UNITED STATES OF AMERICA
FEDERAL AVIATION AGENCY
WASHINGTON, D. C.

Civil Air Regulations Amendment 20-12
Effective: March 16, 1960
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## PART 20—PILOT AND INSTRUCTOR CERTIFICATES

### Knowledge, Experience, and Skill Requirements for Private and Commercial Certificates

The adequacy of the knowledge, experience, and skill requirements prescribed for applicants seeking private and commercial pilot certificates has been under evaluation since February 1958, when the Civil Aeronautics Board published and circulated Civil Air Regulations Draft Release No. 58-2 proposing certain amendments to those requirements. Industry comment was requested by April 18, 1958, and the time for submission of comment was later extended to July 15, 1958. The proposed amendments were not acted on by the Board prior to December 31, 1958. The Federal Aviation Agency has continued active consideration of the adequacy of the present requirements of Part 20 and has considered the amendments proposed by Draft Release 58-2 and the industry comment submitted in connection with the release.

We find that Part 20 should be amended to require:

1. Dual instruction in the basic control of the airplane by reference to instruments in the private pilot aeronautical experience requirements, and inclusion in the skill requirements of a demonstration of emergency capability in attitude control simulating loss of visual reference during flight operations.

2. A minimum of 10 hours of instrument flight instruction in the aeronautical experience requirements for the commercial pilot.

3. Inclusion of a demonstration of ability to control the aircraft solely by reference to instruments in the commercial pilot skill test requirements.

4. Familiarity with and a demonstration of the use of radio for communications and navigation in the cross-country requirements for private and commercial pilots.

5. A demonstration of cross-country planned flight in the skill test required for commercial pilots.

Draft Release 58-2 proposed an increase of flight experience from 40 to 50 hours for the private pilot applicant. The comment received showed strong objection to a 10-hour increase, but general agreement with the benefits of some instrument training for the private pilot. Recent research conducted in primary flight training at West Virginia University has demonstrated that students who learn to observe and use flight instruments from the beginning of their flight training are much more proficient in holding attitude, altitude, headings and airspeeds in normal VFR flight. Early training develops a keener appreciation of the conditions which must be avoided to prevent involvement with IFR situations and the realization that only a fully trained and qualified instrument pilot should attempt flight under instrument weather conditions. Further, the trainee is provided with the incentive to secure additional training leading to qualification as an instrument-rated pilot.

Flight training which included the early and integrated use of instruments throughout the course did not appreciably increase the total hours required for private pilot certification and consistently produced more competent applicants than those without benefit of such integrated instrument training.

After consideration of all these factors it is felt that no additional mandatory increase in minimum flight experience for the private pilot applicant should be made. Rather, it is left to the individual ability of the student and his instructor to meet the performance standards set forth in this regulation as aeronautical skill requirements. It is believed that the use of a qualified instrument trained flight instructor will prove economical in the saving of flight time required of the average student to meet these performance standards, although this regulation imposes only the requirement that the instructor be the holder of a current Flight Instructor Certificate.

In contrast with the record of no appreciable increase in the total hours of flight instruction required for producing a better private pilot applicant at the West Virginia University research course, a recent survey of several hundred records chosen at random from Federal Aviation Agency files revealed that the average flight time required by the private pilot applicant under present requirements exceeded 60 hours. This is 25 hours above the approved school minimum and 20 hours above the non-approved school applicant. Federal Aviation Agency records show that about ⅛ of the active flight instructors now hold instrument ratings and it is urged that operators and students alike make full use of these rated instructors as first choice for their training program.

The number of fatal accidents clearly indicates the need for higher private pilot qualifications. During 1958, private pilots were involved in a total of 272 major accidents in which 345 pilots and passengers were killed and 155 seriously injured. Of these accidents, 120 or 44 percent resulted from inability to cope with emergencies which developed primarily en route, such as becoming lost, loss of control in instrument conditions, and collision with objects in reduced visibility. A total of 125 or 46 percent resulted from fundamental weaknesses in pilot judgment or technique such as stall/spin due to inadequate speed control, attempting operation beyond the pilot's or aircraft's capability, inadequate or no preflight planning or preparation, and exhausting or mismanaging fuel.

