Civil Aeronautics Manual 50

Air Agency Certificates

Revised

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U. S. DEPARTMENT OF COMMERCE

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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.

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

[This manual supersedes Civil Aeronautics Manual 50 dated July 1, 1954, Supplement 1 dated August 15, 1955, and Supplement 2 dated January 16, 1956. It will be revised from time to time in accordance with the changes in the Civil Air Regulations, Part 50, or as the need for additional explanations are brought to the attention of the Administrator.]

Contents

[Certificate]

[Ground Schools]

Requirements

[Flying Schools]

[General]

Appendices

Airman Agency Certificates

Certificate

50.1 *Issuance.* An airman agency certificate will be issued to an applicant who complies with the minimum requirements for one or more school ratings.

50.2 ***School ratings.***

(a) Basic ground school.
(b) Advanced ground school.
(c) Primary flying school.
(1) Airplanes.
(2) Helicopters.
(3) Gliders.
(d) Commercial flying school.
(1) Airplanes.
(2) Helicopters.
(3) Gliders.
(e) Instrument flying school.
(f) Flight instructor school.

Ground Schools

Requirements

50.10 ***Ground school requirements.***

(a) Classrooms adequately heated and lighted, of sufficient size to accommodate the greatest number of students scheduled for attendance at any one time.

(b) Sufficient classroom equipment to insure adequate instruction in all required subjects.

(c) At least one regularly available principal instructor possessed of a ground instructor certificate with ratings for each of the required subjects of the curriculum.

50.10–1 *Classrooms (CAA interpretations which apply to sec. 50.10 (a)).* The Administrator will consider minimum classroom space, heat, and light requirements to have been met when the applicant furnishes space with a minimum floor area of 80 square feet, plus at least 15 square feet for each additional student over the number of five; heated and ventilated in accordance with local public health laws; and lighted sufficiently to permit a person with normal eyesight to study or read without eyestrain.

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

50.10–2 *Equipment (CAA interpretations which apply to sec. 50.10 (b)).* The Administrator will consider minimum classroom equipment requirements to have been met when the applicant furnishes the following:

(a) *Basic or advanced ground school equipment.* For each enrolled student, a desk-chair, chair and desk, or chair and table space to permit such work as laying out courses on aeronautical charts; and a blackboard which provides at least 12 square feet of usable surface. (Tablet-arm chairs will not be considered as providing adequate working space.)

(b) *Basic ground school equipment.* Texts and related source materials to cover Civil Air Regulations, meteorology, aerial navigation, radio as used for airport traffic control and also as used in obtaining flight assistance services, general service and operation of aircraft and aircraft engines, and pertinent operational data at the private pilot level. Also, illustrative, explanatory, and demonstration aids and materials which are representative of those which a private pilot needs in actual piloting operations, such as radio facility charts, aeronautical charts, computers, Airman's Guide, etc.

(c) *Advanced ground school equipment.* Texts and related source materials covering the subjects named in section 50.10–2 (b) and, in addition, navigation of aircraft by use of radio aids. Also, models, mock-ups, cutaways, classroom-size or lecture-size blueprints, diagrams, etc., covering the operation and functioning of instruments and equipment required under

Part 43, and Parts 3, 5, and 6 as they pertain to the particular course being taught.

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

50.10–3 *Instructors (CAA interpretations which apply to sec. 50.10 (c)).* Each agency must have in its employ a principal instructor whose services are available for purposes of instruction or supervision of each scheduled class subject. Each such instructor must hold a currently valid ground instructor certificate with appropriate ratings for all subjects offered in the school curriculum. An instructor other than the principal instructor must hold a currently valid ground instructor certificate with appropriate ratings for each subject he teaches.[1]

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

50.11 *Ground school curriculum.* A ground school curriculum approved by the Administrator for at least one of the following:

(a) *Basic ground school.* 50 hours of classroom instruction in the subjects of Civil Air Regulations (the regulations in this subchapter), including air traffic control practices and procedures, navigation, meteorology, and general servicing of aircraft.

(b) *Advanced ground school.* 150 hours of instruction in the subjects of Civil Air Regulations, including air traffic control practices and procedures navigation meteorology, aircraft and engines, including the general servicing and maintenance of aircraft and engines.

[1] Ratings which an instructor must hold hold before he can serve either as instructor in a particular subject or as principal instructor for all subjects are as follows:

Subjects taught in approved schools	Ground instructor ratings required						
	CAR	Navigator	Meteorologist	Aircraft	Aircraft engineer	Link trainer operator	Radio navigator
Civil Air Regulations	X						
Meteorology			X				
Aerial navigation		X					X
Basic instrument						X	
Radio aids to navigation							X
General service and safety practices.							
Aircraft				X			
Aircraft engines					X		
Operational safety practices				X	X		

50.11–1 *Basic ground curriculum (CAA policies which apply to sec. 50.11 (a)).* In providing a curriculum satisfactory to the Administrator, an applicant may elect to adopt the following minimum acceptable curriculum or may submit one of equal or higher standard for approval. The minimum acceptable basic ground school curriculum will provide for not less than 50 hours of classroom instruction in the following subjects and for successful accomplishment of an examination on each subject:

(a) *Civil Air Regulations.* Instruction in the following regulations will be given:

(1) Part 1—Certification, Identification, and Marking of Aircraft and Related Products.

(2) Part 3.20—Airplane Categories—3.20 (a) (1), (2), (3).

(3) Part 20—Pilot Certificates.

(4) Part 43—General Operation Rules.

(5) Part 60—Air Traffic Rules, including visual flight rule operation, instrument flight rule operation, VFR and IFR flight plan operation, and air traffic control practices and procedures.

(6) Part 62—Notice and Reports of Aircraft Accidents and Missing Aircraft.

(b) *Meteorology.* Instruction in the following subjects will be given:

(1) Weather recognition.

(2) Icing.

(3) Fog.

(4) Frontal characteristics, with particular emphasis on thunderstorms.

(5) General cloud formations and their relationship to weather characteristics.

(6) Weather maps and symbols.

(7) Teletype sequences and symbols.

(8) Elementary weather forecasting.

(9) Pressure areas and their characteristics, including motion of air masses (wind systems).

(10) Significance of isobaric patterns.

(11) Winds aloft.

(12) Humidity-temperature-dewpoint relationship and significance to pilot.

(13) Precipitation.

(14) Practical application of meteorological knowledge to safe flying practices.

(15) Services and assistance available from the U. S. Weather Bureau.

(c) *Aerial navigation and radio.* Instruction in the following phases will be given:

(1) Navigational methods, including pilotage; dead reckoning; and basic radio aids to navigation, including elementary radio orientation.

(2) Navigational instruments commonly used.

(3) Basic use of computer.

(4) Proper use of flight plans.

(5) Proper use of published aids, such as: Flight Information Manual; Airman's Guide; and Notams.

(6) Explanation of radio aids to flight.

(7) Proper use of radio, including voice procedure and phraseology.

(8) Flight assistance services.

(d) *General service and safety practices.* Instruction in the following procedures and practices will be given:

(1) Care of aircraft, including preflight inspection procedures; general safety precautions; explanation of preventive maintenance, repair, and required inspections.

(2) Care of engines, including preflight inspection procedures; fuel requirements; proper starting, warmup, and shutdown procedures; explanation of preventive maintenance, repair, required inspection, use of operating manual; and functions, limitations, and characteristic errors of instruments required under Part 43.

(3) Flight safety practices, including operation under conditions of high altitude, extreme temperatures, gross weight, icing (wing ice, propeller ice, carburetor ice); adverse surface conditions (rough, soft, slippery); turbulent air (mountain and canyon effects, surface obstruction and thermal effects); marginal visibility (day and night); radio communications failure; low fuel supply, aerodynamic effect of frost or snow on airfoils, maximum range versus maximum endurance operation, proper tiedown or securing of aircraft, emergency assistance, and lost procedures; use of landing lights and flares; obstructions to flight, such as antennae, poles, and birds; and procedure when operating unfamiliar aircraft.

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

50.11–2 *Advanced ground school curriculum (CAA policies which apply to sec. 50.11 (b)).* In providing a curriculum satisfactory to the Administrator, an applicant may elect to adopt the following minimum acceptable curriculum or may submit one of equal or higher standard for approval. The minimum acceptable advanced ground school curriculum will provide for not less than 150 hours of classroom 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 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 exists; and parachutes.

