of CAM 50.

In addition to the listed references, many excellent articles, books, bulletins, and manuals are published by the flying branches of the U. S. Military Establishment, various manufacturers, and professional experts.

Aircraft Powerplant Handbook (CAA Technical Manual No. 107)	$1.50
Air Force-Navy-CAA Procedures for the Control af Air Traffic	1.00
Airman's Guide (Individual copies vary in price—subscription of 26 issues per year, including Flight Information Manual)	2.75
Airways Operations Training Series:	
Instrument Landing System (Bulletin No. 1)	.20
Location Markers and Homing Facilities (Bulletin No. 2)	.15
Visual-Aural Ranges and Omniranges (Bulletin No. 3)	.20
Distance Measuring Equipment and Offset Course Computer (Bulletin No. 4)	.15
Basic Omnirange Flying	Free
Facts of Flight	.50
Flight Information Manual—Part I	.40
Part II	1.00
Flight Instruction Manual (CAA Technical Manual No. 100)	1.50
Flight Instructor Oral Examination Guide Book	.05
Meteorology for Pilots (CAA Bulletin No. 25)	1.50
Path of Flight	.75
Personal Aircraft Inspection Manual (CAA Technical Manual No. 101)	.55
Questions and Answers for Private Pilots	.25
Realm of Flight	.60
Student Pilot Guide	.15
Terrain Flying (CAA Office of Aviation Information)	.30

