CIVIL AERONAUTICS MANUAL 42

U. S. Department of Commerce — Civil Aeronautics Administration

Civil Aeronautics Manuals and supplements thereto are issued by the Office of Aviation Safety, Civil Aeronautics Administration, for the guidance of the public and are published in the Federal Register and the Code of Federal Regulations.

Supplement No. 5 — February 27, 1952

SUBJECT: Revisions to CAM 42

The purpose of this supplement is to provide holders of Civil Aeronautics Manual 42 with revised CAA rules and policies issued pursuant to Civil Air Regulation 42.80-7. This revised portion of CAM 42 was published in the Federal Register on May 15, 1951.

Instructions for insertion of revised manual pages:

REMOVE AND DESTROY THE FOLLOWING PAGES:	INSERT IN LIEU THEREOF THE FOLLOWING PAGES:
42.83	42.80-7
42.96-1	42.91-3
	42.96-1

The following ink revision should be made:

In section 42.80-5, Table 3 (b), the column headed "20,000" should have the last two figures listed therein changed from "3,750" and "3,865" to "4,750" and "4,865" respectively.

Office of Aviation Safety — E. S. HENSLEY, Director

52746

Library

TABLE 1—EN ROUTE LIMITATIONS—Continued

BEECH D18S

Weight in pounds	Terrain clearance [1] in feet and climb speed in m. p. h. TIAS			
	Propeller feathered		Propeller idling	
	Feet	Miles per hour	Feet	Miles per hour
8,750	7,100	103.5		
8,500	7,600	103.5	5,600	104.5
8,000	8,800	102.5	6,700	104.0
7,500	9,900	102.0	7,900	103.0

LOCKHEED 10E

Weight in pounds	Terrain clearance [1] in feet and climb speed in m. p. h. TIAS			
	Propeller feathered		Propeller idling	
	Feet	Miles per hour	Feet	Miles per hour
10,500	9,000	96	7,500	96.5
10,000	9,600	96	8,100	96.5
9,500	10,200	96	8,600	96.5
9,000	10,700	96	9,200	96.5
8,500	11,300	96	9,750	96.5
8,000	11,900	96	10,350	96.5

LOCKHEED 12A

Weight in pounds	Terrain clearance [1] in feet and climb speed m. p. h. TIAS	
	Feet	Miles per hour
8,600	6,700	98.5
8,000	7,400	98.5
7,500	7,950	98.5
7,000	8,500	98.5
6,500	9,000	98.5

[1] Highest altitude of terrain over which airplane may be operated in compliance with CAR 42.82.

§ 42.80-7 *Performance data on Boeing S-307 aircraft (CAA rules which apply to § 42.80).* The following performance limitations data, applicable to Boeing S-307 aircraft, shall be used in determining compliance with § 42.80. These data are presented in Tables 1 through 3 and Figures 1 and 2.

(See the following two pages for Figs. 1 and 2.)

TABLE 1—TAKE-OFF LIMITATIONS

(a) "Effective length" of runway required when effective length is determined in accordance with § 42.1 (a) (12) (distance to accelerate to

$1.15\ V_{s_1} = 1.15\ (98.4)\ \sqrt{\text{Wgt.}/50{,}000}$ m. p. h. TIAS and stop, with zero wind and zero gradient).

Standard altitude in feet	Airplane weight in pounds and critical engine failure speeds in m. p. h. TIAS		
	46,000 V_1=108.5	48,000 V_1=111.0	50,000 V_1=113.0
	Distance in feet		
S. L.	3,730	4,010	4,260
1,000	3,900	4,190	4,460
2,000	4,120	4,430	4,720
3,000	4,350	4,680	4,990
4,000	4,600	4,950	5,280
5,000	4,860	5,250	5,600
6,000	5,140	5,550	5,940
7,000	5,460	5,910	6,320
8,000	5,820	6,330	6,770

(b) Actual length of runway required when "effective length," considering obstacles, is not determined (distance to accelerate to 1.15 (98.4) $\sqrt{\text{Wgt.}/50{,}000}$ m. p. h. TIAS, and stop, divided by the factor 0.85).