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

Flying Schools

50.12 *Flying school requirements.*

(a) An airport adequate for the aircraft to be used and safe for the flight instruction to be given.

(b) Adequate hangar facilities housing all aircraft used for flight instruction.

(c) Adequate office, rest room, and ready room facilities.

(d) A sufficient number of certificated aircraft appropriate for the flight instruction to be given.

(e) Adequate shop, or readily available facilities suitable to insure proper maintenance of the aircraft to be used.

(f) A sufficient number of certificated mechanics readily available to provide for the inspection, maintenance, and repair of all aircraft used for flight instruction, unless other arrangements are approved by the Administrator.

(g) A sufficient number of regularly available and appropriately rated flight instructors.

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.

(Published in 20 F. R. 4766, July 6, 1955, effective Aug. 15, 1955.)

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, Apr. 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.

(b) Flight equipment for the commercial course must include airplanes of at least two different types[2] which are significantly different in performance, flight characteristics, and operating requirements. One airplane must have a demonstrated cruising speed of not less than 120 m. p. h. using METO power.[3] Airplanes utilized in the radio navigation or instrument flight portion of the curriculum must

[2] Type, as defined in Part 20 of this subchapter and as used in this section, means all aircraft of the same basic design, including all modifications thereto except those modifications which result in a change in handling or flight characteristics.

[3] Appendix C shows a list of makes and models which meet this requirement. Applicants should contact a [Flight Operations and Airworthiness] District Office for approval of unlisted makes and models.

be equipped with the minimum instrumentation and radio equipment required by section 43.30 (c) of this subchapter.

(c) Each training aircraft must have in the aircraft, available to the pilot trainee, an appropriate pilot's training checklist which contains essential operational data concerning prestarting procedure; warmup procedure; pretakeoff procedure; cruising flight procedure; prelanding procedure; shutting down procedure; and emergency procedure for critical flight situations involving aircraft/engine troubles; flight configurations and operational speeds for severe turbulence; and single-engine operation where appropriate.

(d) An approved air agency with commercial rating and/or instrument rating must have available a simulated flight training device acceptable to the Administrator, or must give all required instrument flight training in aircraft.

(Published in 20 F. R. 4766, July 5, 1955, effective Aug. 15, 1955; amended effective July 15, 1957.)

50.12–4 *Maintenance and repair facilities (CAA interpretations which apply to sec. 50.12 (e)).* Applicants must provide by ownership, rental, lease, or other arrangement the facilities necessary to assure that the minimum flight equipment required by section 50.12 can be maintained in a continuous condition of airworthiness. Aircraft must be hangared when not being used except at such times as lunch periods, or brief periods of inactivity due to scheduling.

(Published in 19 F. R. 2443, Apr. 27, 1954, effective July 1, 1954.)

[50.12–5 *Chief flight instructors (CAA policies which apply to sec. 50.12 (g)).*

(a) Each flight course given by a certificated flying school should be conducted under the direct supervision of a chief flight instructor. The chief flight instructor will be designated by the agency. He should possess a good record as a pilot and flight instructor, and the following appropriate qualifications:

[(1) *Primary Flying School.*

[(i) Age—24.

[(ii) Two years' experience as an active certificated flight instructor immediately preceding the date of his designation as chief flight instructor; 500 hours as a certificated primary flight instructor, including 50 in the past year.

[(iii) 1,000 hours as pilot-in-command.

[(2) *Commercial Flying School.*

[(i) Age—24.

[(ii) Three years' experience as an active certificated flight instructor immediately preceding the date of his designation as chief instructor; 1,000 hours as a certificated flight instructor, including 100 in the past year.

[(iii) Instrument rating. However, a chief flight instructor who does not hold an instrument rating but meets all other requirements may designate a certificated instrument flight instructor employed by the agency to supervise the required instrument instruction and conduct instrument proficiency checks. (This provision will be withdrawn when it is apparent that qualified chief pilots with instrument ratings are available to flying schools.)

[(iv) 2,000 hours as pilot-in-command.

[(3) *Instrument Flying School.*

[(i) Age—24.

[(ii) Two years' experience as a certificated instrument flight instructor (a rated flight instructor with an instrument rating prior to Mar. 1, 1957) immediately preceding his designation as chief instructor; 100 hours of instrument flight under actual or simulated instrument flight conditions, and 250 hours as instrument flight instructor.

[(iii) 1,000 hours as pilot-in-command.

[(4) *Flight Instructor Flying School.* Same as for a commercial flying school, except that an instrument rating is not required.

[(b) The agency should assign to the chief instructor, and the chief instructor should accept in writing, or by endorsement on a copy of the assignment, the following responsibilities and duties:[4]

[(1) Certification of all training reports, graduation certificates, and official recommendations of the flying school.

[(2) Maintenance of adequate instructional standards.

[(3) Effective scheduling of aircraft, instructors, and students.

[4 A chief instructor may serve as chief instructor for any number of flight courses, provided he meets the requirements for each.]

[(4) Maintenance of student progress and accomplishment records.

[(5) Conduct of instructor competence and standardization checks.

[(6) Conduct of student proficiency stage checks.

[(7) Maintenance of liaison with the CAA in the application of techniques, procedures, and standards by the school.

[(c) The local General Safety District Office is to be notified in writing of any change in the designation of a chief flight instructor.]

(Published in 20 F. R. 4767, July 6, 1955, effective Aug. 15, 1955; amended in 22 F. R. 3006, Apr. 27, 1957, effective May 15, 1957.)

50.13 *Flying school curriculum.* A curriculum approved by the Administrator for at least one of the following:

(a) *Primary flying school.*

(1) Airplanes—35 hours of flight time, or 30 hours of flight time and such additional specialized instruction as is acceptable to the Administrator.

(2) Helicopters—35 hours of flight time.

(3) Gliders—8 hours of flight time.

(b) *Commercial flying school.*

(1) Airplanes—160 hours of flight time.

(2) Helicopters—160 hours of flight time.

(3) Gliders—20 hours of flight time.

(c) *Instrument flying school.* 30 hours of instrument flying instruction of which at least 20 hours shall be in actual flight; and 30 hours of ground instruction in the subjects of Civil Air Regulations (the regulations in this subchapter), navigation, meteorology, and radio orientation and procedure, as applied to instrument flying.

(d) *Flight instructor school.* 25 hours of flying devoted exclusively to the science of flight instruction and 40 hours of theoretical instruction in subjects covering the fundamentals of giving flight instruction and the analysis and performance of flight technique.

[50.13–1 *Flying school curriculum—airplanes (CAA policies which apply to sec. 50.13).* The Administrator will approve a course which includes the following:

[(a) *Primary flying school curriculum.*

[The required 35 hours of flight time will include the training phases listed below and a demonstration of student performance and knowledge.[5] Student progress checks may apply toward the course time.

[(1) PHASE I—*Basic Flying.*

[(i) *Airplane equipment familiarization.*

[Use of cockpit controls.

[Fuel system operation, octane required.

[Fire extinguisher, first aid kit, etc.

[(ii) *Preflight preparatory procedures.*

[Use of checklist.

[Safety principles for engine.

[Hand signals for ground operations.

[Equipment checks.

[Local taxiing and traffic rules.

[(iii) *Taxiing and parking.*

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

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

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

[(iv) *Takeoffs and landings.*

[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.

[Operations on hard surfaced runways.

[Operations on sod surfaced areas.

[Operations at controlled airports.

[Operations at uncontrolled airports.

[Operations in heavy local traffic.

[Operations in crosswinds.

[Operations in gusty winds.

[Landings using power-on approaches and slips.

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

[(v) *Straight and level flight.*

[5 See appendix D for training procedures and performance standards.]

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

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

[Maintenance of flight path over ground.

[(vi) *Turns.*

[Flight control functions.

[Principles in overbanking tendencies.

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

[Transitions to and maintenance of desired banks and altitudes.

[(vii) *Climbs and glides.*

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

[10°–30° banked turns.

[30°–60° banked turns.

[Spirals with bank at least 45°, through 720°–1080°.

[(viii) *Stalls.*

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

[Stalls and recoveries from takeoff and departure configurations.

[Stalls and recoveries from approach and landing configurations.

[Stalls and recoveries from accelerated maneuvering.

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

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

[Principles for establishing and maintaining slow flight.

[Stabilized slow flight in turns at constant altitude.

[Stabilized slow flight in turning climbs and descents.

[Effects of power usage during slow flight.

