

Title 14—AERONAUTICS AND SPACE

Chapter I—Federal Aviation Agency

[Docket Nos. 719, 873, 1093; Amdt. 121-7]

PART 121—CERTIFICATION AND OPERATIONS: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Miscellaneous Amendments

This amendment completely revises the crewmember and aircraft dispatcher training program requirements contained in Subpart N of Part 121 of the Federal Aviation Regulations.

In addition, amendments are made to certain requirements of Subpart O "Flight Crewmember Qualifications". One amendment concerns the use of approved aircraft simulator training courses in lieu of alternate required proficiency flight checks and also the use of aircraft simulators for certain proficiency flight check maneuvers. Another amendment to this subpart adds a requirement for an initial and annual proficiency check for pilots serving as other than pilot in command and second in command. Additional amendments to Subpart O are made to conform certain requirements with the amended training program requirements.

These amendments are based on three separate notices of proposed rule making issued by the Federal Aviation Agency. These notices were: (1) Draft Release 61-7, "Qualification and Training Requirements for Pilots Other Than Pilots in Command"; (2) Draft Release 61-17, "Use of Aircraft Simulators for Pilot Training and Proficiency Checks"; and (3) Draft Release 62-9, "Approval of Air Carrier Training Programs".

CAR Parts 40, 41, and 42 were recodified into FAR Part 121 effective April 1, 1965, and these amendments are therefore issued as amendments to Part 121. The term "certificate holder" is used in this preamble and in the amendments, as in Part 121, to include all air carriers and commercial operators certificated under Part 121.

The Agency has held several informal meetings since these notices were issued with the organizations representing the persons affected by the three proposals. The most recent of these meetings were held in June and July of 1964. Reports of these meetings are included in the Docket for Draft Release 62-9. This rule reflects the comments received by the Agency at these meetings in addition to the comments received in response to the original notices.

The major proposals from each of these notices and the amendments based thereon are hereinafter discussed separately.

Draft Release 61-7. As proposed in this notice, the recent experience provision is amended to require that those requirements be met by "all pilots who serve as required flight crewmembers, or who are utilized at the flight controls during takeoffs and landings." The present recent experience requirements (i.e., three takeoffs and three landings within preceding 90 days) apply only to pilots serving as pilot in command or second in command. The Air Transport Association of America objected to this

proposal on the ground that it was inconsistent with the Agency's policy with respect to pilot crewmembers not required by the regulations; that is, that the training requirements be consistent with the duties performed. The Agency does not agree that any inconsistency is created. As stated in Draft Release 61-7, the Agency believes that each "required" pilot flight crewmember should be qualified to relieve other pilots at the flight controls during any phase of flight, including takeoffs and landings.

As proposed in Draft Release 61-7, § 121.449 is amended to require that the second in command of a crew of three or more pilots be subject to the same semi-annual proficiency check requirement as a pilot in command and further to require an initial and annual pilot proficiency check for all pilots not covered by the pilot in command and second in command proficiency check requirements.

Draft Release 61-17. The majority of the proposals in this notice were related to minimum standards for the approval of airplane simulators. These standards were adopted as amendments to CAR Parts 40, 41, and 42 effective June 10, 1963. Those portions of Draft Release 61-17 that were not included in the 1963 amendments were related to the use of airplane simulators in conducting pilot proficiency checks. Basically, the proposal sought to incorporate in the rules the substance of CAMs 40.302-3 and -4 (and comparable CAMs to Parts 41 and 42).

As indicated in the notice, even before the 1957 amendment permitting the substitution of an approved course of training in an airplane simulator for every other required proficiency flight check, those certificate holders using approved simulators in their training programs were permitted to conduct all but four of their pilot in command proficiency check maneuvers in the simulator, instead of in an airplane in flight. However, specific approval by the Agency was required before a certificate holder could make such a substitution. The Agency feels that since this program has operated successfully for many years it should be set forth in the rules as proposed in Draft Release 61-17. Accordingly, a new § 121.442 incorporates the provisions proposed in Draft Release 61-17 and presently contained in CAMs 40.302-3 and -4.

Draft Release 62-9. This notice proposed to amend CARs 40, 41, and 42 to specify the procedures and minimum standards to be used in obtaining approval of a training program. As indicated in the draft release, while the CARs were amended effective January 1, 1961, to require "approval" of the training program established by each certificate holder, that amendment did not contain any procedures or minimum standards for obtaining such approval.

Draft Release 62-9 proposed to add an appendix that set forth in detail the curriculum requirements necessary to obtain approval of a training program. Many of the comments received on the notice were critical of the amount of detail included in the proposed rule. It was suggested, that by setting forth the

procedures and minimum requirements in such detail, the Agency would put too much emphasis on uniformity and thereby would discourage the efforts of individual certificate holders to use initiative to improve their training programs. Upon reviewing the proposal, the Agency agrees that the rules should contain only those minimum items that are necessary, in the interest of safety, in every training program. Accordingly, the rule as adopted does not contain the type of appendix originally proposed. Instead the Agency has included in the rules, in as broad terms as possible, those items felt to be essential to every training program. The appendix now being added is basically a table setting forth the programmed hours of training, for each trainee in each major category, that the Agency would consider to be a minimum in the absence of a showing by the certificate holder that circumstances justify a lesser amount. Those circumstances that would justify such a reduction are set forth in § 121.414. The table as adopted is basically the same as Chart 1 contained in the notice.

