UNITED STATES OF AMERICA
CIVIL AERONAUTICS BOARD
WASHINGTON, D. C.

Civil Air Regulations Revised Part 42
Effective: June 1, 1949
Adopted: March 23, 1949

PART 42 - IRREGULAR AIR CARRIER AND OFF-ROUTE RULES

Currently effective Part 42 provides rules for the operation of irregular air carriers which in many respects establish a comparable level of safety to that required for operations conducted by scheduled air carriers. Revised Part 42 is designed to provide a level of safety in irregular operations in transport-type aircraft which will be the equivalent of that required of the scheduled air carriers in so far as the inherent differences in such operations will permit. These requirements are the result of the consideration given to the application of Part 42 to irregular air carrier operations since the original promulgation of the part in 1946, the knowledge that the many irregular air carriers who have conducted operations at a high level of safety desire safety standards equivalent to those required of scheduled operators, and the Board's opinion that it is in the public interest to require all operators serving the public to perform their services with the highest possible degree of safety.

A more detailed statement of the basis and purpose of the part is contained in the Explanatory Statement of Part 42.

Interested persons have been afforded an opportunity to participate in the making of the revised part, and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates a revised Part 42 of the Civil Air Regulations (14 CFR, Part 42) effective June 1, 1949, to read as follows:

PART 42 - IRREGULAR AIR CARRIER AND OFF-ROUTE RULES

42.0	Applicability of Part 42.	
42.1	Definitions.	
42.5 - 42.9	Certificate rules.	
42.11 - 42.16	Aircraft requirements.	
42.21 - 42.26	Aircraft equipment.	
42.30 - 42.32	Maintenance requirements.	
42.40 - 42.48	Flight crew requirements.	Passenger-
42.51 - 42.62	Flight operation rules.	carrying
42.70 - 42.83	Operating limitations for large airplanes.	
42.91 - 42.96	Required records and reports.	

EXPLANATORY STATEMENT OF PART 42

When Part 42 of the Civil Air Regulations, which established nonscheduled air carrier certification and operation rules, was promulgated, the Board was cognizant of the fact that the application of these rules to nonscheduled operators should be kept under constant study and that changes in these rules would be required from time to time based upon operating experience. As a result of this continued consideration, substantial changes have already been made in Part 42 to raise the required minimum level of safety; for example, additional provisions have since been promulgated relating to fire prevention, pilot qualification, aircraft maintenance, pilot flight time limitations, and weather minimums. These changes introduced requirements that were highly comparable with similar operating requirements for scheduled air carriers.

The last of the nonscheduled air carriers operating under the "grandfather clause" of § 42.45 has been inspected and granted an operating certificate by the Administrator. An examination of the records obtained in the certification process indicates that there are more than 2,600 nonscheduled operators, and that about 560 multiengine aircraft of similar types to those operated by scheduled carriers are being operated by about 140 of these carriers.

The standards presently established by Part 42 for these larger types of transport aircraft do not in all respects provide a comparable level of safety with the prescribed standards for scheduled operations. The revised part, therefore, is designed to establish such equivalent standards as the inherent differences in scheduled and nonscheduled operations permit. New requirements are set forth to insure comparable airmen competency, aircraft equipment, maintenance, and operating limitations for passenger carriage.

After considering comments received in the rule-making process, the Board has raised, from 10,000 to 12,500 pounds, the weight which will distinguish between rules applicable to large aircraft and to small aircraft. There are a few aircraft in the range between 10,000 and 12,500 pounds whose operational and maintenance characteristics more closely correspond to those generally recognized as "small" aircraft than to the larger transport category type airplanes. Examination of pertinent irregular air carrier statistics indicates that fewer than a score of airplanes will be affected by the change.

The revised part will require an applicant for a certificate to own or have the exclusive use of at least one standard (NC) certificated aircraft, and no operator will be permitted to use a large aircraft (aircraft with a

maximum certificated take-off weight of 12,500 pounds or more) for any type of service unless such aircraft has been found to be safe for the service to be offered and listed in the operating certificate. These provisions will enable the Administrator to re-examine all large aircraft to determine whether or not they are equipped and maintained in accordance with required standards, and will provide an administrative means for limiting transient use of aircraft so that the Administrator may be assured that maintenance and training required is satisfactorily provided for by the carrier.

In order to expedite the administrative problems under the part, it is required that each air carrier shall promptly notify the Administrator of any change in its principal business office and operations or maintenance base, and that the carrier shall keep copies of pertinent airman and maintenance records at its operations base.

For passenger operations under IFR conditions the part requires multiengine aircraft with specified performance characteristics; and land aircraft operated over water beyond power-off gliding distance from shore are also required to be multiengine. These are the principal restrictions affecting operators of small aircraft. In addition, all aircraft are required to have installed a carburetor heater and carburetor temperature gauge for each engine when used under any conditions other than VFR day.

The part provides for a minimum flight altitude for day VFR operations of 500 feet above the surface and 1,000 feet from a mountain, hill, or other obstruction to flight, provided that there is a minimum ceiling of 1,000 feet. Previously, the minimum flight altitude was 1,000 feet. The effect of this rule is to prevent VFR flight when the ceiling is less than 1,500 feet. In view of operating experience since adoption of the requirement the Board believes that it imposes an impractical and unduly high requirement for many operations, expecially those in small aircraft to which Part 42 is largely applicable. It is not believed that safety will be adversely affected by this change in minimum flight altitudes.

It will be noted that the flight time limitations currently in Part 42 have not been revised. The Board is currently considering new flight time limitations for all flight crew personnel, and expects to apply such requirements as it finds necessary, after affording due opportunity for public participation in the rule-making process, to all flight crew personnel utilized by air carriers and commercial operators. It will also be noted that current oxygen requirements are unchanged; revised requirements for all operators are currently being considered by the Board.

42.0 Applicability of Part 42.

(a) The provisions of this part shall apply to irregular air carriers operating in interstate, overseas, or foreign air transportation, to Alaskan air carriers when authorized by the Administrator under the provisions of § 41.000, and to air carriers holding scheduled air carrier operating certificates when making charter trips or when performing other special services.

(b) An air carrier holding a scheduled air carrier operating certificate may elect to conduct charter flights or other special services between

points which it is authorized to serve under the terms of such certificate, under the provisions of Part 41, or 40 and 61, as the case may be, and the scheduled air carrier operating certificate: Provided, That the certificate is amended to authorize such operation: And provided further, That charter or special services to other points shall be conducted under the provisions of this part, except that it shall not be necessary for the carrier to obtain an irregular air carrier operating certificate if its scheduled air carrier operating certificate is appropriately amended.

42.1 Definitions.

(a) As used in this part the words listed below shall be defined as follows:

(1) Accelerate-stop distance. Accelerate-stop distance is the distance required to reach the critical point of take-off and, assuming failure of the critical engine at that point, to bring the airplane to a stop using approved braking means. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such distance is determined.)

(2) Air carrier. Air carrier means any citizen of the United States who undertakes directly the carriage by aircraft of persons or property as a common carrier for compensation or hire, whether such carriage is wholly by aircraft or partly by aircraft and partly by other forms of transportation between any of the following places: a place in any State of the United States, or the District of Columbia, and a place in any other State of the United States, or the District of Columbia; places in the same State of the United States through the airspace over any place outside thereof; places in the same Territory or possession of the United States, or the District of Columbia; a place in any State of the United States, or the District of Columbia, and any place in a Territory or possession of the United States, and a place in any other Territory or possession of the United States; a place in the United States and any place outside thereof; or the carriage of mail by aircraft.