We find current trends in general aviation are rapidly bringing about significant changes in the use of airplanes. The performance characteristics and equip-

ment of many aircraft now in production permit flights of considerable distance in a matter of a few hours. This desirable feature in itself brings about exposure to variable and unanticipated visibility conditions. Present navigational equipment makes possible and even encourages continuation of flight under conditions of deteriorating weather, approaching darkness, or on top of an overcast. Also, many of today's airplanes are equipped with instruments which will permit attitude control without reference to the ground provided the pilot has been trained to use them. By contrast, general aviation in the past has been characterized generally by local or medium distance flights during which constant weather conditions usually prevailed.

In consideration of these advantages, the flight test for a private pilot certificate is being revised to require a demonstration of ability to control the attitude of an airplane in flight solely by reference to instruments. The training to meet these standards will be integrated with the student's other primary dual instruction and is not to be given as a separate block of instrument flight instruction. Emphasis given in the instrument training shall be toward development of a better trained and more proficient pilot by providing additional tools and teaching their proper use. Many persons opposed this requirement based on the erroneous opinion that each aircraft utilized would require the same full instrumentation necessary for IFR operations prescribed by Part 43 of the Civil Air Regulations. An artificial horizon is desirable; however, for the purpose of providing this instruction, the only required additional instruments over those prescribed for VFR operations by Part 43 is a turn and bank indicator and sensitive altimeter. The turn indicator may be driven electrically or by vacuum derived from a motor-driven or venturi installation. The extended visor cap is recommended as a means of simulating instrument flight conditions. This method permits the flight instructor to better observe and avoid other traffic.

Section 20.44(d) presently provides for 10 hours of instrument flight experience for the commercial pilot applicant but only as an alternative to not having his certificate endorsed to state that fact. This amendment eliminates this provision and makes the 10 hours of instrument flight experience a required standard for the issuance of a commercial pilot certificate. Provision is made for the reissuance of a certificate without endorsement to the holder of a currently endorsed certificate upon showing evidence of having met the instrument flight experience requirements of this amendment. Since there are no operating restrictions issued in connection with the endorsement, it is meaningless except that a certificate so endorsed may not be valid for use in foreign countries because it does not meet the commercial pilot standards prescribed by Annex I of the International Civil Aviation Organization (ICAO). Adoption of this amendment will permit the United States to notify ICAO that our certification standards for the commercial pilot meet this international standard.

The principal reason for the adoption of the 10 hours of flight experience and demonstration of skill stems from the fact a commercial pilot has the privilege of piloting aircraft for hire. During cross-country flight he may encounter unanticipated adverse weather conditions, particularly at night, and he should be able to control the attitude of the airplane by reference to instruments and to cope with reduced visibility conditions in piloting the airplane out of such areas. Therefore, 10 hours of instrument flight experience and a demonstration of ability to control an airplane in flight solely by reference to instruments is being required for the commercial pilot applicant.

It should be clearly understood that the instrument training and demonstration of basic instrument flight capability required by this amendment for private and commercial pilot applicants convey no instrument flying privileges. To engage in instrument operations, the pilot must hold an instrument rating and the airplane must be equipped for IFR operations as prescribed by Part 43 of the Civil Air Regulations.

The changes included in this amendment constitute part of our safety program designed to improve the competence of the student, private, and commercial pilot. Additional revisions of the Civil Air Regulations to further implement this safety program are under consideration and if adoption is found desirable, will be circulated for industry comment. It is to be noted the amendments herewith adopted will come into effect 4 months after the adoption date. This period has been provided to permit pilots now in training ample opportunity to be certificated under the present requirements if desired.