The rules as adopted make clear the basic requirements for initial and recurrent training for each crewmember and aircraft dispatcher. Provision is made for the revision of an approved training program at the initiative of either the certificate holder or the Administrator. The provisions for revision on the Administrator's initiative are comparable to those contained in the recently adopted continuous maintenance program and set forth in § 121.373.

The provision of § 121.421(a) authorizing the "initial training" of a flight engineer to be given in operations under Part 121 has been deleted. This change is consistent with the Agency's repeal of a comparable authorization in § 40.307 in amendment 40-43. Recurrent training and the annual flight check (except emergency procedures) may, however, be conducted in operations under Part 121 as long as the flight engineer remains qualified to serve in such operations. The basis for this distinction is the Agency's belief that operations under the Part should not be exposed to the hazards that might be created by the use of a flight engineer, whose qualifications have not been determined or have expired.

In view of the requirement that each pilot receive recurrent training each year in each type airplane in which he is to retain qualification, the Agency believes that the requirement that every other proficiency check must be performed in the largest type airplane flown is no longer needed. Accordingly, this requirement is deleted from §§ 121.441 and 121.449.

In view of the detailed crewmember emergency training requirement included in this amendment the training requirement contained in § 121.397(c) is deleted as obsolete.

After further deliberation and in consideration of all comments received in response to DR 62-9, it is not deemed necessary or appropriate at this time to set forth requirements for the minimum number of programmed hours of ground and flight training for training programs

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to FAR Part 121

applicable to airplanes with a maximum certificated takeoff weight of 12,500 pounds or less. Such requirements would only be applicable to a few scheduled certificate holders using small airplanes and located for the most part in Alaska. Such certificate holders' training programs vary considerably depending on the type of operation conducted. Accordingly, standardized programmed hours such as proposed in Chart 2 are not being adopted at this time for application to the approved training programs of certificate holders using small airplanes.

Interested persons have been afforded an opportunity to participate in the making of this amendment (26 F.R. 3438 (DR 61-7); 26 F.R. 8461 (DR 61-17); 27 F.R. 2319 (DR 62-9)), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Chapter I of Title 14 of the Code of Federal Regulations is amended as hereinafter set forth effective August 16, 1965. (Secs. 313(a), 601, 604, 605, Federal Aviation Act of 1958; 49 U.S.C. 1354, 1421, 1424, 1425.)

Issued in Washington, D.C., on May 11, 1965.

N. E. HALABY,
Administrator.

§ 121.433 [Amended]

1. By amending § 121.433(a) by striking the reference to section "121.423" and inserting in place thereof "121.422, 121.425,".

2. By amending § 121.433 to read as follows:

§ 121.439 Pilot qualification: Recent experience.

Unless, within the preceding 90 days, the pilot has made at least three takeoffs and three landings in an airplane of the type in which he is to serve, no certificate holder may use a pilot—

- (a) As a pilot in command;
- (b) As a second in command;
- (c) As a pilot flight crewmember required by this part; or
- (d) At the flight controls of an airplane during takeoffs or landings.

3. By amending § 121.441 as follows:
a. By amending the second sentence of paragraph (b) by striking the word "a" after the words "Administrator or" and by inserting the words "an approved" in place thereof.
b. By striking the third sentence of paragraph (b) and by amending subparagraph (23) thereof to read as follows:

§ 121.441 Pilot checks.

(b) *Proficiency check.* . . .
(23) Flight maneuvers, except that weight and power combinations less than those specified may be used if the performance capabilities of the airplane under the specified conditions are simulated:

(i) At the authorized maximum takeoff weight, takeoff using maximum takeoff power with a simulated failure of the critical engine.

(ii) If a three-engine or four-engine airplane, flight, including maneuvering to a landing at the authorized maximum landing weight, with the most critical combination of two engines inoperative or operating at zero thrust using, where appropriate, applicable climb speeds set forth in the Airplane Flight Manual.

(iii) At the authorized maximum landing weight, simulated pull-out at a safe altitude from the approach configurations with the critical engine inoperative or operating at zero thrust and from the landing configuration with all engines operative.

c. By striking paragraph (d) and by redesignating paragraph (e) as (d).

4. By adding a new § 121.442 to read as follows:

§ 121.442 Use of flight simulator.

(a) *Substitution of approved airplane simulator training course for proficiency flight check.* After the first proficiency check, the satisfactory completion of an approved training course in an approved airplane simulator may be substituted at alternate six-month intervals for the proficiency check required by § 121.441 (b), if the simulator meets the requirements of Appendix B of this part and—

(1) The simulator is maintained at the same level as required for initial approval;

(2) A functional preflight check of the simulator is performed each day before beginning simulator flight training or proficiency checks;

(3) A daily discrepancy log is kept and an entry of each discrepancy is made by the simulator instructor or check airman before the end of each training or check flight; and

(4) If a modification is made to the airplane, a corresponding modification is made to the simulator if necessary for flight crew training or proficiency checks.

The simulator may be used with inoperative instruments or equipment if they are not applicable to the particular phase of training being given.