(3) Alaskan air carrier. Alaskan air carrier includes any air carrier subject to the provisions of § 292.2 1/ of the Economic Regulations as heretofore or hereafter amended.

(4) Alternate airport. An alternate airport is one listed in the flight plan as a point to which a flight may be directed if, subsequent to departure, a landing at the point of intended destination becomes inadvisable.

1/ Section 292.2 currently provides that Alaskan air carriers shall include certificated and noncertificated air carriers engaging solely in air transportation within the Territory of Alaska.

(5) Approach or take-off area. The approach or take-off area shall be an area symmetrical about a line coinciding with and prolonging the center line of the runway, or the most probable landing or take-off path for instrument approaches where there is a multiplicity of parallel runways or a large hard-surfaced area continuously available for landing or take-off. This area shall be assumed to extend longitudinally in a straight line from the intersection of the obstruction clearance line with the runway to the most remote obstacle touched by the obstruction clearance line and in no case less than 1,500 feet. Thence, it shall be assumed to continue in a path consistent with the instrument approach or take-off procedures for the runway in question or, where such procedures are not specified, consistent with turns of at least 4,000 feet in radius. It shall be further assumed to extend laterally at the point of intersection of the obstruction clearance line with the runway 200 feet on each side of such center line. This distance shall increase uniformly to 500 feet on each side of such center line at a longitudinal distance of 1,500 feet from such point of intersection. Thereafter, this distance shall be assumed to be 500 feet on each side of such center line.

(6) Approved. Approved, when used either alone or as modifying other words such as "means," "method," "action," etc., shall mean approved by the Administrator.

(7) Check pilot. Check pilot is a pilot authorized by the Administrator to check pilots of the air carrier for such items as familiarity with en route procedures and piloting technique.

(8) Crew member. Crew member means any individual assigned for the performance of duty on the aircraft other than as a flight crew member.

(9) Critical engine. The critical engine is the engine the failure of which gives the most adverse effect on the performance characteristics of the aircraft. (See the airworthiness requirements under which

the airplane was type certificated for the manner in which such engine is determined.)

(10) Critical-engine-failure speed. The critical-engine-failure speed is a true indicated air speed, selected by the aircraft manufacturer, at which the take-off may be safely continued even though the critical engine becomes suddenly inoperative. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

(11) Critical point of take-off. The critical point of take-off is that point beyond which the aircraft cannot be brought to a safe stop in the event of failure of the critical engine. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such point is determined.)

(12) Effective length of runway. The effective length of runway is the distance from the point where the obstruction clearance line intersects the runway to the far end thereof.

(13) Flight crew member. Flight crew member means a pilot, flight radio operator, flight engineer, or flight navigator assigned to flight duty on the aircraft.

(14) Flight time. Flight time shall mean the total time from the moment the aircraft first moves under its own power for the purpose of flight until the moment it comes to rest at the end of the flight.

(15) IFR. The symbol used to designate instrument flight rules.

(16) Irregular air carrier. Irregular air carrier includes any air carrier subject to the provisions of § 292.1 2/ of the Economic Regulations as heretofore or hereafter amended.

(17) Large aircraft. Aircraft of 12,500 pounds or more maximum certificated take-off weight shall be considered large aircraft.

2/ Section 292.1 currently provides that the term "irregular air carrier" means any air carrier which (1) directly engages in air transportation, (2) does not hold a certificate of public convenience and necessity under § 401 of the Civil Aeronautics Act of 1938, as amended, and (3) does not operate or hold out to the public, expressly or by course of conduct, that it operates one or more aircraft between designated points, or within a designated point, regularly or with a reasonable degree of regularity, upon which aircraft it accepts for transportation, for compensation or hire, such members of the public as apply therefor or such property as the public offers. No air carrier shall be deemed to be an irregular air carrier unless the air transportation services offered and performed by it are of such infrequency as to preclude an implication of a uniform pattern or normal consistency of operation between, or within, such designated points.

(18) Maximum certificated take-off weight. Maximum certificated take-off weight shall mean the maximum take-off weight authorized by the terms of the aircraft airworthiness certificate. 3/

(19) Minimum control speed. The minimum control speed is the minimum speed at which the airplane can be maintained in straight flight after an engine suddenly becomes inoperative. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

(20) Night. Night is the time between the ending of evening twilight and the beginning of morning twilight as published in the Nautical Almanac converted to local time for the locality concerned. 4/

(21) Obstruction clearance line. The obstruction clearance line is a line drawn tangent to or clearing all obstructions showing in a profile of the approach or take-off area which has a slope to the horizontal of 1/20.

(22) Passenger-carrying aircraft. An aircraft carrying any individual other than a flight crew or crew member, company employee, or an authorized government representative shall be considered a passenger-carrying aircraft.

(23) Pilot compartment. Pilot compartment means that part of the aircraft designed for the use of the flight crew.

(24) Pilot in command. Pilot in command shall mean the pilot responsible for the operation and safety of the aircraft during the time defined as flight time.

(25) Point-of-no-return. Point-of-no-return means the point beyond which the aircraft no longer has sufficient fuel, under existing conditions, to return to the point of departure or any alternate for that point.

3/ Note that the aircraft airworthiness certificate incorporates as a part thereof an airplane operating record or an airplane flight manual which contains the pertinent limitation.

4/ The Nautical Almanac containing the ending of evening twilight and the beginning of morning twilight tables may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Information is also available concerning such tables in the offices of the Civil Aeronautics Administration or the United States Weather Bureau.

(26) Power-off stall speed. The power-off stall speed is the minimum steady flight speed at which the airplane with engines idling is controllable in the landing configuration. (See the airworthiness requirements under which the airplane was type certificated for the manner in which such speed is determined.)

(27) Rating. Rating is an authorization issued with a certificate, and forming a part thereof, stating special conditions, privileges, or limitations pertaining to such certificate.

(28) Runway. A runway is a hard-surfaced area normally used for the landing or take-off of airplanes. An unpaved area at the end of a paved area may be considered as part of a runway if it is smooth and firm enough to permit an airplane to traverse it safely.

(29) Second pilot. Second pilot shall include any pilot other than the pilot in command assigned as a member of the flight crew.

(30) Small aircraft. Aircraft of less than 12,500 pounds maximum certificated take-off weight shall be considered small aircraft.

(31) Transport category aircraft. Transport category aircraft are aircraft which have been certificated in accordance with the requirements of Part 4b, or under the transport category performance requirements of Part 4a.

(32) Type. Type shall mean all aircraft of the same basic design including all modifications thereto except those modifications which result in a change in handling or flight characteristics.

(33) VFR. The symbol used to designate visual flight rules.

(34) V_{s_o}. V_{s_o} means the power-off, true-indicated stalling speed of an aircraft. (See the airworthiness requirements under which the airplane was type certificated for the manner in which V_{s_o} is determined.)

CERTIFICATE RULES

42.5 Certificate issuance. An air carrier operating certificate describing the operations authorized and prescribing such operating specifications and limitations as may be reasonably required in the interest of safety shall be issued by the Administrator to a properly qualified citizen of the United States who is capable of conducting the proposed operations in accordance with the applicable requirements hereinafter specified. Application for a certificate, or application for amendment thereof, shall be made in a manner and contain information prescribed by the Administrator. No person subject to the provisions of this part shall operate in air transportation without, or in violation of the terms of, an air carrier operating certificate.

