CIVIL AERONAUTICS BOARD
SAFETY BUREAU
WASHINGTON, D. C.

January 20, 1947

CIVIL AIR REGULATIONS DRAFT RELEASE NO. 47-2

SUBJECT: Proposed revision of Civil Air Regulations Part 24 - Mechanic Certificates and Part 53 - Mechanic School Certificates.

With this Draft Release the Safety Bureau of the Civil Aeronautics Board is circulating a proposed revision of Parts 24 and 53 of the Civil Air Regulations relative to the certification of mechanics and mechanic schools. These proposed revisions are circulated together because Part 53 - Mechanic School Certificates is closely related to Part 24 - Mechanic Certificates, and it is believed desirable to review these Parts at the same time.

Other proposed revisions of Part 24 have been circulated previously, and the comments received suggested a number of changes in the proposed requirements. This revision includes most of the suggestions, and it is now recirculated for further comment prior to being presented to the Board for adoption.

The proposed revision of Part 24 provides that a mechanic certificate would include one or more of the following ratings: (a) airframe; (b) power plant; (c) aircraft inspector; (d) propellers; (e) instruments; and (f) radio. The term "airframe" has been chosen because it applies to the aircraft without its power plant, and more clearly defines the component which it covers. The term "power plant" applies to the aircraft engine and its related components, and includes such types of power units as jet and turbo as well as the reciprocating type.

The present Civil Air Regulations do not authorize a certificated mechanic to return aircraft to service aftermajor repair or overhaul, inasmuch as this privilege is given to approved repair stations or to representatives of the Administrator. Therefore, it is now proposed to establish an aircraft inspector rating which would permit the holder of such rating to return aircraft to service after major repair or overhaul and, furthermore, to make the annual inspection of aircraft required by Part 43 of the Civil Air Regulations.

Privileges and limitations for all ratings are clearly set forth because of the large variety of airplane and power-plant types now in use.

It is provided that oral and practical examinations for all ratings will be confined to the particular type of airframe or power plant with which the applicant is familiar. The rules will permit a mechanic to repair and overhaul airframes or power plants as indicated by his rating without regard to

size or horsepower. This is not a relaxation of repair requirements because a limitations section has been included which prohibits a mechanic from undertaking repairs with which he has not had previous experience or knowledge. Such a provision limits the mechanic to the work he is qualified to perform without restricting the possible scope of his work.

Part 18 of the Civil Air Regulations now permits repair or overhaul of instruments and propellers only by an appropriately rated repair station or by the manufacturer, and such repairs must be made under the supervision of A & E certificated mechanics. Individuals conducting repairs to propellers, instruments, and radio equipment are specialists who are not particularly concerned with the details of repair and alteration of airframes or power plants, and therefore should not be required to qualify in the latter capacities.

In addition to requiring certificated airmen for the repair of aircraft and aircraft engines, the Civil Aeronautics Act of 1938 also recognizes propellers and appliances as essential parts of an assembled aircraft. Thus a provision has been made to recognize specialized skill and training by providing for the issuance of a mechanic certificate with ratings for propellers, instruments, and radio.

The proposed Part 53 has been drafted to permit mechanic schools to broaden the scope of their curricula and to provide additional courses to conform with the ratings provided in the proposed Part 24. Such schools can arrange their curricula to teach the student any combination of courses desired. However, the minimum number of hours of instruction has been increased, because operating experience indicates that the schools are unable to give sufficient instruction in the time previously specified.

A provision in revised Part 53 also makes it possible for a student to receive a transcript of credit for completion of a portion of an approved curriculum at the end of a specific phase in the course. This transcript may be used by an individual desiring to transfer from one school to another, and will be accepted as evidence of a specific amount of training which will be considered as aeronautical experience within the meaning of proposed Part 24.

In accordance with its established policy, the Board earnestly desires to secure comments from the aviation industry regarding these proposed changes together with any alternate proposals or recommendations. Your cooperation in filling out the attached questionnaires, and returning them to the Safety Bureau, Civil Aeronautics Board, Washington 25, D. C., before March 20, 1947 1947, will be sincerely appreciated.

W. S. Dawson
Director, Safety Bureau

PART 24
MECHANIC CERTIFICATES

(Note: For clarity, the proposed revision of Part 24 is set forth below in the left column, and the right-hand column is reserved for explanatory remarks as to the objectives and intent of the regulations.)

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| 24.0 CERTIFICATE | REMARKS |
|---|---|
| 24.00 Issuance. A mechanic certificate will be issued by the Administrator to an applicant who meets the minimum requirements prescribed herein. | Applicant for a mechanic certificate should complete application form supplied by the nearest office of the Civil Aeronautics Administration and return to such office, presenting proof of his mechanical experience. Examinations will be given at a time and place designated by a representative of the Administrator. |
| 24.01 Age. Applicant shall be at least 18 years of age. | |
| 24.02 Citizenship. Applicant shall be a citizen of the United States or of a foreign government which grants reciprocal mechanic privileges to citizens of the United States on equal terms and conditions with citizens of such foreign government. | |
| 24.03 Education. Applicant shall be able to read, write, speak, and understand the English language: Provided, That this requirement shall not apply to an applicant employed by an air carrier outside the United States and certificates issued to such applicants shall bear the following notation, "Valid only outside the United States while employed by_____(name of air carrier)." | This rule is provided in order that American operators may employ mechanic of foreign citizenship in foreign countries. |

## 24.1 MECHANIC RATINGS

24.10 Issuance. One or more of the following mechanic ratings will be issued with a mechanic certificate:

(a) airframe,
(b) power-plant,
(c) aircraft inspector,
(d) propeller,
(e) instrument,
(f) radio.