(b) *Airplane simulator training course requirements.* When a course of training in an approved airplane simulator is to be substituted for a required proficiency check as provided for in paragraph (a) of this section, the certificate holder must comply with at least the following in conducting the course of training:

(1) The course must be conducted in an approved simulator appropriate to the particular type of airplane and must include:

(i) Each flight maneuver required for a proficiency check as specified in § 121.441(b), except maneuvering at minimum speed, landing under circling approach conditions, takeoffs, and landings with simulated engine failures, and the instrument approach procedures for which the lowest minimums are approved.

(ii) Appropriate maneuvers peculiar to the particular type of airplane (such as dutch roll);

(iii) At least four hours of simulator flight training time and instruction in all normal and emergency procedures ap-

propriate to the particular type of airplane;

(iv) At least two hours of briefing and debriefing on the maneuvers and procedures involved.

(2) A sufficient number of airplane simulator instructors must be provided. Each instructor must hold, or have held, a valid airline transport pilot certificate and have completed, to the satisfaction of an approved check airman or the Administrator, the approved pilot ground training course and a complete airplane simulator flight training course for the type airplane simulator on which he is to instruct.

(3) Satisfactory completion of the approved simulator course by each trainee must be certified to by an approved check airman or the Administrator.

(4) A record system must be established and maintained on each trainee indicating the kind, amount, and dates of training received and certification of satisfactory completion.

(c) *Use of approved airplane simulator as part of required proficiency check.* In addition to the authorization contained in paragraph (a) of this section for the substitution of an approved airplane simulator training course for certain proficiency checks required by § 121.441(b), an approved airplane simulator may be used in the conduct of such a proficiency check as follows:

(1) An approved airplane simulator may be used to conduct all required maneuvers except those excluded in paragraph (b)(1)(i) of this section.

(2) Except for the oral equipment examination and the maneuvers associated with orientation, beam bracketing, cone identification, loop orientation, and other such maneuvers authorized to be given in a synthetic trainer in subparagraph (24) of paragraph (b) of § 121.441, those parts of a required proficiency flight check given in an approved airplane simulator under subparagraph (1) of this paragraph must be satisfactorily demonstrated to an approved check airman or the Administrator.

§ 121.443 [Amended]

5. By amending § 121.443(a) by inserting the words "an approved" immediately after the words "appropriate instructor or".

6. By amending § 121.449 to read as follows:

§ 121.449 Proficiency checks: Second in command and other pilots.

(a) A certificate holder may not use a pilot as second in command or in any other capacity as a pilot crewmember (other than pilot in command) unless he has satisfactorily shown to the Administrator or an approved check pilot that he is able to pilot and navigate each airplane that he is to fly and to perform his assigned duties. Thereafter, he may not serve as second in command or in any other capacity as a pilot crewmember (other than pilot in command) unless each 12 calendar months he satisfactorily completes a similar pilot proficiency check.

(b) Except as provided in paragraphs (c) and (d) of this section, the profi-

ciency check must include at least an oral or written equipment test and the following procedures and flight maneuvers:

(1) Takeoffs and landings.
(2) The procedures and flight maneuvers set forth in §§ 121.418(a) (5) through (8) and 121.420(a).

(c) After the first proficiency check, the satisfactory completion of an approved training course in an approved airplane simulator that meets the requirements of § 121.442(a) may be substituted at alternate 12 calendar month intervals for the proficiency checks required by paragraph (a) of this section. Satisfactory completion of a proficiency check in accordance with § 121.441 or § 121.442 meets the requirements of this section.

(d) For pilots who are not to serve at the flight controls during takeoff or landing, the initial and annual proficiency checks need include only the assigned flight duties (including flight emergencies) and the maneuvers and procedures set forth in § 121.418(a) (5) through (9).

(e) For pilots who are to serve as second in command of an operation requiring three or more pilots, the proficiency check requirements are the same as those required for a pilot in command in § 121.441 and must be completed every 6 months.

(f) The provisions and limitations set forth in § 121.442 with respect to the use of approved airplane simulators in substitution for or in the conduct of proficiency checks, are also applicable to the proficiency check requirements of this section.

§ 121.397 [Amended]

7. By striking paragraph (c) of § 121.397.

§ 121.463 [Amended]

8. By striking the reference to section "121.425" in § 121.463(a) and by inserting in place thereof a reference to "121.423".

9. By amending Subpart N of Part 121 and by adding an Appendix E to Part 121 as hereinafter set forth.

Subpart N—Crewmember and Aircraft Dispatcher Training Program

- Sec.
- 121.410 Applicability.
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 - 121.423 Aircraft dispatcher training: Domestic and flag air carriers.
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 - 121.425 Initial flight assignments on a particular type of airplane.

AUTHORITY: The provisions of this Subpart N issued under secs. 813(a), 601, 604, and 605, Federal Aviation Act of 1958; 49 U.S.C. 1354, 1421, 1424, and 1425.

Subpart N—Crewmember and Aircraft Dispatcher Training Program

§ 121.410 Applicability.

Except where otherwise stated, this subpart prescribes requirements applicable to each certificate holder for establishing and maintaining a training program for each crewmember and each required aircraft dispatcher.

§ 121.411 Training program: General.