(a) Exceptions. Whenever upon investigation the Administrator finds that the general standards of safety required for air carrier operations require or permit a deviation from any specific requirement of this part, he may issue an air carrier operating certificate or amendment providing for such deviation. The Administrator shall promptly notify the Board of any deviation included in the air carrier operating certificate and the reasons therefor.

42.6 Duration. An air carrier operating certificate shall continue in effect unless it is surrendered, suspended, or revoked, or a termination date is set by the Board, after which it shall be returned to the Administrator.

42.7 Display. The air carrier operating certificate shall be kept available at the carrier's principal operations office for inspection by any authorized representative of the Administrator or Board.

42.8 Inspection. Any authorized representative of the Administrator or the Board shall be permitted at any time and place to make inspections or examinations to determine the air carrier's compliance with the Civil Air Regulations.

42.9 Operations base, maintenance base, and/or office. On or before July 1, 1949, each irregular air carrier shall give written notice to the Administrator of his principal business office, his principal operations base, and principal maintenance base. Thereafter, prior to any change in any such office or base, he shall give written notice to the Administrator.

AIRCRAFT REQUIREMENTS

42.11 Aircraft required. An air carrier shall own or have the exclusive use of at least one aircraft. All aircraft used in the carriage of persons or property for compensation or hire shall be certificated in accordance with the standard airworthiness requirements. No air carrier shall operate a large aircraft for the carriage of goods or persons for compensation or hire unless the Administrator has found such aircraft safe for the service to be offered and has listed it in the air carrier operating certificate.

42.12 Fire prevention requirements. Aircraft powered by an engine or engines rated at more than 600 h.p. each for maximum continuous operation shall, when used in passenger service, comply with the applicable fire prevention requirements of Part 4b: Provided, That in those instances where the Administrator, prior to the effective date of this part, has authorized an air carrier to operate aircraft without full compliance with such requirements, such aircraft may be operated in accordance with such authorization. For particular types of aircraft, where the Administrator finds that literal compliance with specific items of this requirement would not contribute materially to the objective sought, he may accept such measures of compliance as he finds will so contribute.

42.13 Engine rotation. Multiengine aircraft having any engine rated

at more than 480 h.p. for maximum continuous operation shall be so equipped that the crankshaft rotation of each such engine can be stopped promptly in flight.

42.14 Minimum performance requirements for all aircraft. Except as otherwise provided in this part, no air carrier shall use any aircraft unless it meets such operating limitations as the Administrator determines will provide a safe relation between the performance of the aircraft and the airports to be used and the areas to be traversed.

42.15 Minimum performance requirements for large airplanes used in passenger operations. No air carrier shall use large airplanes in passenger operations except as provided below:

(a) Transport category airplanes shall meet the operating limitations of §§ 42.70 through 42.78.

(b) Nontransport category airplanes shall either:

(1) retain their present airworthiness certificate status and shall meet the operating limitations of §§ 42.80 through 42.83, or

(2) qualify by showing compliance with either the performance requirements of §§ 4a.75-T through 4a.7533-T or the requirements contained in Part 4b, and when so qualified shall meet the operating limitations of §§ 42.70 through 42.78 over the area to be traversed.

(c) Airplanes used after December 31, 1953, shall comply with all of the requirements of Part 4b or the transport category requirements of Part 4a and shall meet the requirements of §§ 42.70 through 42.78 over each route to be flown.

42.16 Aircraft limitations for IFR and land aircraft overwater operations. When passengers are carried, no air carrier shall use any aircraft under IFR weather conditions or any land aircraft in overwater operations except as follows:

(a) IFR operations. Aircraft shall be multiengine and shall meet the appropriate en route operating limitations of § 42.74 or § 42.82.

(b) Overwater operations. Land aircraft shall be multiengine and shall meet the appropriate en route operating requirements of § 42.74 or § 42.82, unless the overwater operation consists only of take-offs and landings or the aircraft is flown at such an altitude that it can reach land in the event of power failure.

AIRCRAFT EQUIPMENT

42.21 Basic required instruments and equipment for aircraft. The following instruments and equipment acceptable to the Administrator for the type of operations specified shall be installed and in serviceable condition in all aircraft:

(a) VFR (day). For day VFR flight the following is required:

(1) air-speed indicator,
(2) altimeter,
(3) magnetic direction indicator,
(4) tachometer for each engine,
(5) oil pressure gauge for each engine using pressure system,
(6) coolant temperature gauge for each liquid-cooled engine,
(7) oil temperature gauge for each air-cooled engine,
(8) manifold pressure gauge or equivalent when required for the proper operation of the engine,
(9) fuel gauge indicating the quantity of fuel in each tank,
(10) position indicator, if aircraft has retractable landing gear or flaps,
(11) approved seats and safety belts adequate for all persons on board the aircraft,
(12) in passenger service, a minimum of two approved hand-type fire extinguishers, one of which is installed in the pilot compartment, the other accessible to the passengers and ground personnel, unless the aircraft is so designed that the fire extinguisher in the pilot compartment is directly available to passengers and ground personnel, in which case only one fire extinguisher is required; in cargo service, fire extinguisher or extinguishers adequate for the aircraft,
(13) source of electrical energy sufficient to operate all radio and electrical equipment installed,
(14) one spare set of fuses or 3 spare fuses of each magnitude.

(b) VFR (night). For night VFR flight the following is required:

(1) instruments and equipment specified in § 42.21 (a),
(2) carburetor temperature gauge,
(3) carburetor heating or de-icing equipment for each engine,
(4) set of approved forward and rear position lights,
(5) at least one landing light,
(6) approved landing flares as follows, if the aircraft is operated beyond a 3-mile radius from the center of the airport of take-off:

Maximum certificated take-off weight of aircraft	Flares
Less than 3,500 lbs.	5 class-3 or 3 class-2
3,500 lbs. to 5,000 lbs.	4 class-2
More than 5,000 lbs.	2 class-1 or 3 class-2 and 1 class-1

If desired, flare equipment specified for heavier aircraft may be used.

(7) two-way radio communications system and navigational equipment appropriate to the ground facilities to be used,

(8) generator of adequate capacity,
(9) one set of instrument lights.

(c) IFR (day). For day IFR flight the following is required:

(1) instruments and equipment specified in § 42.21 (a),
(2) two-way radio communications system and navigational equipment appropriate to the ground facilities to be used,
(3) gyroscopic rate-of-turn indicator,
(4) bank indicator,
(5) rate-of-climb indicator,
(6) artificial horizon indicator,
(7) sensitive altimeter adjustable for changes in barometric pressure, in lieu of § 42.21 (a) (2),
(8) clock with a sweep-second hand,
(9) one gyro direction indicator,
(10) generator of adequate capacity,
(11) one outside air temperature gauge easily readable from the pilot's position,
(12) one carburetor temperature gauge or equivalent approved device,
(13) power failure warning means or vacuum gauge on instrument panel connecting to lines leading to gyroscopic instruments,
(14) carburetor heating or de-icing equipment for each engine,
(15) heated pitot tube for each air-speed indicator.

(d) IFR (night). For night IFR flight the following is required:

(1) instruments and equipment specified in § 42.21 (a), (b), and (c): Provided, That when any requirements under (a), (b), or (c) are identical, such requirements need not be duplicated.