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

[(i) *Pattern and track flying.*

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

[Constant radius turns about a point.

["8's" around pylons.

["S" turns across a road.

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

[(ii) *Emergencies and critical situations.*

[Principles and safe flying practices involved, when encountering items below:

[Being lost.

[Low on fuel.

[Turbulent air.

[Adverse flight visibility conditions.

[Radio station shutdowns.

[Motor trouble.

[Loss of performance due to high altitudes, high temperatures, downdrafts in mountainous terrain.

[Instrument / communication / navigational equipment trouble.

[Icing conditions (carburetor, wings, propeller).

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

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

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

[Takeoffs and landings on soft surfaces.

[Takeoffs and landings under conditions of high density/operational altitudes.

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

[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.

[Loading of airplane.

[Weather information.

[Facilities to be used.

[Operations to strange airports of varying size, altitudes, traffic conditions, etc.

[(v) *Radio.*

[Airport traffic control procedures.

[Preparing, filing and closing flight plans.

[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 flying school curriculum.*

[The required 160 hours of flight time will include at least 100 hours of solo flight, of which 20 will be solo cross-country. The curriculum will include at least the training phases and maneuvers listed below, and a demonstration of student proficiency and knowledge.[6] Student progress checks may apply toward the course time.

[(1) PHASE I—*Basic Flying.*

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

[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.

[Use of cockpit controls.

[Fuel system operation, octane required.

[Fire extinguisher, first aid kit, etc.

[(ii) *Preflight preparatory procedures.*

[Principles involved in each preparatory procedure.

[Use of checklist.

[Safety principles for engine.

[Hand signals for ground operations.

[Equipment checks.

[Local taxiing and traffic rules

[(iii) *Taxiing and parking.*

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

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

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

[(If seaplane training.) Principles, procedures and operations on water subject to tidal or current action involving sailing and beaching; docking; and mooring.

[(iv) *Takeoffs and landings.*

[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.

[Operations on hard surfaced runways.

[Operations on sod surfaced areas.

[Operations at controlled airports.

[Operations at uncontrolled airports.

[Operations in heavy local traffic.

[Operations in crosswinds.

[Operations in gusty winds.

[Landings using power-on approaches and slips.

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

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

[(v) *Straight and level flight.*

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

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

[Maintenance of flight path over ground.

[(vi) *Turns.*

[Principles of and familiarization with aerodynamic forces involved and available for turning purposes under full load and varying power conditions.

[Flight control functions.

[Principles in overbanking tendencies.

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

[Transitions to and maintenance of desired banks and altitudes.

[(vii) *Climbs and glides.*

[Principles of establishing and maintaining a normal angle in climbs and descents.

[10°–30° banked turns.

[30°–60° banked turns.

[6 See appendix D for training procedures and performance standards.]

[Spirals with bank at least 45°, through 720°–1080°.

[Use of power and speed control to maintain preassigned rates of descent and ascent.

[(viii) *Stalls.*

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

[Stalls and recoveries from takeoff and departure configurations.

[Stalls and recoveries from approach and landing configurations.

[Stalls and recoveries from accelerated maneuvering.

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

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

[Principles for establishing and maintaining slow flight.

[Stabilized slow flight in turns at constant altitude.

[Stabilized slow flight in turning climbs and descents.

[Effects of power usage during slow flight.

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

[(i) *Pattern and track flying.*

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

[Constant radius turns about a point.

["**8**'s" around pylons.

["**S**" turns across a road.

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

[(ii) *Emergencies and critical situations.*

[Principles and safe flying practices involved, when encountering items below:

[Being lost.

[Low on fuel.

[Turbulent air.

[Adverse flight visibility conditions.

[Radio station shutdowns.

[Motor trouble.

[Loss of performance due to high altitudes, high temperatures, downdrafts in mountainous terrain.

[Instrument / communication / navigational equipment trouble.

[Icing conditions (carburetor, wings, propeller).

[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.*

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

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

[Takeoffs and landings on soft surfaces.

[Takeoffs and landings under conditions of high density/operational altitudes.

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

[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.

[Loading of airplane.

[Weather information.

[Facilities to be used.

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

[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).*

[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.

[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.

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

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

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

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

[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).*

[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 c. g. limits, operational recommended speeds and limitations for the engine and airplane, procedures for use of communication, navigation and flight instrumentation equipment, and procedures to be used under the emergency situations, and for normal gear extension (if applicable).

[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 post-flight procedures.

[(3) *Minimum total course times.*

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

[Solo flight---------- 100 hours.

[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.*

[VFR operations.

[Basic instrument flying.

[Night flying.

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

[(c) *Instrument flying school curriculum.*

[The curriculum will include the training phases and maneuvers listed below, and a demonstration of student proficiency and knowledge.[7] Student progress checks may apply toward the course time.

[(1) PHASE I—*Basic Instrument Flying.*

[(i) *Straight and level flight.*

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

[Smooth air operation at cruising speed.

[Turbulent air operation at recommended rough air speed.

[(ii) *Turns.*

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

[Smooth air operation at cruising speed.

[Turbulent air operation at recommended rough air speed.

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

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

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

[Same as above, but in rough air.

[(iv) *Stalls.*

[Principles and procedures for detection of and recovery from partial and full stalls.

[[7] See appendix D for training procedures and performance standards.]

[Stall detection and recoveries.

[Full stall recoveries.

[(v) *Recovery from unusual attitudes.*

[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).

[Recoveries to level flight attitudes and speeds.

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

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

[(i) *Estimation of arrival times.*

[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.

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

[Flight from point to point.

[(ii) *Tuning radio equipment.*

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

[Use of equipment in flight.

[(iii) *Orientation.*

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

[Range orientation and identification from an unknown position.

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

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

[Range leg or radial alignment and following.

[(v) *Locating range stations.*

[Principles and procedures for locating and identifying arrival over station.

[Location and identification of station.

[(vi) *Instrument approach procedures.*

[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.)

[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.*

[Principles and procedures for execution of the correct missed approach procedures.

[Execution of missed approach procedures for airport involved.

[(viii) *Air Traffic control procedures.*

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

[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 flying school curriculum.*

[The curriculum will include the training phases and maneuvers listed below, and a demonstration of student proficiency and knowledge.[8] Student progress checks may apply toward the course time.

[(1) *Flight portion*____25 hours of flying.

[(i) PHASE I—*Performance skills.*

[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.*

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

[[8] See appendix D for training procedures and performance standards.]

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

[(i) *Fundamentals of flight instruction.*

[Basic learning characteristics.

[Determination of objectives, or aims.

[Instructional management (preparation and execution).

[Teaching methods and techniques.

[Evaluation techniques.

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

[Theory of flight.

[Control functions and effects.

[Common student errors—causes and remedies.

[Common flight instructor deficiencies—causes and remedies.

[Principles of safety.]

(Published in 19 F. R. 2444, Apr. 27, 1954, effective July 1, 1954; amended in 20 F. R. 4767, July 6, 1955, effective Aug. 15, 1955; amended in 22 F. R. 3006, Apr. 27, 1957, effective May 15, 1957.)

50.13–2 *Flying school curriculum—helicopters (CAA policies which apply to sec. 50.13).* The applicant will submit a proposed curriculum which will meet at least the minimum flight experience requirements set forth in section 50.13 of this part.

(Published in 20 F. R. 4768, July 6, 1955, effective Aug. 15, 1955.)

50.13–3 *Flying school curriculum—gliders (CAA policies which apply to sec. 50.13).* The applicant will submit a proposed curriculum which will meet at least the minimum flight experience requirements set forth in section 50.13 of this part.

(Published in 20 F. R. 4768, July 6, 1955, effective Aug. 15, 1955.)

[50.13–4 *Curriculum requirements for graduation from an approved school (CAA policies which apply to sec. 50.13).* An approved school will not graduate a student unless he has completed all of the curriculum requirements of the course in which he is enrolled. A student may be allowed credit, not to exceed 50 percent of the curriculum requirements, for previous pilot experience and knowledge. The school granting the credit will determine by appropriate flight check or examinations the amount of credit to be allowed.]

(Published in 22 F. R. 3008, Apr. 27, 1957, effective May 15, 1957.)

General

50.20 *Application.* Application for an airman agency certificate and rating shall be made upon the form prescribed and furnished by the Administrator, and shall be accompanied by two copies of any proposed curriculum.