Standard altitude in feet	Airplane weight in pounds and critical engine failure speed (V_1) in m. p. h. TIAS		
	46,000 V_1=108.5	48,000 V_1=111.0	50,000 V_1=113.0
	Distance in feet		
S. L.	4,390	4,720	5,010
1,000	4,590	4,930	5,245
2,000	4,845	5,210	5,555
3,000	5,120	5,505	5,870
4,000	5,410	5,825	6,210
5,000	5,720	6,175	6,590
6,000	6,045	6,530	6,990
7,000	6,425	6,955	7,435
8,000	6,845	7,445	7,965

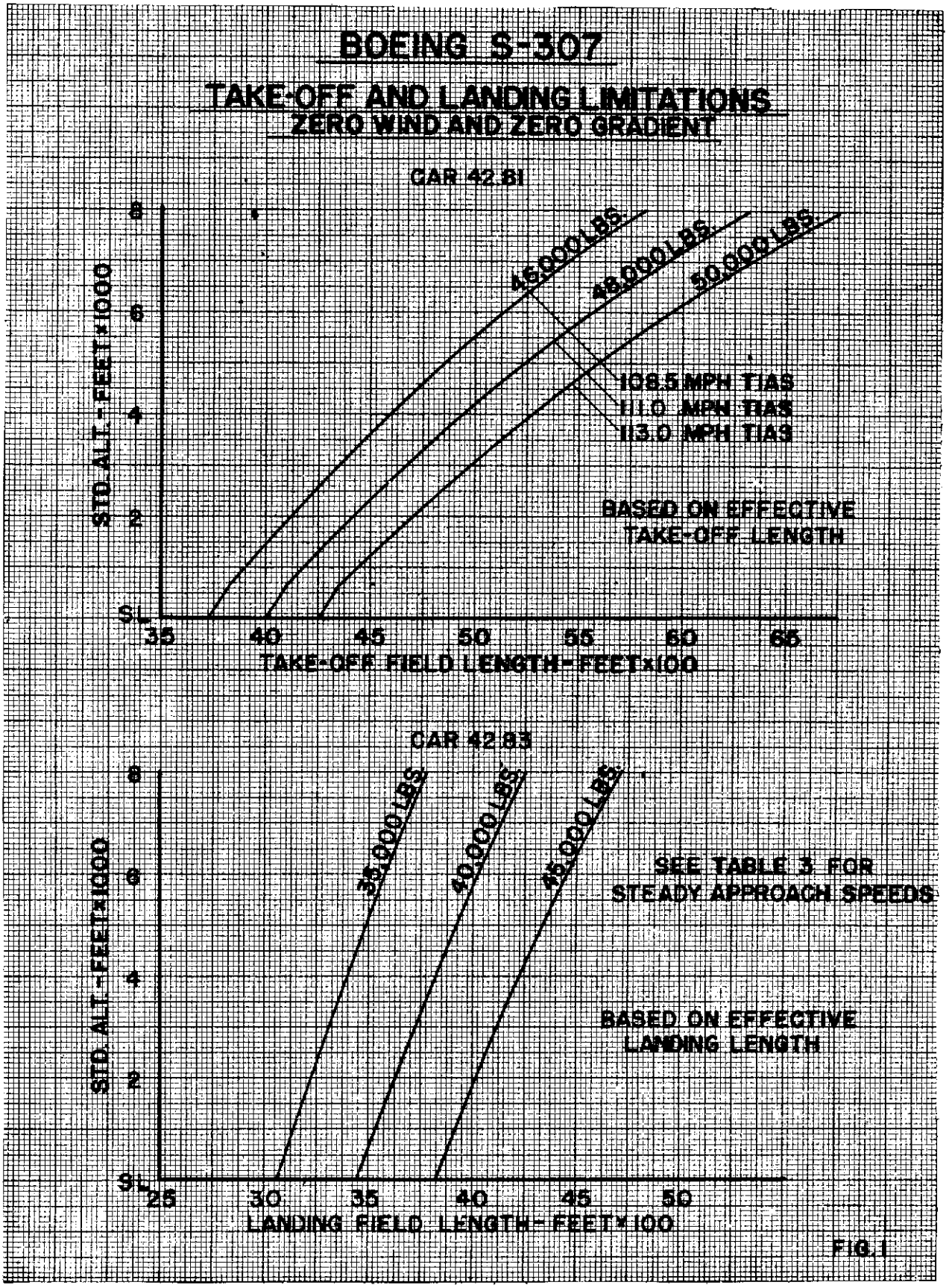
BOEING S-307
TAKE-OFF AND LANDING LIMITATIONS
ZERO WIND AND ZERO GRADIENT
CAR 42.81
STD. ALT. - FEET x 1000
8
6
4
2
SL
50,000 LBS.
49,000 LBS.
50,000 LBS.
108.5 MPH TIAS
111.0 MPH TIAS
113.0 MPH TIAS
BASED ON EFFECTIVE TAKE-OFF LENGTH
35
40
45
50
55
60
65
TAKE-OFF FIELD LENGTH - FEET x 100
CAR 42.83
STD. ALT. - FEET x 1000
8
6
4
2
SL
45,000 LBS.
40,000 LBS.
35,000 LBS.
SEE TABLE 3 FOR STEADY APPROACH SPEEDS
BASED ON EFFECTIVE LANDING LENGTH
25
30
35
40
45
50
LANDING FIELD LENGTH - FEET x 100