42.22 Additional required instruments and equipment for large aircraft. In addition to the basic instruments required by § 42.21, the following instruments and equipment for the type of operations specified shall be installed and in serviceable condition in large aircraft:

(a) Day (VFR and IFR). For flight during the day the following is required:

(1) additional air-speed indicator,
(2) additional sensitive altimeter,
(3) alternate source of energy to supply gyroscopic instruments which shall be capable of carrying the required load. Engine-driven pumps, when used, shall be on separate engines and, in lieu of one such source of energy, an auxiliary power unit may be used. The installation shall be such that the failure of one source of energy will not interfere with the proper functioning of the instrument by means of the other source.

(4) in passenger service, in addition to fire-detecting and fire-extinguishing equipment necessitated as a result of compliance with § 42.12, such additional hand-type fire extinguishers as the Administrator finds necessary for compliance with § 42.21 (a) (12).

(b) Night (VFR and IFR). For flight during the night the following is required:

(1) instruments and equipment specified in § 42.22 (a), and one additional landing light.

42.23 Radio communications system and navigational equipment for large aircraft. In lieu of the radio communications system and navigational equipment specified in § 42.21 (b) (7) and (c) (2), the following shall be required in large aircraft for the type of operations specified:

(a) For day VFR operations over routes on which navigation can be accomplished by visual reference to landmarks, each aircraft shall be equipped with such radio equipment as is necessary to accomplish the following:

(1) transmit to at least one appropriate ground station from any point on the route and transmit to airport traffic control towers, from a distance of not less than 25 miles,

(2) receive communications at any point on the route,

(3) by either of two independent means, receive meteorological information at any point on the route and receive instructions from airport traffic control towers.

(b) For day VFR operations over routes on which navigation cannot be accomplished by visual reference to landmarks, for night VFR, or for IFR operations, each aircraft shall be equipped as specified in subparagraphs (a) (1), (2), and (3) of this section, and in addition shall be equipped with at least one marker beacon receiver and with such radio equipment as is necessary to receive satisfactorily, by either of two independent means, radio navigational signals from any other radio aid to navigation intended to be used. For operations outside the United States each aircraft operated for long distances over water or uninhabited terrain shall be equipped with two independent means of transmitting to at least one appropriate ground station from any point on the route.

(c) If appropriate, one of the means provided for compliance with subparagraph (a) (3) may be employed for compliance with subparagraph (a) (2), and the means provided for compliance with the requirements of paragraph (b) may be employed for compliance with subparagraphs (a) (1) and (3).

42.24 First-aid and emergency equipment.

(a) Each aircraft shall be equipped with readily available first-aid and emergency evacuation equipment adequate for the type of operation and number of persons carried.

(b) Each aircraft operated over uninhabited terrain shall carry such emergency equipment as the Administrator finds necessary for the preservation of life for the particular operation.

(c) Except for take-offs, landings, or flights for short distances over water for which the Administrator finds that any of the equipment in subparagraphs (1), (2), or (3) below is unnecessary, each aircraft operated over water shall be equipped with:

(1) individual life preservers or flotation devices readily available for each person aboard the aircraft,

(2) life rafts of sufficient capacity to contain all persons aboard the aircraft,

(3) a Very pistol or equivalent signal equipment,

(4) portable emergency radio signalling device which is not dependent upon the aircraft power supply,

(5) such additional emergency equipment as the Administrator finds necessary for the preservation of life for the particular operation involved.

42.25 Cockpit check list. The air carrier shall provide for each type of aircraft a cockpit check list adapted to each operation in which the aircraft is to be utilized. The check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be used by the flight crew.

42.26 Oxygen. Aircraft operated at an altitude exceeding 10,000 feet above sea level continuously for more than 30 minutes, or at an altitude exceeding 12,000 feet above sea level for any length of time, shall be equipped with effective oxygen apparatus and an adequate supply of oxygen available for the use of the operating crew. Such aircraft shall also be equipped with an adequate separate supply of oxygen available for the use of passengers when operated at an altitude exceeding 12,000 feet above sea level.

MAINTENANCE REQUIREMENTS

42.30 General. No person shall operate an aircraft which is not in an airworthy condition. All inspections, repairs, alterations, and maintenance shall be performed in accordance with Part 18 of the Civil Air Regulations, and with the maintenance manual when required by § 42.32 (d).

42.31 Inspections and maintenance.

(a) Aircraft shall be given a preflight check to determine compliance with § 42.51 (c) and, in addition, shall meet the following requirements:

(1) Large aircraft shall be maintained and inspected in accordance with a continuous maintenance and inspection system as provided for in the maintenance manual.

(2) Small aircraft shall either be maintained and inspected in accordance with subparagraph (a) (1) above or be given a periodic inspection at least every 100 hours of flight time and an annual inspection at least every 12 months. The annual inspection may be accepted as a periodic inspection.

(b) A record shall be carried in the aircraft at all times showing that the latest inspections required by subparagraphs (a) (1) or (2) have been accomplished, except such record may be kept at the principal operations base when the aircraft is maintained and inspected as provided in subparagraph (a) (1) above.

42.32 Additional maintenance requirements for large aircraft. The following requirements are applicable to operations conducted in large aircraft:

(a) Facilities. Facilities for the proper inspection, maintenance, overhaul, and repair of the types of aircraft used shall be maintained by the air carrier, unless arrangements acceptable to the Administrator are made with other persons possessing such facilities.

(b) Maintenance personnel. A staff of qualified mechanics, inspectors, and appropriate supervisory personnel shall be employed by the air carrier and kept available for performing the functions specified in § 42.30, except where the air carrier has obtained the approval of the Administrator for the performance of such functions by some other person. The air carrier shall permit maintenance to be performed only by an individual competent therefor.

(c) Reporting of mechanical irregularities occurring in operation. Each air carrier shall prescribe in its operations manual a procedure for

the submission of written reports by the members of the flight crew for all mechanical irregularities occurring during the operation of the aircraft. The members of the flight crew designated by the air carrier shall submit a written report in accordance with such system to the person responsible for the maintenance of the aircraft. This report shall be submitted at the end of each through flight or sooner if the seriousness of the irregularity so warrants. Such report or copy thereof indicating the action taken shall be retained in the aircraft for the information of the next flight crew. 5/

(d) Maintenance manual.

(1) The air carrier shall prepare and maintain for the use and guidance of maintenance personnel a maintenance manual which contains full information pertaining to the maintenance, repair, and inspection of aircraft and equipment and clearly outlines the duties and the responsibilities of maintenance personnel. The form and content shall be acceptable to the Administrator. It shall contain a copy of the approved time limitations for inspection and overhauling of aircraft, aircraft engines, propellers, and appliances. Copies and revisions shall be furnished to all persons designated by the Administrator. All copies in the hands of company personnel shall be kept up to date.

(2) A copy of those portions pertaining to the aircraft shall be carried therein.

(3) Any changes prescribed by the Administrator in the interest of safety shall be promptly incorporated in the manual. Other changes not inconsistent with any Federal regulation, the air carrier operating certificate, or safe operating practices may be made without prior approval of the Administrator.

(4) No maintenance, repair, or inspection of aircraft or equipment shall be made by the air carrier contrary to the provisions of the maintenance manual.

FLIGHT CREW REQUIREMENTS

42.40 Airman requirements. No air carrier shall utilize an individual as an airman unless he has met the appropriate requirements of the Civil Air Regulations.