50.20–1 *Application (CAA policies which apply to sec. 50.20).* An application for an airman agency certificate and rating may be obtained from the local [General] Safety District Office, which will also furnish full information concerning the execution of the application, and make arrangements for the precertificating inspection of facilities, equipment, and/or other items pertinent to the certificating or rating of an airman agency.

(Published in 19 F. R. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

50.21 *Display.* Display of an airman agency certificate shall be made upon the reasonable request of any person.

50.22 *Duration.* An airman agency certificate shall expire 24 calendar months after the month of issuance.

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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.23 *Renewal.* Application for renewal of an airman agency certificate shall be made on a form furnished by the Administrator and may be mailed or presented to any inspector within 60 days prior to the month of expiration.

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 [General] 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 [Gen-

eral] 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. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

50.24 *Transfer.* An airman agency certificate is not transferable.

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 [General] 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. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

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 [General] 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. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

50.25 *Surrender.* Upon the suspension, revocation, termination, or cancellation of an airman agency certificate the holder thereof shall surrender such certificate to an authorized representative of the Administrator.

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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.25–2 *Involuntary surrender of certificate (CAA policies which apply to sec. 50.25).* 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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.26 *Quality of instruction.* The quality of instruction shall be such that at least 80 percent of the students who apply within 60 days after graduation will be able to qualify for pilot ratings appropriate to the curriculum from which they were graduated.

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 [General] 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 [inspectors] 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 a [General Safety Inspector]. In order to facilitate scheduling of these spot flights checks, the agency will notify the local [General] 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 [inspector,] 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

[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.

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.

(Published in 20 F. R. 4771, July 6, 1955, effective Aug. 15, 1955; amended effective July 15, 1957.)

50.26–2 *Student ground instruction checks (CAA policies which apply to sec. 50.26).* A CAA [General Safety Inspector] 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.

(Published in 20 F. R. 4771, July 6, 1955, effective Aug. 15, 1955; amended effective July 15, 1957.)

50.27 *Student examinations.* Upon the completion of each subject included in an approved curriculum, each student taking the subject shall be given an appropriate examination. The student's written examination, or, in the case of a practical examination, a report thereof, shall be kept by the school for not less than 1 year from the date of the termination of the student's enrollment.

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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.28 *Records.* The school shall keep an accurate individual record of each student, which shall include a chronological log of all instruction, attendance, subjects covered, examinations and examination grades. The entire record shall be certified by an authorized official of the school.

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.[10] Upon course completion or graduation, the entire record or file will be certified by an authorized representative of the agency.

(Published in 19 F. R. 2443–2450 on April 27, 1954, effective July 1, 1954; amended in 22 F. R. 3009, Apr. 27, 1957, effective May 15, 1957.)

50.29 *Graduation certificates.* A graduation certificate on the form prescribed by the Administrator shall be given each student graduated from a certificated airman agency school.

[50.29–1 *Graduation certificate form (CAA policies which apply to sec. 50.29).* The school may use its own graduation certificate. However, if the school uses its own certificate form, then the information contained on the example certificate, Form ACA–391, in appendix A, should be incorporated. Form ACA–391 is available at local General Safety District Offices.]

(Published in 19 F. R. 2449, Apr. 27, 1954, effective July 1, 1954; amended in 22 F. R. 3009, Apr. 27, 1957, effective May 15, 1957.)

50.30 *Inspection.* Upon reasonable request, an applicant for an airman agency certificate, or the holder of such a certificate, shall permit any authorized representative of the Administrator or the Board to inspect its personnel, facilities, equipment, and records.

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 oper-

[10 Credit from approved schools may be transferred 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 credit for attendance and accomplishment which were compiled by the student in the prior approved school(s).]

ation 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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.31 ***Curriculum changes.*** **Changes in an approved curriculum shall not be made without filing immediate notification of such changes with the Administrator. Unless the school is notified to the contrary within 45 days after filing the proposed changes with the Administrator, they will be considered approved.**

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 [General] Safety District Office. This notification will state specifically which portions of the previously approved curriculum are to be changed, and will specifically set forth the proposed changes.

(Published in 19 F. R. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

50.32 ***Maintenance of facilities, equipment, and material.*** **A certificated airman agency shall maintain personnel, facilities, and equipment at least equal in quality and quantity to those required for the issuance of such a certificate.**

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. 2449, Apr. 27, 1954, effective July 1, 1954.)

50.33 ***Advertising.*** **No certificated airman agency shall make any statement pertaining to the school which is false, or which is designed to mislead any person contemplating enrollment in the school. Any advertising which indicates that the school is approved by the Administrator shall clearly differentiate between those courses which have been approved by the Administrator and those which have not.**

50.34 ***Change of location.*** **No change in a location of an approved airman agency shall be made without the prior written approval of the Administrator.**

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 [General] Safety District Office from which forms may be obtained for this purpose. Upon receipt of such notification of intent, the local [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 [General] 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. 2449, Apr. 27, 1954, effective July 1, 1954; amended effective July 15, 1957.)

[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.

†FORM ACA-387
(4-17-47)

DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION

FORM APPROVED
BUDGET BUREAU NO. 41-R067.4

APPLICATION FOR AIRMAN AGENCY CERTIFICATE AND RATING, AND INSPECTION REPORT

APPLICATION IS MADE FOR AN AIRMAN AGENCY CERTIFICATE WITH THE FOLLOWING RATINGS

☐ BASIC GROUND SCHOOL ☐ PRIMARY FLYING SCHOOL ☐ INSTRUMENT FLYING SCHOOL

☐ ADVANCED GROUND SCHOOL ☐ COMMERCIAL FLYING SCHOOL ☐ FLIGHT INSTRUCTOR SCHOOL

I CERTIFY THAT I AM FAMILIAR WITH PART 50 OF THE CIVIL AIR REGULATIONS AND ITS ACCOMPANYING MANUAL 50 AND, TO THE BEST OF MY KNOWLEDGE, BELIEVE THAT MY SCHOOL MEETS THE REQUIREMENTS FOR CERTIFICATION AS PRESCRIBED THEREIN.

(Check applicable item)

☐ THE APPROPRIATE CURRICULUM OUTLINED IN MANUAL 50 WILL BE FOLLOWED

☐ THE CURRICULUM ATTACHED HERETO IN DUPLICATE WILL BE FOLLOWED

NAME OF SCHOOL	ADDRESS OF SCHOOL

DATE _____ SIGNATURE OF APPLICANT _____ TITLE _____

THE FOLLOWING IS FOR THE USE OF CAA PERSONNEL ONLY

INSPECTION REPORT

AIR AGENCY CERTIFICATE NO.

INSTRUCTIONS

The inspector will indicate in appropriate spaces below the results of his inspection of the applicant's facilities. Explain any deficiencies found under Item III, "Remarks".

☐ APPROVED ☐ DISAPPROVED

SIGNATURE OF INSPECTOR

DATE OF INSPECTION

	YES	NO
I-GROUND SCHOOL (NOT APPLICABLE TO PRIMARY AND COMMERCIAL FLYING SCHOOLS)		
A. ARE CLASSROOMS ADEQUATELY HEATED AND LIGHTED AND OF SUITABLE SIZE FOR NUMBER OF STUDENTS ENROLLED?		
B. ARE ADEQUATE TOILET AND WASHROOM FACILITIES PROVIDED?		
C. IS CLASSROOM EQUIPMENT SUFFICIENT FOR INSTRUCTION IN REQUIRED SUBJECTS?		
D. ARE CERTIFICATED GROUND INSTRUCTORS AVAILABLE FOR ALL SUBJECTS FOR WHICH RATINGS ARE PROVIDED IN CIVIL AIR REGULATIONS?		
II-FLYING SCHOOLS		
A. FACILITIES		
1. ARE SUITABLE OFFICE FACILITIES PROVIDED?		
2. IS SUITABLE STUDENT READY ROOM PROVIDED?		
3. ARE ADEQUATE TOILET AND WASHROOM FACILITIES PROVIDED?		
4. IS HANGAR OF SUFFICIENT SIZE TO HOUSE ALL AIRCRAFT USED FOR FLIGHT INSTRUCTION AND TO MEET THE REQUIREMENTS OF MANUAL 50?		
5. ARE SUITABLE SHOP AND MAINTENANCE FACILITIES PROVIDED?		
a. ARE THESE OWNED BY APPLICANT? OR		
b. UNDER SATISFACTORY AND PRACTICAL LEASE TO APPLICANT?		
6. LOCATION OF MAINTENANCE FACILITIES *(Describe)*	XXX	XXX
7. DOES AIRPORT MEET THE MINIMUM REQUIREMENTS OF MANUAL 50 FOR TYPE OF SCHOOL RATING SOUGHT?		
8. ARE ADEQUATE NIGHT FLYING FACILITIES PROVIDED?		
9. WHERE APPLICABLE, GIVE DATE OF STATE APPROVAL FOR COMMERCIAL OPERATION OF THIS FIELD.		