(a) Each certificate holder shall—
(1) Establish, obtain approval of, and maintain a training program that meets the requirements of this subpart and that ensures that each crewmember and each aircraft dispatcher is adequately trained to perform his assigned duties;

(2) Provide adequate ground and flight training facilities and properly qualified instructors for the training required by this subpart;

(3) Provide and keep current, with respect to each airplane type it uses, appropriate course material, examinations, training forms, instructions, and procedures for use in conducting the checks required by this subpart; and

(4) Provide enough approved check airmen (who hold at least the same airman certificates and ratings that the airman being checked is required to hold) to conduct the flight checks required by this part.

(b) No certificate holder may use any crewmember or aircraft dispatcher in operations under this Part unless before serving in such operations the crewmember or dispatcher has—

(1) Satisfactorily completed the appropriate initial training phase of the certificate holder's approved training program; and

(2) Thereafter, at least once each 12 months, has satisfactorily completed the appropriate recurrent training phase and any required checks.

(c) Whenever a crewmember or aircraft dispatcher who is required to take recurrent training, a flight check, or a competence check, takes that check or completes that training in the calendar month before, or the calendar month after, the calendar month in which it becomes due, he is considered to have taken or completed it in the calendar month in which it became due.

§ 121.412 Training program: Approval and revision.

(a) To obtain initial approval of its training program or approval of any revision thereto, each certificate holder must submit to the Administrator—

(1) Three copies of the proposed curriculum; and

(2) Training forms, records, and any other relevant material requested by the Administrator.

(b) The Administrator approves a training program or revisions to an approved training program if he finds that the curriculum complies with this subpart and Appendix E of this part.

(c) Whenever the Administrator finds that revisions to an approved training program are necessary for the continued adequacy of the program, the certificate holder shall, after notification by the Administrator, make any changes in the

program found by the Administrator to be necessary. A certificate holder may petition the Administrator to reconsider the notice to make a change in a program. The petition must be filed with the FAA Air Carrier District Office charged with the overall inspection of the certificate holder's operations within 30 days after the certificate holder receives the notice. Except in the case of an emergency requiring immediate action in the interest of safety, the filing of the petition stays the notice pending a decision by the Administrator.

§ 121.413 Certification of completion of training.

Each instructor, supervisor, or approved check airman who is responsible for particular initial or recurrent training or a flight check shall certify as to the proficiency of the crewmember or dispatcher concerned after he completes that training or check. That certification shall be made a part of the crewmember's or dispatcher's record.

§ 121.414 Curriculum requirements.

(a) *General.* The training program for each crewmember and dispatcher must consist of appropriate ground and flight training as required in this subpart and except as provided in paragraph (b) or (c) of this section, must include the programmed hours of initial and recurrent training set forth in Appendix E of this part. The certificate holder shall standardize procedures for each flight crew function so that each flight crewmember knows the functions for which he is responsible and the relation of those functions to the functions of other flight crewmembers.

(b) *Reduction in programmed hours: General.* A certificate holder may apply to the Administrator for a reduction in the programmed hours of training for the following situations:

(1) When a crewmember's or dispatcher's training and experience in previous training courses, including approved training courses conducted by another certificate holder, ensure that an adequate level of ability and proficiency would result from a modified training course and the certificate holder's training record contains satisfactory evidence to substantiate the prior training and experience.

(2) When a modified training course will adequately ensure proficiency for crewmembers and dispatchers transitioning from one airplane type to a similar airplane type (differences training).

(3) When a crewmember is transitioning from one crewmember function on an airplane to another crewmember function, for which he holds an appropriate airman certificate, on the same or a similar type airplane.

(4) When a re-evaluation of an approved training program shows that improvements in methods, training aids, quality of instruction, or any combination thereof, have increased training effectiveness to warrant the reduction.

(c) *Reduction in programmed hours: Initial flight training and initial flight assignments.* A reduction in the programmed hours of initial flight training is permitted as follows:

(1) A flight crewmember who progresses successfully through the initial flight training in less than the programmed flight time for that phase may be flight checked at that stage of the training by an approved check airman or by the Administrator, if recommended by the certificate holder's instructor or approved check airman. Whenever more than 20 percent of the flight checks given under this paragraph are unsatisfactory, the Administrator rescinds this privilege until he finds that satisfactory means have been taken to improve the effectiveness of the training.

(2) Whenever the hours of training in an approved airplane simulator set forth in column III of Appendix E are included in the initial flight training curriculum, the number of hours of initial flight training required in column II may be reduced by 25 percent. The Administrator may after evaluation grant proportionate reductions based on the use of other procedural trainers.

(3) The hours of initial flight assignment set forth in column V of Appendix E may be reduced (not to exceed 50 percent) for pilots and flight engineers by substituting one takeoff and one landing for each required hour of flight.

(4) A pilot who has satisfactorily completed the required programmed hours of initial training for second in command on a particular airplane type may qualify as pilot in command of that type airplane by completing the programmed hours of upgrade training set forth in Appendix E, in place of the programmed hours of initial training for that position.

(d) *Reduction in programmed hours: Recurrent ground training.* A certificate holder may apply to the Administrator for a reduction (not to exceed 25 percent) in the programmed hours of recurrent ground school training when the certificate holder uses a directed study course as part of its recurrent ground training.

§ 121.415 Synthetic trainers.

(a) *Approved airplane simulator.* An approved airplane simulator, appropriate to the particular type airplane, may be used to accomplish any training required in this subpart, unless that training is required to be performed in actual flight.