42.41 Composition of flight crew.

(a) No air carrier shall operate an aircraft with less than the minimum flight crew required for the particular operation and the type of aircraft as determined by the Administrator in accordance with the standards

---

5/ See § 42.96 for the requirements for reporting aircraft or component malfunctioning and defects.

hereinafter prescribed and specified in the air carrier operations manual for the area in which operations are authorized.

(b) Where the provisions of this part require the performance of two or more functions for which an airman certificate is necessary, such requirement shall not be satisfied by the performance of multiple functions at the same time by any airman.

(c) Second Pilot. A second pilot shall be required on large aircraft, or on other aircraft when passengers are carried on operations under IFR, or when the Administrator finds that a second pilot is otherwise required in the interest of safety.

(d) Flight radio operator. An airman holding a flight radio operator certificate shall be required for flight over any area over which the Administrator has determined that radiotelegraphy is necessary for communication with ground stations during flight.

(e) Flight engineer. An airman holding a flight engineer certificate shall be required on all aircraft of more than 80,000 lbs. maximum certificated take-off weight, and on all other aircraft certificated for more than 30,000 lbs. maximum certificated take-off weight where the Administrator finds that the design of the aircraft used or the type of operation is such as to require a flight engineer for the safe operation of the aircraft, or on other aircraft where required by the aircraft airworthiness certificate.

(f) Flight navigator. An airman holding a flight navigator certificate shall be required for flight over any area where the Administrator has determined that celestial navigation is necessary.

42.42 Pilot qualification for small aircraft.

(a) Pilot in command. Any pilot serving as pilot in command on small aircraft shall hold a valid commercial pilot certificate with an appropriate rating for the aircraft on which he is to serve, and for:

(1) day flight VFR - he shall have had at least 50 hours of cross-country flight time as a pilot;

(2) night flight VFR - he shall have had a total of at least 500 hours of flight time as a pilot, including 100 hours of cross-country flight time of which 25 hours shall have been at night;

(3) IFR flight - he must possess a currently effective instrument rating and have had a total of at least 500 hours of flight time as a pilot including 100 hours of cross-country flight.

(b) Second pilot. Any pilot serving as second pilot on small aircraft shall hold for:

(1) VFR flight - a valid commercial pilot certificate with the appropriate ratings;

(2) IFR flights - a currently effective instrument rating.

42.43 Pilot qualifications for large aircraft.

(a) Pilot in command. Any pilot serving as pilot in command on large aircraft shall meet the following requirements:

(1) After December 31, 1949, he shall possess a valid airline transport pilot rating with an appropriate rating for the aircraft on which he is to serve;

(2) Prior to and including December 31, 1949, he shall either meet the above or:

(i) possess a valid commercial pilot certificate with an appropriate rating for the aircraft on which he is to serve;

(ii) possess a currently effective instrument rating;

(iii) have logged at least 1,200 hours of flight time of which 500 hours shall have been cross-country;

(iv) have logged at least 100 hours of night flight of which 50 hours shall have been cross-country.

(b) Second pilot. Any pilot serving as second pilot in large aircraft shall:

(1) possess a valid commercial pilot certificate with an appropriate rating for the aircraft on which he is to serve;

(2) possess a currently effective instrument rating.

(c) Three-pilot crew. In a crew of three or more pilots at least two pilots shall meet the requirements of paragraph (a).

42.44 Recent flight experience requirements for flight crew members. No air carrier shall utilize an airman, nor shall any individual serve as an airman, unless he meets the appropriate experience requirements specified below:

(a) Pilots.

(1) Within the preceding 90 days a pilot shall have made at least 3 take-offs and landings in an aircraft of the same type on which he is to serve. For night flight one of the take-offs and landings required above shall have been made at night.

(2) Within the preceding 6 months a pilot on large aircraft shall have successfully accomplished an equipment check on aircraft of the type on which he is to serve. Such equipment check shall be given by an authorized representative of the Administrator or a check pilot designated by the Administrator.

(3) Within the preceding 6 months the pilot in command on any large aircraft, or on any aircraft under IFR conditions, shall have successfully accomplished an instrument check demonstrating his ability to pilot and navigate by instruments, to accomplish a standard instrument approach using radio range facilities, and to accomplish an instrument approach in accordance with ILS, GCA, or D/F procedures when such facilities are to be used. This instrument check shall have been given by an authorized representative of the Administrator or a check pilot designated by the Administrator on an aircraft which the air carrier is authorized to use.

(b) Flight radio operator. No individual shall be assigned to nor perform duties as a flight radio operator unless within the preceding 12 months he has had at least four months of satisfactory experience as a radiotelegraph operator and at least 25 hours of experience in the operation of aircraft radio during flight, or until a person designated by the Administrator has checked the airman and has determined that he is (1) familiar with all radio information pertinent to the operations of the air carrier and (2) competent with respect to the operating procedures and radio equipment to be used.

(c) Flight engineer. No individual shall be assigned to nor perform the duties as a flight engineer unless within the preceding 12 months he has had at least 50 hours of experience as a flight engineer on the type of aircraft on which he is to serve, or until a person designated by the Administrator has checked the airman and determined that he is (1) familiar with all current information and operating procedures relating to the type of aircraft on which he is to serve and (2) competent with respect to the flight engineer's duties on such aircraft.

(d) Flight navigator. No individual shall be assigned to nor perform duties as a flight navigator unless within the preceding 12 months he has had at least 50 hours of experience as a flight navigator, or until a person designated by the Administrator has checked the airman and determined that he is (1) familiar with all current navigational information pertaining to the operations of the air carrier and (2) competent with respect to the operating procedures and navigational equipment to be used.

42.45 Proficiency of crew members serving on large aircraft. The air carrier shall by means of a training program or otherwise insure that crew members are proficient in their duties and are kept currently informed of all techniques and new developments pertinent thereto. The program shall include instruction in emergency procedures and in crew coordination.

42.46 Logging flight time.

(a) A pilot in command may log his total flight time.

(b) A second pilot holding an airline transport pilot certificate and rating for the aircraft flown may log the total time during which he is on duty on the flight deck.

(c) A second pilot not holding an airline transport pilot certificate and rating for the aircraft flown may log 50% of the total flight time during which he is on duty on the flight deck.

(d) A pilot may log as instrument flight time only such time as he is actually manipulating the controls when the aircraft is being flown solely by reference to instruments.

42.47 Grace period for airman periodic checks. Whenever this part requires an airman check at stated intervals, a grace period of 30 days shall be allowed: Provided, That the effective date of the check, if met within the grace period, shall be the same as if met on the day immediately preceding such grace period.

42.48 Flight time limitations for pilots on large aircraft. The following limitations shall be applicable to pilots serving on large aircraft.

(a) Individual pilot limitations.

(1) A pilot may be scheduled to fly 8 hours or less during any 24 consecutive hours without a rest period during such 8 hours.

(2) A pilot shall receive 24 hours of rest before being assigned further duty when he has flown in excess of 8 hours during any 24 consecutive hours. Time spent in deadhead transportation to or from duty assignment shall not be considered part of such rest period.

(3) A pilot shall be relieved from all duty for not less than 24 consecutive hours at least once during any 7 consecutive days.

(4) A pilot shall not fly as a crew member in air carrier service more than 100 hours during any 30 consecutive days.

(5) A pilot shall not fly as a crew member in air carrier service more than 1,000 hours in any one calendar year.

(6) A pilot shall not do other commercial flying if his total flying time for any specified period will exceed the limits of that period.

(b) Aircraft having a crew of two pilots.

