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CIVIL AIR REGULATIONS

Part 40

Scheduled Interstate Air Carrier Certification and Operation Rules

Effective October 1, 1953

CIVIL AERONAUTICS BOARD

WASHINGTON, D. C.

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Chapter I—Civil Aeronautics Board

Subchapter A—Civil Air Regulations

PART 40 — SCHEDULED INTERSTATE AIR CARRIER CERTIFICATION AND OPERATION RULES

Adopted by the Civil Aeronautics Board at its office in Washington, D. C., on the 13th day of April 1953.

Presently effective Parts 40 and 61 of the Civil Air Regulations prescribe the standards for scheduled interstate air carrier certification and operation respectively. Subsequent to the promulgation of present Parts 40 and 61, the scheduled air carrier industry has undergone rapid growth and development. This growth and development necessitated the devisement of new procedures and techniques many of which are not compatible with the standards presently applicable to these operations. It has also become apparent that these regulations are in need of clarification and simplification in order to facilitate their administration by the air carriers to whom they apply and by the Administrator of Civil Aeronautics. In view of the foregoing, it became evident that the standards for certification and operation of scheduled air carriers should be revised.

The first proposed revision contemplated the consolidation of Parts 40, 41, and 61 into a single Part 40. A draft of this proposal was published in the FEDERAL REGISTER as a notice of proposed rule making (15 F. R. 6700) and circulated as Draft Release No. 50–8, dated October 2, 1950. In response to that notice, the Civil Aeronautics Administration (CAA) and the Air Transport Association (ATA) opposed the combining of domestic and international operating rules in a single part with the reasoning that to do so would substantially increase their administrative complexity. The Board recognized this comment to be of sufficient validity and importance as to dictate against an attempt at that time to consolidate the rules pertaining to domestic and international operations and decided, therefore, that the proposed Part 40 should be further amended so as to incorporate only the rules applicable to domestic scheduled air carrier certification and operation.

Numerous conferences and discussions were held with interested persons as a consequence of which a new proposal to combine present Parts 40 and 61 into a single Part 40 was drafted and published in the FEDERAL REGISTER as a notice of proposed rule making (16 F. R. 8923) and circulated as Draft Release No. 51–6 dated August 27, 1951. In response to this notice, extensive comments were received from the various representative groups in the scheduled air carrier industry. These comments were consolidated and on May 8, 1952, conferences were commenced with these groups to discuss in detail the comment received. These conferences disclosed, among other matters, that certain issues were present concerning which interested persons desired an opportunity to present oral argument before the Board.

On July 30, 1952, the Board published in the FEDERAL REGISTER as a notice of proposed rule making (17 F. R. 6971) a revised draft of the proposed Part 40. This notice not only reflected changes made as a result of the comment received on Draft Release No. 51–6 and the conferences held subsequent thereto, but also invited additional comment with respect to those matters pertaining to the proposed part concerning which opportunity for oral argument was desired.

As a result of comment received in response to the July 30, 1952, notice, a notice of proposed rule making and oral argument was published in the FEDERAL REGISTER (17 F. R. 11124) and circulated as Draft Release No. 52–33 setting down for oral argument before the Board certain, but not all, of the requested issues. On January 8, 1953, the Board heard oral argument on the designated issues and gave permission to interested persons to submit additional written comment on those issues concerning which oral argument was requested, but which were not set down to be heard by the Board.

The revision of Part 40 brought to issue certain matters which are either highly controversial in nature or which involve further detailed study of their various technical aspects or both. As these issues arose, it was decided to separate certain of them from the revision of Part 40 to preclude further unwarranted delay in the promulgation of the proposed revision. These controversial items are being processed as separate rule-making proceedings.

Among the items designated for separate rule-making proceedings were four issues pertaining to flight time and duty time limitations. By notice of proposed rule making and oral argument (17 F. R. 11883) circulated as Draft Release No. 52–34 the Board set down these issues for oral argument on February 26, 1953. Upon request of the ATA and the Air Line Pilots Association (ALPA) this oral argument was postponed indefinitely by notice published in the FEDERAL REGISTER (18 F. R. 1120) and circulated as Draft Release No. 53–3.

With regard to the other controversial items being considered separately, the issues pertaining to emergency and survival equipment and propeller reverse pitch indicating lights were published in the FEDERAL REGISTER as notices of proposed rule making (17 F. R. 8022 and 17 F. R. 9827) and circulated as Draft Releases Nos. 52–26 and 52–28, respectively. Consideration by the Board of rules pertaining to these two items is contemplated within the immediate future. Another item being considered separately concerns the mandatory application of certain transport category requirements to airplanes operated under the revised part. This item is presently under study and provisions pertaining thereto have been removed from revised Part 40.

Considerable comment has been received concerning the reference in § 40.181 (a) concerning the designation of a second alternate when the weather conditions forecast for the destination and first alternate are "marginal". This comment indicated that the word "marginal" is not sufficiently definitive and that the language contained in this section does not establish an unambiguous standard for air carrier operations. The Board recognizes that this comment may have merit but is of the opinion that some provision should be contained in Part 40 in recognition of marginal weather conditions. It is intended, therefore, that additional consideration be given this matter and an appropriate alternative proposal be circulated in the near future.

This revision of Part 40 contains numerous changes from the presently effective provisions. Many of these changes are comparatively minor in nature, however, several of the changes involve the establishment of a substantially different basis of certification and operation. A change in the procedure for the issuance of operations specifications is included in revised Part 40. The new rule separates the operations specifications from the air carrier operating certificate and establishes separate procedures for the issuance and amendment of each. In addition, provisions are included which govern the content of the operations specifications.

Another matter of particular significance concerns the presently effective requirement that aircraft used in scheduled air transportation after a certain date shall comply with the transport category requirements of the appropriate certification rules and shall meet the transport category performance requirements of the appropriate operating part. Because this requirement was intended to remove from scheduled air transportation several aircraft not capable of complying with the transport category requirements, such aircraft types as the Lockheed 18 and the Douglas DC-3 would not be permitted to operate in scheduled passenger service after the specified dates unless recertificated in the transport category. The Board has found it necessary on four previous occasions to alter the effective date of this requirement in order to permit the continued use of these aircraft types.

The safety record of both the Lockheed 18 and the Douglas DC-3 aircraft clearly indicates that these aircraft may be continued in scheduled passenger service without detrimental effect upon safety in air transportation. Revised Part 40, therefore, provides that aircraft types which have been certificated under a previous set of airworthiness rules should be permitted to continue their useful economic life unless the operational record of such aircraft indicates a necessity for application of more restrictive airworthiness regulations. The rule requiring that only transport category aircraft be used after December 31, 1953, therefore, is deleted from this regulation.

This revision of Part 40 also provides operating limitations for aircraft not certificated in the transport category. These provisions are based upon the non-transport category performance limitations which presently appear in Part 42 of the Civil Air Regulations with certain changes to render them more nearly an approximate equivalent of the many requirements and rules from various sources presently applicable to such aircraft types as the Lockheed 18 and the Douglas DC-3.

The aircraft equipment requirements contained herein differ in some respects from those contained in existing scheduled air carrier regulations. In the sense that certain of these aircraft requirements are not applicable to all operations in existing Civil Air Regulations, they may be regarded as technically retroactive. However, it is not believed that these requirements will actually cause undue hardship because in almost every instance the scheduled passenger-carrying fleet is presently so equipped.

Revised Part 40 contains numerous changes in the training program for crew members. Training standards are provided for both initial and recurrent training. These standards now include training provisions for other members of the crew as well as for the pilot crew members. In the belief that the instrument check, so called, is in fact a misnomer and during recent years has become more nearly a "proficiency" check, the regulation labels it accordingly. The regulation requires two such checks annually, but relates these checks more nearly to the pilots' over-all proficiency and removes much of the instrument check portion which was not related to direct and intimate knowledge and skill concerning the operation of aircraft controls. Provision is made for the accomplishment of procedures such as radio range orientation, manual loop navigation, and rudimentary tracking and beam bracketing in approved flight simulators. The regulations provide that the proficiency check give more precise treatment to aspects such as engine-out operation in multi-engine aircraft. Provisions for a line check are included as a means of requiring the carrier to ascertain that the training provided the pilot is reflected in typical route operations. In order to insure that some control is maintained over pilot proficiency in all aircraft types an additional requirement has been added making it necessary that either a proficiency check or a line check be had in each type of aircraft within the preceding 12 months before a pilot is to serve as pilot in command.

In addition, new standards are included which increase the emphasis upon airport qualification and to some degree deemphasize the route qualification factors. This trend is motivated by the development of aircraft and navigational equipment with less reliance upon visual aids for en route navigation, the increased complexity of procedure for operations in terminal areas, and the improvement in instrument approach facilities whereby all-weather operation more closely approaches reality.

The Board has attempted, through the technique of redispatch in flight, to alleviate certain excessive fuel requirements which were encountered in air carrier operations as a result of the present Civil Air Regulations. In addition, the air carriers are relieved of the necessity for making provision for an alternate airport whenever the weather forecasts assure that no difficulty may be anticipated in approaching and landing at the destination under visual flight rules irrespective of the fact that flight en route may be accomplished in accordance with the instrument flight rules. The Board is of the opinion that adequate safeguards are provided to permit operations without the additional fuel normally required when an alternate airport is specified. The regulation provides, therefore, that under conditions in which available forecasts assure no undue delay in transition from IFR en route to VFR approach and landing at the destination an alternate airport need not be specified.

Another change from existing rules concerns the execution of an instrument approach at an airport to which the ceiling and visibility are reported to be below the minimums specified for that airport. The present rules prohibit a pilot from executing an instrument approach in such a situation. Revised Part 40 provides an exception to this prohibition in those instances when the landing is being made at an airport at which ILS and GCA are available and used for the approach and in those instances when the approach has progressed into its final phase at the time the below minimum report is received, and the pilot has determined that conditions at least equal to the prescribed minimums actually exist.

In addition to editorial and clarifying corrections, this revision of Part 40 contains numerous changes which have been made as a result of comment received in response to notice of proposed rule making and the Board's conclusions concerning matters presented during oral argument. In addition the sections have been renumbered and rearranged subsequent to the July 30, 1952 notice. Since the sections discussed herein are numbered in accordance with the revised numbering, the number of the section as it appeared in the July 30, 1952 notice is indicated in brackets as a reference aid.

A new subparagraph (a) (3) is added to § 40.320 providing a weekly flight time limitation of 30 hours. Although this flight time limitation is in presently effective Part 61, it was not included in the July 30, 1952 notice because of controversy concerning the number of hours which this limitation should provide. This issue is now being considered in separate rule making proceedings. In order that this part not be unduly delayed in promulgation, it was considered desirable to continue in effect the limitation as contained in Part 61 and make such later changes thereto as may be necessary upon completion of the separate rule-making proceedings.

Section 40.358 has been changed by adding a requirement that the pilot in command shall insure that appropriate aeronautical charts containing adequate information concerning navigational aids and instrument approach procedures are aboard the airplane for each flight. This requirement is presently in effect in § 61.309 of Part 61 and had been inadvertently omitted from revised Part 40 on the assumption that this requirement was to be included in Part 43 of the regulations. Since no such requirement has been introduced into Part 43, it was considered desirable that the presently effective requirement be continued by including it in revised Part 40.

On January 8, 1953, the Board heard oral argument on certain matters at issue pertaining to revised Part 40. After careful consideration of the comments and arguments presented, the Board reached the following conclusions with respect to the provisions set down for oral argument.

With respect to the proposal that there be added to the non-transport category take-off performance limitations contained in § 40.91 [40.63] a requirement to take account of temperature, the Board concluded that, while temperature does have a marked effect on aircraft performance, the impact upon operating weights of such aircraft as the DC–3 would be correspondingly marked were temperature accountability to be required. The excellent safety record of such aircraft as the DC–3 and Lockheed 18 appears to dictate against such a requirement at this time.

With respect to the proposal to decrease the requirement for gradient accountability contained in § 40.91 [40.63], the Board concluded that although its proposal does constitute an increase in gradient accountability when compared with previous requirements applicable to non-transport category aircraft, this requirement will not create an undue burden in view of the fact that these rules also permit account to be taken of favorable wind components during the take-off. The inclusion of non-transport category performance limitations in Part 40 intended to insure operating weights approximately equivalent to those resulting from previous rules and the Board concludes that this rule is consistent with such an objective.

With respect to the proposal to decrease the landing distance requirements of § 40.93 [40.65], the Board concluded that the proposed requirement will effect operating weights of non-transport category airplanes adversely only in exceptional circumstances. The proposed landing distance requirements appear to be justified from the fact that overshooting accidents constitute a disproportionate percentage of all air carrier accidents. The Board also concluded that undue burden would not result from the application of this rule.

With respect to the proposal to amend § 40.232 (c) [40.92 (c)] to require additional navigational receiving equipment during the period of transition from low frequency to very high frequency navigation systems, the Board concluded that no showing had been made that the rule proposed by the Board did not in fact require the same duality of airborne equipment as contemplated under existing regulations. The Board was concerned, however, with the charge made during oral argument that there exists a requirement in certain high density terminal areas for airborne equipment in addition to that specified in § 40.232 [40.92]. This view, however, was not at issue during the oral argument and the Board intends, therefore, that a separate rule-making action be initiated in the near future to determine whether Part 40 should be further amended to require radio equipment in addition to that specified when necessary for air traffic control in particular terminal areas.

With respect to the proposal to amend § 40.280 (b) [40.120 (b)] to require that check airmen be "actively engaged in the same occupation as the airmen being checked" the Board concluded that no justification was presented for so restrictive a limitation upon managerial discretion. The Board was concerned, however, with an expressed view that "a holder of an airline transport pilot license who is trained and qualified on the equipment meets the requirements of the last sentence of § 40.280 (b) [40.120 (b)]". Since this construction is not consistent with the Board's intent in proposing the requirement, an amendment of this section has been made to clarify the Board's intent that check airmen shall possess the certificates and ratings required to be held by the airmen being checked.

With respect to the proposal that § 40.289 (b) [40.126 (b)] be amended to include a maximum interval for checking the competence of each crew member, the Board has concluded that an interval of twelve months should be established in order to insure against excessive intervals between such checks.

With respect to the proposals to amend § 40.302 [40.132] concerning proficiency and line checks, the Board is of the opinion that a misunderstanding as to the Board's intent may have been responsible in large measure for the expressed apprehension concerning this requirement. It is not intended that more than two proficiency checks a year be required. It is intended, however, that at least one of the two required proficiency checks shall be accomplished in the larger aircraft type in which a pilot is to serve as pilot in command. This section has been amended to simplify and clarify this requirement. The Board has also concluded that retention of the remainder of the section in substantially the form proposed by the Board will not create an undue burden upon air carriers.

With respect to the proposal to amend § 40.303 (c) [40.135 (c)], the Board has concluded that this requirement should be simplified so as to require only a landing and a take-off at each airport into which the pilot is scheduled to fly. The requirement to "fly through the approach procedure for which the lowest minimums are authorized" has been deleted. The Board is of the opinion that this amendment will simplify the administration of the rule without jeopardizing the objective sought.

With respect to the proposal to amend § 40.303 [40.135] to permit route familiarization by means of two one-way flights over the routes and to eliminate the requirement for night familiarization, the Board has concluded that such an amendment would simplify route qualification procedures without seriously compromising the resulting degree of pilot familiarization.

With respect to the proposal to amend § 40.304 [40.136] to enable a pilot to be scheduled into an airport at which he has not landed during the preceding twelve months, by reason of flying over such airport during that period, the Board has concluded that flight over an airport in operations commonly conducted today do not provide a pilot with sufficient opportunity to remain familiar with the airport and its facilities and physical environs. The Board recognized on the other hand that some relaxation can be made in this requirement by permitting such a pilot to serve as pilot-in-command and land at such airports if the reported weather conditions are at least three miles visibility and the ceiling at or above the lowest initial approach altitude for that airport.

With respect to the proposal to amend § 40.307 [40.138] to require the recent experience requirements for flight engineer to be made applicable each six months instead of each twelve months as prescribed, the Board concluded that such an amendment is desirable and would serve to insure that flight engineers possess adequate recent experience for the proper execution of their duties and that such an amendment will not constitute an undue burden upon the air carriers.

With respect to the proposal to amend § 40.351 [40.151] to require that the aircraft dispatcher and pilot in command be jointly responsible for delay of a flight, the Board concluded that this amendment was desirable in that it stated more clearly the Board's intent with respect to the relationships of the pilots and dispatchers. The Board did not agree, however, with the proposal that a new paragraph (e) be added to define certain functions of the dispatcher not related to safety because it considered such matters irrelevant to Part 40.

With respect to the proposal to amend § 40.391 [40.82] by deleting the words "en route", the Board concluded that such an amendment would appear to authorize operation of an airplane with required equipment unserviceable for an indefinite period of time. It is acknowledged, however, that certain operations may exist wherein the strict observance of this requirement would constitute an undue burden upon an air carrier. The Board has provided for such an eventuality by permitting the Administrator to exempt a carrier from strict compliance with the prohibition against re-scheduling a flight with required equipment inoperative in any particular circumstance in which the Administrator finds that undue hardship will result and that strict compliance with the requirement is not necessary in the interest of safety .