In consideration of the foregoing, and and since the changes included in this amendment substantively agree with those published as a notice of proposed rule making in the FEDERAL REGISTER (23 F.R. 1014), Part 20 of the Civil Air Regulations (14 CFR Part 20) is hereby amended as follows, effective March 16, 1960:

1. By amending § 20.24(b) to read as follows:

**§ 20.24 Flight area limitations.**

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(b) He has received dual instruction in:

(1) Crosswind and simulated soft-field takeoffs and landings;

(2) Climbing and gliding turns at minimum safe speeds;

(3) Cross-country navigation by reference to aeronautical charts;

(4) Safe operating procedures in simulated emergencies such as engine failure, loss of flying speed, marginal visibility, deteriorating weather, getting lost, and similar critical situations;

(5) Conforming with air traffic control instructions by radio and lights; and

(6) The proper use of two-way radio communications, VFR navigation procedures and techniques: *Provided*, That in areas where ground electronic communication equipment and navigational aids are not available within 100 miles of the base of operation, a synthetic trainer may be used for training in air traffic procedures, phraseology, and radio navigation; and

2. By amending § 20.33(b) to read as follows:

**§ 20.33 Aeronautical knowledge.**

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(b) The practical aspects of cross-country flying, including flight planning, map reading, pilotage, radio communication procedures, radio navigation, and emergency procedures.

3. By amending § 20.34 by redesignating the present paragraph (d) as paragraph (e), and by inserting a new paragraph (d) to read as follows:

**§ 20.34 Aeronautical experience.**

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(d) Dual instruction in the control of an airplane solely by reference to instruments, given by the holder of a flight instructor certificate with an airplane rating. The airplane shall be equipped with at least a sensitive altimeter, turn and bank indicator, and a means for simulating instrument flight conditions. This instruction by reference to instruments shall be integrated with the dual flight instruction in primary flight maneuvers given before and after solo; and

4. In § 20.35, by amending paragraph (b), and inserting a new paragraph (g), as follows:

**§ 20.35 Aeronautical skill.**

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(b) Planning of a VFR cross-country flight to a specified destination, reckoning with weather conditions, fuel requirements, check points, estimated time of arrival, available alternate airports, radio communication and navigation procedures, air traffic control procedures, and accomplishing such portion of the planned flight, including change of course to an alternate airport, and execution of emergency procedures, as are necessary to demonstrate proficiency in cross-country flying;

* * * * *

(g) Demonstrate in simulated instrument flight to an FAA Inspector or a designated flight examiner with an instrument rating ability to safely control an aircraft manually by sole reference to the aircraft flight instruments. This demonstration shall include manual control in the following:

(1) Recovery from the start of a power-on spiral;

(2) Recovery from the approach to a climbing stall;

(3) Normal turns of 180° duration left and right to within ±20° of proper 180° heading;

(4) Shallow climbing turns to a predetermined altitude;

(5) Shallow descending turns at reduced power to a predetermined altitude; and

(6) Straight and level flight.

NOTE: The basic criteria for a satisfactory demonstration shall be safe and positive

manual control, not precision in speed, altitude, and direction control. Nevertheless, unsafe or unsure control of airspeed, erratic ... or gain of altitude or consistent failure ... maintain the general direction of flight ... all be disqualifying. The intent of this added aeronautical experience and skill is basically as follows: This student or applicant has just flown suddenly into worsening weather conditions which make further control of the aircraft by visual reference to the ground unsafe or unlikely. He allows the aircraft to assume an attitude that, if continued, would result in a probable uncontrollable maneuver. Can he recover from this position safely and then turn back in the proper direction where known pilotage weather conditions exist, while at the same time adjusting and maintaining altitude control that will clear safely terrain and other obstructions. If he can do this consistently, with positive and safe control, he is a much safer private pilot. It is important, however, that all through the course of instruction, the student has stressed to him the danger of operating into weather flight conditions described above and that this minimum ability can be fatal if proper respect is not maintained by him.