(1) A pilot shall not be scheduled to fly in excess of 8 hours during any 24-hour period unless he is given an intervening rest period at or before the termination of 8 scheduled hours of flight duty. Such rest period shall equal at least twice the number of hours flown since the last

preceding rest period, and in no case shall such rest period be less than 8 hours. During such rest period the pilot shall be relieved of all duty with the air carrier.

(2) A pilot shall not be on duty for more than 16 hours during any 24 consecutive hours.

(c) Aircraft having a crew of three pilots.

(1) A pilot shall not be scheduled for duty on the flight deck in excess of 8 hours in any 24-hour period.

(2) A pilot shall not be scheduled to be aloft for more than 12 hours in any 24-hour period.

(3) A pilot shall not be on duty for more than 18 hours in any 24-hour period.

(d) Aircraft having a crew of four pilots.

(1) A pilot shall not be scheduled for duty on the flight deck in excess of 8 hours during any 24-hour period.

(2) A pilot shall not be scheduled to be aloft for more than 16 hours in any 24-hour period.

(3) A pilot shall not be on duty for more than 20 hours during any 24-hour period.

FLIGHT OPERATION RULES

42.51 Pilot responsibilities

(a) Pilot in command. The pilot in command of the aircraft shall be designated by the air carrier.

(b) Preflight action. Prior to commencing a flight the pilot in command shall familiarize himself with the latest weather reports pertinent to the flight issued by the United States Weather Bureau or, if unavailable, by the most reliable source, and with the information necessary for the safe operation of the aircraft en route, and on the airports or other landing areas to be used, and determine that the flight can be completed with safety.

(c) Charts and flight equipment. The pilot in command shall have in his possession in the cockpit proper flight and navigational facility charts, including instrument approach procedures when instrument flight is authorized, and such other flight equipment as may be necessary to properly conduct the particular flight proposed.

(d) Emergency decisions.

(1) When required in the interest of safety, a pilot may make any immediate decision and follow any course of action which in his judgment appears necessary, regardless of prescribed methods or requirements. He shall, where practicable, keep the proper control station fully informed regarding the progress of the flight. 6/

(2) In an emergency requiring either the dumping of fuel or a landing at a weight in excess of the authorized landing weight, a pilot may elect to follow whichever procedure he considers safer.

(e) Serviceability of equipment. Prior to starting any flight, the pilot shall determine that the aircraft, all engines and propellers, appliances and required equipment, including all instruments, are in proper operating condition. If during the flight any such engine, propeller, appliance, or equipment malfunctions or becomes inoperative, the pilot in command shall determine whether the flight can be continued with safety. Unless he believes that flight can be continued safely, he shall hold or cancel it until satisfactory repairs or replacements are made.

6/ See § 42.94 for the report to be filed by the pilot where the authority granted by this section is exercised.

(f) Pilots at controls. In the case of aircraft requiring two or more pilots, two pilots shall remain at the controls at all times while taking off, landing, and while the aircraft is en route except when the absence of one is necessary in connection with his regular duties or when he is replaced by a person authorized under the provisions of paragraph (g) below.

(g) Admission to pilot compartment. In aircraft having a separate pilot compartment, no person other than a crew member, a check pilot, an authorized representative of the Administrator or the Board in pursuance of official duty, or a person whose admission is approved by the pilot in command may be admitted to the pilot compartment. In the latter case, the pilot in command shall remain at the controls.

42.52 Fuel supply. The following minimum fuel requirements shall be applicable as specified:

(a) United States. Within the continental limits of the United States the following requirements shall be met unless the Administrator finds, after considering the character of the terrain being traversed, the available airports, and the category of aircraft being operated, that the safe conduct of the flight normally requires a greater quantity of fuel.

(1) No flight in small aircraft under VFR shall be started unless the aircraft carries sufficient fuel and oil, considering the wind and other weather conditions forecast, to fly to the point of intended landing, and thereafter for a period of at least 30 minutes at normal cruising consumption.

(2) No flight in large aircraft under VFR shall be started unless, considering the factors enumerated in subparagraph (1), the aircraft carries sufficient fuel and oil to fly to the point of intended landing, and thereafter for a period of at least 45 minutes at normal cruising consumption.

(3) No flight in large or small aircraft under IFR shall be started unless, considering the factors set forth in subparagraph (1), sufficient fuel and oil are carried aboard the aircraft (i) to reach the point of intended landing, (ii) thereafter to fly to the alternate airport, and (iii) thereafter to fly for a period of 45 minutes at normal cruising consumption.

(b) Outside the United States. Outside the continental limits of the United States the following requirements shall be met unless the Administrator finds, after considering the character of the terrain being traversed, the available airports, and the category and type of aircraft being operated, that the flight may be safely conducted with a lesser quantity of fuel.

(1) No flight shall be started unless, considering the wind and other weather conditions expected, the aircraft carries sufficient fuel and oil (i) to fly to the next point of landing specified in the flight plan, (ii) thereafter to fly to and land at the most distant alternate airport designated in the flight plan, and (iii) thereafter to fly for a period of at least 2 hours at normal cruising consumption.

(2) No flight shall be returned to the point of departure or to an alternate airport for that point unless the aircraft has sufficient fuel to return to such point and thereafter to fly for a period of at least 2 hours at normal cruising consumption.

(3) No flight shall be started to a destination for which there is no available alternate unless the aircraft carries sufficient fuel, considering wind and other weather conditions expected, to fly to that point and thereafter to fly for at least 3 hours at normal cruising consumption.

42.53 Minimum flight altitude rules. Except during take-off and landing, the flight altitude rules prescribed in paragraphs (a) and (b) below, in addition to the applicable provisions of § 60.107, shall govern air carrier operations: Provided, That other altitudes may be established by the Administrator for any area where he finds, after considering the character of the terrain being traversed, the quality and quantity of meteorological service, the navigational facilities available, and other flight conditions, that the safe conduct of flight permits or requires such other altitudes.

(a) Day VFR operations. No aircraft shall be flown at an altitude less than 500 feet above the surface or less than 1,000 feet from any mountain, hill, or other obstruction to flight.

(b) Night VFR or IFR operations. No aircraft shall be flown at an altitude less than 1,000 feet above the highest obstacle located within a horizontal distance of 5 miles from the center of the course intended to be flown or, in mountainous terrain designated by the Administrator, 2,000 feet above the highest obstacle located within a horizontal distance of 5 miles from the center of the course intended to be flown: Provided, That in VFR operations at night in such mountainous terrain aircraft may be flown over a lighted civil airway at a minimum altitude of 1,000 feet above such obstacle.

42.54 Flight into known icing conditions. No aircraft shall be flown into known or reportable heavy icing conditions. Aircraft may be flown into light or moderate icing conditions only if the aircraft is equipped with an approved means for de-icing the wings, propellers, and such other parts of the aircraft as are essential to safety.

42.55 Weather minimums. No flight shall be started unless the take-off, en route operation, and landing at destination can be conducted in

accordance with the weather requirements of Part 60, 7/ but in no case less than the minimums specified below:

(a) for VFR take-off, en route operation, or landing, the weather minimums shall be a ceiling of 1,000 feet and visibility of 1 mile for day and 2 miles for night, unless otherwise authorized by an air traffic clearance obtained from air traffic control, and

(b) for IFR operations the weather minimums, including alternate airport requirements, shall be not less than those specified in the CAA Flight Information Manual, or as otherwise specified or authorized by the Administrator.