FIG. 1

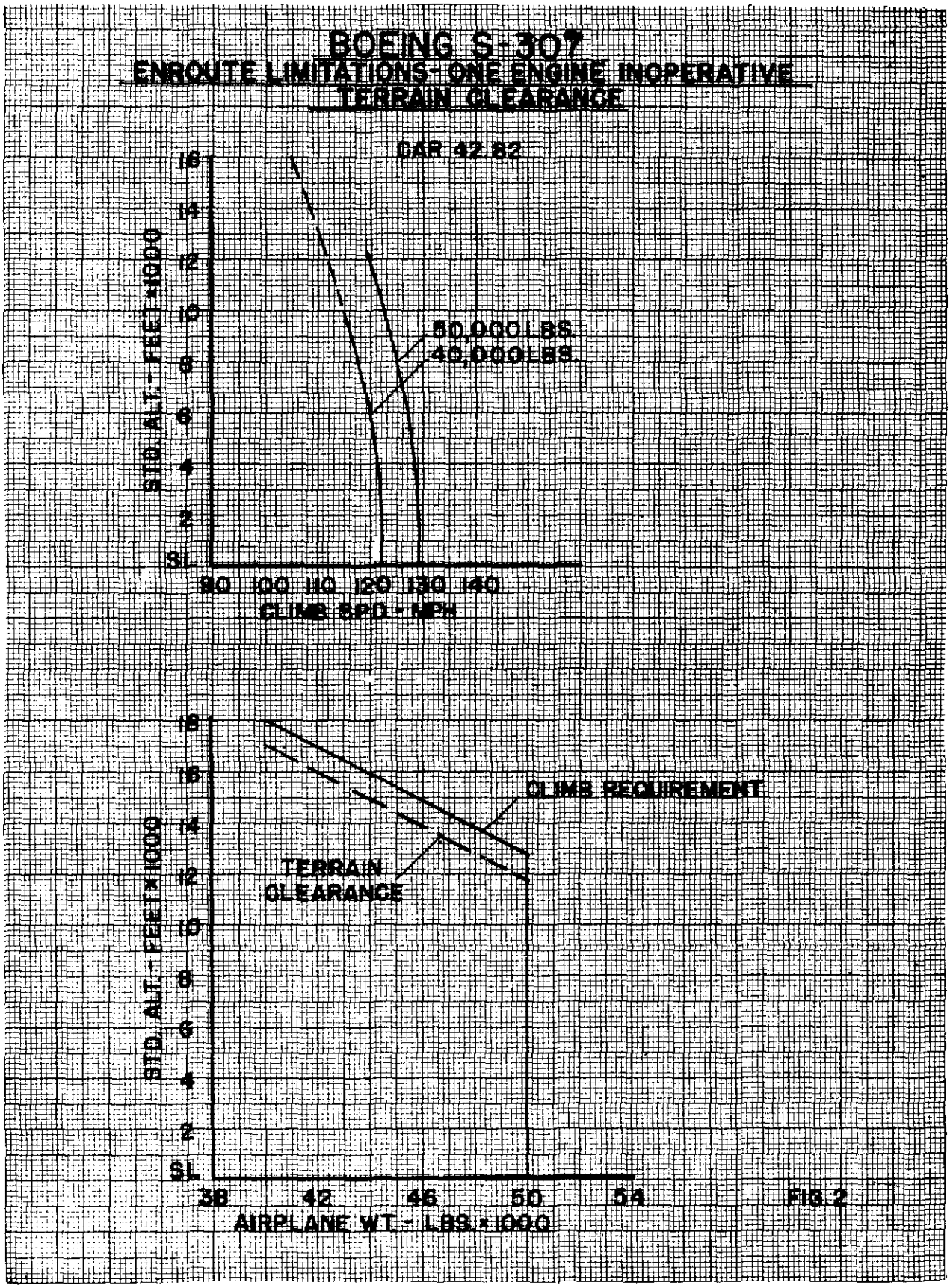
BOEING S-307
ENROUTE LIMITATIONS-ONE ENGINE INOPERATIVE
TERRAIN CLEARANCE
CAR 42.82
STD. ALT.-FEET×1000
16
14
12
10
8
6
4
2
SL
50,000 LBS.
40,000 LBS.
90 100 110 120 130 140
CLIMB SPD.-MPH
CLIMB REQUIREMENT
TERRAIN CLEARANCE
38 42 46 50 54
AIRPLANE WT.-LBS.×1000