With respect to the proposal to amend § 40.408 [40.193] to substitute a 500-foot minimum altitude for the prescribed 1,000 feet under VFR conditions, the Board concluded that the higher minimum altitude is the more desirable as the general requirement. The Board concluded, moreover, that proper administration of this rule, will enable the carrier under conditions acceptable to the Administrator to avoid undue hardship without compromising safety.

With respect to the proposal to amend § 40.408 [40.193] to permit over-the-top operations below the minimum en route IFR altitude under conditions less restrictive than those currently contained in § 61.261, the Board concluded that adequate consideration of the matters pertinent thereto had been made when promulgating Civil Air Regulation Amendment 61–8, effective September 10,

1952, and that this amendment constitutes a reasonable and desirable limitation upon such operations.

With respect to the proposal to amend § 40.507 [40.207] to require the time since last overhaul of airframe and engines to be included in the aircraft maintenance log, the Board concluded that this information was desirable for the proper assessment by the flight crew of certain irregularities experienced in flight and that the provision of information from which time since last overhaul may be readily determined by the flight crew should be required.

The following provisions of revised Part 40 are discussed for the purpose of making clear the intent of the rule. The definition of "runway" in § 40.5 [40.2] is not intended to alter materially the existing use of airport areas other than paved areas for the purpose of "overrun".

Section 40.32 [40.22] does not contemplate the re-approval of all off-airway routes presently contained in air carrier operations specifications. These specifications continue in effect in accordance with § 40.18 (a) [40.12 (a)] as though they had been issued under the provisions of revised Part 40. The Administrator does have authority, however, under § 40.21 [40.15] to amend any operations specifications, "if he finds that safety in air transportation so requires or permits."

Although some of the words and phrases of §§ 40.70 [40.53] through 40.78 [40.61] have been rearranged or reworded, there is no intention to change the meaning of, or the interpretation presently being adhered to, regarding the existing transport category performance limitations.

Although certain editorial changes have been made in §§ 40.202 [40.80] through 40.205 [40.86], the intent of these sections is the same as the comparable provisions of present Part 61 regarding oxygen and protective breathing equipment.

The incorporation of the special airworthiness requirements, in §§ 40.110 [40.300] through 40.143 [40.333] and 40.150 [40.340] through 40.153 [40.343] is made without alteration of the intent of these provisions from presently effective regulations.

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

In consideration of the foregoing the Civil Aeronautics Board hereby revises Part 40 of the Civil Air Regulations (14 CFR, Part 40, as amended) effective October 1, 1953, to read as follows:

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AUTHORITY: §§ 40.1 to 40.511 issued under sec. 205, 52 Stat. 984; 49 U. S. C. 425. Interpret or apply secs. 601, 605, 52 Stat. 1007, 1010; 49 U. S. C. 551, 555.

APPLICABILITY AND DEFINITIONS

§ 40.1 *Applicability of this part.* The provisions of this part are applicable to air carriers holding certificates of public convenience and necessity issued in accordance with Title IV of the Civil Aeronautics Act of 1938, as amended, when they engage in scheduled interstate air transportation within the continental limits of the United States: *Provided*, That the provisions of this part shall not apply to operations conducted pursuant to economic exemption authority issued by the Board for a period of 90 days or less: *And provided further*, That the Administrator may authorize any air carrier holding authority to engage in scheduled cargo operations pursuant to Title IV of the Civil Aeronautics Act of 1938, as amended, to conduct such operations in accordance with the air carrier certification and operations rules prescribed in Part 42 of this subchapter: *And provided further*, That in the case of segments of routes extending beyond the continental limits of the United States, the Administrator may authorize an air carrier to conduct operations over such route segments pursuant to provisions of this part.

§ 40.2 *Applicability of Parts 43 and 60 of this subchapter.* The provisions of Parts 43 and 60 of this subchapter shall be applicable to all air carrier operations conducted under the provisions of this part unless otherwise specified in this part.

§ 40.5 *Definitions.* As used in this part terms shall be defined as follows:

Accelerate-stop distance. Accelerate-stop distance is the distance required to accelerate an airplane to a specified speed and, assuming failure of the critical engine at the instant that speed is attained, to bring the airplane to a stop. (See the pertinent airworthiness requirements for the manner in which such distance is determined.)

Administrator. The Administrator is the Administrator of Civil Aeronautics.

Air carrier. Air carrier means any citizen of the United States who directly, or by lease or by other arrangement, undertakes the carriage by airplane of persons or property as a common carrier for compensation or hire, or the carriage of mail by airplane.

Air traffic clearance. An air traffic clearance is an authorization issued by air traffic control for an airplane to proceed under specified conditions.

Air traffic control. Air traffic control is a service provided for the purpose of: (1) Preventing collisions between airplanes, and, on the airport ground maneuvering area, between airplanes and obstructions; and (2) expediting and maintaining an orderly flow of air traffic.

Aircraft dispatcher. An aircraft dispatcher is an individual holding a valid aircraft dispatcher certificate issued by the Administrator who exercises responsibility with the pilot in command in the operational control of each flight.

Airframe. Airframe shall mean any and all kinds of fuselages, booms, nacelles, cowlings, fairings, empennages, airfoil surfaces, and landing gear, and all parts, accessories, or controls, of whatever description, appertaining thereto, but not including engines and propellers.

Airplane. A power-driven fixed-wing aircraft, heavier than air, which is supported by the dynamic reaction of the air against its wings.

Airport. An airport is an area of land or water which is used, or intended for use, for the landing and take-off of airplanes.

Alternate airport. An alternate airport is an approved airport to which a flight may proceed if a landing at the airport to which the flight was dispatched becomes inadvisable.

Appliances. Appliances shall mean instruments, equipment, apparatus, parts, appurtenances, or accessories of whatever description, which are used, or are capable of being or intended to be used, in the navigation, operation, or control of airplanes in flight (including communication equipment, electronic devices, and any other mechanism or mechanisms installed in or attached to airplanes during flight, but excluding parachutes), and which are not a part or parts of airframes, engines, or propellers.

Approved. Approved, when used alone or as modifying terms such as means, method, action, equipment, etc., shall mean approved by the Administrator.

Authorized representative of the Administrator. An authorized representative of the Administrator shall mean any employee of the Civil Aeronautics Administrator or any private person, authorized by the Administrator to perform particular duties of the Administrator under the provisions of this part.

Ceiling. Ceiling is the height above the ground or water of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration" and not classified as "thin" or "partial."

Check airman. A check airman is an airman designated by the air carrier and approved by the Administrator to examine other airmen to determine their proficiency with respect to procedures and technique and their competence to perform their respective airman duties.

Control area. Control area is airspace having defined dimensions, designated

by the Administrator, which extends upward from an altitude of 700 feet above the surface, within which air traffic control is exercised. In the case of operations conducted in the airspace of a foreign country, control area shall mean the airspace designated by the appropriate authority of such country.

Control zone. Control zone is airspace having defined dimensions, designated by the Administrator, which extends upward from the surface, which includes one or more airports, and within which rules additional to those governing control areas apply for the protection of air traffic. In the case of control zones located in foreign countries, the control zone shall be designated by the appropriate authority of such country.

Crew member. A crew member is any individual assigned by an air carrier for the performance of duty on an airplane in flight.

Critical engine. The critical engine is that engine the failure of which gives the most adverse effect on the airplane flight characteristics relative to the case under consideration.

Critical-engine-failure speed. V_{SF} (transport category airplanes). The critical-engine-failure speed is the airplane speed used in the determination of the take-off distance required at which the critical engine is assumed to fail. (See the pertinent airworthiness requirements for the manner in which such speed is determined.)

Dispatch release. A dispatch is an authorization issued by an air carrier specifying the conditions for the origination or continuance of a particular flight.

Duty aloft. Duty aloft includes the entire period during which an individual is assigned as a member of an airplane crew during flight time.

Effective length of runway—(1) *Take-off.* The effective length of runway for take-off as used in the take-off operating limitations for nontransport category airplanes is the distance from the end of the runway at which the take-off is started to the point at which the obstruction clearance plane associated with the other end of the runway intersects the center line of the runway.

(2) *Landing.* The effective length of runway for landing as used in the landing operating limitations for both transport and nontransport category airplanes is the distance from the point at which the obstruction clearance plane associated with the approach end of the runway intersects the center line of the runway to the far end thereof.

En route. En route shall mean the entire flight from the point of origination to the point of termination, including intermediate stops.

Extended overwater operation. An extended overwater operation shall be considered an operation over water conducted at a distance in excess of 50 miles from the nearest shore line.

Fireproof. Fireproof material means a material which will withstand heat equally well or better than steel in dimensions appropriate for the purpose for which it is to be used. When applied to material and parts used to confine fires in designated fire zones, fireproof means that the material or part will perform this function under the most severe conditions of fire and duration likely to occur in such zones.

Fire-resistant. When applied to sheet or structural members, fire-resistant material means a material which will withstand heat equally well or better than aluminum alloy in dimensions appropriate for the purpose for which it is to be used. When applied to fluid-carrying lines, this term refers to a line and fitting assembly which will perform its intended protective functions under the heat and other conditions likely to occur at the particular location.

Flame-resistant. Flame-resistant material means a material which will not support combustion to the point of propagating, beyond safe limits, a flame after the removal of the ignition source.

Flammable. Flammable fluids or gases mean those which will ignite readily or explode.

Flash-resistant. Flash-resistant material means material which will not burn violently when ignited.

Flight crew member. A flight crew member is a crew member assigned to duty on an airplane as a pilot or flight engineer.

Flight engineer. A flight engineer is an individual holding a valid flight engineer certificate issued by the Administrator and whose primary assigned duty during flight is to assist the pilots in the mechanical operation of an airplane.

Flight time. Flight time is the time from the moment the airplane first moves under its own power for the purpose of flight until it comes to rest at the next point of landing (block-to-block time).

High-altitude operation. High-altitude operation is flight conducted at or above 12,500 feet above sea level east of longitude 100° W. and at or above 14,500 feet above sea level west of longitude 100° W.

IFR. IFR is the symbol used to designate instrument flight rules.

Interstate air transportation. Interstate air transportation is the carriage by airplane of persons or property as a common carrier for compensation or hire or the carriage of mail by airplane, in commerce between 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; or between places in the same State of the United States, or the District of Columbia; whether such commerce moves wholly by airplane or partly by airplane and partly by other forms of transportation.

Maximum certificated take-off weight. Maximum certificated take-off weight is the maximum take-off weight authorized by the terms of the airplane airworthiness certificate.[1]

Minimum control speed. The minimum control speed is the minimum speed at which an airplane can be safely controlled in flight after an engine suddenly becomes inoperative. (See pertinent airworthiness requirements for the manner in which such speed is determined.)

Month. Month shall mean that period of time extending from the first day of any month as delineated by the calendar through the last day thereof.

Night. Night is the time between the ending of evening civil twilight and the beginning of morning civil twilight as published in the American Air Almanac converted to local time for the locality concerned.[2]

Obstruction clearance area—(1) *Take-off.* A take-off obstruction clearance area as used in the take-off operating limitations for nontransport category airplanes is an area on the earth's surface defined as follows: The center line of the obstruction clearance area in plan view shall coincide with and prolong the center line of the runway, beginning at the point where the obstruction clearance plane intersects the center line of the runway and proceeding to a point not less than 1,500 feet from the beginning point. Thereafter the center line shall proceed in a path consistent with the take-off procedure for the runway or, where such a procedure has not been established, consistent with turns of at least 4,000-foot radius until a point is reached beyond which the obstruction clearance plane clears all obstructions. The obstruction clearance area shall extend laterally for a distance of 200 feet on each side of the center line at the point where the obstruction clearance plane intersects the runway and shall continue at this width until the end of the runway; thence it shall increase uniformly to 500 feet on each side of the center line at a point 1,500 feet from the intersection of the obstruction clearance plane with the runway; thereafter it shall extend laterally for a distance of 500 feet on each side of the center line.

(2) *Landing.* A landing obstruction clearance area as used in the landing operating limitations for both transport and nontransport category airplanes is an area on the earth's surface defined as follows: The center line of the obstruction clearance area in plan view shall coincide with and prolong the center line of the runway, beginning at the point where the obstruction clearance plane intersects the center line of the runway and proceeding to a point not less than 1,500 feet from the beginning point. Thereafter the center line shall proceed in a path consistent with the instrument approach procedure for the runway or, where such a procedure has not been established, consistent with turns of at least 4,000-foot radius until a point is reached beyond which the obstruction clearance plane clears all obstructions. The obstruction clearance

[1] The airplane airworthiness certificate incorporates as a part thereof the airplane operating record or that portion of an Airplane Flight Manual which contains the pertinent limitation.

[2] The American Air 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.

area shall extend laterally for a distance of 200 feet on each side of the center line at the point where the obstruction clearance plane intersects the runway and shall continue at this width until the end of the runway; thence it shall increase uniformly to 500 feet on each side of the center line at a point 1,500 feet from the intersection of the obstruction clearance plane with the runway; thereafter it shall extend laterally for a distance of 500 feet on each side of the center line.

Obstruction clearance plane. An obstruction clearance plane is a plane which is tangent to or clears all obstructions within the obstruction clearance area and which slopes upward from the runway at a slope of 1:20 to the horizontal as shown in a profile view of the obstruction clearance area.

Operational control. Operational control is the exercise of authority over initiation, continuation, diversion, or termination of a flight.

Over-the-top. Over - the - top shall mean the operation of an airplane above a layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration" and not classified as "thin" or "partial."

Pilot in command. The pilot is command is the pilot designated by the air carrier as the pilot responsible for the operation and safety of the airplane during the time defined as flight time.

Pilotage. Pilotage is navigation by means of visual reference to landmarks.

Propeller. Propeller shall mean a device for propelling an airplane through the air, having blades mounted on a power-driven shaft, which when rotated produces by its action on the air a thrust approximately parallel to the longitudinal axis of the airplane.

Provisional airport. A provisional airport is an airport approved for use by an air carrier for the purpose of providing service to a community when the regular airport serving that community is not available.

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

Refueling airport. A refueling airport is an airport approved as an airport to which flights may be dispatched only for refueling.

Regular airport. A regular airport is an airport approved as a regular terminal or intermediate stop on an authorized route.

Route. A route is the airspace on either side of a course joining those points on the surface of the earth between which an air carrier provides air transportation in accordance with the terms of its certificate of public convenience and necessity issued by the Board.

Route segment. A route segment is a portion of a route each terminus of which is identified by: (1) A continental or insular geographic location, or (2) a point at which a definite radio fix can be established.

Runway. A runway is a clearly defined area of an airport suitable for the safe landing or take-off of airplanes.

Scheduled for duty aloft. Scheduled for duty aloft shall mean the assignment of a flight crew member on the basis of the flight time established in the operations schedules rather than the actual flight time.

Show. Show shall mean to demonstrate or prove to the satisfaction of the Administrator prior to the issuance of the air carrier operating certificate and at any time thereafter required by the Administrator.

Synthetic trainer. A synthetic trainer is a device the use of which is approved to simulate certain operating conditions.

Take-off safety speed, V_2. The take-off safety speed is the airplane speed used in the determination of the take-off flight path at which the climb-out following take-off can be safely executed with one engine inoperative and with the airplane in the take-off configuration. (See the pertinent airworthiness requirements for the manner in which such speed is determined.)

Time in service. Time in service, as used in computing maintenance time records, is the time from the moment an airplane leaves the ground until it touches the ground at the end of a flight.

Transport category airplane. A transport category airplane is an airplane which has been type certificated in accordance with the requirements of Part 4b of this subchapter or the transport category requirements of Part 4a of this subchapter.

Type. With regard to airman qualifications, type shall mean all airplanes of the same basic design, including all modifications thereto except those modifications which the Administrator has found result in a substantial change in characteristics pertinent to the airman concerned.

VFR. VFR is the symbol used to designate visual flight rules.

V_{s_0}. V_{s_0} is the symbol used to designate the true indicated stalling speed or the minimum steady flight speed in the landing configuration.

Visibility. Visibility is the greatest distance at which conspicuous objects can be seen and identified.

(1) *Flight visibility.* Flight visibility is the average range of visibility forward from the cockpit of an airplane in flight to see and identify prominent unlighted objects by day and prominent lighted objects by night.

(2) *Ground visibility.* Ground visibility is the visibility at the earth's surface as reported by the United States Weather Bureau or by a source approved by the Weather Bureau.

Week. Week shall mean that period of time extending from the first day of any week as delineated by the calendar through the last day thereof.

Year. Year shall mean that period of time extending from the first day of any year as delineated by the calendar through the last day thereof.

CERTIFICATION RULES AND OPERATIONS SPECIFICATIONS REQUIREMENTS

§ 40.10 *Certificate required.* No person subject to the provisions of this part shall operate an airplane in scheduled interstate air transportation without, or in violation of the terms of, an air carrier operating certificate issued by the Administrator.

§ 40.11 *Contents of certificate.* An air carrier operating certificate shall specify the points to and from which, and the routes over which, an air carrier is authorized to operate.

§ 40.12 *Application for certificate.* An application for an air carrier operating certificate shall be made in the form and manner and contain information prescribed by the Administrator.

§ 40.13 *Issuance of certificate.* (a) An air carrier operating certificate shall be issued by the Administrator to an applicant having a certificate of public convenience and necessity issued by the Civil Aeronautics Board when the Administrator finds, after investigation, that such person is properly and adequately equipped and able to conduct a safe operation in accordance with the requirements of this part and with the operations specifications authorized in this part.