42.56 Instrument approach. No instrument approach procedure shall be executed or landing made at an airport when the latest United States Weather Bureau report for that airport indicates the ceiling or visibility to be less than that prescribed by the Administrator for landing at such airport.

42.57 Airport lighting for night operations. No air carrier shall use an airport for the take-off or landing of an aircraft at night unless such airport is adequately lighted.

42.58 Navigational aids for IFR flight. IFR operations shall be conducted only over civil airways and at airports equipped with radio ranges or equivalent facilities, unless the Administrator has found that instrument navigation can be conducted by the use of radio direction finding equipment installed in the aircraft or by other specialized means and has approved or otherwise authorized such operation in the air carrier operating certificate.

42.59 Passenger use of emergency equipment. The air carrier shall establish procedures for familiarizing passengers with the location and use of emergency equipment.

42.60 Operations manual for large aircraft.

(a) When operations are conducted in large aircraft the air carrier shall prepare and maintain for the use and guidance of operations personnel an operations manual which contains full information necessary to guide flight and ground personnel in the conduct of safe flight operations and to inform such personnel regarding their duties and responsibilities. The manual shall also contain a copy of the air carrier operating certificate. The form and content shall be acceptable to the Administrator. Copies and revisions shall be furnished to all persons designated by the Administrator. All copies in the hands of company personnel shall be kept up to date.

7/ See the Flight Information Manual for specific en route, take-off, and landing minimums for particular routes and airports.

(b) A copy of the operations manual shall be kept at the principal operations base. Those portions of the manual pertinent to safe operation of the aircraft, including the copy of the air carrier operating certificate, shall be carried therein.

(c) Any changes prescribed by the Administrator in the interest of safety shall be promptly incorporated in the manual. Other changes not inconsistent with any Federal regulation, the air carrier operating certificate, or a safe operating practice may be made without the prior approval of the Administrator.

(d) No operation shall be conducted by the air carrier contrary to the safety provisions of the operations manual.

42.61 Flight plan for large aircraft. No large aircraft shall be taken off unless a VFR or IFR flight plan containing the appropriate information required by Part 60 is filed by the air carrier with the nearest CAA communications station or, when outside the United States, with the appropriate authority. In the event communications facilities are not readily available, such flight plan shall be filed as soon as practicable after becoming air-borne.

42.62 Flight manifest for large aircraft and passenger-carrying aircraft operating under IFR conditions. For all large aircraft, or any aircraft carrying passengers under IFR conditions, a flight manifest form shall be prepared and signed for each flight by qualified personnel of the air carrier charged with the duty of supervising the loading of the aircraft and the preparation of the flight manifest form. The form and contents of this manifest shall be in accordance with the instructions contained in the air carrier's operations manual and shall include the names and addresses of the passengers carried, points of departure and destination, the weight of the cargo and passengers, and the distribution of such weight in the aircraft in accordance with the weight control system prescribed in the operations manual. The weight of the passengers may be determined in accordance with a weight control system prescribed by the Administrator. In the event passengers are picked up at points other than the principal operations base or discharged at points other than as shown on the latest manifest, the pilot shall, before starting the flight, cause a duplicate copy of the revised manifest to be mailed to such base, unless other requirements are set forth in the carrier's operations manual. 8/

8/ See § 42.95 for record-keeping requirements for the flight manifest.

OPERATING LIMITATIONS FOR LARGE PASSENGER-CARRYING AIRPLANES

42.70 Operating limitations for transport category airplanes.

(a) In operating any passenger-carrying transport category airplane the provisions of §§ 42.71 through 42.78 shall be complied with unless deviations therefrom are specifically authorized by the Administrator on the ground that the special circumstances of a particular case make a literal observance of the requirements unnecessary for safety.

(b) For transport category aircraft the data contained in the Airplane Flight Manual shall be applied in determining compliance with these provisions. Where conditions differ from those for which specific tests were made, compliance shall be determined by interpolation or by computation of the effects of changes in the specific variables where such interpolations or computations will give results substantially equalling in accuracy the results of a direct test.

42.71 Weight limitations.

(a) No airplane shall be taken off from any airport located at an elevation outside of the altitude range for which maximum take-off weights have been determined, and no airplane shall depart for an airport of intended designation, or have any airport specified as an alternate, which is located at an elevation outside of the altitude range for which maximum landing weights have been determined.

(b) The weight of the airplane at take-off shall not exceed the authorized maximum take-off weight for the elevation of the airport from which the take-off is to be made.

(c) The weight at take-off shall be such that, allowing for normal consumption of fuel and oil in flight to the airport of intended destination, the weight on arrival will not exceed the authorized maximum landing weight for the elevation of such airport.

42.72 Take-off limitations to provide for engine failure. No take-off shall be made except under conditions which will permit compliance with the following requirements.

(a) It shall be possible, from any point on the take-off up to the time of attaining the critical-engine-failure speed, to bring the airplane to a safe stop on the runway as shown by the accelerate-stop distance data.

(b) It shall be possible, if the critical engine should fail at any instant after the airplane attains the critical-engine-failure speed, to proceed with the take-off and attain a height of 50 feet, as indicated by the take-off path data, before passing over the end of the take-off area.

Thereafter, it shall be possible to clear all obstacles, either by at least 50 feet vertically, as shown by the take-off path data, or by at least 200 feet horizontally within the airport boundaries and by at least 300 feet horizontally after passing beyond such boundaries.

(1) In determining the allowable deviation of the flight path in order to avoid obstacles by at least the distances above set forth, it shall be assumed that the airplane is not banked before reaching a height of 50 feet, as shown by the take-off path data, and that a maximum bank thereafter does not exceed 15°.

(c) In applying conditions (a) and (b), correction shall be made for any gradient of the take-off surface. Take-off data based on still air may be corrected to allow for the effect of a favorable wind according to reported wind conditions: Provided, That not more than 50% of the wind component along the direction of take-off may be used. 9/

42.73 En route limitations - all engines operating. No airplane shall be taken off at a weight in excess of that which would permit a rate of climb (expressed in feet per minute), with all engines operating, of at least 6 V_{s_o} (when V_{s_o} is expressed in miles per hour) at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track. Transport category airplanes certificated under Part 4a are not required to comply with this section. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by the anticipated consumption of fuel and oil.

42.74 En route limitations - one engine inoperative. No airplane of a maximum certificated weight of less than 40,000 lbs. shall be taken off at a weight in excess of that which would permit a rate of climb (expressed in feet per minute), with one engine inoperative of at least 0.02 $V_{s_o}^2$ (when V_{s_o} is expressed in miles per hour) at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles either side of the intended track; for airplanes of a maximum certificated weight of 40,000 to 60,000 lbs., inclusive, the rate of climb shall increase linearly in relation to weight to 0.04 $V_{s_o}^2$; for airplanes of a maximum certificated weight of over 60,000 lbs. the rate of climb shall be 0.04 V_{s_o}; for transport category airplanes certificated under Part 4a the rate of climb shall be 0.02 $V_{s_o}^2$ for all maximum certificated weights. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by the anticipated consumption of fuel and oil.

9/ It will be noted that Special Civil Air Regulation Serial Number 397 requires the pilot to take account of temperature variations as well as his wind component in take-off.