FIG. 2

TABLE 2—EN ROUTE LIMITATIONS

Weight in pounds	Terrain clearance [1] in feet and climb speed in m. p. h. TIAS	
	Feet	Miles per hour
40,000	17,000	103.0
41,000	16,400	105.0
42,000	15,900	107.0
43,000	15,350	108.5
44,000	14,800	110.5
45,000	14,300	112.0
46,000	13,750	114.0
47,000	13,200	115.5
48,000	12,700	117.0
49,000	12,150	118.5
50,000	11,650	120.0

[1] Highest altitude of terrain over which airplane may be operated in compliance with § 42.82.

TABLE 3—LANDING LIMITATIONS

(a) "Effective length" of runway required when effective length is determined in accordance with § 42.1 (a) (12) with zero wind and zero gradient.

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in m. p. h. TIAS					
	35,000	V_{50}	40,000	V_{50}	45,000	V_{50}
	Distance in feet					
S. L.	3,065	93	3,445	99.5	3,815	105
1,000	3,145	93	3,540	99.5	3,915	105
2,000	3,225	93	3,630	99.5	4,015	105
3,000	3,310	93	3,725	99.5	4,120	105
4,000	3,390	93	3,820	99.5	4,225	105
5,000	3,480	93	3,925	99.5	4,340	105
6,000	3,575	93	4,035	99.5	4,460	105
7,000	3,670	93	4,140	99.5	4,580	105
8,000	3,770	93	4,260	99.5	4,715	105

[1] Steady approach speed through 50-foot height m. p. h. TIAS denoted by symbol V_{50}.

(b) Actual length of runway required when effective length, considering obstacles, is not determined in accordance with § 42.1 (a) (12).

Standard altitude in feet	Airplane weight in pounds and approach speeds [1] in m. p. h. TIAS					
	35,000	V_{50}	40,000	V_{50}	50,000	V_{50}
	Distance in feet					
S. L.	3,890	93	4,375	99.5	4,845	105
1,000	3,995	93	4,495	99.5	4,970	105
2,000	4,095	93	4,610	99.5	5,100	105
3,000	4,205	93	4,730	99.5	5,230	105
4,000	4,305	93	4,850	99.5	5,365	105
5,000	4,420	93	4,985	99.5	5,510	105
6,000	4,540	93	5,125	99.5	5,665	105
7,000	4,660	93	5,260	99.5	5,815	105
8,000	4,790	93	5,410	99.5	5,990	105

[1] Steady approach speed through 50-foot height m. p. h TIAS denoted by symbol V_{50}.