(b) Whenever, upon investigation, the Administrator finds that the general standards of safety required for air carrier operations in airplanes of 12,500 pounds or less maximum certificated take-off weight, or for air carrier operations conducted pursuant to a temporary authorization issued under Title IV of the Civil Aeronautics Act of 1938, as amended, require or permit a deviation from any specific requirement for a particular operation or class of operations for which an application for an air carrier operating certificate has been made, he may issue operations specifications prescribing requirements which deviate from the requirements of this part. The Administrator shall promptly notify the Board of such deviations in the operations specifications and the reasons therefor.

§ 40.14 *Amendment of certificate.* (a) The Administrator shall, after notice and opportunity for hearing to the carrier concerned, amend an air carrier operating certificate when he finds that such amendment is reasonably required in the interest of safety.

(b) Upon application by an air carrier the Administrator shall amend an air carrier operating certificate when he finds that the general standards of safety permit such an amendment.

§ 40.15 *Display of certificate.* The air carrier operating certificate shall be available at the principal operations office of an air carrier for inspection by any authorized representative of the Board or the Administrator.

§ 40.16 *Duration of certificate.* (a) An air carrier operating certificate shall remain in effect until termination of the certificate of public convenience and necessity or other economic authorization issued by the Board held by the air carrier, or until surrendered, suspended, revoked, or otherwise terminated by order of the Board. After suspension or revocation it shall be returned to the Administrator.

(b) Nothing in this section shall be

construed to deny or to defeat the jurisdiction of the Federal courts, the Administrator, or the Board to impose any authorized sanction, including revocation of the certificate, for a violation of the Civil Aeronautics Act of 1938, as amended, regulations in this subchapter, or the air carrier operating certificate occurring during the effective period of such certificate.

§ 40.17 *Transferability of certificate.* An air carrier operating certificate is not transferable, except with the written consent of the Administrator.

§ 40.18 *Operations specifications required.* (a) On and after the effective date of this part all air carrier operations specifications currently in force relating to interstate air transportation shall cease to be a part of any air carrier operating certificate and shall be deemed to be operations specifications issued under this part. Thereafter new or amended specifications shall be issued by the Administrator for operations subject to this part in a form and manner prescribed by him and in accordance with the provisions of this part.

(b) No person subject to the provisions of this part shall operate as an air carrier without, or in violation of, operations specifications issued by the Administrator.

§ 40.19 *Contents of specifications.* The operations specifications shall contain the following:

(a) Types of operations authorized.

(b) Types of airplanes authorized for use.

(c) En route authorizations and limitations.

(d) Airport authorizations and limitations.

(e) Time limitation for overhauls, inspections, and checks of airframes, engines, propellers, and appliances, or standards by which such time limitations shall be determined.

(f) Procedures used to maintain control of weight and balance of airplanes.

(g) Interline equipment interchange requirements, if pertinent, and

(h) Such additional items as the Administrator determines, under the enabling provisions of this part, are necessary to cover a particular situation.

§ 40.20 *Utilization of operations specifications.* The air carrier shall keep its personnel informed with respect to the contents of the operations specifications and all amendments thereto applicable to the individual's duties and responsibilities. A set of specifications shall be maintained by the air carrier as a separate and complete document. Pertinent excerpts from the specifications or references thereto shall be inserted in the manual issued by the air carrier.

§ 40.21 *Amendment of operations specifications.* Any operations specification may be amended by the Administrator if he finds that safety in air transportation so requires or permits. Except in the case of an emergency requiring immediate action in respect to safety in air transportation or upon consent of the air carrier concerned, no amendment shall become effective prior to thirty days after the date the air carrier has been notified of such amendment. Within thirty days after either the receipt of such notice or the refusal of the Administrator to approve an air carrier's application for amendment, the air carrier may petition the Board to review the action of the Administrator. Except with regard to emergency amendments by the Administrator, the effectiveness of any amendment concerning which the carrier has petitioned for review shall be stayed pending the Board's decision.

§ 40.22 *Inspection authority.* An authorized representative of the Board or the Administrator shall be permitted at any time and place to make inspections or examinations to determine an air carrier's compliance with the requirements of the Civil Aeronautics Act of 1938, as amended, the regulations in this subchapter, the provisions of the air carrier's operating certificate, and the operations specifications.

§ 40.23 *Operations and maintenance base and office.* Each air carrier shall give written notice to the Administrator of his principal business office, his principal operations base, and his principal maintenance base. Thereafter, prior to any change in any such office or base, he shall give written notice to the Administrator.

REQUIREMENTS FOR SERVICES AND FACILITIES

§ 40.30 *Route requirements; demonstration of competence.* The air carrier shall show that it is competent to conduct scheduled operations over any route or route segment between any regular, provisional, or refueling airport and that the facilities and services available are adequate for the type of operation proposed. The Administrator shall not require actual flight over a route or route segment, if the air carrier shows that such flight is not essential to safety. The air carrier may thereafter conduct operations between regular, provisional, or refueling airports on any approved route or routes on which the operational facilities and procedures are substantially similar: *Provided,* That high-altitude operations may be conducted over any route.

§ 40.31 *Width of routes.* A route or route segment shall include the navigable airspace on each side of an approved course or courses, and it shall have a width designated by the Administrator consistent with terrain, available navigational aids, traffic density, and air traffic control procedures: *Provided,* That for high-altitude operations, courses need not be approved, and the width of navigable airspace on each side thereof need not be designated by the Administrator.

§ 40.32 *IFR routes outside of control areas.* IFR routes outside of control areas shall be approved if the air carrier shows that the navigational and communications facilities are adequate for the operations proposed, unless the Administrator finds that because of traffic density an adequate level of safety cannot be insured in a particular area: *Provided,* That for high-altitude operations IFR routes need not be approved.

§ 40.33 *Airports.* The air carrier shall show that each route has sufficient airports found by the Administrator to be properly equipped and adequate for the type of operations to be conducted. Consideration shall be given to items such as size, surface, obstructions, facilities, public protection, lighting, navigation and communications aids, and traffic control.

§ 40.34 *Communications facilities.* The air carrier shall show that a two-way air/ground radio communication system is available at such points as will insure reliable and rapid communications over the entire route, either direct or via approved point-to-point circuits for the following purposes:

(a) Communications between airplanes and the appropriate dispatch office, in which case such systems shall be independent of systems operated by the Federal Government, and

(b) Communications between airplanes and the appropriate air traffic control unit, in which case the Administrator may permit the use of communications systems operated by the Federal Government.

§ 40.35 *Weather reporting facilities.* The air carrier shall show that sufficient weather reporting services are available at such points along the route as are necessary to insure such weather reports and forecasts as are necessary for the operation. Weather reports used to control flight movements shall be those prepared and released by the U. S. Weather Bureau, or by a source approved by the Weather Bureau. Forecasts used to control flight movements shall be prepared from such weather reports.

§ 40.36 *En route navigational facilities.* The air carrier shall show that nonvisual ground aids to air navigation are available along each route, that they are so located as to permit navigation to any regular, provisional, refueling, or alternate airport within the degree of accuracy necessary for the operation involved, and that they are available for the navigation of airplanes within the degree of accuracy required for air traffic control: *Provided,* That no nonvisual ground aids to navigation are required for day VFR operations where the characteristics of the terrain are such that navigation can be conducted by pilotage.

§ 40.37 *Servicing and maintenance facilities.* The air carrier shall show that competent personnel and adequate facilities and equipment, including spare parts, supplies, and materials, are available at such points along the air carrier's routes as are necessary for the proper servicing, maintenance, repair, and inspection of airplanes and auxiliary equipment.

§ 40.38 *Location of dispatch centers.* The air carrier shall show that it has a sufficient number of dispatch centers adequate for the operations to be con-

ducted and located at such points as are necessary to insure the proper operational control of each flight.

MANUAL REQUIREMENTS

§ 40.50 *Preparation of manual.* The air carrier shall prepare and keep current a manual for the use and guidance of flight and ground operations personnel in the conduct of its operations.

§ 40.51 *Contents of manual.* (a) The manual shall contain instructions, information, and data necessary for the personnel concerned to carry out their duties and responsibilities with a high degree of safety. It shall be in a form to facilitate easy revision, and each page shall bear the date of the last revision thereof. The contents of such manual shall not be contrary to the provisions of any Federal regulations, operations specifications, or the operating certificate. The manual may be in two or more separate parts (e. g., flight operations, ground operations, maintenance, communications, etc.) to facilitate use by the personnel concerned, but each part shall contain so much of the information listed below as is appropriate for each group of personnel:

(1) General policies,

(2) Duties and responsibilities of each crew member and appropriate members of the ground organization,

(3) Reference to appropriate regulations in this subchapter and Civil Aeronautics Manuals,

(4) Flight dispatching and control,

(5) En route flight, navigation, and communication procedures, including procedures for the dispatch or continuance of flight, if any item of equipment required for the particular type of operation becomes inoperative or unserviceable en route,

(6) Appropriate information from the en route operations specifications, including for each approved route the types of airplanes authorized, their crew complement, the type of operation (i. e., VFR, IFR, day, night) and other pertinent information,

(7) Appropriate information from the airport operations specifications, including for each airport its location, its designation (i. e., regular, alternate, provisional, etc.), types of airplanes authorized, instrument approach procedures, landing and take-off minimums, and other pertinent information,

(8) Take-off, en route, and landing weight limitations,

(9) Procedures for familiarizing passengers with the use of emergency equipment during flight,

(10) Emergency procedures and equipment,

(11) The method of designating succession of command of flight crew members,

(12) Procedures for determining the usability of landing and take-off areas and for dissemination of pertinent information to operations personnel,

(13) Procedures for operation during periods of icing, hail, thunderstorms, turbulence, or any potentially hazardous meteorological conditions,

(14) Airman training programs, including appropriate ground, flight, and emergency phases,

(15) Instructions and procedures for maintenance, repair, overhaul, and servicing,

(16) Time limitations for overhaul, inspection, and checks, of airframes, engines, propellers, and appliances, and standards by which such time limitations shall be determined,

(17) Procedures for refueling airplanes, elimination of fuel contamination, protection from fire including electrostatic protection, and the supervision and protection of passengers during refueling,

(18) Inspections for airworthiness, including instructions covering procedures, standards, responsibilities, and authority of the inspection personnel,

(19) Methods and procedures for maintaining the airplane weight and center of gravity within approved limits,

(20) Pilot and dispatcher route and airport qualification procedures,

(21) Accident notification procedures, and

(22) Other data or instructions related to safety.

(b) At least one complete master copy of the manual containing all parts thereof shall be retained at the appropriate operations base of the air carrier.

§ 40.52 *Distribution of manual.* (a) Copies of the entire manual, or appropriate portions thereof, together with revisions thereto shall be furnished to the following:

(1) Appropriate ground operations and maintenance personnel of the air carrier,

(2) Flight crew members,

(3) Authorized representatives of the Administrator assigned to the air carrier to act as aviation safety agents.

(b) All copies of the manual shall be kept up to date.

AIRPLANE REQUIREMENTS

§ 40.60 *General.* Airplanes shall be identified, certificated, and equipped in accordance with the applicable airworthiness requirements of the regulations in this subchapter. No air carrier shall operate any airplane in scheduled operation unless such airplane meets the requirements of this part and is in an airworthy condition.

§ 40.61 *Airplane certification requirements.* (a) *Airplanes certificated on or before June 30, 1942.* Airplanes certificated as a basic type on or before June 30, 1942, shall either:

(1) Retain their present airworthiness certification status and meet the requirements of § 40.90, or

(2) Comply with either the performance requirements of §§ 4a.737–T through 4a.750–T of this subchapter or the performance requirements of §§ 4b.110 through 4b.125 of this subchapter and in addition shall meet the requirements of §§ 40.70 through 40.78: *Provided,* That should any type be so qualified, all airplanes of any one operator of the same or related types shall be similarly qualified and operated.

(b) *Airplanes certificated after June 30, 1942.* Airplanes certificated as a basic type after June 30, 1942, and used in passenger operation shall be certificated as transport category airplanes and shall meet the requirements of § 40.70.

§ 40.62 *Airplane limitation for type of route.* All airplanes used in passenger air transportation shall be multiengine airplanes and shall comply with the following requirements:

(a) *Two- or three-engine airplanes.* Two- or three-engine airplanes shall not be used in passenger-carrying operations unless adequate airports are so located along the route that the airplanes will at no time be at a greater distance therefrom than one hour of flying time in still air at normal cruising speed with one engine inoperative: *Provided,* That the Administrator may specify distances greater or less than those set forth herein when he determines that the character of the terrain, the type of operation, or the performance of the airplanes to be used so permit or require.

(b) *Land airplanes on extended overwater routes.* Land airplanes operated on flights involving extended overwater operations shall be certificated as adequate for ditching in accordance with the ditching provisions of Part 4b of this subchapter.

§ 40.63 *Proving tests.* (a) A type of airplane not previously approved for use in scheduled operation shall have at least 100 hours of proving tests, in addition to the airplane certification tests, accomplished under the supervision of an authorized representative of the Administrator. As part of the 100-hour total at least 50 hours shall be flown over authorized routes and at least 10 hours shall be flown at night.

(b) A type of airplane which has been previously proved shall be tested for at least 50 hours of which at least 25 hours shall be flown over authorized routes when the airplane:

(1) Is materially altered in design, or

(2) Is to be used by an air carrier who has not previously proved such a type.

(c) During proving tests only those persons required to make the tests and those designated by the Board or the Administrator shall be carried. Mail, express, and other cargo may be carried when approved by the Administrator.

AIRPLANE PERFORMANCE OPERATING LIMITATIONS; TRANSPORT CATEGORY

§ 40.70 *Transport category airplane operating limitations.* (a) In operating any passenger-carrying transport category airplane the provisions of §§ 40.71 through 40.78 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 airplanes the performance 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 inter-

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polation or by computation of the effects of changes in the specific variables where such interpolations or computations will give results substantially equaling in accuracy the results of a direct test.

(c) No airplane shall be taken off at a weight which exceeds the allowable weight for the runway being used as determined in accordance with the take-off runway limitations of the transport category operating rules of this part, after taking into account the temperature operating correction factors required by §§ 4a.749a–T or 4b.117 of this subchapter, and set forth in the Airplane Flight Manual for the airplane.

§ 40.71 *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 destination 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.

§ 40.72 *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 in 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 runway. 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. 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 takeoff path data, and that a maximum bank thereafter does not exceed 15°.

(c) In applying the requirements of paragraphs (a) and (b) of this section, corrections shall be made for any gradient of the take-off surface. To allow for wind effect, take-off data based on still air may be corrected by not more than 50 percent of the reported wind component along the take-off path if opposite to the direction of take-off, and shall be corrected by not less than 150 percent of the reported wind component if in the direction of take-off.

§ 40.73 *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_0} (when V_s 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 on either side of the intended track. Transport category airplanes certificated under Part 4a of this subchapter 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 normal consumption of fuel and oil.

§ 40.74 *En route limitations; one engine inoperative.* 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 one engine inoperative, of at least $\left(0.06-\frac{0.08}{N}\right) V_{s_0}^2$ (when N is the number of engines installed and V_{s_0} 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 on either side of the intended track: *Provided*, That for transport category airplanes certificated under Part 4a of this subchapter, the rate of climb shall be $0.02\ V_{s_0}^2$. 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 normal consumption of fuel and oil.

§ 40.75 *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 of this subchapter:

(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 § 40.78, assuming all engines are operating at cruising power; 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 at least $0.01\ V_{s_0}^2$ (when V_{s_0} 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. The rate of climb referred to in this paragraph shall be determined by assuming the airplane's weight to be either that expected at the moment of failure of the second engine, assuming the 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.

§ 40.76 *Special en route limitations.* The 10-mile lateral distance specified in §§ 40.73 through 40.75 may, for a distance of no more than 20 miles, be reduced to 5 miles, if operating VFR, or if air navigational facilities are so located as to 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.

§ 40.77 *Landing distance limitations; airport of destination.* No airplane shall be taken off at a weight in excess of that which, under the conditions stated in this part would permit the airplane to be brought to rest at the field of intended destination within 60 percent of the effective length of the runway from a point 50 feet directly above the intersection of the obstruction clearance plane 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 airplane is landed on the most favorable runway and direction in still air.

(b) It shall be assumed, considering the probable wind velocity and direction, that the airplane is landed on the most suitable runway, taking due account of the ground handling characteristics of the airplane type involved and other conditions (e. g., landing aids, terrain, etc.) and allowing for the effect on the landing path and roll of not more than 50 percent of the wind component along the landing path if opposite to the direction of landing, or not less than 150 percent of the wind component if in the direction of landing.

(c) If the airport of intended destination will not permit full compliance with paragraph (b) of this section, the airplane may be taken off if an alternate airport is designated which permits compliance with § 40.78.

§ 40.78 *Landing distance limitations; alternate airports.* No airport shall be designated as an alternate airport in a dispatch release unless the airplane at the weight anticipated at the time of arrival at such airport can comply with the requirements of § 40.77: *Provided*, That the airplane can be brought to rest within 70 percent of the effective length of the runway.