(b) *Use of synthetic trainers other than approved simulators.* Procedures trainers, systems trainers, or other training devices that are shown to be adequate for a particular phase of training required in this subpart may be used for that training unless it is required to be performed in actual flight.

§ 121.416 Crewmember emergency training.

(a) Each certificate holder shall design its training emergency procedures to give each crewmember who is assigned emergency and evacuation functions instruction in the appropriate emergency procedures listed below, including assignments in an emergency and coordination among crewmembers, and individual instruction in the location and operation of all emergency equipment used in ditching and evacuation:

(1) Procedures for handling failure of an engine, engines, or other airplane components or systems.

(2) Procedures for handling—

(i) Emergency decompression;

(ii) Fire in the air or on the ground;

(iii) Ditching; and

(iv) Evacuation.

(3) The power setting for maximum endurance and maximum range.

(b) The certificate holder shall give each crewmember, at least once each 12 calendar months, recurrent training in the emergency procedures set forth in this section.

(c) Synthetic trainers approved to simulate flight operating emergency conditions, static airplanes, ground demonstrations, classroom lectures, films, or other training devices, as appropriate, may be used for training crewmembers in emergency procedures if the method used ensures that each crewmember is adequately trained in the operation or use of all equipment such as lifevests, oxygen, oxygen masks, escape ropes and chutes, and emergency exits.

(d) The certificate holder shall give instruction, by lectures and films (or other equivalent means approved after demonstration) to each crewmember performing duties on pressurized airplanes operated above 25,000 feet covering at least—

(1) Respiration;

(2) Hypoxia;

(3) Duration of consciousness at altitudes without supplemental oxygen;

(4) Gas expansion;

(5) Gas bubble formation; and

(6) Physical phenomena and incidents of decompression.

(e) Each certificate holder shall include in its emergency training program drills, as appropriate to each type airplane and its equipment, using established procedures for:

(1) Ditching.

(2) Evacuation.

(3) Fire extinguishing.

(4) Operation and use of emergency exits.

(5) Use of evacuation chutes.

(6) Placing of escape ropes.

(7) Administration of crew and passenger oxygen.

(8) Removal of liferafts from airplane, inflation of rafts, and boarding of passengers and crew.

(9) Putting on and inflation of lifevests.

(10) Handling of passengers during emergencies.

In conducting drills, each certificate holder shall ensure that each trainee actually performs each function or action appropriate to his duties except those functions or actions that the Administrator finds can be adequately learned by the trainee through demonstration.

§ 121.417 Ground training: Pilots.

(a) The initial ground training that the certificate holder must provide for each pilot before he serves as a pilot flight crewmember must include at least instruction in—

(1) The appropriate provisions of the certificate holder's operations specifica-

tions and of the Federal Aviation Regulations, especially the operating and dispatch or flight release rules and airplane operating limitations;

(2) Dispatch procedures (domestic and flag air carriers) or flight release procedures (supplemental air carriers and commercial operators) and appropriate contents of the manuals;

(3) Duties and responsibilities of crewmembers;

(4) The type of airplane to be flown, including a study of the airplane, aircraft engines, major components and systems, performance limitations, cruise control, fuel consumption, flight planning, standard and emergency operating procedure, and appropriate contents of the approved Airplane Flight Manual;

(5) Principles and methods for determining weight and balance limitations for takeoff and landing;

(6) Navigation and the use of appropriate navigation aids, including instrument approach facilities and procedures that the certificate holder is authorized to use;

(7) Air traffic control systems and procedures, and pertinent ground control letdown procedures

(8) Enough meteorology to ensure a practical knowledge of the principles of icing, fog, thunderstorms, and frontal systems including, as appropriate, high altitude weather phenomena;

(9) Procedures for operating in turbulent air including, as appropriate, clear air turbulence, icing, hail, thunderstorm, and other potentially hazardous meteorological conditions; and

(10) Communications procedures and communications equipment failure procedures.

(b) Each certificate holder shall give each pilot—

(1) Any additional ground training necessary to ensure qualification in new equipment, procedures, or techniques; and

(2) Recurrent ground training every 12 calendar months to ensure his continued proficiency in procedures, techniques, and information essential to the satisfactory performance of his duties.

§ 121.418 Flight training: all pilots.

(a) The initial flight training that the certificate holder must provide for each pilot before he serves as a pilot flight crewmember must include at least the approved programmed hours of flight instruction and practice in the following:

(1) Assigned flight duties.

(2) Takeoffs and landings during day and night in each type of airplane in which he is to serve as a pilot.

(3) Normal and emergency flight maneuvers in each type of airplane in which he is to serve as pilot.

(4) Flight under simulated instrument conditions.

(5) Climbs and climbing turns.

(6) Maneuvers at minimum speeds.

(7) Engine shutdown and restart.

(8) Approaches to stalls.

(9) Flight under simulated IFR conditions using each kind of navigation facility used in normal operations.

(b) A pilot qualifying to serve as other than pilot in command or second in command shall show the Administrator or

an approved check pilot that he is able to take off and land each type of airplane in which he is to serve.

(c) Each certificate holder shall give each pilot—

(1) Any additional flight training necessary to ensure qualification in new equipment, procedures, or techniques; and

(2) Recurrent training each 12 calendar months consisting of at least the approved programmed hours of flight instruction and practice in the items set forth in paragraph (a) of this section and any required flight checks in each type airplane on which the pilot serves as a pilot and in which he is not required to receive a proficiency check or in substitution a simulator training course under § 121.441 or § 121.447.