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

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

"CAR § 42.82 *En route limitations; one engine inoperative.* No airplane shall be taken off at a weight in excess of that which, with the critical engine inoperative, would permit a rate of climb of at least 50 feet per minute at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within 10 miles of either side of the intended track or at an altitude of 5,000 feet, whichever is higher. For the purpose of this section it shall be assumed that the weight of the airplane as it proceeds

along its intended track is progressively reduced by the anticipated consumption of fuel and oil; that the propeller of the inoperative engine is in the minimum drag position; that the wing flaps and landing gear are in the most favorable positions; and that the remaining engine or engines are operating at the maximum continuous power available. The 10-mile lateral distance specified herein may, for a distance of no more than 20 miles, be reduced to 5 miles provided that special air navigational facilities provide a reliable and accurate identification of any high ground or obstruction located outside of such 5-mile lateral distance but within the 10-mile distance."

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

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

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

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

REQUIRED RECORDS AND REPORTS

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

"(a) Total time and service,

"(b) Time since last overhaul,

"(c) Time since last inspection, and

"(d) Mechanical failures."

42.91-1 CONTENT OF MAINTENANCE RECORDS. (*CAA policies which apply to section 42.91.*)

The basic requirement of the above records is to provide a means for determining that overhaul, inspection, and check of the various units or components is performed within the prescribed time limitations. In the case of appliances, any method which will accomplish this result, other than keeping of individual time records on the units themselves, will be satisfactory.

42.91-2 PRINCIPAL MAINTENANCE BASE. (*CAA policies which apply to section 42.91.*)

When the principal maintenance base is at a location other than the principal operations base, the term "Principal Operations Base," when applied to maintenance matters, shall be considered to mean the principal maintenance base. Copies of the necessary records shall also be maintained at the principal operations base if it is in a region other than the one in which the principal maintenance base is located.

42.91-3 RETENTION OF RECORDS. (*CAA policies which apply to section 42.91.*)

The records required by this section shall be preserved and retained by the air carrier for a period of 2 years. For additional requirements pertaining to preservation of records, see Part 249 of the Economic Regulations of the Civil Aeronautics Board.

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

42.92-1 CONTENT OF AIRMAN RECORDS. (*CAA policies which apply to section 42.92.*)

(a) GENERAL. The following pertinent information is considered the minimum necessary in the airman records required by this section:

(1) Name (in full);

(2) Current duties and date of assignment (pilot, engineer, navigator, etc.);

(3) Airman certificates (type, number, and ratings);

(4) Date, result, and class of last physical examination;

(5) Date and result of last 6-month instrument competency flight check for each pilot in command;

(6) Record of each pilot's flight time including trip time, instrument, night flight time, and flight time in the make and model of aircraft on which he is currently qualified;

(7) Records of company training for all crewmen, including actual flight, synthetic flight, and maintenance of proficiency training;

(8) Any check pilot authorization.

42.92-2 AVAILABILITY OF RECORDS. (*CAA policies which apply to section 42.92.*)

The above information shall be made available at any time for inspection by an authorized representative of the Administrator or Board.

42.92-3 RETENTION OF RECORDS. (*CAA policies which apply to section 42.92.*)

The disposition of any flight crew member released from the employ of the air carrier, or who becomes physically or professionally disqualified must be so indicated in these records and such records shall be retained by the company for at least 1 year. For additional requirements pertaining to preservation of records see Part 249 of the Economic Regulations of the Civil Aeronautics Board.

"CAR § 42.93 *Emergency flight reports.* In the case of emergencies necessitating the transportation of persons or medical supplies for the protection of life or property, the rules contained herein regarding type of aircraft, equipment, and weather minimums to be observed will not be applicable: *Provided,* That within 48 hours after any such flight returns to its base the air carrier shall file a report with the Administrator setting forth the conditions under which the flight was made, the necessity therefor, and giving the names and addresses of the crew and passengers."