AIRPLANE PERFORMANCE OPERATING LIMITATIONS; NONTRANSPORT CATEGORY

§ 40.90 *Nontransport category airplane operating limitations.* In operating any large, nontransport category airplane in passenger service after December 31, 1953, the provisions of §§ 40.91 through 40.93 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. Prior to that date such airplanes shall be operated either in accordance with §§ 40.91 through 40.93 or in accordance with such operating limitations as the Administrator determines will provide a safe relation between the performance of the airplanes and the airports to be used and the areas to be traversed. Performance data published or approved by the Administrator for each such nontransport category airplane shall be used in determining compliance with the provisions of §§ 40.91 through 40.93.

§ 40.91 *Take-off limitations.* No take-off shall be made at a weight in excess of that which will permit the airplane to be brought to a safe stop within the effective length of the runway from any point during the take-off up to the time of attaining 105 percent of minimum control speed or 115 percent of the power-off stalling speed in the take-off configuration, whichever is the greater. In applying the requirements of this section:

(a) It may be assumed that take-off power is used on all engines during the acceleration;

(b) Account may be taken of not more than 50 percent of the reported wind component along the take-off path if opposite to the direction of take-off, and account shall be taken of not less than 150 percent of the reported wind component if in the direction of the take-off;

(c) Account shall be taken of the average runway gradient when the average gradient is greater than ½ percent. The average runway gradient is the difference between the elevations of the end points of the runway divided by the total length;

(d) It shall be assumed that the airplane is operating in the standard atmosphere.

§ 40.92 *En route limitations; one engine inoperative.* (a) No take-off shall be made at a weight in excess of that which will permit the airplane to climb at a rate of at least 50 feet per minute with the critical engine inoperative at an altitude of at least 1,000 feet above the elevation of the highest obstacle within 5 miles on either side of the intended track or at an altitude of 5,000 feet, whichever is the higher: *Provided,* That in the alternative an air carrier may utilize a procedure whereby the airplane is operated at an altitude such that, in event of an engine failure, the airplane can clear the obstacles within 5 miles on either side of the intended track by 1,000 feet, if the air carrier can demonstrate to the satisfaction of the Administrator that such a procedure can be used without impairing the safety of operation. If such a procedure is utilized, the rate of descent for the appropriate weight and altitude shall be assumed to be 50 feet per minute greater than indicated by the performance information published or approved by the Administrator. Before approving such a procedure, the Administrator shall take into account, for the particular route, route segment, or areas concerned, the reliability of wind and weather forecasting, the location and types of aids to navigation, the prevailing weather conditions, particularly the frequency and amount of turbulence normally encountered, terrain features, air traffic control problems, and all other operational factors which affect the safety of an operation utilizing such a procedure.

(b) In applying the requirements of paragraph (a) of this section, it shall be assumed that:

(1) The critical engine is inoperative;

(2) The propeller of the inoperative engine is in the minimum drag position;

(3) The wing flaps and landing gear are in the most favorable positions;

(4) The operative engine or engines are operating at the maximum continuous power available;

(5) The airplane is operating in the standard atmosphere;

(6) The weight of the airplane is progressively reduced by the weight of the anticipated consumption of fuel and oil.

§ 40.93 *Landing distance limitations; airport of intended destination.* No take-off shall be made at a weight in excess of that which, allowing for the anticipated weight reduction due to consumption of fuel and oil, will permit the airplane to be brought to a stop within 60 percent of the effective length of the most suitable runway at the airport of intended destination.

(a) This weight shall in no instance be greater than that permissible if the landing were to be made:

(1) On the runway with the greatest effective length in still air and,

(2) On the runway required by the probable wind, taking into account not more than 50 percent of the probable headwind component and not less than 150 percent of the probable tail-wind component.

(b) In applying the requirements of this section it shall be assumed that:

(1) The airplane passes directly over the intersection of the obstruction clearance plane and the runway at a height of 50 feet in a steady gliding approach at a true indicated air speed of at least 1.3 V_{s_0};

(2) The landing is made in such a manner that it does not require any exceptional degree of skill on the part of the pilot.

(3) The airplane is operating in the standard atmosphere.

SPECIAL AIRWORTHINESS REQUIREMENTS

§ 40.110 *Fire prevention.* All airplanes used in passenger service, powered by engines rated at more than 600 horsepower each for maximum continuous operation and which have not been certificated in accordance with the provisions of Part 4b of this subchapter in effect on or after November 1, 1946, shall comply with the requirements contained in §§ 40.111 through 40.143: *Provided,* That if the Administrator finds that in particular models of existing airplanes literal compliance with specific items of these requirements might be extremely difficult of accomplishment and that such compliance would not contribute materially to the objective sought, he may accept such measures of compliance as he finds will effectively accomplish the basic objectives of these regulations.[3]

§ 40.111 *Susceptibility of materials to fire.* The Administrator shall prescribe the heat conditions and testing procedures which any specific material or individual part must meet where necessary for the purpose of applying the following defined terms: fireproof, fire-resistant, flame-resistant, flash-resistant, and flammable.

§ 40.112 *Cabin interiors.* All compartments occupied or used by the crew or passengers shall comply with the following provisions:

(a) Materials shall in no case be less than flash-resistant.

(b) The wall and ceiling linings, the covering of all upholstering, floors, and furnishings shall be flame-resistant.

(c) Compartments where smoking is to be permitted shall be equipped with ash trays of the self-contained type which are completely removable. All other compartments shall be placarded against smoking.

(d) All receptacles for used towels, papers, and wastes shall be of fire-resistant material and shall incorporate covers or other provisions for containing possible fires started in the receptacles.

§ 40.113 *Internal doors.* Where internal doors are equipped with louvres or other ventilating means, provision convenient to the crew shall be made for closing the flow of air through the door when such action is found necessary.

§ 40.114 *Ventilation.* All passenger and crew compartments shall be suitably ventilated. Carbon monoxide concentration shall not exceed one part in 20,000 parts of air, and fuel fumes shall not be present. Where partitions between compartments are equipped with louvres or other means allowing air to flow between such compartments, provision convenient to the crew shall be made for closing the flow of air through the louvres or other means when such action is found necessary.

§ 40.115 *Fire precautions.* Each compartment shall be designed so that, when used for the purpose of storing cargo or baggage, it shall comply with all of the requirements prescribed for cargo or baggage compartments. It shall include no controls, wiring, lines, equipment, or accessories the damage or failure of which would affect the safe operation of the airplane, unless such item is adequately shielded, isolated, or otherwise protected so that it cannot be damaged by movement of cargo in the compartment, and so that any breakage or failure of such item would not create

[3] The requirements of §§ 40.111 through 40.143 are taken directly from Part 04, as amended by Amendment 04-4, effective November 1, 1946, and are the requirements made applicable by the Board in Amendment 61-2, effective November 1, 1946, to all airplanes powered by engines of more than 600 horsepower each for maximum continuous operation when used in passenger service. As the requirements of Part 04 pertaining to liquid-cooling systems are not applicable, they have been omitted from this part.

a fire hazard in the compartment. Provision shall be made to prevent cargo or baggage from interfering with the functioning of the fire-protective features of the compartment. All materials used in the construction of cargo or baggage compartments, including tie-down equipment, shall be flame-resistant or better. In addition, all cargo and baggage compartments shall include provisions for safeguarding against fires according to the following classifications:

(a) Cargo and baggage compartments shall be classified in the "A" category, if presence of a possible fire therein can be readily discernible to a member of the crew while at his station, and if all parts of the compartment are easily accessible in flight. A hand fire extinguisher shall be available for such compartment.

(b) Cargo and baggage compartments shall be classified in the "B" category, if sufficient access is provided while in flight to enable a member of the crew to move by hand all contents and to reach effectively all parts of the compartment with a hand fire extinguisher. Furthermore, the design of the compartment shall be such that, when the access provisions are being used, no hazardous quantity of smoke, flames, or extinguishing agent will enter any compartment occupied by the crew or passengers. Each compartment in this category shall be equipped with a separate system of an approved type smoke detector or fire detector other than heat detector to give warning at the pilot or flight engineer station. Hand fire extinguishers shall be readily available for use in all compartments of this category. Compartments in this category shall be completely lined with fire-resistant material, except that additional service lining of flame-resistant material may be employed.

(c) Cargo and baggage compartments shall be classified in the "C" category, if they do not conform with the requirements for the "A" or "B" categories. Each compartment of the "C" category shall be equipped with: (1) A separate system of an approved type smoke detector or fire detector other than heat detector to give warning at the pilot or flight engineer station, and (2) an approved built-in fire-extinguishing system controlled from the pilot or flight engineer station. Means shall be provided to exclude hazardous quantities of smoke, flames, or extinguishing agent from entering into any compartment occupied by the crew or passengers. Ventilation and drafts shall be further controlled within each such cargo or baggage compartment to the extent that the extinguishing agent provided can control any fire which may start within the compartment. All cargo and baggage compartments of this category shall be completely lined with fire-resistant material, except that additional service lining of flame-resistant material may be employed.

§ 40.116 *Proof of compliance.* Compliance with those provisions of § 40.115 which refer to compartment accessibility, the entry of hazardous quantities of smoke or extinguishing agent into compartments occupied by the crew or passengers, and the dissipation of the extinguishing agent in category "C" compartments shall be demonstrated by tests in flight. It shall also be demonstrated during these tests that no inadvertent operation of smoke or fire detectors in adjacent or other compartments within the airplane would occur as a result of fire contained in any one compartment, either during or after extinguishment, unless the extinguishing system floods such compartments simultaneously.

§ 40.117 *Propeller de-icing fluid.* If combustible fluid is used for propeller de-icing, the provisions of §§ 40.131 through 40.135 shall be complied with.

§ 40.118 *Pressure cross-feed arrangements.* Pressure cross-feed lines shall not pass through portions of the airplane devoted to carrying personnel or cargo unless means are provided to permit the flight personnel to shut off the supply of fuel to these lines, or unless the lines are enclosed in a fuel and fumeproof enclosure that is ventilated and drained to the exterior of the airplane. Such enclosures need not be used if these lines incorporate no fittings on or within the personnel or cargo areas and are suitably routed or protected to safeguard against accidental damage. Lines which can be isolated from the remainder of the fuel system by means of valves at each end shall incorporate provisions for the relief of excessive pressures that may result from exposure of the isolated line to high ambient temperatures.

§ 40.119 *Location of fuel tanks.* Location of fuel tanks shall comply with the provisions of § 40.132. In addition, no portion of engine nacelle skin which lies immediately behind a major air egress opening from the engine compartment shall act as the wall of an integral tank. Fuel tanks shall be isolated from personnel compartments by means of fume and fuel-proof enclosures.

§ 40.120 *Fuel system lines and fittings.* Fuel lines shall be installed and supported in a manner that will prevent excessive vibration and will be adequate to withstand loads due to fuel pressure and accelerated flight conditions. Lines which are connected to components of the airplane between which relative motion may exist shall incorporate provisions for flexibility. Flexible connections in lines which may be under pressure and subjected to axial loading shall employ flexible hose assemblies rather than hose clamp connections. Flexible hose shall be of an acceptable type or proven suitable for the particular application.

§ 40.121 *Fuel lines and fittings in designated fire zones.* Fuel lines and fittings in all designated fire zones (see § 40.131) shall comply with the provisions of § 40.134.

§ 40.122 *Fuel valves.* In addition to the requirements contained in § 40.133 for shutoff means, all fuel valves shall be provided with positive stops or suitable index provisions in the "on" and "off" positions and shall be supported in such a manner that loads resulting from their operation or from accelerated flight conditions are not transmitted to the lines connected to the valve.

§ 40.123 *Oil lines and fittings in designated fire zones.* Oil lines and fittings in all designated fire zones (see § 40.131) shall comply with the provisions of § 40.134.

§ 40.124 *Oil valves.* Requirements of § 40.133 for shutoff means shall be complied with. Closing of oil shutoff means shall not prevent feathering the propeller, unless equivalent safety provisions are incorporated. All oil valves shall be provided with positive stops or suitable index provisions in the "on" and "off" positions, and shall be supported in such a manner that loads resulting from their operation or from accelerated flight conditions are not transmitted to the lines attached to the valve.

§ 40.125 *Oil system drains.* Accessible drains shall be provided to permit safe drainage of the entire oil system and shall incorporate means for positive or automatic locking in the closed position. (See also § 40.135).

§ 40.126 *Engine breather line.* Engine breather lines shall be so arranged that condensed water vapor which may freeze and obstruct the line cannot accumulate at any point. Breathers shall discharge in a location which will not constitute a fire hazard in case foaming occurs and so that oil emitted from the line will not impinge upon the pilots' windshield. The breather shall not discharge into the engine air induction system. (See also § 40.135).

§ 40.127 *Fire walls.* All engines, auxiliary power units, fuel-burning heaters, and other combustion equipment which are intended for operation in flight shall be isolated from the remainder of the airplane by means of fire walls or shrouds, or other equivalent means.

§ 40.128 *Fire-wall construction.* Fire walls and shrouds shall be constructed in such a manner that no hazardous quantity of air, fluids, or flame can pass from the engine compartment to other portions of the airplane. All openings in the fire wall or shroud shall be sealed with close-fitting fireproof grommets, bushings, or fire-wall fittings. Fire walls and shrouds shall be constructed of fireproof material and shall be protected against corrosion. The following materials have been found to comply with this requirement:

(a) Heat and corrosion resistant steel 0.015 inch thick;

(b) Low carbon steel, suitably protected against corrosion, 0.018 inch thick.

§ 40.129 *Cowling.* Cowling shall be constructed and supported in such a manner as to be capable of resisting all vibration, inertia, and air loads to which it may normally be subjected. Provision shall be made to permit rapid and complete drainage of all portions of the cowling in all normal ground and flight attitudes. Drains shall not discharge in

locations constituting a fire hazard. Cowling, unless otherwise specified by these regulations, shall be constructed of fire-resistant material. Those portions of the cowling which are subjected to high temperatures due to their proximity to exhaust system parts or exhaust gas impingement shall be constructed of fireproof material.

§ 40.130 *Engine accessory section diaphragm.* Unless equivalent protection can be demonstrated by other means, a diaphragm shall be provided on air-cooled engines to isolate the engine power section and all portions of the exhaust system from the engine accessory compartment. This diaphragm shall comply with the provisions of § 40.128.

§ 40.131 *Powerplant fire protection.* Engine accessory sections, installations where no isolation is provided between the engine and accessory compartment, also regions wherein lie auxiliary power units, fuel-burning heaters, and other combustion equipment shall be referred to as designated fire zones. Such zones shall be protected from fire by compliance with §§ 40.132 through 40.135.

§ 40.132 *Flammable fluids.* No tanks or reservoirs which are a part of a system containing flammable fluids or gases shall be located in designated fire zones, except where the fluid contained, the design of the system, the materials used in the tank, the shutoff means, and all connections, lines, and controls are such as to provide equivalent safety. Not less than ½ inch of clear air space shall be provided between any tank or reservoir and a fire wall or shroud isolating a designated fire zone.

§ 40.133 *Shutoff means.* Means for each individual engine shall be provided for shutting off or otherwise preventing hazardous quantities of fuel, oil, de-icer, and other flammable fluids from flowing into, within, or through any designated fire zone, except that means need not be provided to shut off flow in lines forming an integral part of an engine. In order to facilitate rapid and effective control of fires, such shutoff means shall permit an emergency operating sequence which is compatible with the emergency operation of other equipment, such as feathering the propeller. Shutoff means shall be located outside of designated fire zones, unless equivalent safety is provided (see § 40.132), and it shall be shown that no hazardous quantity of such flammable fluid will drain into any designated fire zone after shutting off has been accomplished. Adequate provisions shall be made to guard against inadvertent operation of the shutoff means and to make it possible for the crew to reopen the shutoff means after it has once been closed.

§ 40.134 *Lines and fittings.* All lines and fittings for same located in designated fire zones which carry flammable fluids or gases and which are under pressure, or which attach directly to the engine, or are subject to relative motion between components, exclusive of those lines and fittings forming an integral part of the engine, shall be flexible, fire-resistant lines with fire-resistant, factory-fixed, detachable, or other approved fire-resistant ends. Lines and fittings which are not subject to pressure or to relative motion between components shall be of fire-resistant materials.

§ 40.135 *Vent and drain lines.* All vent and drain lines and fittings for same located in designated fire zones and which carry flammable fluids or gases shall comply with the provisions of § 40.134, if the Administrator finds that rupture or breakage of a particular drain or vent line may result in a fire hazard.

§ 40.136 *Fire-extinguisher systems.* (a) Unless it can be demonstrated that equivalent protection against destruction of the airplane in case of fire is provided by the use of fireproof materials in the nacelle and other components which would be subjected to flame, fire-extinguishing systems shall be provided to serve all designated fire zones.

(b) Materials in the fire-extinguishing system shall not react chemically with the extinguishing agent so as to constitute a hazard.

§ 40.137 *Fire-extinguishing agents.* Extinguishing agents employed shall be methyl bromide, carbon dioxide, or any other agent which has been demonstrated to provide equivalent extinguishing action. If methyl bromide or any other toxic extinguishing agent is employed, provisions shall be made to prevent the entrance of harmful concentrations of fluid or fluid vapors into any personnel compartment either due to leakage during normal operation of the airplane or as a result of discharging the fire extinguisher on the ground or in flight when a defect exists in the extinguisher system. If a methyl bromide system is provided, the containers shall be charged with dry agent and shall be sealed by the fire-extinguisher manufacturer or any other party employing satisfactory recharging equipment. If carbon dioxide is used, it shall not be possible to discharge sufficient gas into personnel compartments to constitute a hazard from the standpoint of suffocation of the occupants.