(d) In addition to the initial and recurrent training required by this section, each certificate holder must provide any additional initial and recurrent training required in this subpart, as appropriate to the position in which the pilot is to serve.

§ 121.419 Flight training: Pilot in command and second in command in a crew requiring three or more pilots.

(a) *Initial.* The initial flight training that the certificate holder must provide for each pilot before he serves as a pilot in command or second in command of an operation that requires three or more pilots must include the approved programmed hours of flight instruction and practice in at least the maneuvers and procedures set forth in § 121.441(b) in each type airplane (in which he has not previously qualified) to be flown by him, and in addition the following:

- (1) Briefing session.
- (2) Preflight inspection of the airplane.
- (3) Pretakeoff checks.
- (4) Crosswind takeoffs.
- (5) Operation of systems controls at the flight engineer station.
- (6) If appropriate to training in the particular type airplane, zero flap landings, dutch rolls, turns with and without spoilers, tuck and Mach buffet, procedures for runaway or jammed stabilizer, landing and go around with the horizontal stabilizer out of trim.
- (7) In flight or in a static airplane, airplane simulator, procedures or systems trainer, or other appropriate training device—

(i) Normal operation as appropriate to the particular type airplane of the pressurization, pneumatic, air conditioning, fuel, oil, electronic, electrical, hydraulic, and flight control systems; and

(ii) In-flight emergency procedures, including, as appropriate to the particular type of airplane: powerplant, heater, cargo compartment, cabin, flight deck, wing, and electrical fires; smoke removal; electrical, hydraulic, flight control, and flight instrument system malfunction or failures; decompression; and fuel dumping.

In conducting a takeoff with a simulated failure of the critical engine under § 121.441(b)(23) in transport category airplanes, the engine failure must be simulated as close as possible to the critical engine failure speed V_1 and climb-out

must be made as close as possible to the takeoff safety speed V_2 , and the pilot shall determine the values for V_1 and V_2 .

(b) *Recurrent.* Each certificate holder shall give each pilot in command and second in command in an operation that requires three or more pilots at least two periods of recurrent flight training within each 12 calendar month period that together consist of at least the approved programmed hours and that include the maneuvers and procedures set forth in § 121.441(b). The recurrent training must be given in each type airplane in which the pilot is to retain qualification, except that where a pilot is qualified in more than one airplane type he need only be given one period of training in each type within each 12 calendar month period. Satisfactory completion of a required proficiency check in a particular type airplane under § 121.441 or § 121.442 is considered to satisfy the recurrent flight training or flight check required by this section in that type airplane.

§ 121.420 Flight training: Second in command and certain other pilots.

(a) *Initial.* The initial flight training that the certificate holder must provide for each pilot before he serves as second in command in an operation other than an operation requiring three or more pilots, before he serves at the flight controls during takeoff or landing, or before he serves as pilot (other than as pilot in command or second in command) in an operation requiring three or more pilots, must include the approved programmed hours of flight instruction and practice in at least the following maneuvers and procedures in each type airplane (in which he has not previously qualified) to be flown by him:

- (1) Assigned flight duties of second in command including flight emergencies.
- (2) Taxiing.
- (3) Takeoff and landing with simulated engine failure.
- (4) Flight under simulated IFR conditions including instrument approach at least down to circling approach minimums and a simulated missed approach using that kind of approach procedure for which the lowest minimums are approved.
- (5) Flight under simulated IFR conditions using each kind of navigational facility and letdown procedure that is used in normal operations. Except for those approach procedures for which the lowest minimums are approved, letdown procedures may be given in a synthetic trainer that has the radio equipment and instruments necessary to simulate other navigational and letdown procedures approved for the certificate holder.
- (6) Except for zero flap landing, the training set forth in § 121.419(a) (6) and (7).

(b) *Recurrent.* Each certificate holder shall give each pilot subject to the requirements of this section, recurrent training at least once each 12 calendar months. The recurrent training must—

(1) Consist of at least the approved programmed hours of training in the maneuvers and procedures set forth in subparagraphs (1) through (5) of paragraph (a) of this section and in emergency procedures.

(2) Be given in each type airplane in which the pilot is to retain qualification, except that satisfactory completion of a required proficiency check in a particular type airplane under § 121.441, § 121.442, or § 121.449 is considered to satisfy the recurrent flight training or flight check required by this section in that type airplane.

§ 121.421 Flight engineer training.

(a) The initial training that the certificate holder must provide for each flight engineer before he serves as flight engineer must include at least the approved programmed hours of ground and flight training in the following:

(1) Ground training in the subjects specified in subparagraphs (1) through (5) of § 121.417(a) and those parts of subparagraphs (8) through (10) of that paragraph relating to his duties, functions, and responsibilities;

(2) Enough flight training on each type airplane on which he is to serve to be proficient in the duties assigned to him and a flight check that includes the following:

- (i) A preflight inspection.
- (ii) Performance of assigned flight engineer duties accomplished from the flight engineer station during taxi, run-up, takeoff, climb, cruise, descent, approach, and landing.
- (iii) Normal and emergency or alternate operation of all airplane systems.
- (iv) Accomplishment of appropriate functions and computations, such as fuel management and fuel consumption records.