FORM ACA-387 (4-17-47)

II-FLYING SCHOOLS (Continued)	YES	NO
B. FLIGHT EQUIPMENT		
1. ARE AIRCRAFT PROVIDED IN SUFFICIENT NUMBER AND OF A TYPE REQUIRED BY MANUAL 50 FOR THE TYPE OF SCHOOL RATING SOUGHT?		
2. DO THE AIRCRAFT TO BE USED PROVIDE THE NECESSARY EQUIPMENT AND DEVICES REQUIRED BY MANUAL 50 FOR THE TYPE OF SCHOOL RATING SOUGHT?		
3. ARE AIRCRAFT OWNED BY APPLICANT?		
4. IF AIRCRAFT IS LEASED, IS LEASE ARRANGEMENT PRACTICAL AND SATISFACTORY?		
5. ARE SUFFICIENT NUMBER OF PARACHUTES AS REQUIRED BY MANUAL 50 PROVIDED?		
C. PERSONNEL		
1. IF SHOP AND MAINTENANCE FACILITIES ARE OWNED BY APPLICANT, ARE SUFFICIENT CERTIFICATED PERSONNEL AVAILABLE TO MAINTAIN AIRCRAFT?		
a. ARE CERTIFICATED PERSONNEL REGULARLY EMPLOYED? OR		
b. ARE CERTIFICATED PERSONNEL UNDER CONTRACT?		
c. IF CERTIFICATED PERSONNEL ARE UNDER CONTRACT, IS THE ARRANGEMENT PRACTICAL AND SATISFACTORY?		
2. ARE SUFFICIENT NUMBER OF CERTIFICATED FLIGHT INSTRUCTORS REGULARLY AVAILABLE?		
3. NAME AND CERTIFICATE NUMBER OF CHIEF FLIGHT INSTRUCTOR		

NAME	CERTIFICATE NO.

III-REMARKS

23344

Form ACA 391
(Rev. 6-15-41)

UNITED STATES OF AMERICA
DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
WASHINGTON

School Graduation Certificate

This is to certify that _____ (Name)

_____ (Address) was graduated from the

_____ curriculum of the

_____ (School)

_____ (Address) Air Agency Certificate No. _____

on _____ (Date); that he has successfully completed the instruction required by the Civil Air Regulations and is eligible to apply for a _____

Certificate and _____ Rating as issued by the Administrator of Civil Aeronautics.

The record of this graduate is as follows:

Flying time:		COURSES SATISFACTORILY COMPLETED	GRADE
Dual			
Solo			
Total			
Final flying grade			

I certify that the above statements are true.

_____ (School)

By _____ (Signature)

_____ (Title)

Date issued _____

16—6127-1 U. S. GOVERNMENT PRINTING OFFICE

The United States of America

Department of Commerce
Civil Aeronautics Administration

Air Agency Certificate

Number 3-11-05

This certificate is issued to

DOE FLYING SCHOOL

whose business address is

Municipal Airport
Kansas City, Missouri

upon finding that its organization complies in all respects with the requirements of the Civil Air Regulations relating to the establishment of an Air Agency, and is empowered to operate an approved Airman Agency

with the following ratings:

Primary Flying School
Airplanes
Helicopters
Gliders
Commercial Flying School
Airplanes
Helicopters
Gliders

This certificate, unless canceled, suspended, or revoked, shall continue in effect until April 30, 1954.

Date issued:

April 1, 1954

By direction of the Administrator

Chief, General Safety Branch

This Certificate is not Transferable, AND ANY MAJOR CHANGE IN THE BASIC FACILITIES, OR IN THE LOCATION THEREOF, SHALL BE IMMEDIATELY REPORTED TO THE APPROPRIATE REGIONAL OFFICE OF THE CIVIL AERONAUTICS ADMINISTRATION.

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both

U. S. GOVERNMENT PRINTING OFFICE: 1949—O-818984

Form ACA-390
(12-48)

[STUDENT ACCOMPLISHMENT RECORD

FEARLESS FLYERS, Inc.
Midtown, Arkansas

Student JOHN R DOE
Course PRIMARY FLIGHT
Date enrolled NOV. 28, 1956
Date graduated _____

Date	Maneuvers or Items Covered	Flight Time Grnd.	Dual	Solo	Remarks or Appraisal	Signature*
11/28/56	Airplane familiarization, preflight procedures, and straight and level flight.	1:00	:30		Interested - asks good questions. A former model builder	Jack Mosley CFI 41435
12/21/56	Solo progress check	:20	1:00	:15	Check OK - Appears eager to learn.	H. G. Smith Chief Flight Instructor
12/25/56	Takeoffs and landings			:30	Slight X-wind	John R. Doe

*Each flight entry must be signed by (*a*) the instructor for dual instruction flights, (*b*) the chief pilot for student progress checks, or a CAA inspector for student spot checks or official flight tests. The student should sign for each solo flight.

This form is not available from the CAA, but may be used as a model by flying schools for the preparation of their own forms.]

Appendix B

Reference Material

1. PUBLICATIONS

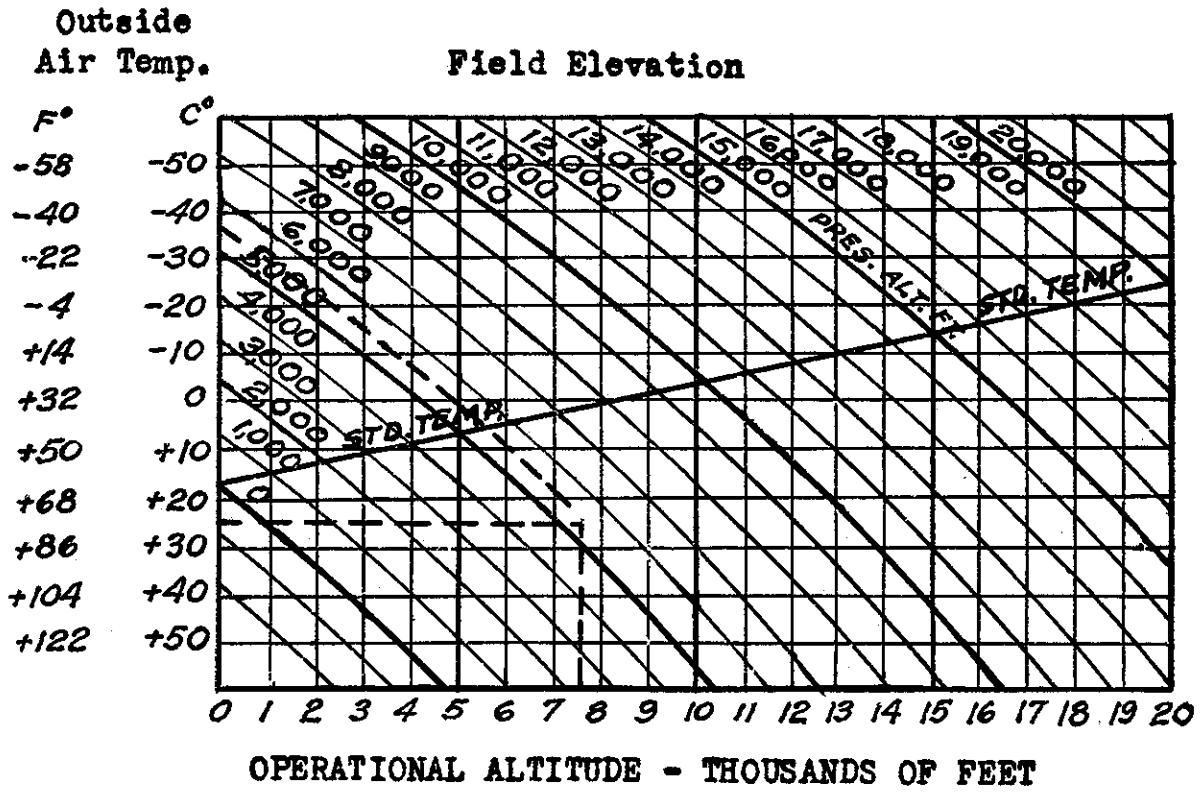
The publications listed below are basic sources of materials included in the CAA written examinations for private pilot, commercial pilot, instrument, and flight instructor ratings. These bulletins, manuals, and references are subject to revision at any time, and care should be taken to ensure use of 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 of Air Traffic	1.00
Airman's Guide (Individual copies vary in price—subscription of 26 issues per year, including Flight Information Manual)	2.75
Facts of Flight	.50
Flight Information Manual	[.50]
Flight [Instructor's Handbook] (CAA Technical Manual No. [105]	1.50
Flight Instructor Oral Examination Guide Book	.05
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
Terrain Flying	.30
[Pilots' Weather Handbook (CAA Technical Manual No. 104)	1.50]
[Pilots' Radio Handbook (CAA Technical Manual No. 102)	.55]