§ 40.138 *Extinguishing agent container pressure relief.* Extinguishing agent containers shall be provided with a pressure relief to prevent bursting of the container due to excessive internal pressures. The discharge line from the relief connection shall terminate outside the airplane in a location convenient for inspection on the ground. An indicator shall be provided at the discharge end of the line to provide a visual indication when the container has discharged.

§ 40.139 *Extinguishing agent container compartment temperature.* Precautions shall be taken to assure that the extinguishing agent containers are installed in locations where reasonable temperatures can be maintained for effective use of the extinguisher system.

§ 40.140 *Fire-extinguishing system materials.* All components of fire-extinguishing systems located in designated fire zones shall be constructed of fireproof materials, except for connections which are subject to relative motion between components of the airplane, in which case they shall be of flexible fire-resistant construction so located as to minimize the possibility of failure.

§ 40.141 *Fire-detector systems.* Quick-acting fire detectors shall be provided in all designated fire zones and shall be sufficient in number and location to assure the detection of fire which may occur in such zones.

§ 40.142 *Fire detectors.* Fire detectors shall be constructed and installed in such a manner as to assure their ability to resist without failure, all vibration, inertia, and other loads to which they may normally be subjected. Detectors shall be unaffected by exposure to oil, water, or other fluids or fumes which may be present.

§ 40.143 *Protection of other airplane components against fire.* All airplane surfaces aft of the nacelles in the region of one nacelle diameter on both sides of the nacelle center line shall be constructed of fire-resistant material. This provision need not be applied to tail surfaces lying behind nacelles unless the dimensional configuration of the airplane is such that the tail surfaces could be affected readily by heat, flames, or sparks emanating from a designated fire zone or engine compartment of any nacelle.

§ 40.150 *Control of engine rotation.* All airplanes shall be provided with means for individually stopping and restarting the rotation of any engine in flight.

§ 40.151 *Fuel system independence* Airplane fuel systems shall be arranged in such manner that the failure of any one component will not result in the irrecoverable loss of power of more than one engine. A separate fuel tank need not be provided for each engine if the Administrator finds that the fuel system incorporates features which provide equivalent safety.

§ 40.152 *Induction system ice prevention.* Means for preventing the malfunctioning of each engine due to ice accumulation in the engine air induction system shall be provided for all airplanes.

§ 40.153 *Carriage of cargo in passenger compartments.* When operating conditions require the carriage of cargo which cannot be loaded in approved cargo racks, bins, or compartments which are separate from passenger compartments, such cargo may be carried in a passenger compartment if the following requirements are complied with: *Provided*, That the Administrator, under a particular set of circumstances, may authorize deviations from these requirements when he finds that safety will not be adversely affected and that it is in the public interest to carry such cargo:

(a) It shall be packaged or covered in a manner to avoid possible injury to passengers.

(b) It shall be properly secured in the airplane by means of safety belts or other tie-downs possessing sufficient strength to eliminate possibility of shifting under

all normally anticipated flight and ground conditions.

(c) It shall not be carried aft of or directly above seated passengers.

(d) It shall not impose any loads on seats or on the floor structure which exceed the designed loads for those components.

(e) It shall not be placed in any position which restricts the access to or use of any required emergency or regular exit or the use of the aisle between the crew and the passenger compartments.

INSTRUMENTS AND EQUIPMENT FOR ALL OPERATIONS

§ 40.170 *Aircraft instruments and equipment for all operations.* (a) Instruments and equipment required by §§ 40.171 through 40.232 shall be approved and shall be installed in accordance with the provisions of the airworthiness requirements applicable to the instruments or equipment concerned.

(b) The following instruments and equipment shall be in operable condition prior to take-off, except as provided in § 40.391 (b) for continuance of flight with equipment inoperative:

(1) Instruments and equipment required to comply with airworthiness requirements under which the airplane is type certificated and as required by the provisions of § 40.110 and §§ 40.150 through 40.153.

(2) Instruments and equipment specified in §§ 40.171 through 40.178 for all operations, and the instruments and equipment specified in §§ 40.200 through 40.232 for the type of operation indicated, wherever these items are not already provided in accordance with subparagraph (1) of this paragraph.

§ 40.171 *Flight and navigational equipment for all operations.* The following flight and navigational instruments and equipment are required for all operations:

(a) An air-speed indicating system with heated pitot tube or equivalent means for preventing malfunction due to icing.

(b) *Sensitive altimeter.*

(c) Clock (sweep-second).

(d) Free-air temperature indicator.

(e) Gyroscopic bank and pitch indicator (artificial horizon).

(f) Gyroscopic rate-of-turn indicator combined with a slip-skid indicator (turn and bank indicator).

(g) *Gyroscopic direction indicator.*

(h) Magnetic compass.

(i) Vertical speed indicator (rate-of-climb indicator).

§ 40.172 *Engine instruments for all operations.* The following engine instruments are required for all operations:

(a) Carburetor air temperature indicator for each engine.

(b) Cylinder head temperature indicator for each air-cooled engine.

(c) Fuel pressure indicator for each engine.

(d) Fuel flowmeter or fuel mixture indicator for each engine not equipped with an automatic altitude mixture control.

(e) Means for indicating fuel quantity in each fuel tank.

(f) Manifold pressure indicator for each engine.

(g) Oil pressure indicator for each engine.

(h) Oil quantity indicator for each oil tank when a transfer or separate oil reserve supply is used.

(i) Oil-in temperature indicator for each engine.

(j) Tachometer for each engine.

(k) On and after December 31, 1953, an independent fuel pressure warning device for each engine or a master warning device for all engines with means for isolating the individual warning circuits from the master warning device.

§ 40.173 *Emergency equipment for all operations.* (a) The emergency equipment specified in paragraphs (b), (c), and (d) of this section is required for all operations. Such equipment shall be readily accessible to the crew, and the method of operation shall be plainly indicated. When such equipment is carried in compartments or containers, the compartments or containers shall be so marked as to be readily identifiable.

(b) Hand fire extinguishers for crew, passenger, and cargo compartments: Hand fire extinguishers of an approved type shall be provided for use in crew, passenger, and cargo compartments in accordance with the following requirements:

(1) The type and quantity of extinguishing agent shall be suitable for the type of fires likely to occur in the compartment where the extinguisher is intended to be used.

(2) At least one hand fire extinguisher shall be provided and conveniently located on the flight deck for use by the flight crew.

(3) At least one hand fire extinguisher shall be conveniently located in the passenger compartment of airplanes accommodating more than six but less than 31 passengers. On airplanes accomodating more than 30 passengers, at least two fire extinguishers shall be provided. None need be provided in passenger compartments of airplanes accommodating six or less persons.

(c) First-aid equipment: First-aid equipment suitable for treatment of injuries likely to occur in flight or in minor accidents shall be provided in a quantity appropriate to the number of passengers and crew accommodated in the airplane.

(d) Crash ax: All airplanes shall be equipped with at least one crash ax, and if accommodations are provided for more than 30 persons including the crew airplanes shall be equipped with at least two crash axes. This equipment shall be stowed in readily accessible locations.

§ 40.174 *Seats and safety belts for all occupants.* A seat and an individual safety belt are required for each passenger and crew member, excluding infants, who are in other than a recumbent position during take-off and landing. One safety belt only is required in a berth for one or two persons in a recumbent position during take-off and landing. During flight between take-off and landing, one safety belt is sufficient for two persons occupying a multiple lounge or divan seat.

§ 40.175 *Miscellaneous equipment for all operations.* All airplanes shall have installed the following equipment:

(a) If protective fuses are used, spare fuses of a number approved for the particular airplane and appropriately described in the air carrier manual.

(b) Windshield wiper or equivalent for each pilot.

(c) A power supply and distribution system capable of producing and distributing the load for all required instruments and equipment using an external power supply in the event of failure of any one power source or component of the power distribution system: *Provided*, That the Administrator may authorize the use of common elements in the power distribution system when he finds that such elements are so designed as to be reasonably protected against malfunction. Engine-driven sources of energy, when used, shall be on separate engines.

(d) Means for indicating the adequacy of the power being supplied to required flight instruments.

(e) Two independent static pressure systems, so vented to the outside atmospheric pressure that they will be least affected by air flow variation, moisture, or other foreign matter, and so installed as to be airtight except for the vent. When a means is provided for transferring an instrument from its primary operating system to an alternate system, such means shall include a positive positioning control and shall be marked to indicate clearly which system is being used.

(f) Means for locking all companionway doors which separate passenger compartments from flight crew compartments. Keys for all doors which separate passenger compartments from other compartments having emergency exit provisions shall be readily available to all crew members. Any door which is the means of access to a required passenger emergency exit shall be placarded to indicate that it must be open during take-off and landing. All doors which lead to compartments normally accessible to passengers and which are capable of being locked by passengers shall be provided with means for unlocking by the crew in the event of an emergency.

(g) For seaplanes only, anchor light or lights, a warning bell for signalling when not under way during fog conditions, and an anchor adequate for the size of the seaplane.

§ 40.176 *Cockpit check procedure for all operations.* The air carrier shall provide for each type of airplane a cockpit check procedure adapted to each operation in which the airplane is to be utilized. This procedure shall include all items necessary for flight crew members to check for safety prior to starting engines, prior to taking off, prior to landing, and in engine emergencies. It shall be so designed as to obviate the necessity for a flight crew member to rely upon his memory for items to be checked

and shall be readily usable in the cockpit of each airplane.

§ 40.177 *Passenger information for all operations.* All airplanes shall be equipped with signs visible to passengers and cabin attendants to notify such persons when smoking is prohibited and when safety belts should be fastened. These signs shall be capable of on-off operation by the crew.

§ 40.178 *Exit and evacuation marking for all operations.* After December 31, 1953, all airplanes shall comply with the provisions of this section.

(a) Emergency exits of airplanes carrying passengers shall be clearly marked as such in letters not less than three-fourths of an inch high with luminous paint, such markings to be located either on or immediately adjacent to the pertinent exit and readily visible to passengers. Location and method of operation of the handles shall be marked with luminous paint.

(b) The exterior areas of the fuselage of an airplane shall be marked to indicate the location of mechanisms of access and those areas suitable for cutting to facilitate the escape and rescue of occupants in the event of an accident.

INSTRUMENTS AND EQUIPMENT FOR SPECIAL OPERATIONS

§ 40.200 *Instruments and equipment for operations at night.* Each airplane operated at night shall be equipped with the following instruments and equipment in addition to those required by §§ 40.171 through 40.178:

(a) Flashing position lights,

(b) Two landing lights,

(c) Two class 1 or class 1A landing flares,

(d) Instrument lights providing sufficient illumination to make all instruments, switches, etc., easily readable, so installed that their direct rays are shielded from the flight crew members' eyes and that no objectionable reflections are visible to them. A means of controlling the intensity of illumination shall be provided unless it is shown that nondimming instrument lights are satisfactory,

(e) An air-speed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to icing, and

(f) A sensitive altimeter.

§ 40.201 *Instruments and equipment for operations under IFR or over-the-top.* Each airplane operated under IFR or over-the-top shall be equipped with the following instruments and equipment in addition to those required by §§ 40.171 through 40.178:

(a) An air-speed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to icing,

(b) A sensitive altimeter, and

(c) Instrument lights providing sufficient illumination to make all instruments, switches, etc., easily readable, so installed that their direct rays are shielded from the flight crew members' eyes and that no objectionable reflections are visible to them. A means of controlling the intensity of illumination shall be provided unless it is shown that nondimming instrument lights are satisfactory.

§ 40.202 *Supplemental oxygen*—(a) *General.* Except where supplemental oxygen is provided in accordance with the requirements of § 40.203, supplemental oxygen shall be furnished and used as set forth in paragraphs (b) and (c) of this section. The amount of supplemental oxygen required for a particular operation to comply with the rules in this part shall be determined on the basis of flight altitudes and flight duration consistent with the operating procedures established for each such operation and route. As used in the oxygen requirements hereinafter set forth, "altitude" shall mean the pressure altitude corresponding with the pressure in the cabin of the airplane, and "flight altitude" shall mean the altitude above sea level at which the airplane is operated.

(b) *Crew members.* (1) At altitudes above 10,000 feet to and including 12,000 feet oxygen shall be provided for, and used by, each member of the flight crew on flight deck duty, and provided for all other crew members during the portion of the flight in excess of 30 minutes within this range of altitudes.

(2) At altitudes above 12,000 feet oxygen shall be provided for, and used by, each member of the flight crew on flight deck duty, and provided for all other crew members during the entire flight time at such altitudes.

(c) *Passengers.* Each air carrier shall provide a supply of oxygen for passenger safety as approved by the Administrator in accordance with the following standards:

(1) For flights of over 30-minute duration at altitudes above 8,000 feet to and including 14,000 feet a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be required.

(2) For flights at altitudes above 14,000 feet to and including 15,000 feet a supply of oxygen sufficient to provide oxygen for the duration of the flight at such altitudes for 30 percent of the number of passengers carried shall generally be considered adequate.

(3) For flights at altitudes above 15,000 feet a supply of oxygen sufficient to provide oxygen for each passenger carried during the entire flight at such altitudes shall be required.

§ 40.203 *Supplemental oxygen requirements for pressurized cabin airplanes.* When operating pressurized cabin airplanes, the air carrier shall so equip such airplanes as to permit compliance with the following requirements in the event of cabin pressurization failure:

(a) *For crew members.* When operating such airplanes at flight altitudes above 10,000 feet, the air carrier shall provide sufficient oxygen for all crew members for the duration of the flight at such altitudes: *Provided*, That not less than a 2-hour supply of oxygen shall be provided for the flight crew members on flight deck duty. The oxygen supply required by § 40.205 may be considered in determining the supplemental breathing supply required for flight crew members on flight deck duty in the event of cabin pressurization failure.

(b) *For passengers.* When operating such airplanes at flight altitudes above 8,000 feet, the air carrier shall provide the following amounts of oxygen:

(1) When an airplane is not flown at a flight altitude of over 25,000 feet, a supply of oxygen sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried shall be considered adequate, if at any point along the route to be flown the airplane can safely descend to a flight altitude of 14,000 feet or less within 4 minutes.

(2) In the event that such airplane cannot descend to a flight altitude of 14,000 feet or less within 4 minutes, the following supply of oxygen shall be provided:

(i) For the duration of the flight in excess of 4 minutes at flight altitudes above 15,000 feet a supply sufficient to comply with § 40.202 (c) (3);

(ii) For the duration of the flight at flight altitudes above 14,000 feet to and including 15,000 feet, a supply sufficient to comply with § 40.202 (c) (2); and

(iii) For flight at flight altitudes above 8,000 feet to and including 14,000 feet, a supply sufficient to furnish oxygen for 30 minutes to 10 percent of the number of passengers carried.

(3) When an airplane is flown at a flight altitude above 25,000 feet, sufficient oxygen shall be furnished in accordance with the following requirements to permit the airplane to descend to an appropriate flight altitude at which the flight can be safely conducted. Sufficient oxygen shall be furnished to provide oxygen for 30 minutes to 10 percent of the number of passengers carried for the duration of the flight above 8,000 feet to and including 14,000 feet and to permit compliance with § 40.202 (c) (2) and (c) (3) for flight above 14,000 feet.

(c) For purposes of this section it shall be assumed that the cabin pressurization failure will occur at a time during flight which is critical from the standpoint of oxygen need and that after such failure the airplane will descend, without exceeding its normal operating limitations, to flight altitudes permitting safe flight with respect to terrain clearance.

§ 40.204 *Equipment standards.* The oxygen apparatus, the minimum rates of oxygen flow, and the supply of oxygen necessary to comply with the requirements of § 40.202 shall meet the standards established in § 4b.651 of this subchapter, effective July 20, 1950: *Provided*, That where full compliance with such standards is found by the Administrator to be impractical, he may authorize such changes in these standards as he finds will provide an equivalent level of safety.

§ 40.205 *Protective breathing equipment for the flight crew*—(a) *Pressurized cabin airplanes.* Each required flight crew member on flight deck duty shall have easily available at his station protective breathing equipment covering

the eyes, nose, and mouth, or the nose and mouth where accessory equipment is provided to protect the eyes, to protect him from the effects of smoke, carbon dioxide, and other harmful gases. Not less than a 300-liter STPD supply of oxygen for each required flight crew member on flight deck duty shall be provided for this purpose.

(b) *Nonpressurized cabin airplanes.* The requirement stated in paragraph (a) of this section shall apply to nonpressurized cabin airplanes, if the Administrator finds that it is possible to obtain a dangerous concentration of smoke, carbon dioxide, or other harmful gases in the flight crew compartments in any attitude of flight which might occur when the airplane is flown in accordance with either the normal or emergency procedures approved by the Administrator.

§ 40.206 *Equipment for overwater operations.* (a) The following equipment shall be required for all extended overwater operations:

(1) Life preserver or other adequate individual flotation device for each occupant of the airplane,

(2) Lifesaving rafts sufficient in number to adequately carry all occupants of the airplane,

(3) Suitable pyrotechnic signalling devices,

(4) One portable emergency radio signalling device, capable of transmission on the appropriate emergency frequency or frequencies, which is not dependent upon the airplane power supply and which is self-buoyant and water-resistant, and

(b) Rafts and life preservers referred to in paragraph (a) (1) and (2) of this section shall be installed so as to be available to the crew and passengers.