(b) Each certificate holder shall give each flight engineer—

(1) Any additional ground and flight training necessary to ensure his qualification in new equipment, procedures, and techniques; and

(2) At least once each 12 calendar months—

(i) A flight check (that conforms with the initial flight check) in each type airplane in which he is to retain qualification; and

(ii) Recurrent ground and flight training that includes at least the programmed hours set forth in the certificate holder's approved training program to ensure his continued proficiency with respect to procedures, techniques, and information essential to the satisfactory performance of his duties.

(c) Satisfactory completion of the flight check items set forth in subparagraph (2) of paragraph (a) of this section in each type airplane in which a flight engineer serves may be substituted for the programmed hours of recurrent flight training otherwise required in the approved training program for that type airplane.

(d) Except for emergency procedures and as prohibited in § 121.453, a recurrent flight check may be given in operations under this part or the entire check (excluding preflight inspection) may be given in a synthetic trainer that is representative of that type airplane.

§ 121.422 Flight navigator training.

(a) The initial training that the certificate holder must provide for each flight navigator before he serves as a flight navigator must include at least the

approved programmed hours of ground and flight training in the following:

(1) Ground training for each type airplane on which he is to serve, in at least the applicable parts of subparagraphs (1) through (4) and (6) through (8) of § 121.417(a) and in the following:

(i) Limitations on climb, cruise, and descent speeds.

(ii) Each item of navigational equipment installed, including relevant radio, radar, and other electronic equipment.

(iii) Relevant performance information in the certificate holder's manual.

(iv) Airspeed, temperature, and pressure indicating instruments or systems.

(v) Kinds of compasses, limitations, and methods of compensation.

(vi) Cruise control charts and data, including fuel consumption rates.

(2) Enough flight training to ensure his proficiency in the duties assigned to him.

(b) Each certificate holder shall give each flight navigator—

(1) Any additional ground and flight training necessary to ensure his qualification in new equipment, procedures, and techniques; and

(2) At least once each 12 calendar months, recurrent ground and flight training and a flight check to ensure his continued proficiency.

(c) The flight training required by this section may be given during flights under this part if given under the supervision of a qualified flight navigator. The flight checks required by this section may be given during flights under this part or in a synthetic trainer in place of a check in flight.

§ 121.423 Aircraft dispatcher training: Domestic and flag air carriers.

(a) The initial training each domestic and flag air carrier must provide for each aircraft dispatcher before he serves as a dispatcher must include at least the programmed hours of training set forth in the approved training program. In addition, each aircraft dispatcher shall, before performing duties as an aircraft dispatcher, satisfactorily demonstrate to the supervisor or ground instructor authorized to certify his proficiency, his knowledge of the following:

(1) Contents of the air carrier operating certificate.

(2) Appropriate provisions of the air carrier's operations specifications, manuals, and the Federal Aviation Regulations.

(3) Communications facilities used, including characteristics, limitations, and normal and emergency procedures.

(4) Navigational aids and publications.

(5) Meteorology, including types of meteorological information and forecasts, interpretation of weather data including forecasting of en route and terminal temperature and other weather conditions, frontal systems, wind conditions, and use of weather charts, actual and prognostic, for various altitudes.

(6) Flight operations procedures including the following:

(i) Duties and responsibilities of pilots and dispatchers.

(ii) Weight and balance computations.

(iii) Basic airplane performance dispatch requirements and procedures.

(iv) Notam system.

(v) Flight planning including track selection, flight time analyses, and fuel requirements.

(7) Airports used and the terrain en route.

(8) Prevailing weather phenomena.

(9) Sources of weather information available.

(10) Pertinent air traffic control procedures.

(11) Emergency procedures.

(12) Airplane performance information (applicable to each type airplane operated by the air carrier for which the dispatcher is responsible) including at least—

(i) Cruise control methods, procedures, and data;

(ii) Airplane limitations;

(iii) Airplane performance data;

(iv) Minimum equipment list; and

(v) Flight planning.

(b) The training program must emphasize emergency procedures, including the alerting of proper governmental, company, and private agencies to give the maximum help to an airplane in distress.

(c) Each air carrier shall give each dispatcher—

(1) Any additional training necessary to ensure his qualification for new equipment, procedures, and techniques; and

(2) At least once each 12 calendar months, recurrent ground training (consisting of the programmed hours set forth in the approved training program) and a competence check to ensure his continued competence with respect to the procedures, techniques, and information essential to his duties.

§ 121.424 Flight attendant training.

(a) The initial training that the certificate holder must provide for each flight attendant before he serves on a flight under this part must ensure that such crewmember is fully qualified to perform the duties assigned during flight time. This training must consist of at least the programmed hours of initial training set forth in the certificate holder's approved training program including at least the following, as appropriate to assigned duties and responsibilities:

(1) Authority of the pilot in command.

(2) Passenger handling, including procedures to be followed in the event of the presence of deranged persons or other persons whose conduct might jeopardize the safety of other passengers.