42.75 En route limitations - two engines inoperative. No airplane having four or more engines shall be flown along an intended track except under the following conditions: Provided, That this section shall not apply to transport category airplanes certificated under Part 4a:

(a) No place along the intended track shall be more than 90 minutes away from an available landing area at which a landing may be made in accordance with the requirements of § 42.78, assuming all engines are operating at cruising speed; or

(b) the take-off weight is such that the airplane with two engines inoperative shall have a rate of climb (expressed in feet per minute) of a least $0.01\ V_{so}^2$ (when V_{so} is expressed in miles per hour) either at an altitude of 1,000 feet above the elevation of the highest ground or obstruction within 10 miles on either side of the intended track or at an altitude of 5,000 feet, whichever is higher.

(1) The rate of climb referred to in paragraph (b) shall be determined by assuming the airplane's weight to be either that attained at the moment of failure of the second engine, assuming that failure to occur 90 minutes after departure, or that which may be attained by dropping fuel at the moment of failure of the second engine assuming that sufficient fuel is retained to arrive at an altitude of at least 1,000 feet directly over the landing area.

42.76 En route limitations - where special air navigational facilities exist. The 10-mile lateral distance specified in §§ 42.73 through 42.76 may, for a distance of no more than 20 miles, be reduced to 5 miles, provided that special air navigational facilities provide a reliable and accurate identification of any high ground or obstruction located outside of such 5-mile lateral distance but within the 10-mile distance.

42.77 Landing distance limitations - airport of destination. No airplane shall be taken off at a weight in excess of that which, under the conditions stated hereinafter in paragraphs (a) and (b), would permit the airplane to be brought to rest at the field of intended destination within 60% of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance line and the runway. For the purpose of this section it shall be assumed that the take-off weight of the airplane is reduced by the weight of the fuel and oil expected to be consumed in flight to the field of intended destination.

(a) It shall be assumed that the aircraft is landed on the most favorable runway and direction without regard to wind.

(b) It shall be assumed, considering every probable wind velocity and direction, that the aircraft is landed on the most suitable runway, taking due account of the ground handling characteristics of the airplane and allowing for the effect on the landing path and roll of not more than 50% of the favorable wind component.

(c) If the airport of intended destination will not permit full compliance with paragraph (b) above, the aircraft may be taken off if an alternate airport is designated which permits compliance with § 42.78.

42.78 Landing distance limitations - alternate airports. No airport shall be designated as an alternate airport in a flight plan unless the aircraft at the weight at take-off can comply with the requirements of paragraphs (a) and (b) of § 42.77 at such airport: Provided, That the aircraft can be brought to rest within 70% of the effective length of the runway.

42.80 Operating limitations for aircraft not certificated in the transport category. In operating any passenger-carrying, large, nontransport category airplanes after January 1, 1950, the provisions of §§ 42.81 through 42.83 shall be complied with. Prior to that date, such aircraft shall be operated in accordance with such operating limitations as the Administrator determines will provide a safe relation between the performance of the aircraft and the airports to be used and the areas to be traversed. Performance data published by the Administrator for each such nontransport category type aircraft shall be used in determining compliance with these provisions.

42.81 Take-off limitations. No take-off shall be made except under conditions which will permit the airplane to be brought to a safe stop within the effective length of the runway from any point on take-off up to the time of attaining, with all engines operating at normal take-off power, 105% of the minimum control speed or 115% of the power-off stall speed in the take-off configuration, whichever is greater, as shown by the accelerate-stop distance data.

(a) In applying this requirement take-off data shall be based upon still-air conditions, and no correction shall be made for any uphill gradient of 1% or less when such percentage is measured as the difference between elevation at the end points of the runway divided by the total length. For all uphill gradients greater than 1%, the effective take-off length of the runway shall be reduced 20% for each 1% grade.

42.82 En route limitations - one engine inoperative. No airplane shall be taken off at a weight in excess of that which, with the critical engine inoperative, would permit a rate of climb of at least 50 feet per minute at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track or at an altitude of 5,000 feet, whichever is higher. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds along its intended track is progressively reduced by the anticipated consumption of fuel and oil; that the propeller of the inoperative engine is in the minimum drag position; that the wing flaps and landing gear are in the most favorable positions; and that the remaining engine or engines are operating at the maximum continuous power available. The 10-mile lateral distance specified herein may, for a distance of no more than 20 miles, be reduced to 5 miles provided that special air navigational facilities provide a reliable and accurate identification of any high ground or obstruction located outside of such 5-mile lateral distance but within the 10-mile distar

42.83 Landing distance limitations- airport of destination. No airplane shall be taken off at a weight in excess of that which, under the conditions hereinafter stated in paragraphs (a) and (b), would permit the airplane to be brought to rest at the field of intended destination within 70% of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance line and the runway. For the purpose of this section it shall be assumed that the take-off weight of the airplane is reduced by the weight of the fuel and oil expected to be consumed in flight to the field of intended destination.

(a) It shall be assumed that the aircraft is landed on the most favorable runway and direction without regard to wind.

(b) It shall be assumed, considering every possible wind velocity and direction, that the aircraft is landed on the most suitable runway, taking due account of the ground handling characteristics of the airplane and allowing for the effect on the landing path and roll of not more than 50% of the favorable wind component.

(c) If the airport of intended destination will not permit full compliance with paragraph (b) above, the aircraft may be taken off if an alternate airport is designated which permits compliance with paragraphs (a) and (b) above.

REQUIRED RECORDS AND REPORTS

42.91 Maintenance records. Each air carrier shall keep at its principal operations base the following current records with respect to all aircraft, aircraft engines, propellers, and, where practicable, applicances used in air transportation:

(a) total time and service
(b) time since last overhaul
(c) time since last inspection, and
(d) mechanical failures.

42.92 Airman records. An air carrier shall maintain at its principal operations base current records of every airman utilized as a member of a flight crew. These records shall contain such information concerning the qualifications of each airman as is necessary to show compliance with the appropriate requirements prescribed by the Civil Air Regulations. No air carrier shall utilize any airman as a flight crew member unless records are maintained for such airman as required herein.

42.93 Emergency flight reports. In the case of emergencies necessitating the transportation of persons or medical supplies for the protection of life or property, the rules contained herein regarding type

of aircraft, equipment, and weather minimums to be observed will not be applicable: Provided, That within 48 hours after any such flight returns to its base the air carrier shall file a report with the Administrator setting forth the conditions under which the flight was made, the necessity therefor, and giving the names and addresses of the crew and passengers.

42.94 Pilot's emergency deviation report. Where pursuant to authority granted in § 42.51 (d) a pilot has deviated from established methods or requirements, he shall, within 7 days after completion of the trip, file with the Administrator a report thereof giving a brief statement concerning the circumstances of the emergency and the nature of the deviation.

42.95 Flight manifest record. A signed copy and any revision of the flight manifest required by § 42.62 shall be retained in the personal possession of the pilot for the duration of the flight, and a duplicate copy thereof shall be retained by the air carrier at its principal operations base for at least one year after completion of the flight.

42.96 Reporting of malfunctioning and defects. An air carrier shall report in a manner prescribed by the Administrator all malfunctioning and defects occurring during operation or discovered during inspection which cause or may be reasonably expected by the air carrier to cause an unsafe condition in any aircraft, engine, propeller, or appliance. The corrective action taken by the air carrier to prevent recurrence of the malfunctioning or defect shall be indicated.

(Secs. 205 (a), 601, 604, 52 Stat. 984, 1007, 1010; 62 Stat. 1216; 49 U.S.C. 425 (a), 551, 554, P. L. 872, 80th Cong. 2d Sess.)

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