§ 40.207 *Equipment for operations in icing conditions.* (a) For all operations in icing conditions each airplane shall be equipped with means for the prevention or removal of ice on windshields, wings, empennage, propellers, and other parts of the airplane where ice formation will adversely affect the safety of the airplane.

(b) For operations in icing conditions at night means shall be provided for illuminating or otherwise determining the formation of ice on the portions of the wings which are critical from the standpoint of ice accumulation. When illuminating means are used, such means shall be of a type which will not cause glare or reflection which would handicap crew members in the performance of their normal functions.

RADIO EQUIPMENT

§ 40.230 *Radio equipment.* Each airplane used in scheduled air transportation shall be equipped with radio equipment specified for the type of operation in which it is engaged. Where two independent radio systems are required by §§ 40.231 and 40.232, each system shall have an independent antenna installation: *Provided*, That where rigidly supported nonwire antennas or other antenna installations of equivalent reliability are used, only one such antenna need be provided.

§ 40.231 *Radio equipment for operations under VFR over routes navigated by pilotage.* (a) For operations conducted under VFR over routes on which navigation can be accomplished by pilotage, each airplane shall be equipped with such radio equipment as is necessary under normal operating conditions to:

(1) Permit communications with at least one appropriate ground station (as specified in § 40.34) from any point on the route and with other airplanes operated by the air carrier;

(2) Permit communications with airport traffic control towers from any point in the control zone within which flights are intended. The means employed for compliance with subparagraph (1) of this paragraph may be used for compliance with this subparagraph; and

(3) Receive meteorological information from any point en route by either of two independent systems. Either of the means required for compliance with subparagraphs (1) and (2) of this paragraph may be used to comply with one of the systems required by this subparagraph.

(b) For all operations at night conducted under VFR over routes on which navigation can be accomplished by pilotage, each airplane, in addition to the equipment specified in paragraph (a) of this section, shall be equipped with at least one receiving system capable of receiving route navigational signals applicable to the route to be flown, except that no marker beacon receiver or ILS receiver need be provided.

§ 40.232 *Radio equipment for operations under VFR over routes not navigated by pilotage or for operations under IFR or over-the-top.* (a) For operations conducted under VFR over routes on which navigation cannot be accomplished by pilotage or for operations conducted under IFR or over-the-top, each airplane, in addition to the equipment required by § 40.231, shall be equipped with such radio equipment as is necessary to receive satisfactorily, by either of two independent systems, radio navigational signals from all primary en route and approach navigational facilities intended to be used, except that only one marker beacon receiver which provides visual and aural signals or one ILS receiver need be provided. Equipment provided to receive signals en route may be used to receive signals on approach, if it is capable of receiving both signals.

(b) In the case of operation on routes using procedures based on automatic direction finding, only one automatic direction finding system need be installed: *Provided*, That ground facilities are so located and the airplane is so fueled that, in case of failure of the automatic direction finding equipment, the flight may proceed safely to a suitable airport which has ground radio navigational facilities whose signals may be received by the use of the remaining airplane radio systems.

(c) During the period of transition from low frequency to very high frequency radio navigational systems one means of satisfactorily receiving signals over each of these systems shall be considered as complying with the requirement that two independent systems be provided to receive en route or approach navigational facility signals: *Provided*, That ground facilities are so located and the airplane is so fueled that in case of failure of either system the flight may proceed safely to a suitable airport which has ground radio navigational facilities whose signals may be received by use of the remaining airplane radio system.

MAINTENANCE AND INSPECTION REQUIREMENTS

§ 40.240 *Responsibility for maintenance.* Irrespective of whether the air carrier has made arrangements with any other person for the performance of maintenance and inspection functions, each air carrier shall have the primary responsibility for the airworthiness of its airplanes and required equipment.

§ 40.241 *Maintenance and inspection requirements.* (a) The air carrier or the person with whom arrangements have been made for the performance of maintenance and inspection functions shall establish an adequate inspection organization responsible for determining that workmanship, methods employed, and material used are in conformity with the requirements of the regulations of this subchapter, with accepted standards and good practices, and that any airframe, engine, propeller, or appliance released for flight is airworthy.

(b) Any individual who is directly in charge of inspection, maintenance, overhaul, or repair of any airframe, engine, propeller, or appliance shall hold an appropriate license or airman certificate.

§ 40.242 *Maintenance and inspection training program.* The air carrier, or the person with whom arrangements have been made for the performance of maintenance and inspection functions, shall establish and maintain a training program to insure that all maintenance and inspection personnel charged with determining the adequacy of work performed are fully informed with respect to all procedures and techniques and with new equipment introduced into service, and are competent to perform their duties.

§ 40.243 *Maintenance and inspection personnel duty time limitations.* All maintenance and inspection personnel shall be relieved of all duty for a period of at least 24 consecutive hours during any 7 consecutive days.

AIRMAN AND CREW MEMBER REQUIREMENTS

§ 40.260 *Utilization of airman.* No air carrier shall utilize an individual as an airman unless he holds a valid appropriate airman certificate issued by the Administrator and is otherwise qualified for the particular operation in which he is to be utilized.

§ 40.261 *Composition of flight crew.* (a) No air carrier shall operate an airplane with less than the minimum flight

crew specified in the airworthiness certificate for the type of airplane and required in this part for the type of operation.

(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 mutiple functions at the same time by any airman.

(c) Where the air carrier is authorized to operate under instrument conditions or operates airplanes of 12,500 pounds or more maximum certificated weight, the minimum pilot crew shall be 2 pilots.

(d) On flights requiring a flight engineer, at least one other flight crew member shall be sufficiently qualified, so that in the event of illness or other incapacity, emergency coverage can be provided for that function for the safe completion of the flight. A pilot need not hold a flight engineer certificate to function in the capaicity of a flight engineer for emergency conditions only.

§ 40.263 *Flight engineer.* An airman holding a valid flight engineer certificate shall be required on all airplanes certificated for more than 80,000 pounds maximum certificated take-off weight. Such airman shall also be required on all four-engine airplanes certificated for more than 30,000 pounds maximum certificated take-off weight where the Administrator finds that the design of the airplane used or the type of operation is such as to require engineer personnel for the safe operation of the airplane.

§ 40.265 *Flight attendant.* At least one flight attendant shall be provided by the air carrier on all flights carrying passengers in airplanes of 10-passenger capacity or more.

§ 40.266 *Aircraft dispatcher.* Each air carrier shall provide an adequate number of qualified dispatchers at each dispatch center to insure the proper operational control of each flight.

TRAINING PROGRAM

§ 40.280 *Training requirements.* (a) Each air carrier shall establish a training program sufficient to insure that each crew member and dispatcher used by the air carrier is adequately trained to perform the duties to which he is to be assigned. The initial training phases shall be satisfactorily completed prior to serving in scheduled operations.

(b) Each air carrier shall be responsible for providing adequate ground and flight training facilities and properly qualified instructors. There also shall be provided for flight checking a sufficient number of check airmen holding the same airman certificates and ratings as are required for the airman being checked.

(c) The training program for each flight crew member shall consist of appropriate ground and flight training including proper flight crew co-ordination. Procedures for each flight crew function shall be standardized to the extent that each flight crew member will know the functions for which he is responsible and the relation of those functions to those of other flight crew members. The initial program shall include at least the appropriate requirements specified in §§ 40.281 through 40.286.

(d) The crew member emergency procedures training program shall include at least the requirements specified in § 40.286.

(e) The appropriate instructor, supervisor, or check airman responsible for the particular training or flight check shall certify to the proficiency of each crew member and dispatcher upon completion of his training, and such certification shall become a part of the individual's record.

§ 40.281 *Initial pilot ground training.* Ground training for all pilots shall include instruction in at least the following:

(a) The appropriate provisions of the air carrier operations specifications and appropriate provisions of the regulations of this subchapter with particular emphasis on the operation and dispatching rules and airplane operating limitations;

(b) Dispatch procedures and appropriate contents of the manuals;

(c) The duties and responsibilities of crew members;

(d) The type of airplane to be flown, including a study of the airplane, engines, all major components and systems, performance limitations, standard and emergency operating procedures, and appropriate contents of the approved Airplane Flight Manual;

(e) The principles and methods of determining weight and balance limitations for take-off and landing;

(f) Navigation and use of appropriate aids to navigation, including the instrument approach facilities and procedures which the air carrier is authorized to use;

(g) Airport and airways traffic control systems and procedures, and ground control letdown procedures if pertinent to the operation.

(h) Meteorology sufficient to insure a practical knowledge of the principles of icing, fog, thunderstorms, and frontal systems.

(i) Procedures for operation in turbulent air and during periods of ice, hail, thunderstorms, and other potentially hazardous meteorological conditions.

§ 40.282 *Initial pilot flight training.* (a) Flight training for all pilots shall include at least take-offs and landings, during day and night, and normal and emergency flight maneuvers in each type of airplane to be flown by him in scheduled operations, and flight under simulated instrument flight conditions.

(b) Flight training for a pilot qualifying to serve as pilot in command shall include flight instruction and practice in at least the following maneuvers and procedures:

(1) In each type of airplane to be flown by him in scheduled operations:

(i) At the authorized maximum take-off weight, take-off using maximum take-off power with simulated failure of the critical engine. For transport category airplanes the simulated engine failure shall be accomplished as closely as possible to the critical engine failure speed (V_1), and climb-out shall be accomplished at a speed as close as possible to the take-off safety speed (V_2). Each pilot shall ascertain the proper values for speeds V_1 and V_2;

(ii) At the authorized maximum landing weight, flight in a four-engine airplane, where appropriate, with the most critical combinations of two engines inoperative, or operating at zero thrust, utilizing appropriate climb speeds as set forth in the Airplane Flight Manual;

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

(iv) Suitable combinations of airplane weight and power less than those specified in subdivisions (i), (ii), and (iii) of this subparagraph may be employed if the performance capabilities of the airplane under the above conditions are simulated.

(2) Conduct of flight under simulated instrument conditions, utilizing all types of navigational facilities and the letdown procedures used in normal operations. If a particular type of facility is not available in the training area, such training may be accomplished in a synthetic trainer.

§ 40.284 *Initial flight engineer training.* (a) The training for flight engineers shall include at least paragraphs (a) through (e) of § 40.281.

(b) Flight engineers shall be given sufficient training in flight to become proficient in those duties assigned them by the air carrier. Except for emergency procedures, this training may be accomplished during scheduled flight under the supervision of a qualified flight engineer.

§ 40.286 *Initial crew member emergency training.* (a) The training in emergency procedures shall be designed to give each crew member appropriate individual instruction in all emergency procedures, including assignments in the event of an emergency, and proper coordination between crew members. At least the following subjects as appropriate to the individual crew member shall be taught: The procedures to be followed in the event of the failure of an engine, or engines, or other airplane components or systems, emergency decompression, fire in the air or on the ground, ditching, evacuation, the location and operation of all emergency equipment, and power setting for maximum endurance and maximum range.

(b) Synthetic trainers may be used for training of crew members in emergency procedures where the trainers sufficiently simulate flight operating emergency conditions for the equipment to be used.

§ 40.288 *Initial aircraft dispatcher training.* (a) The training program for aircraft dispatchers shall provide for training in their duties and responsibilities and shall include a study of the flight operation procedures, air traffic control procedures, the performance of

the airplanes used by the air carrier, navigational aids and facilities, and meteorology. Particular emphasis shall be placed upon the procedures to be followed in the event of emergencies, including the alerting of proper Governmental, company, and private agencies to render maximum assistance to an airplane in distress.

(b) Each aircraft dispatcher shall, prior to initially performing the duty of an aircraft dispatcher, satisfactorily demonstrate to the supervisor or ground instructor authorized to certify to his proficiency, his knowledge of the following subjects:

(1) Contents of the air carrier operating certificate,

(2) Appropriate provisions of the air carrier operating specifications, manual, and regulations of this subchapter.

(3) Characteristics of the airplanes operated by the air carrier,

(4) Cruise control data and cruising speeds for such airplanes.

(5) Maximum authorized loads for the airplanes for the routes and airports to be used,

(6) Air carrier radio facilities,

(7) Characteristics and limitations of each type of radio and navigational facility to be used,

(8) Effect of weather conditions on airplane radio reception,

(9) Airports to be used and the general terrain over which the airplanes are to be flown,

(10) Prevailing weather phenomena,

(11) Sources of weather information available,

(12) Pertinent air traffic control procedures, and

(13) Emergency procedures.

§ 40.289 *Recurrent training.* (a) Each air carrier shall provide such training as is necessary to insure the continued competence of each crew member and dispatcher and to insure that each possesses adequate knowledge and familiarity with all new equipment and procedures to be used by him.

(b) Each air carrier shall, at intervals established as part of the training program, but not to exceed 12 months, check the competence of each crew member and dispatcher with respect to procedures, techniques, and information essential to the satisfactory performance of his duties. Where the check of the pilot in command requires actual flight, such check shall be considered to have been met by the checks accomplished in accordance with § 40.302.

(c) The appropriate instructor, supervisor, or check airman shall certify as to the proficiency demonstrated, and such certification shall become a part of the individual's record. In the case of pilots other than pilots in command, a pilot in command may make such certification.

FLIGHT CREW MEMBER AND DISPATCHER QUALIFICATION

§ 40.300 *Qualification requirements.* (a) No air carrier shall utilize any flight crew member or dispatcher, nor shall any such airman perform the duties authorized by his airman certificate, unless he satisfactorily meets the appropriate requirements of § 40.280 or § 40.289, and §§ 40.301 through 40.310. All pilots serving as pilot in command shall hold appropriate airline transport pilot certificates and ratings. All other pilots shall hold at least commercial pilot certificates and instrument ratings.

(b) Check airmen shall certify as to the proficiency of the pilot in command being examined, as required by §§ 40.302 and 40.303, and such certification shall become a part of the airman's records.

§ 40.301 *Pilot recent experience.* No air carrier shall schedule a pilot to serve as such in scheduled air transportation unless within the preceding 90 days he has made at least 3 take-offs and 3 landings in the airplane of the particular type on which he is to serve.

§ 40.302 *Pilot checks.* (a) Line check: Prior to serving as pilot in command, and at least once each 12 months thereafter, a pilot shall satisfactorily accomplish a line check in one of the types of airplanes normally to be flown by him. This check shall be given by a check pilot who is qualified for the route. It shall consist of at least a scheduled flight between terminals over a route to which the pilot is normally assigned during which the check pilot shall determine whether the individual being checked satisfactorily exercises the duties and responsibilities of pilot in command.

(b) Proficiency check: (1) An air carrier shall not utilize a pilot as pilot in command until he has satisfactorily demonstrated to a check pilot or a representative of the Administrator his ability to pilot and navigate airplanes to be flown by him. Thereafter, at least twice each 12 months at intervals of not less than 4 months or more than 8 months, a similar pilot proficiency check shall be given each such pilot. Where such pilots serve in more than one airplane type, the pilot proficiency check shall be given in the larger airplane type at least once each 12 months.

(2) The pilot proficiency check shall include at least the following:

(i) The flight maneuvers specified in § 40.282 (b) (1), except that the simulated engine failure during take-off need not be accomplished at speed V_1,

(ii) Flight maneuvers approved by the Administrator accomplished under simulated instrument conditions utilizing the navigational facilities and letdown procedures normally used by the pilot: *Provided*, That maneuvers other than those associated with approach procedures for which the lowest minimums are approved may be given in a synthetic trainer which contains the radio equipment and instruments necessary to simulate other navigational and letdown procedures approved for use by the air carrier.

(c) Prior to serving as pilot in command in a particular type of airplane, a pilot shall have accomplished during the preceding 12 months either a proficiency check or a line check in that type of airplane.

§ 40.303 *Pilot route and airport qualification requirements.* (a) An air carrier shall not utilize a pilot as pilot in command until he has been qualified for the route on which he is to serve in accordance with paragraphs (b), (c), and (d) of this section and the appropriate instructor or check pilot has so certified.

(b) Each such pilot shall demonstrate adequate knowledge concerning the subjects listed below with respect to each route to be flown. Those portions of the demonstration pertaining to holding procedures and instrument approach procedures may be accomplished in a synthetic trainer which contains the radio equipment and instruments necessary to simulate the navigational and letdown procedures approved for use by the air carrier.

(1) Weather characteristics,

(2) Navigational facilities,

(3) Communication procedures,

(4) Type of en route terrain and obstruction hazards,

(5) Minimum safe flight levels,

(6) Position reporting points,

(7) Holding procedures,

(8) Pertinent traffic control procedures, and

(9) Congested areas, obstructions, physical layout, and all instrument approach procedures for each regular, provisional, and refueling airport approved for the route.

(c) Each such pilot shall make a landing and take-off at each regular, provisional, and refueling airport into which he is scheduled to fly. Unless impracticable, such landing and take-off shall be made under day VFR to permit the qualifying pilot to observe the airport and surrounding terrain, including any obstructions to landing and take-off. The qualifying pilot shall be accompanied by a pilot who is qualified at the airport.