(3) With respect to each type of airplane on which a crewmember is to serve as a flight attendant in air transportation—

(i) A general description of the airplane;

(ii) A knowledge of all crewmember assignments, functions, and responsibilities during ditching and evacuation;

(iii) Briefing of passengers;

(iv) Use of public address system and means of communicating with cockpit;

(v) Location and operation of portable fire extinguishers, including a knowledge of the type of fires to be combated with each type of extinguisher;

(vi) Location and use of first-aid equipment;

(vii) Proper use of electrical galley equipment, cabin heat controls, if installed in cabin, and ventilation controls;

(viii) Location and operation of passenger oxygen equipment; and

(ix) Location and operation of all normal and emergency exits, including evacuation chutes and escape ropes.

(b) Each certificate holder shall give each flight attendant at least once each twelve calendar months recurrent training that includes at least the programmed hours set forth in the certificate holder's approved training program and a competence check to determine the attendant's ability to perform assigned duties and responsibilities.

§ 121.425 Initial flight assignments on a particular type of airplane.

(a) Except as provided in paragraph (b) of this section, in addition to the ground and flight training specified in the certificate holder's approved training program (Appendix E, columns I and II), no crewmember may serve on a type airplane on which he has not previously served, or in a crew position in which he has not previously served, unless he satisfactorily completes at least the number of programmed hours specified in the certificate holder's approved training program for initial flight assignment (Appendix E, column V). In conducting initial flight assignments in each type airplane—

(1) Each pilot in command must perform the duties of a pilot in command while being observed by an approved check airman.

(2) Each second in command must either perform the duties of second in command while being observed by an approved check airman, or act as observer on the flight deck.

(3) Each flight engineer must perform the duties of a flight engineer while being observed by a qualified flight engineer or an approved check airman.

(4) Each flight attendant must either perform the duties of a flight attendant while being observed by a supervisor or act as an observer.

(b) A flight attendant who is assigned to duty in more than one type aircraft and who has received sufficient ground school and practical training in each type aircraft, is required to comply with paragraph (a) (4) of this section only in the larger type aircraft to which assigned.

NOTE: The reporting and/or record-keeping requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

APPENDIX E
PROGRAMMED HOURS OF TRAINING

	I Ground School					II Flight Training		III Approved Simulator		IV Procedural Trainer (a)		V Initial Flight Assignments (e)			
	PIC FE	2IC	NA	FA	DS	PIC	2IC FE	PIC	2IC FE	PIC	2IC	PIC	2IC	FE	FA DS
Basic indoctrination (newly hired)	40	40	40	40	40	x	x	x	x	x	x	x	x	x	x
DC-3 initial (I) and upgrade (U), C-46 recurrent (R)	40	40	x	8	16	8	4	x	x	4	4	10	x	x	5
	12	12	x	x	8	2.5	1.0	x	x	4	2	x	x	x	x
	64	64	x	8	30	8	5	10(b)	10(b)	4	4	15	15	x	5
M 202/404 and CV 240/440	x	22	x	x	x	x	5	x	10(b)	x	4	x	10	x	x
	16	16	x	4	8	3	1.5	10(c)	10(d)	4	2	x	x	x	x
	64	64	24	8	40	8	5	10(b)	10(b)	4	4	16	16	7.5	5
DC-4, L-040 and L-740	x	22	x	x	x	x	5	x	10(b)	x	4	x	16	x	x
	16	16	12	4	10	3	1.5	10(c)	10(d)	4	2	x	x	x	x
	80	80	24	10	40	10	6	15(b)	15(b)	4	4	20	20	10	5
B-377, L-1049, 1640 and DC-8/7	x	40	x	x	x	x	2	x	15(b)	x	4	x	20	x	x
	20	20	12	5	10	2	1.5	10(e)	10(d)	4	2	x	x	x	x
	80	80	x	8	40	10	6	x	x	4	4	20	20	x	6
F-27 and CV-540	x	40	x	x	x	x	6	x	x	x	4	x	20	x	x
	20	20	x	4	10	3	1.5	x	x	4	2	x	x	x	x
	80	80	x	10	40	10	6	10(b)	10(b)	4	4	25	25	x	5
Viscount and Argosy	x	40	x	x	x	x	6	x	10(b)	x	4	x	25	x	x
	20	20	x	5	20	3	1.5	10(c)	6(d)	4	2	x	x	x	x
	120	120	32	10	40	15	7	15(b)	15(b)	4	4	25	25	12.5	5
L-188, CL-44, BAC III, and Cara- velle	x	60	x	x	x	x	7	x	15(b)	x	4	x	25	x	x
	20	20	16	5	20	3	1.5	10(e)	10(d)	4	2	x	x	x	x
	120	120	32	16	40	20	10	20(b)	20(b)	4	4	25	25	12.5	5
B-707, B-720, B-727, DC-8 and CV-880, CV-990	x	60	x	x	x	x	10	x	15(b)	x	4	x	15	x	x
	25	25	16	12	20	6	3	10(e)	10(d)	4	2	x	x	x	x

NOTES

(a) Programmed hours required to satisfy requirements of § 121.441(b) (24) when performed in other than an airplane in flight or an approved airplane simulator.

(b) Programmed hours required to reduce initial flight training by 25 percent as provided in § 121.414(c) (2).

(c) Programmed hours required when PIC proficiency checks required by § 121.441(b) are conducted in accordance with § 121.442.

(d) Programmed hours when 2IC proficiency checks are conducted in accordance with § 121.449(c). Minimum flight engineer recurrent flight training and check time to satisfy requirements of § 121.421(b).

(e) Programmed hours required to satisfy requirements of § 121.424.

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