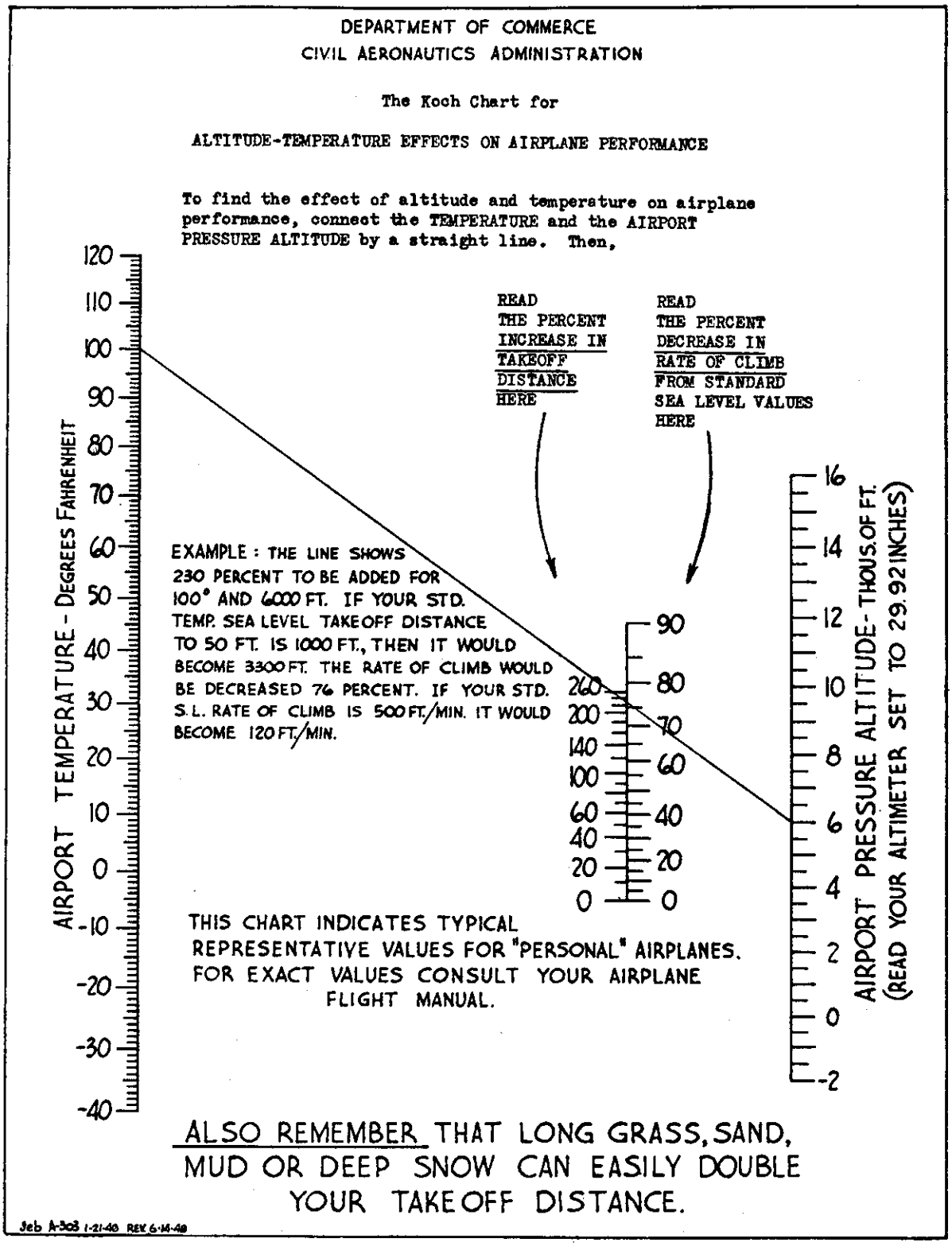
2. OPERATIONAL CHARTS

(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 6-14-40

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 Cruisemaker
Cessna Aircraft Company	170, 172, 180, 182, 190, and 195
Helio Aircraft Corporation	H–391
Meyers Aircraft Company	145
Mooney Aircraft, Inc	Mark 20
[North American and Ryan	Navion]
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 [inspector] 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.

425345 O—57—No. 50——3

[Appendix D

Flight Training Objectives, Standards, and Procedures

[A. PRIMARY FLYING SCHOOL CURRICULUM

[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.

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

[(1) *Airplane equipment familiarization.*

[*Objective:* To familiarize the student with equipment to be used, its use, and proper care.

[*Standard:* Student will demonstrate accurate knowledge of the airplane, its equipment, and operating procedures.

[*Curriculum:* Instruction will include simple explanation of the use of controls including throttle, carburetor heat, mixture control, trim tabs, flaps, stabilizer, brakes, and the proper use of each; fuel system including proper grades of fuel; safety belts; location and use of fire extinguisher (if any); location of first aid kits (if any); and handling and use of parachutes (when required).

[(2) *Preflight prepaartory procedures.*

[*Objective:* To teach student to determine by means of a physical examination, whether the airplane is in a generally satisfactory state of airworthiness, is properly serviced and ready for the operation planned, and to carry out systematic flight preparatory procedures.

[*Standard:* Student will demonstrate ability to make a complete and thorough visual check and to display an accurate knowledge of the preflight inspection, starting, warmup, stopping, loading, and other preparatory procedures recommended by the manufacturer, or by CAA Technical Manual No. 100.

[*Curriculum:* Course will include instruction on and explanation of, the items listed in the manufacturer's checklist or, in the absence of such checklist, a preflight inspection procedure may be used in accordance with the suggested list in CAA Technical Manual No. 100. If an approved aircraft operating manual is available, the instructor will teach the student to use the manual properly.

[The instructor will explain the dangers resulting from the operation of aircraft engines when the aircraft controls are unattended or are attended by persons unfamiliar with them; and such placard limitations as are pertinent to equipment being used. Instructor will also explain flight instruction and ground crew operational hand signals, engine starting (including swinging the propeller), warmup, and stopping procedures; pretaxi checks; radio and/or any special equipment; and local field traffic rules.

[(3) *Taxiing and parking (sailing and docking).*

[*Objective:* To teach the student to operate the aircraft safely, efficiently, and effectively when moving on the surface.

[*Standard:* Student will demonstrate ability to maintain directional and speed control without abrupt or uncontrolled deviations occurring during straight ahead or turning movements; to execute necessary procedures to keep proposed taxi path under observation; to use, correctly and smoothly, the engine, flight, and taxi controls; to maintain safe clearance distances from other aircraft and surface obstacles; to comply with local taxi rules, and any visual or radio control tower instructions; and to conduct and complete engine runup check.

[*Curriculum:* Course will include instruction in proper control coordination and airplane response (including throttle and brakes); upwind, crosswind, and downwind taxiing on both surfaced and unsurfaced areas; engine operational checks, with particular regard for temperatures, ignition, and power; groundspeed control; and precision parking/docking/mooring.

[(4) *Takeoffs and landings.*

[*Objective:* To teach the student to safely and efficiently effect the transition from a normal position of rest on the surface to flight, and return to the surface.

[*Standard:* Student will demonstrate ability to move into takeoff position with precision; to apply power smoothly and positively; to make good a straight ground path on the runway and over the airport while taking off and landing, including compensation for drift, and touchdowns without landing-gear side loads; to maintain recommended angle of attack during takeoff run; to maintain the recommended best rate of climb airspeed and the recommended glide speed at appropriate power settings, within ±5 m. p. h.; to use flaps and other equipment as recommended; to effect landing at a preassigned location (beyond, and within 300 feet of, a prenamed spot or line); and to comply with traffic pattern rules and/or instructions.