42.93-1 SUBMISSION OF EMERGENCY FLIGHT REPORTS. (*CAA policies which apply to section 42.93.*)

The report referred to in this section shall be submitted in duplicate to the local Aviation Safety Agent, and a copy shall be retained by the air carrier for at least 1 year.

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

42.94-1 SUBMISSION OF PILOT'S EMERGENCY DEVIATION REPORT. (*CAA policies which apply to section 42.94.*)

The report referred to in this section shall be submitted in duplicate to the local Aviation Safety Agent, and a copy shall be retained by the air carrier for at least 1 year.

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

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

42.96-1 MECHANICAL HAZARD AND DIFFICULTY REPORTS. (*CAA rules which apply to section 42.96.*)

(a) GENERAL. The following reporting procedure will apply to all certificated irregular air carriers which operate large aircraft and eliminates the necessity for submission of Form ACA-1226 by these operators.

(b) DAILY MECHANICAL REPORTS.

(1) SUBMISSION OF REPORTS. Whenever a failure, malfunction, or other defect[6] is detected in flight or on the ground in an aircraft or aircraft component, which may reasonably be expected by the air carrier to cause a serious hazard in the operation of any aircraft, notice thereof is to be transmitted to the nearest CAA Aviation Safety District or Regional Office in the area in which the aircraft is being operated.

(2) TIMES OF SUBMISSION. Such daily reports should be submitted only where mechanical hazards have been detected; should be submitted within the 24-hour period from midnight to midnight of the day of occurrence; and should be transmitted to the nearest Aviation Safety Office before noon of the following working day when possible, except that reports for Fridays, Saturdays, and Sundays should be submitted not later than noon of the following Monday. When it is impossible to furnish the report before noon due to scheduling, it should be reported as early as possible, but in no case later than 24 hours after the period for which the report is submitted. It is not necessary that the operator's personnel personally appear at the CAA office since such reports may be transmitted by telephone, wire, or other rapid means of communication.

(3) METHOD OF TRANSMISSION. Such reports may be transmitted in a manner or on a form convenient to the air carrier's system of communications and procedures.

(i) SUGGESTED FORM FOR TRANSMISSION. Whenever practicable, the following guide for each aircraft type should be used by the air carrier in submission of the daily reports:

(*a*) Type, CAA identification number of aircraft, air carrier, and date;

(*b*) Emergency procedure effected (unscheduled landing, dumping fuel, etc.);

(*c*) Nature of condition (fire, structural failure, etc.);

(*d*) Identification of part and system involved, including the model designation of the major component (e. g., P & W R-2800-34);

(*e*) Apparent cause of trouble (wear, cracks, design, personnel error, etc.);

(*f*) Disposition (repaired, replaced, aircraft grounded, etc.);

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

[6] Failures, malfunctions, or other defects not covered by CAR Part 62, which are to be reported under these rules, comprise generally the following basic items: Fire hazards, structural hazards, serious system or component malfunctions or failures, unsafe procedures or conditions, and defects in design or quality of parts and materials found installed on aircraft or intended for such installation.

(4) SUPPLEMENTARY INFORMATION. The daily reports should not be withheld pending presentation of all specific details pertaining to such items of information. As soon as the additional information is obtained, it is to be submitted in an expedited supplement to the original report, making reference to the date and place of submission of the first report.

(c) MONTHLY REPORT OF CHRONIC MECHANICAL DIFFICULTIES. As soon as practicable after the end of each calendar month, each certificated irregular air carrier operating large aircraft shall submit three copies of a report covering the mechanical difficulties experienced during the preceding month which they consider chronic or otherwise particularly significant from a safety standpoint. The report is to fully identify all components (manufacturer, model, type, etc.) and contain sufficient information so as to enable a determination of the trend of failures and defects and to provide information on which to base corrective action. The detailed information from which such reports are prepared shall be kept current and available for examination at the air carrier's main headquarters by any authorized representative of the Administrator or Board.

The reports shall be submitted to the office of the assigned Aviation Safety Agent—Aircraft Maintenance for review, appropriate investigation, and forwarding to the Washington office of the Air Carrier Maintenance Branch.