(d) Where an en route operation is to be conducted at or below the level of the adjacent terrain which is within a horizontal distance of 25 miles on either side of the center line of the route to be flown, the pilot shall be familiarized with such route by not less than two one-way trips as pilot or additional member of the crew over the route under VFR to permit the qualifying pilot to observe terrain along the route.

§ 40.304 *Maintenance and reestablishment of pilot route and airport qualifications for particular trips.* (a) To maintain pilot route and airport qualifications, each pilot being utilized as pilot in command, within the preceding 12-month period, shall have made at least one trip as pilot or other member of the crew between terminals into which he is scheduled to fly and one actual entry or one simulated entry utilizing a synthetic trainer into each regular, provisional, and refueling airport into which he is scheduled to fly, and shall have complied with the provisions of § 40.303 (d), if applicable.

(b) In order to reestablish pilot route and airport qualifications after absence from a route or an airport thereon for a period in excess of 12 months, a pilot shall comply with the appropriate provisions of § 40.303: *Provided*, That in the event a pilot who is qualified over a

route has not made an actual or simulated entry into an airport thereon during the preceding twelve months, he may serve as pilot in command and land at such airport if the reported weather conditions are at least three miles visibility and a ceiling at or above the lowest initial approach altitude for that airport.

§ 40.305 *Competence check; other pilots.* Prior to serving as pilot, and at least twice each 12 months thereafter at intervals of not less than 4 months nor more than 8 months, each pilot not being utilized as pilot in command shall demonstrate that he is capable of flying by instruments. This demonstration may be made to a pilot serving as pilot in command or a check pilot of the air carrier during scheduled flight.

§ 40.307 *Flight engineer qualification for duty.* A flight engineer shall not be assigned to nor perform duties for which he is required to be certificated as a flight engineer unless, within the preceding 6-month period, he has had at least 50 hours of experience as a flight engineer on the type airplane on which he is to serve, or until the air carrier or an authorized representative of the Administrator has checked such flight engineer and determined that he is familiar with all essential current information and operating procedures relating to the type of airplane to which he is to be assigned and is competent with respect to such airplane.

§ 40.310 *Aircraft dispatcher qualification for duty.* (a) Prior to dispatching airplanes over any route or route segment, an aircraft dispatcher shall be familiar, and the air carrier shall determine that he is familiar, with all essential operating procedures for the entire route and with the airplanes to be used: *Provided,* That where he is qualified only on a portion of such route, he may dispatch airplanes, but only after coordinating with dispatchers who are qualified for the other portions of the route between the points to be served.

(b) An aircraft dispatcher shall not dispatch airplanes in the area over which he is authorized to exercise dispatch jurisdiction unless within the preceding 12 months he has made at least one round trip over the particular area on the flight deck of an airplane. The trip selected for qualification purposes shall be one which includes entry into as many points as practicable, but it shall not be necessary for the aircraft dispatcher to make a flight over each route in the area.

FLIGHT TIME LIMITATIONS

§ 40.320 *Flight time limitations.* (a) An air carrier shall not schedule any flight crew member for duty aloft in scheduled air transportation or in other commercial flying if his total flight time in all commercial flying will exceed the following flight time limitations:

(1) 1,000 hours in any year,

(2) 100 hours in any month,

(3) 30 hours in any week.

(b) An air carrier shall not schedule any flight crew member for duty aloft for more than 8 hours during any 24 consecutive hours, unless he is given an intervening rest period at or before the termination o. 8 scheduled hours of duty aloft. Such rest period shall equal twice the number of hours of duty aloft since the last preceding rest period, and in no case shall the rest period be less than 8 hours.

(c) When a flight crew member has been on duty aloft in excess of 8 hours in any 24 consecutive hours he shall, upon completion of his assigned flight or series of flights, be given at least 16 hours for rest before being assigned any further duty with the air carrier.

(d) Time involved in transportation, not local in character, required of a flight crew member by an air carrier and provided by the air carrier for the purpose of transporting the flight crew member to an airport at which he is required to serve on a flight as a crew member, or from the airport at which he was relieved from duty as a crew member to return to his home station, shall not be considered as part of any required rest period.

(e) Each flight crew member engaged in scheduled air transportation shall be relieved from all duty with the air carrier for at least 24 consecutive hours during any seven consecutive days.

(f) No flight crew member shall be assigned any duty with an air carrier during any rest period prescribed by this part.

(g) A flight crew member shall not be considered to be scheduled for duty in excess of prescribed limitations, if the flights to which he is assigned are scheduled and normally terminate within such limitations, but due to exigencies beyond the air carrier's control, such as adverse weather conditions, are not at the time of departure expected to reach their destination within the scheduled time.

DUTY TIME LIMITATIONS; AIRCRAFT DISPATCHER

§ 40.340 *Aircraft dispatcher daily duty time limitations.* (a) The daily duty period for aircraft dispatchers shall commence at such time as will permit him to become thoroughly familiar with existing and anticipated weather conditions along the route prior to the dispatch of any airplane. He shall remain on duty until all airplanes dispatched by him have completed their flights, or have proceeded beyond his jurisdiction, or until he is relieved by another qualified aircraft dispatcher.

(b) The following rules will govern the hours of duty for aircraft dispatchers, except when circumstances or emergency conditions beyond the control of the air carrier require otherwise:

(1) *Maximum consecutive hours of duty.* No dispatcher shall be scheduled for duty as such for a period of more than 10 consecutive hours.

(2) *Maximum scheduled hours of duty in 24 consecutive hours.* If a dispatcher is scheduled for duty as such for more than 10 hours in a period of 24 hours, he shall be given a rest period of not less than 8 hours at or before the termination of 10 hours of dispatcher duty.

(3) *Dispatcher's time off.* Each aircraft dispatcher shall be relieved from all duty with the air carrier for a period of at least 24 consecutive hours during any 7 consecutive days.

FLIGHT OPERATIONS

§ 40.351 *Operational control.* The air carrier shall be responsible for operational control.

(a) *Joint responsibility of aircraft dispatcher and pilot in command.* The aircraft dispatcher and the pilot in command shall be jointly responsible for the preflight planning, delay, and dispatch release of the flight in compliance with the applicable regulations of this subchapter and operations specifications.

(b) *Responsibility of dispatcher.* The aircraft dispatcher shall be responsible:

(1) For monitoring the progress of each flight and the issuance of instructions and information necessary for the continued safety of the flight.

(2) For the cancellation or redispatch of a flight, if, in his opinion or in the opinion of the pilot in command, the flight cannot operate or continue to operate safely as planned or released.

(c) *Responsibility of pilot in command.* The pilot in command shall during flight time be in command of the airplane and crew and shall be responsible for the safety of the passengers, crew members, cargo, and airplane.

§ 40.352 *Operations notices.* Each air carrier shall notify the appropriate operations personnel promptly of all changes in equipment and operating procedures, including known changes in the use of navigational aids, airports, air traffic control procedures and regulations, local airport traffic control rules, and of all known hazards to flight, including icing and other potentially hazardous meteorological conditions and irregularities of ground and navigational facilities.

§ 40.353 *Operations schedules.* In establishing flight operations schedules, each air carrier shall allow sufficient time for the proper servicing of airplanes with fuel and oil at intermediate stops, and it shall consider the prevailing winds along the particular route and the cruising speed of the type of airplane to be flown which shall not exceed the specified cruising output of the airplane engines.

§ 40.354 *Flight crew members at controls.* All required flight crew members shall remain at their respective stations when the airplane is taking off or landing, and while en route except when the absence of one such flight crew member is necessary in connection with his regular duties. All flight crew members shall keep their seat belts fastened when at their respective stations.

§ 40.355 *Manipulation of controls.* No person other than a qualified pilot of the air carrier shall manipulate the flight controls during flight, excepting that any one of the following persons may, with the permission of the pilot in command, manipulate such controls:

(a) Authorized pilot safety representatives of the Administrator or the Board who are qualified on the airplane and are engaged in checking flight operations, or

(b) pilot personnel of another air carrier properly qualified on the airplane and authorized by the operating carrier.

§ 40.356 *Admission to flight deck.* For purposes of this section the Administrator shall determine what constitutes the flight deck of an airplane.

(a) In addition to the crew members assigned to a particular airplane, CAA aviation safety agents and authorized representatives of the Board while in the performance of official duties shall be admitted to the flight deck of an airplane.

NOTE: Nothing contained in this paragraph shall be construed as limiting the emergency authority of the pilot in command to exclude any person from the flight deck in the interest of safety.

(b) The persons listed below may be admitted to the flight deck when authorized by the pilot in command.

(1) An employee of the Federal Government or of an air carrier or other aeronautical enterprise whose duties are such that his presence on the flight deck is necessary or advantageous to the conduct of safe air carrier operations,[1] or

(2) Any other person specifically authorized by the air carrier management and the Administrator.

(c) All persons admitted to the flight deck shall have seats available for their use in the passenger compartment except:

(1) CAA Aviation Safety agents or other authorized representatives of the Civil Aeronautics Administration or the Civil Aeronautics Board engaged in checking flight operations.

(2) Air traffic controllers who have been authorized by the Administrator to observe ATC procedures.

(3) Certificated airmen of the air carrier.

(4) Certificated airmen of another air carrier who have been authorized by the air carrier concerned to make specific trips over the route.

§ 40.357 *Use of cockpit check procedure.* The cockpit check procedure shall be used by the flight crew for each procedure as set forth in § 40.176.

§ 40.358 *Personal flying equipment.* The pilot in command shall insure that the following equipment is aboard the airplane for each flight.

(a) Appropriate aeronautical charts containing adequate information concerning navigational aids and instrument approach procedures.

(b) A flash light in good working order in the possession of each crew member.

[1] Federal employees who deal responsibly with matters relating to air carrier safety and such air carrier employees as pilots, dispatchers, meteorologists, communication operators, and mechanics whose efficiency would be increased by familiarity with flight conditions may be considered eligible under this requirement. Employees of traffic, sales, and other air carrier departments not directly related to flight operations cannot be considered eligible unless authorized under subparagraph (2) of this paragraph.

§ 40.359 *Restriction or suspension of operation.* When conditions exist which constitute a hazard to the conduct of safe air carrier operations, including airport and runway conditions, the air carrier shall restrict or suspend operations until such hazardous conditions are corrected.

§ 40.360 *Emergency decisions; pilot in command and aircraft dispatcher.* (a) In emergency situations which require immediate decision and action, the pilot in command may follow any course of action which he considers necessary under the circumstances. In such instances the pilot in command, to the extent required in the interest of safety, may deviate from prescribed operations procedures and methods, weather minimums, and the regulations of this subchapter.

(b) If an emergency situation arises during the course of a flight which requires immediate decision and action on the part of the aircraft dispatcher, and which is known to him, he shall advise the pilot in command of such situation. The aircraft dispatcher shall ascertain the decision of the pilot in command and shall cause the same to be made a matter of record. If unable to communicate with the pilot, the dispatcher shall declare an emergency and follow any course of action which he considers necessary under the circumstances.

(c) When emergency authority is exercised by the pilot in command or by the dispatcher, the appropriate dispatch center shall be kept fully informed regarding the progress of the flight, and within 10 days after the completion of the particular flight a written report of any deviation shall be submitted by the individual declaring the emergency to the Administrator through the air carrier operations manager.

§ 40.361 *Reporting potentially hazardous meteorological conditions and irregularities of ground and navigational facilities.* When any meteorological condition or irregularity of ground or navigational facilities is encountered in flight, the knowledge of which the pilot in command considers essential to the safety of other flights, he shall notify an appropriate ground radio station as soon as practicable. Such information shall thereupon be relayed by that station to the appropriate governmental agency.

§ 40.362 *Reporting mechanical irregularities.* The pilot in command shall enter or cause to be entered in the maintenance log of the airplane all mechanical irregularities encountered during flight. He shall, prior to each flight, inspect the log to ascertain the status of any irregularities entered in the log at the end of the last preceding flight.

§ 40.363 *Engine failure or precautionary stoppage.* (a) Except as provided in paragraph (b) of this section, when one engine of an airplane fails or where the rotation of an engine of an airplane is stopped in flight as a precautionary measure to prevent possible damage, a landing shall be made at the nearest suitable airport in point of time where a safe landing can be effected.

(b) The pilot in command of an airplane having 4 or more engines may, if not more than one engine fails or the rotation thereof is stopped, proceed to an airport of his selection, if, upon consideration of the following factors, he determines such action to be as safe a course of action as landing at the nearest suitable airport:

(1) The nature of the malfunctioning and the possible mechanical difficulties which may be encountered if flight is continued,

(2) The availability of the feathered engine for use,

(3) The altitude, airplane weight, and usable fuel at the time of engine stoppage,

(4) The weather conditions en route and at possible landing points,

(5) The air traffic congestion,

(6) The type of terrain, and

(7) The familiarity of the pilot with the airport to be used.

(c) When engine rotation is stopped in flight, the pilot in command shall immediately notify the proper ground station and shall keep such station fully informed regarding the progress of the flight.

(d) In cases where the pilot in command selects an airport other than the nearest suitable airport in point of time, he shall, upon completion of the trip, submit a written report, in duplicate, to his operations manager setting forth his reasons for determining that the selection of an airport other than the nearest was as safe a course of action as landing at the nearest suitable airport. The operations manager shall, within 7 days after completion of the trip, furnish a copy of this report with his own comments thereon to the Administrator.

§ 40.364 *Instrument approach procedures.* When an instrument approach is necessary, the instrument approach procedures and weather minimums authorized in the operations specifications shall be adhered to.

§ 40.365 *Requirements for air carrier equipment interchange.* (a) Prior to conducting any operations pursuant to an interchange agreement authorized by the Civil Aeronautics Board, the air carrier shall show that:

(1) The procedures proposed for the conduct of such operations by the carriers involved conform with the provisions of this subchapter and with safe operating practices;

(2) All operations personnel involved are familiar with the airplanes and equipment of the air carrier with whom interchange is to be effected, and with the communications and dispatching procedures to be used;

(3) All maintenance personnel involved are familiar with the airplanes and equipment, and the maintenance procedures of the air carrier with whom interchange is to be effected;

(4) The flight crew and the dispatchers involved meet the appropriate route and airport qualifications; and

(5) All airplanes operated are essentially similar to those airplanes of the carrier with whom interchange is to be effected with respect to flight instruments

and their arrangement and with respect to the arrangement and motion of controls critical to safety, unless the Administrator determines that adequate training programs have been established to insure that any dissimilarities which might be a potential hazard will be safely overcome by flight crew familiarization.

(b) The pertinent provisions and procedures affecting the carriers involved shall be included in their manuals.

DISPATCHING RULES

§ 40.381 *Necessity for dispatching authority.* No flight shall be started without specific authority from an aircraft dispatcher, except when an airplane has landed at an intermediate airport specified in the original dispatch release and has remained there for one hour or less.

§ 40.382 *Familiarity with weather conditions.* No aircraft dispatcher shall release a flight unless he is thoroughly familiar with existing and anticipated weather conditions along the route to be flown.

§ 40.383 *Facilities and services.* The dispatcher shall furnish to the pilot in command all available current reports or information pertaining to irregularities of navigational facilities and airport conditions which may effect the safety of the flight. He shall also furnish the pilot, while en route, any additional available information concerning meteorological conditions and irregularities of facilities and services which may affect the safety of the flight.

§ 40.384 *Airplane equipment required for dispatch.* All airplanes dispatched shall be airworthy and shall be equipped in accordance with the provisions of § 40.170.

§ 40.385 *Communications and navigational facilities required for dispatch.* No aircraft shall be dispatched over any route or route segment unless the communications and navigational facilities required by §§ 40.34 and 40.36 are in satisfactory operating condition.

§ 40.386 *Dispatching under VFR.* Airplanes shall be dispatched for operation under VFR only if the appropriate weather reports and forecasts, or a combination thereof, indicate that the ceilings and visibilities along the route to be flown are, and will remain, at or above the minimums required for flight under VFR until the flight arrives at the airport or airports of intended landing specified in the dispatch release.

§ 40.387 *Dispatching under IFR or over-the-top.* Aircraft shall be dispatched for operation under IFR or over-the-top only if the appropriate weather reports and forecasts, or a combination thereof, pertaining to the airport or airports to which dispatched indicate that the ceilings and visibilities will be at or above the minimums approved by the Administrator at the estimated time of arrival thereat.

§ 40.388 *Alternate airport for departure.* (a) If the weather conditions at the airport of take-off are below the approved landing minimums for that airport, no airplane shall be dispatched from that airport unless an alternate airport located with respect to the airport of take-off as follows is specified in the dispatch release: *Provided,* That such alternate need not be selected if the ceiling at the take-off airport is at least 300 feet and the visibility at least one mile:

(1) *Airplanes having 2 or 3 engines.* Alternate airport located at a distance no greater than one hour of flying time in still air at normal cruising speed with one engine inoperative.

(2) *Airplanes having 4 or more engines.* Alternate airport located at a distance no greater than 2 hours of flying time in still air at normal cruising speed with one engine inoperative.

(b) The alternate airport weather requirements shall be those specified in § 40.390.

(c) All required alternate airports shall be listed in the dispatch release.

§ 40.389 *Alternate airport for destination; IFR or over-the-top.* (a) For all IFR or over-the-top operations there shall be at least one alternate airport designated for each airport of destination and, when the weather conditions forecast for the destination and first alternate are marginal, at least one additional alternate airport: *Provided,* That no alternate need be designated when the ceiling at the airport to which the flight is dispatched is forecast to be at least 1,000 feet above the minimum initial approach altitude applicable to such airport and the visibility at such airport is forecast to be at least 3 miles for the period 2 hours before to 2 hours after the estimated time of arrival.