[*Curriculum:* Course will include operation from surfaced runways, unsurfaced areas, actual or simulated small fields and soft fields; controlled airports and uncontrolled airports, and at least one airport where high density traffic exists. Upwind, crosswind, and gusty air takeoff and landing techniques as discussed in CAA Technical Manual No. 100 should be explained, demonstrated, and practiced until the objective of takeoffs and landings has been met. The techniques of using slips should be introduced during landing practice.

[(5) *Straight and level flight.*

[*Objective:* To develop in the student the ability to make good a predetermined course or desired track; maintain a predetermined altitude; and maintain an efficient aircraft attitude.

[*Standard:* Student will demonstrate ability to establish a preassigned heading with no more than four initial directional adjustments or corrections, and thereafter maintain the heading within ±10°; to maintain normal cruising speed for a period of at least 5 minutes within ±10 m. p. h.; and to maintain a preassigned altitude within ±200 feet. For this purpose, the airplane will be trimmed for level flight and for the existing power and load conditions.

[*Curriculum:* Course will include teaching the student to maintain attitude by visual reference to the horizon, the sky, or the ground; proper control pressures to attain the objective; following reference lines along the ground; and maintaining straight direction by the "gunsighting" method of lining up reference points ahead of the aircraft along the desired track, and flying over these points. Instructions should also be given in effective recoveries from slight turns, climbs, and dives which constitute the normal deviations from straight and level flight.

[(6) *Turns.*

[*Objective:* To develop in the student the ability to change direction to preassigned headings by means of executing shallow, medium, or steep banked turns, and at the same time demonstrate proper control coordination to maintain altitude, airspeed, and constant rate of turn.

[*Standard:* The student will demonstrate ability in level flight to effect a smooth transition from a stabilized turn to straight flight or to another stabilized turn of a different bank; to maintain a preassigned altitude within ±50 feet for stabilized 10°–30° banked turns and within ±100 feet for stabilized 30°–60° banked turns; and to maintain airspeed within ±5 m. p. h. for stabilized 10°–30° banked turns, and within ±10 m. p. h. for stabilized 30°–60° banked turns.

[*Curriculum:* Course will include control functions; discussion and explanation of overbanking tendency; and other similarly related items.

[(7) *Climbs and glides.*

[*Objective:* To develop in the student the ability to gain desired altitude, or to descend, and at the same time maintain accurate directional control, proper aircraft attitude, and recommended airspeed.

[*Standard:* The student will demonstrate ability, in both climbs and glides, to effect a smooth transition from a stabilized turning condition to another stabilized condition involving a different degree of bank or rate of climb/descent; to maintain a bank within ±10° during a 360° turn, and an airspeed within ±10 m. p. h. of that recommended respectively for the best rate of climb and for approach glides to landings.

[*Curriculum:* Course will include directionally straight climbs and glides, climbing and gliding 10°–30° banked turns right and left, and 30°–60° banked gliding turns (spirals) right and left. Steep banked gliding turns (spirals) will be taught using a bank in excess of 45° and practiced through at least a 720° and a 1080° change in direction. Student should be familiarized with various means of recognizing normal gliding angle, and the importance of using this gliding angle in descents.

[(8) *Stalls*

[*Objective:* To develop in a student the ability to recognize and take prompt correct action in the event of stalls or incipient stalls in any normal flight attitude.

[*Standard:* The student shall receive sufficient stall instruction to enable him to detect incipient stalls encountered from all normally anticipated flight attitudes, and to effect immediate positive recoveries to straight laterally level flight. He shall also be taught to recover from full stalls entered from all normally anticipated flight attitudes with the least loss of altitude consistent with a prompt safe recovery.

[Normal stalls should be entered with and without power from straight flight and from turns. Recoveries from normal stalls should be initiated as directed by the instructor (i) at the first indication of a stall, (ii) when an uncontrollable pitch or roll occurs, or (iii) after a short delay (1 to 3 seconds) following the uncontrollable pitch or roll.

[Accelerated stalls should be entered from steep climbing turns. Cross-control stalls should be entered from turns with and without power. Recoveries from accelerated and cross-control stalls should be initiated approximately one second after the pitch or roll occurs, and should be completed to straight flight with the minimum loss of altitude consistent with a prompt safe recovery.

[*Curriculum.* Normal stalls should be entered from the various flight attitudes selected by gradually increasing the angle of attack to obtain a decrease in airspeed of approximately one mile an hour per second. Recoveries should be accomplished by prompt coordinated use of the flight controls, and if directed by the instructor, by the smooth application of all available power after the resumption of full control is assured.

[The student should learn during his instruction in stalls from turns that the airplane will tend to roll in the direction opposite any slip or skid. A stall from a perfectly coordinated turn will be little different from one from straight flight. An airplane stalled in a slipping turn will tend to roll away from the turn, "over the top," and one stalled from a skidding turn will probably roll in the direction of the turn, "under the bottom." He should know and be able to demonstrate the effect of this.

[Accelerated stalls should be performed by smoothly but rapidly increasing the angle of attack in a coordinated climbing turn with a bank of least 45° until a definite stall is achieved. Such stalls should occur at not less than 5 m. p. h. above the unaccelerated stalling speed, but in no case should such stalls be practiced at more than 15 m. p. h. above that speed because of the extremely high load factors which can be imposed on the aircraft structure.

[Cross-control stalls should be performed from medium banked climbing and gliding turns. The turn should be forced with excess inside rudder, and the resulting tendency of the bank to steepen opposed by liberal use of top aileron. In many airplanes, the rudder can be almost fully depressed and the aileron control moved fully aft and to the outside before a stall occurs. In practice, the displacement of the controls should be very gradual and result in a stall entry with little or no raising of the nose above its normal flight attitude.

[Cross-control stalls tend to be very abrupt, and are illustrative of many inadvertent stalls and spins which involve inexperienced pilots in serious accidents on departures and ap-

proaches. Correct prompt recovery action is necessary to prevent an immediate spin.

[(9) *Flight at minimum controllable airspeed.*

[*Objective:* To demonstrate the care necessary in control usage at extremely slow airspeeds, in order to avoid unintentional stalls, and to develop the applicant's ability to recognize critically slow airspeeds.

[*Standard:* Student will demonstrate ability to maintain control of the airplane in sustained flight attitudes for not less than 2 minutes at an airspeed within 5 m. p. h. of the stalling speed without allowing any unintentional stalls to occur; to maintain level flight within ±50 feet, using power as required, at a preassigned altitude; maintenance of a 10°–30° banked climb with normal climb power and airplane configuration; maintenance of a 10°–30° banked glide with normal slow gliding power and airplane landing configuration.

[*Curriculum:* Course will include flight instruction and practice at a minimum controllable airspeed under stabilized conditions for straight flight at constant altitudes, climbs, descents, constant altitude turns, and climbing and gliding turns. In addition, instruction will include demonstration of effect of power usage and stalled conditions, including reduction of power and resulting stall.

[(10) *Pattern and track flying.*

[*Objective:* To develop the student's ability to make good a desired track under varying conditions of such items as wind and airspeed, and develop ability to manipulate controls properly and subconsciously while attention is centered outside the aircraft.

[*Standard:* Student will demonstrate ability to maintain, in compliance with the traffic pattern, a desired track around an airport or area within ±100 feet horizontally while maintaining an assigned altitude within ±100 feet; and while maintaining airspeed at least 10 m. p. h. above the stalling speed and not in excess of the normal cruising speed. The student will also be expected to observe and identify other airport traffic and surface features.

[*Curriculum:* Course will include instruction in such maneuvers as constant radius turns around a point; 8's around pylons; S-turns across a road; and flying rectangular patterns, in addition to the student's exposure to actual traffic pattern procedure.

[(11) *Emergencies and critical situations.*

[*Objective:* To develop within the student, the judgment and piloting techniques which may be applied to assure safest probable operation under abnormal circumstances caused by conditions affecting aircraft performance, or conditions of adverse weather or terrain.

[*Standard:* No specific quantitative standards can be set which would be applicable to all situations. However, the student is expected to demonstrate his ability to (i) analyze a situation, (ii) plan a positive course of action, (iii) execute the plan, and (iv) make changes during execution only if time and circumstances make a change necessary and practicable.