5. By amending § 20.43(a) and (b) to read as follows:

**§ 20.43 Aeronautical knowledge.**

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(a) Meteorology, including recognition of basic weather conditions and trends, and the acquisition and use of weather information disseminated by the U.S. Weather Bureau such as hourly sequence reports, terminal forecasts, winds aloft reports, and reading and interpreting weather maps;

(b) Navigation, including pilotage, ad reckoning, the use of instruments d radio aids to navigation, proper radio frequency utilization, radiotelephone procedures and techniques, flight planning, emergency procedures, preflight and inflight services for pilots, and notices to airmen;

6. By amending § 20.44 (b), (c), and (d) to read as follows:

**§ 20.44 Aeronautical experience.**

* * * * *

(b) 100 hours as pilot in command, including:

(1) 50 hours of cross-country, each flight including a landing more than 25 miles from the point of departure;

(2) Takeoffs and landings from at least 2 different airports in accordance with two-way radio instructions from an airport traffic control tower; and

(3) One cross-country flight of at least 350 miles, including landings at 3 points, one of which must be not less than 150 miles from the point of departure;

(c) 10 hours of dual instruction in airplanes in preparation for the commercial pilot flight test. Such dual instruction shall have been acquired within the 6 months preceding the commercial pilot flight test; and

(d) 10 hours of instruction in the operation of an airplane in flight solely by reference to instruments, which shall include not less than 5 hours of dual instrument instruction, given by a rated instrument flight instructor. The remaining 5 hours may be given by the holder of a flight instructor certificate with an airplane rating.

NOTE: The holder of a commercial pilot certificate bearing an endorsement that he did not meet the required 10 hours of instrument flight experience may have such endorsement removed upon presentation of reliable documentary evidence showing that he has met the 10 hours of required flight instruction and has successfully accomplished the skill test required by § 20.45(e).

7. By amending § 20.45 by inserting new paragraphs (e), (f), and (g) to read as follows:

**§ 20.45 Aeronautical skill.**

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(e) Demonstrate in simulated instrument flight to an FAA Inspector or a designated flight examiner with an instrument rating ability to safely control an aircraft manually by sole reference to the aircraft flight instruments. This demonstration shall include manual control in the following:

(1) Recovery from a well-developed power-on moderate turn spiral in a medium banked attitude.

(2) Recovery from a high-angle climb in a turn.

NOTE: High-angle climb is one that if allowed to continue another 30 seconds at cruising power would result in stalling the aircraft.

(3) Standard rate turns of 180° and 360° duration to within ±10° and ±20°, respectively, of proper heading, and within ±150 feet of altitude.

(4) Maximum safe performance climbing turns of 180° duration followed by continued straight climb to predetermined altitude requiring not less than one minute straight climb performed within ±10 knots of airspeed and ±10° of proper heading.

(5) Two consecutive descending 90° turns using normal approach power for reducing altitude performed within ±10 knots of airspeed and ±10° of proper heading. At completion of first 90° turn continue straight descent for 1 minute. Complete second 90° descending turn and continue straight descent for 1½ minutes.

NOTE: This maneuver can be used to simulate a safe but not precise low approach (1000') to an airport, with the instructor acting as radar advisory control.

(6) Straight and level flight performed within ±10° of proper heading, 100 feet of altitude and 10 knots of airspeed.

NOTE: Safe and positive manual control, not precision, is the basic criteria for a satisfactory demonstration but the commercial pilot applicant must maintain control of the aircraft within the prescribed limits of heading, altitude, and airspeed.

(f) Planning a cross-country flight to a specified destination reckoning with weather conditions and forecasts, winds aloft information, airport and radio navigational facilities; pertinent aircraft characteristics, range, and performance; and use of appropriate charts.

(g) Cross-country flying using pilotage, dead reckoning, and radio aids for navigation, including change of course to an alternate airport, coping with simulated in-flight emergencies, and the use of radio for two-way communications with appropriate ground radio facilities.

**§§ 20.35, 20.45 [Amendment]**

8. By adding a note at the end of §§ 20.35 and 20.45 to read as follows:

NOTE: Detailed information on present flight test procedures and standards are contained in Flight Operation and Airworthiness Release No. 420. Revision of the information in this release will be issued as F.A.A. Bureau of Flight Standards Flight Test Guides and will contain appropriate supplemental information concerning the maneuvers required by these amendments. These flight test guides may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

(Secs. 313(a), 601, 602, 72 Stat. 752, 775, 779, 780; 49 U.S.C. 1354, 1421, 1422)

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JAMES T. PYLE,
*Acting Administrator.*

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