(b) The alternate airport weather requirements shall be those specified in § 40.390.

(c) All required alternate airports shall be listed in the dispatch release.

§ 40.390 *Alternate airport weather minimums.* An airport shall not be specified in the dispatch release as an alternate airport unless the weather conditions existing there at the time of dispatch are equal to or above the ceiling and visibility minimums approved for such airport when using it as an alternate, and the appropriate weather reports and forecasts, or a combination thereof, indicate that the weather conditions will be at or above such minimums until the flight shall arrive thereat. The weather minimums at such alternate airport shall not be less than one of the following and in no event less than the corresponding minimums specified for the airport when used as a regular airport: *Provided,* That the Administrator may approve higher or lower minimums at particular airports where the safe conduct of flight requires or permits, considering the character of the terrain being traversed, the meteorological service and navigational facilities available, and other conditions affecting flight.

(a) An airport served by an approved radio navigational facility and either an instrument landing system or a ground control approach system which the carrier has been authorized to use: Ceiling 800 feet and visibility of one mile; or ceiling 700 feet and visibility of 1½ miles; or ceiling 600 feet and visibility of two miles;

(b) An airport served by an approved radio navigational facility: ceiling 1,000 feet and visibility of one mile; or ceiling 900 feet and visibility of 1½ miles; or ceiling 800 feet and visibility of two miles;

(c) An airport not served by an approved radio navigational facility: if overcast, ceiling 1,000 feet above the minimum en route instrument altitude applicable to the route to such alternate airport and visibility of two miles; if broken clouds, ceiling 1,000 feet above the elevation of the airport and visibility of two miles.

§ 40.391 *Continuance of flight; flight hazards.* (a) No aircraft shall be continued in flight toward any airport to which it has been dispatched when, in the opinion of the pilot in command or the aircraft dispatcher, the flight cannot be completed with safety, unless in the opinion of the pilot in command there is no safer procedure. In the latter event, continuation shall constitute an emergency situation as set forth in § 40.360.

(b) If any item of equipment required pursuant to the regulations of this subchapter for the particular operation being conducted becomes unserviceable en route, the pilot in command shall comply with the procedures specified in the manual for such occurrence: *Provided,* That the Administrator may authorize the incorporation in the air carrier manual of procedures for the continued operation of an airplane beyond a scheduled terminal where he finds that, in the particular circumstances of the case, literal compliance with this requirement is not necessary in the interest of safety.

§ 40.392 *Operation in icing conditions.* (a) An airplane shall not be dispatched, en route operations continued, or landing made when, in the opinion of the pilot in command or aircraft dispatcher, icing conditions are expected or encountered which might adversely affect the safety of the flight.

(b) No airplane shall take off when frost, snow, or ice is adhering to the wings, control surfaces, or propellers of the airplane.

§ 40.393 *Redispatch and continuance of flight.* (a) Any regular, provisional, or refueling airport the use of which is authorized for the type of airplane to be operated may be specified as a destination for the purpose of original dispatch.

(b) An airport specified as a destination or alternate for the purpose of original dispatch may be changed en route to another airport which is authorized for the type of airplane to be operated, provided that the appropriate requirements of §§ 40.381 through 40.409 and § 40.70 or § 40.90 are met at the time of redispatch.

(c) No flight shall be continued to any airport to which it has been dispatched unless the weather conditions at an alternate airport specified in the flight release remain at or above the minimums specified for such airport when used as an alternate: *Provided,* That the flight

release may be amended en route to include any approved alternate airport lying within the fuel range of the aircraft as specified in §§ 40.396 and 40.397.

(d) When the flight release is amended while the aircraft is en route, such amendments shall be made a matter of record.

§ 40.394 *Dispatch to and from provisional airport.* (a) No aircraft dispatcher shall dispatch an airplane to a provisional airport unless such airport complies with all of the requirements of this part pertinent to regular airports.

(b) Dispatch from a provisional airport shall be accomplished in accordance with the same regulations governing dispatch from a regular airport.

§ 40.395 *Take-offs from alternate airports or from airports not listed in the operations specifications.* No airplane shall take off from an alternate airport or from an airport which is not listed in the air carrier operations specifications unless:

(a) Such airport and related facilities are adequate for the operation of the airplane,

(b) In taking off it is possible to comply with the applicable airplane operating limitations,

(c) The weather conditions at that airport are equal to or better than those prescribed for such airport, and

(d) The airplane is dispatched in accordance with all dispatching rules applicable to operation from an approved airport.

§ 40.396 *Fuel supply for all operations.* No airplane shall be dispatched unless it carries sufficient fuel:

(a) To fly to the airport to which dispatched, and thereafter,

(b) To fly to and land at the most distant alternate for the airport to which dispatched where such alternate is required and thereafter,

(c) To fly for a period of at least 45 minutes at normal cruising consumption.

§ 40.397 *Factors involved in computing fuel required.* In computing the fuel required, consideration shall be given to the wind and other weather conditions forecast, traffic delays anticipated, and any other conditions which might delay the landing of the airplane. Required fuel shall be additional to unusable fuel.

§ 40.405 *Take-off and landing weather minimums; VFR.* Irrespective of any clearance which may be obtained from air traffic control, no airplane shall take off or land under VFR when the reported ceiling or ground visibility is less than specified below: *Provided,* That where a local surface restriction to visibility exists, such as smoke, dust, or blowing snow or sand, the visibility for both day and night operations may be reduced to one-half mile, if all turns after take-off and prior to landing and all flight beyond a mile from the airport boundary can be accomplished above or outside, the area so restricted.

(a) For day operations: 1,000-foot ceiling and one-mile visibility;

(b) For night operations: 1,000-foot ceiling and two-mile visibility.

§ 40.406 *Take-off and landing weather minimums; IFR.* (a) Except as provided in paragraphs (c) and (d) of this section, irrespective of any clearance which may be obtained from air traffic control, no aircraft shall take off or land under IFR when the reported ceiling or ground visibility is less than that approved for the airport when used as a regular airport.

(b) Except as provided in paragraphs (c) and (d) of this section, no instrument approach procedure shall be executed when the latest weather report furnished by a source authorized in accordance with the provisions of § 40.35 indicates the ceiling or visibility is less than the landing minimum approved for the airport when used as a regular airport.

(c) An instrument approach procedure may be executed when the weather report indicates that the ceiling or visibility is less than approved minimum for landing, if the airport is served by ILS and GCA in operative condition and both are used by the pilot, and thereafter a landing may be made, if weather conditions equal to or better than the prescribed minimums are found to exist by the pilot in command upon reaching the authorized landing minimum altitude.

(d) If an instrument approach procedure is initiated when the current U. S. Weather Bureau report indicates that the prescribed ceiling and visibility minimums exist and a later weather report indicating below minimum conditions is received after the airplane (1) is on an ILS final approach and has passed the outer marker, or (2) is on a final approach using a radio range station or comparable facility and has passed the appropriate facility and has reached the authorized landing minimum altitude, or (3) is on GCA final approach and has been turned over to the final approach controller, such ILS, Range, or GCA approach may be continued and a landing may be made in the event weather conditions equal to or better than the prescribed minimums for the airport are found to exist by the pilot in command of the flight upon reaching the authorized landing minimum altitude.

§ 40.408 *Flight altitude rules.* Except when necessary for take-off and landing, the flight altitude rules prescribed in paragraphs (a) and (b) of this section, in addition to the applicable provisions of § 60.17, shall govern air carrier operations: *Provided,* That other altitudes may be established by the Administrator for any route or portion thereof 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 passenger operations.* No airplane engaged in passenger operations shall be flown at an altitude less than 1,000 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 including over-the-top.* No airplane shall be flown at an altitude less than 1,000 feet above the highest obstacle located within a horizontal distance of five 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 five miles from the center of the course intended to be flown: *Provided,* That in VFR operations at night in such mountainous areas airplanes may be flown over a lighted civil airway at a minimum altitude of 1,000 feet above such obstacle: *And provided further,* That in the case of high-altitude operations, the minimum altitude shall be not less than 2,000 feet above the elevation of the highest ground within 25 miles of the intended track: *And provided further,* That adherence to a minimum flight altitude will not be required during the time a flight is proceeding in accordance with paragraph (c) of this section.

(c) *Daytime over-the-top operations below minimum en route altitudes.* Over-the-top operations may be conducted at flight altitudes lower than the minimum en route IFR altitudes by day only and in accordance with the following provisions:

(1) Such operations shall be conducted at least 1,000 feet above the top of lower broken or overcast cloud cover;

(2) The top of the lower cloud cover shall be generally uniform and level;

(3) Flight visibility shall be at least five miles;

(4) The base of any higher broken or overcast cloud cover shall be generally uniform and level and shall be at least 1,000 feet above the minimum en route IFR altitude for the route segment.

§ 40.409 *Altitude maintenance on initial approach.* (a) When making an initial approach to a radio navigational facility under IFR (excluding over-the-top conducted in accordance with the provisions of § 40.408 (c), an airplane shall not descend below the pertinent minimum altitude for initial approach specified by the Administrator for such facility until arrival over the radio facility has been definitely established;

(b) When making an initial approach on a flight being conducted in accordance with the provisions of § 40.408 (c), a pilot shall not commence an instrument approach until arrival over the radio facility has definitely been established. In executing an instrument approach procedure under such circumstances, the airplane shall not be flown at an altitude lower than 1,000 feet above the top of the lower cloud or the minimum altitude specified by the Administrator for that portion of the instrument approach procedure being flown, whichever is the lower.

§ 40.411 *Preparation of dispatch release.* A dispatch release shall be prepared for each flight between specified points from information furnished by the authorized aircraft dispatcher. This release shall be signed by the pilot in command and by the authorized aircraft dispatcher only when both believe the flight can be made with safety. The aircraft dispatcher may delegate au-

thority to sign such release for a particular flight, but he shall not delegate the authority to dispatch.

§ 40.412 *Preparation of load manifest.* The air carrier shall be responsible for the preparation and accuracy of a load manifest form prior to each takeoff. This form shall be prepared by personnel of the air carrier charged with the duty of supervising the loading of airplanes and the preparation of load manifest forms or by other qualified persons authorized by the air carrier.

REQUIRED RECORDS AND REPORTS

§ 40.500 *Records.* Each scheduled air carrier shall maintain records and submit reports in accordance with the requirements of §§ 40.501 through 40.511. All records shall be retained for the period specified in Part 249 of Subchapter B of this chapter (Economic Regulations), unless otherwise specified in §§ 40.501 through 40.511.

§ 40.501 *Crew member and dispatcher records.* Each air carrier shall maintain current records of every crew member and aircraft dispatcher. These records shall contain such information concerning the qualifications of each such crew member and dispatcher as is necessary to show compliance with the appropriate requirements of the regulations of this subchapter, e. g., proficiency and route checks, airplane qualifications, training, physical examinations, and flight time records. The disposition of any flight crew member or aircraft dispatcher released from the employ of the air carrier, or who becomes physically or professionally disqualified, shall be indicated in these records which shall be retained by the air carrier for at least three months.

§ 40.502 *List of airplanes.* Each air carrier shall maintain a current list of all airplanes being operated by it in scheduled air transportation: *Provided,* That airplanes of another air carrier being operated in accordance with an interchange agreement may be incorporated by reference.

§ 40.503 *Dispatch release form.* (a) The dispatch release may be in any form but shall contain at least the following information with respect to each flight:

(1) Identification number of the airplane to be used, and the trip number,

(2) Airport of departure, intermediate stops, destination, and alternates therefor,

(3) Minimum fuel supply,

(4) Type of operation, e. g., IFR, VFR.

(b) The dispatch release shall contain, or have attached thereto, weather reports, available weather forecasts, or a combination thereof, for the destination, intermediate stops, and alternates specified therein which shall be the latest available at the time the dispatch release is signed by the pilot in command and dispatcher. It shall include such additional weather reports and forecasts, as available, considered necessary or desirable by the pilot in command and aircraft dispatcher.

§ 40.504 *Load manifest.* (a) The load manifest shall contain at least the following information with respect to the loading of an airplane at the time of take-off:

(1) The weight of:

(i) Airplane,

(ii) Fuel and oil,

(iii) Cargo, including mail and baggage, and

(iv) Passengers;

(2) The maximum allowable weight applicable for the particular flight;

(3) The total weight computed in accordance with approved procedures;

(4) Evidence that the airplane is loaded in accordance with an approved schedule which insures that the center of gravity is within approved limits.

(b) The load manifest 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 airplane and the preparation of load manifest forms, or by other qualified personnel authorized by the air carrier.

§ 40.505 *Disposition of load manifest, dispatch release form, and flight plans.* Copies of the completed load manifest, or information therefrom except with respect to cargo and passenger distribution, the dispatch release form, and the flight plan shall be in the possession of the pilot in command and shall be carried in the airplane to its destination. Copies also shall be kept for at least 60 days.

§ 40.506 *Maintenance records.* (a) Each air carrier shall keep at its principal maintenance base current records of the total time in service, the time since last overhaul, and the time since last inspection of all major components of the airframe, engines, propellers, and, where practicable, appliances.

(b) Records of total time in service may be discontinued when it has been shown that the service life of component parts is safely controlled by other means, such as inspection, overhaul, or parts retirement procedures. The Administrator may require the keeping of total time records for specific parts when it is found that other procedures will not safely limit the service life of such parts.

(c) An airplane component, engine, propeller, or appliance for which complete records are not available may be placed in service, provided that:

(1) It is of a type for which total time in service records are not required under the provisions of paragraph (b) of this section,

(2) Parts which are limited by the Administrator or manufacturer to a specific service time are retired and replaced by new parts, and

(3) It has been properly overhauled or rebuilt, and a record of such overhaul or rebuilding is included in the maintenance records.

§ 40.507 *Maintenance log.* A legible record shall be made in the airplane's maintenance log of the action taken in each case of reported or observed failures or malfunctions of airframes, engines, propellers, and appliances critical to the safety of the flight. The air carrier shall establish an approved procedure for retaining an adequate number of such records in the airplane in a place readily accessible to the flight crew and shall incorporate such procedure in the air carrier manual. The maintenance log shall contain information from which the flight crew may readily determine the time since last overhaul of the airframe and engines.

§ 40.508 *Daily mechanical reports.* (a) Whenever a failure, malfunctioning, or other defect is detected in flight or on the ground in an airplane or airplane component which may reasonably be expected by the air carrier to cause a serious hazard in the operation of any airplane, a report shall be made of such failure, malfunctioning, or other defect to the Administrator. This report shall cover a 24-hour period beginning and ending at midnight, shall be submitted by 12 o'clock midnight of the following working day, or sooner if the seriousness of the malfunction or difficulty so warrants, and shall include as much of the following information as is available on the first daily report following such incidents.

(1) Type and CAA identification number of the airplane, name of air carrier, and date;

(2) Emergency procedure effected: unscheduled landing, dumping fuel, etc.;

(3) Nature of condition: fire, structural failure, etc.;

(4) Identification of part and system involved, including the type designation of the major component;

(5) Apparent cause of trouble: wear, cracks, design deficiency, personnel error, etc.;

(6) Disposition: repaired, replaced, airplane grounded, etc.;

(7) Brief narrative summary to supply and other pertinent data required for more complete identification, determination of seriousness, corrective action, etc.

(b) These reports shall not be withheld pending accumulation of all of the information specified in paragraph (a) (1) through (7) of this section. When additional information is obtained relative to the incident, it shall be expeditiously submitted as a supplement to the original report, reference being made to the date and place of submission of the first report.

§ 40.509 *Mechanical interruption summary report.* Each air carrier shall submit regularly and promptly to the Administrator a summary report containing information on the following occurrences:

(a) All interruptions to a scheduled flight, unscheduled changes of airplanes en route, and unscheduled stops and diversions from route which result from known or suspected mechanical difficulties or malfunctions.

(b) The number of engines removed prematurely because of mechanical trouble, listed by make and model of engine and the airplane type in which the engine was installed.

(c) The number of propeller featherings in flight, listed by type of propeller and type of engine and the airplane on which the propeller is installed.

§ 40.510 *Alteration and repair reports.* Reports of major alterations or repairs of airframes, engines, propellers, and appliances shall be made available to the Administrator promptly upon completion of such alterations or repairs.

§ 40.511 *Maintenance release.* When an airplane is released by the maintenance organization to flight operations, a maintenance release or appropriate entry into the maintenance log certifying that the airplane is in an airworthy condition shall be prepared and signed by a maintenance inspector or a person authorized by the inspection organization prior to release of such airplane. If a maintenance release form is prepared, a copy shall be given to the pilot in command. An appropriate record shall be kept for at least 60 days.

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

By the Civil Aeronautics Board.

[SEAL] M. C. MULLIGAN,
Secretary.

[F. R. Doc. 53-3452; Filed, Apr. 20, 1953; 8:45 a. m.]

NOTICE

Advise the Civil Aeronautics Board, Washington 25, D. C., that you have purchased this Part of the Civil Air Regulations and that agency will supply you with copies of amendments *which have been issued since this printing.* Be sure to specify the number of this part, otherwise your request cannot be filled.

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