[*Curriculum:* Course will include instruction in the principles to follow under at least the following types of emergencies and critical situations: getting lost; running low on fuel; encountering turbulent air; getting caught in adverse flight visibility conditions; encountering unexpected radio aid shutdowns; experiencing motor trouble or motor failure; encountering unexpected reductions in performance due to high temperatures, altitudes, or downdraft effects in mountainous terrain; fouled instruments; or icing. Instructional emphasis should be upon analysis of all the factors in the situation, anaylsis of the possible courses of action to extricate oneself, prompt decision upon the most promising course of action, and sticking to the decision unless the pilot is certain that a change can be carried out which will promise a definitely safer action than the initial decision.

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

[*Objective:* To develop in the student the necessary knowledge, judgment, abilities, and techniques to enable him to operate safely into and out of minimum space areas, or from soft terrain such as mud or snow covered surface; and to become familiar with, and be able to utilize maximum performance characteristics of the aircraft.

[*Standard:* For small field, firm surface operations, the student will demonstrate ability to utilize the most advantageous combination of wind, length of takeoff area, and obstacles to be cleared. This demonstration will utilize, if practicable, a "running turn" into the takeoff run, a start from the extreme end of the available takeoff area, obtaining a liftoff as soon as possible, and establishing and maintaining the recommended best angle of climb airspeed and attitude as promptly as is possible after becoming airborne. During the takeoff run there will be no loss of control, and maximum utilization of available takeoff area will be made. During the climbout, airspeed will be maintained within 5 m. p. h. of that recommended as best angle of climb airspeed. Similarly, a student will demonstrate ability in making approaches and landings into a small field by utilizing power approach techniques in accordance with CAA Technical Manual No. 100.

[For soft field operations (grass, snow, spongy sod, etc.), the student will demonstrate ability to take off at best angle of climb and effect a smooth transition to the best rate of climb. Approaches to and landings on soft fields will be demonstrated, in which a power approach and power-stall landing is made with the approach speed being held between normal and normal minus 5 m. p. h., and the rate of descent controlled by smooth power adjustments.

[The above demonstrations should include utilization of recommended flap and power settings for optimum performance. The demonstrations may be made on regular airports by utilizing appropriate areas and by a limiting of the power available for utilization, which would result in the performance simulating that actually obtained from soft and/or high 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.

[(13) *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:* The private pilot flight course shall include at least 5 hours of solo cross-country flying. There should be not less than one dual cross-country flight of at least 2 hours' duration before the first solo cross-country flight.

[The solo flight time shall include a cross-country flight with full stop landings at two or more airports away from the point of departure. The course shall be so arranged that the student cannot use the same check points for any two legs. (Note that the required course may be triangular, or may consist of four or more legs.) The first or the last leg shall be between airports separated by a distance at least equal to two hours normal cruising speed in calm air with the airplane used.

[The course will also include instruction in preflight preparation, such as proper loading in accordance with the aircraft operating limi-

tations, 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.)

[(14) *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

[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.

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

[(1) *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.

[(2) *Preflight preparatory procedures.*

[*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. The why of each, and what the procedure accomplishes should be included.

[(3) *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.

[(4) *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.

[(5) *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.

[(6) *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.

[(7) *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.

[(8) *Stalls.*

[*Objective:* Same as primary flying school curriculum.

[*Standard:* Same as primary flying school curriculum.

[*Curriculum:* Same as primary flying school curriculum.

[(9) *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.

[(10) *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.

[(11) *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.

[(12) *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.

[(13) *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 commercial 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.

[(14) *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 configura-

tions, and power settings to be used upon encountering turbulent air or other unfavorable flying conditions.

[(15) *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.

[*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.

[(16) *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; 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 in section B (11) of this appendix, 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 demon-

strate 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 pitches after reaching a maximum angle of attack.

[(iii) Recovery from partial stalls will be initiated when the instruments indicate the partial stall condition has been reached. Recovery from full stalls is to be initiated after the stall has occurred and the nose has begun to pitch down.

[(iv) The student will be expected to recognize and identify both types of stalls (stall warning device made inoperative—if airplane is so equipped), to take corrective action without exceeding cruising airspeed, and to recover on the original heading within ±10°.

[(5) *Recovery from unusual attitudes.*

[(i) The student will execute recovery to straight and level flight from abnormal attitudes of flight, such as might be encountered in gusty instrument flying weather, without exceeding the airplane's approved operating limitations or load factors.

[(ii) The student will also be expected, in the case of multiengine airplanes, to demonstrate control under engine-out procedures. He will also be expected to comply fully with the recommended procedures and checklist under such circumstances. The student will be expected to demonstrate ability to maintain the recommended engine-out airspeed within ±5 m. p. h. and a heading within ±10°.

[(6) *Estimate arrival times.* The student will obtain weather data, aircraft performance data, flight charts, approach procedures, etc., from which a flight plan shall be prepared, and correctly compute estimated arrival times over checkpoints, at destinations, and at alternate airports.

[(7) *Tuning radio equipment.* The student will make correct selection of frequencies, use of volume control, use of voice and range filters, use of dual radio equipment—if installed.

[(8) *Orientation.* The student will follow a planned course of action for orientation upon a range leg or radial at a preselected altitude, which is maintained within ±100 feet, and make the correct identification of position.

[(9) *Following a range leg or radial.* The student will align with the leg or radial, using heading changes of progressively lesser magnitude after interception at an angle of approximately 45°.

[(10) *Locating range stations.* The student will identify correctly the arrival over the station.

[(11) *Instrument approach procedure.* The student will correctly execute the published approach procedures for the station and airport involved. If the airport being used has standard minimums above 500 feet and 1 mile, due to local conditions, a student is expected to demonstrate his ability to conduct a correct approach to these standard minimums.

[(12) *Missed approach procedures.* The student will execute correctly the published missed approach procedures for the airport being used.

[(13) *Air traffic control procedures.* The student will obtain and correctly adhere to ATC clearances and/or instructions, including holding and emergency procedures.

[*Curriculum:* Instruction will be given in the items and maneuvers listed under "Standards" above and in the subjects specified in section 20.42 (a). In addition, the course of instruction should assure student familiarity and conversancy with radio facility charts, radio range charts, and terminal charts.

[D. FLIGHT INSTRUCTOR SCHOOL CURRICULUM.

[(1) To be acceptable, the required curriculum of at least 25 hours of instructional flying and 40 hours of ground instruction will include the training phases listed below, and a demonstration of student performance to the standards indicated. The flying time curriculum will include at least 25 hours of flying time, of which at least 20 hours shall be set aside exclusively for instruction and practice in the science and techniques of effective flight instruction methods.

[(2) The flight instructor school curriculum will have the following objective, standard, and course requirements:

[*Objective:* To impart to the instructor trainee a thorough understanding of the various items and maneuvers—both in theory and in actual performance, and to develop in the instructor-to-be the knowledge, ability, and techniques which will enable him, in turn, to impart and to develop in others the ability, skill, and techniques which are essential to competent piloting.

[*Standard:* Each flight instructor trainee will be expected to demonstrate the knowledge and skill items to the same standards which apply to pilot student graduates of approved commercial flying schools. In addition, the flight instructor trainee will be expected to demonstrate a comparable degree of skill in the execution of the additional training maneuvers specified below under curriculum coverage.

[*Curriculum:* Instruction within the flight training portion of the curriculum will include at least the following items and maneuvers: all items and maneuvers specified in the Commercial Flying School Curriculum; precision spins of 1½ turns, 2 turns, and 3 turns, and other training maneuvers, such as: Lazy **8**'s chandelles; constant radius turns about a point; **8**'s around pylons; **S**-turns across a road; slow flight across airport without wheels touching, etc.

[The ground instruction portion of the curriculum will comprise: effective instruction principles and methods, including (i) instructor advance preparation, (ii) student preparation, (iii) instructor demonstration, (iv) student participation, and (v) instructor follow-through checks; safe flying habits and principles, including those relating to extricating oneself from critical situations such as (i) getting lost, (ii) running low on fuel, (iii) encountering turbulent air, (iv) getting caught above clouds or in adverse atmospheric visibility conditions, (v) encountering unexpected radio aid shutdown, (vi) experiencing motor trouble, (vii) instrument failures, and (viii) operations under conditions of high temperature/altitude and/or in mountainous terrain; application of learning process characteristics to flight instruction; analysis and performance of maneuvers; methods by which explanations and directions to students can be made clear, simple, and correct; and recognition and correction of student errors.]

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