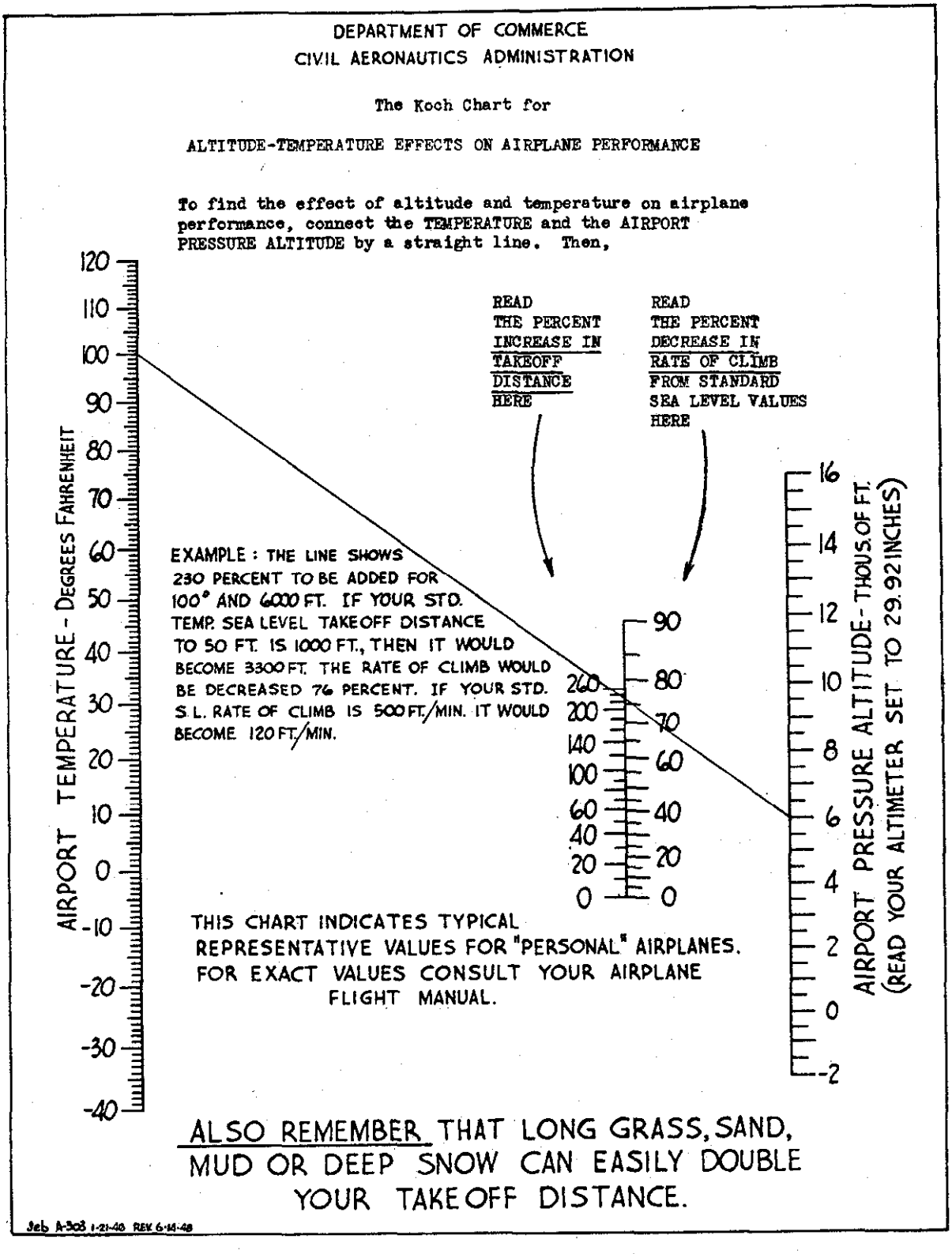
2. OPERATIONAL CHARTS

(a) Operational Altitude Chart



(b) Koch Chart for Altitude-Temperature Effects on Airplane Performance. The following example illustrates the use of this chart to determine the approximate temperature-altitude conditions at the airport which you plan to use:

1. Select the actual elevation of the airport to be used, on the diagonal lines marked *Field Elevation* (Example: 5500 ft.).
2. Select the temperature at the airport (Example: 77 degrees F.).
3. Follow the temperature line to the right until it crosses the diagonal line of *Field Elevation.*
4. From the point where these two lines cross, follow a line to the bottom of the chart and observe the *Operational Altitude* (Density Altitude), (Example: 7700 ft.).
5. This *Operational Altitude* represents approximately the one on which you should expect the takeoff distance and climb performance to be increased or decreased from that expected at sea level under standard atmospheric conditions (Temp. 59 deg. F., Press. 29.92 in.). For more accurate operational effects see the chart for Altitude-Temperature Effects on Airplane Performance.


DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
The Koch Chart for
ALTITUDE-TEMPERATURE EFFECTS ON AIRPLANE PERFORMANCE
To find the effect of altitude and temperature on airplane performance, connect the TEMPERATURE and the AIRPORT PRESSURE ALTITUDE by a straight line. Then,
READ THE PERCENT INCREASE IN TAKEOFF DISTANCE HERE
READ THE PERCENT DECREASE IN RATE OF CLIMB FROM STANDARD SEA LEVEL VALUES HERE
AIRPORT TEMPERATURE - DEGREES FAHRENHEIT
120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40
AIRPORT PRESSURE ALTITUDE - THOUS. OF FT. (READ YOUR ALTIMETER SET TO 29.92 INCHES)
16 14 12 10 8 6 4 2 0 -2
260 200 140 100 60 40 20 0
90 80 70 60 40 20 0
EXAMPLE : THE LINE SHOWS 230 PERCENT TO BE ADDED FOR 100° AND 6000 FT. IF YOUR STD. TEMP. SEA LEVEL TAKEOFF DISTANCE TO 50 FT. IS 1000 FT., THEN IT WOULD BECOME 3300 FT. THE RATE OF CLIMB WOULD BE DECREASED 76 PERCENT. IF YOUR STD. S.L. RATE OF CLIMB IS 500 FT./MIN. IT WOULD BECOME 120 FT./MIN.
THIS CHART INDICATES TYPICAL REPRESENTATIVE VALUES FOR "PERSONAL" AIRPLANES. FOR EXACT VALUES CONSULT YOUR AIRPLANE FLIGHT MANUAL.
ALSO REMEMBER THAT LONG GRASS, SAND, MUD OR DEEP SNOW CAN EASILY DOUBLE YOUR TAKEOFF DISTANCE.
Jeb A-303 1-21-40 REV 6-14-48

(Rev. 8/1/55)

Appendix C

Airplanes Which Meet the Requirements of CAM 50.12–3

The makes and models of single-engine airplanes listed below have demonstrated cruising speeds of at least 120 miles per hour:

Manufacturer	*Model*
Beech Aircraft Corporation	35 Series
Bellanca Aircraft Corporation	14–19 Cruisemaster
Cessna Aircraft Company	170
	180
	195
Helio Aircraft Corporation	H–391
Meyers Aircraft Company	145
Piper Aircraft Corporation	PA–20 Pacer
	PA–22 Tri-Pacer

Additional makes and models will be added to this list as substantiated information is received.

The cruising speed of a make and model, or of a particular airplane may be demonstrated to a CAA agent by flying the airplane at a constant altitude in both directions over a measured course of not less than five miles while operating the aircraft and engine(s) in accordance with the manufacturer's recommended operating cruising procedures, and averaging the ground speeds made good on the two demonstration runs.