The rating issued with a mechanic certificate signifies the category in which the applicant has been examined. A person may hold any combination of ratings.

Existing regulations require major overhaul of propellers and instruments to be made either by a certificated repair station or the manufacturer of the product involved. It is proposed herewith to establish mechanic ratings to expedite major repairs to propellers, instruments, and radio by qualified persons who would be authorized by this rating to return such equipment to service. The provisions for these mechanic ratings will in no way affect the privileges of the airframe or power-plant mechanic.

24.11 Knowledge. Applicant shall pass a general written examination as prescribed by the Administrator, on the construction, maintenance, and repair of airframes, power plants, propellers, or appliances, and their related components, appropriate to the rating sought, and an examination on Part 18, Civil Aeronautics Manual 18, and the applicable portions of Parts 03, 04a, 04b, and 43 of the Civil Air Regulations.

The written examination for an airframe rating will include questions on the theory of construction, operation, and repair of aircraft.

The written examination for a power-plant rating will include questions on the theory of construction, operation, and repair of aircraft engines.

The written examination for an aircraft inspector rating will include inspection procedures, material specification and identification, blueprint reading and layout problems, fabrication and assembly methods, aircraft weight and balance, general principles of magnaflux and X-ray inspection, and a general knowledge of installation and functioning of propeller instruments, radio, and their related components.

Applicants for propeller, instrument, or radio ratings must have knowledge of the components related to the rating sought, which should include understanding of units or accessories supplying electrical pneumatic, or hydraulic power necessary to the functioning of such propellers, instruments, or radio.

24.12 Experience.

(a) Airframe rating. Applicant for an airframe rating shall have had at least one year of practical experience, as a mechanic in the aircraft industry, with the procedures, practices, materials, tools, machine tools, and instruments generally used in the inspection, maintenance, repair, overhaul, and alteration of airframes and their related components.

The practical experience required by this section shall consist of at least one year of service engaged as a mechanic in the aircraft industry.

(b) Power-plant rating. Applicant for a power-plant rating shall have had at least one year of practical experience, as a mechanic in the aircraft industry, with the procedures, practices, materials, tools, machine tools, and instruments generally used in the inspection, maintenance, repair, overhaul, and alteration of power plants and their related components. An individual having one year or more of experience in the repair and overhaul of internal combustion engines, other than aircraft engines, will be considered to have met one-half of the aeronautical experience required for a power-plant rating.

The practical experience required by this section shall consist of at least one year of service engaged as a mechanic in the aircraft industry.

(c) Concurrent experience. If the experience required by (a) and (b) above is acquired concurrently, such concurrent experience must be obtained within a period of not less than 24 months.

(d) Aircraft inspector rating. To be eligible for an aircraft inspector rating, applicant shall have had at least 5 years of experience in the maintenance and repair of airframes and power plants and experience in the installation and operation of propellers, instruments, and radio, and their related components. He shall have held a mechanic certificate with aircraft and engine, or airframe and power-plant ratings, for at least 3 years prior to application, during which period he shall have been actively engaged as a mechanic in the aircraft industry.

Requirements for an airframe or power-plant rating require one year of practical experience for each such rating which, added to the 3 years during which the applicant shall have held these ratings, totals the required 5 years of practical experience. The general experience in the installation and operation of propellers, instruments, and radio need not include experience in major overhaul of these intricate devices, but shall include experience in installation and testing methods employed.

(c) Other mechanic ratings. Applicant shall have had at least one year of practical experience appropriate to the rating sought, as a mechanic in the aircraft industry, with the procedures, practices, materials, tools, machine tools, and instruments generally used in the inspection, maintenance, repair, and overhaul of propellers, instruments, or radio and their related components.

(f) Graduates of certificated mechanic schools. A graduate of an approved course in a certificated mechanic school will be deemed to have met the experience requirements for a mechanic certificate and ratings appropriate to the courses successfully completed, if he makes application and presents a certificate of graduation within 60 days after graduation date.

A graduate of an approved mechanic school will be deemed to have met the experience requirements only for those courses completed; however, such person will be required to take a written examination for the rating sought.

24.13 Skill. Applicant shall pass such oral and practical examinations, appropriate to the rating sought, as are prescribed by the Administrator.

The oral and practical examinations shall consist of a verbal explanation and the actual performance of any particular operation within the category for which a rating is desired.

## 24.2 PRIVILEGES

24.20 Airframe rating. A certificated mechanic with airframe rating may perform or supervise any maintenance operation, repair, overhaul, or alteration of an airframe and any minor repair to a propeller. He may release the airframe or any component part thereof for service after minor repair or minor alteration.

It is intended that the maintenance and repair of airframe electrical wiring, hydraulic, ventilating, heating, oxygen fuel, anti-icing and de-icing systems are included in the duties of the airframe mechanic. The maintenance and repair of rotorcraft, balloons, or airships may be performed by the airframe mechanic; however, § 24.30 permit a mechanic to perform such services only on that type of airframe or any of the component parts thereof with which he is familiar.

24.21 Power-plant rating. A certificated mechanic with power-plant rating may perform or supervise any maintenance operation, repair, overhaul, or alteration of a power plant and any minor repair to propellers. He may release the power plant or any component part thereof for

It is intended that the maintenance and repair of power-plant ignition and electrical systems are included in the duties of the power-plant mechanic. The maintenance and repair of jet, turbine, or turbo-jet types of power plants, or other types of aircraft power plants

service after minor repair or minor alter--tion.

may be performed by the power-plant mechanic; however, § 24.30 permits a mechanic to perform such services only on that type of power plant or an of the component parts thereof with which he is familiar.

24.22 Aircraft inspector rating. A certificated mechanic with aircraft inspector rating may perform or supervise any maintenance operation, repair, overhaul, or alteration of airframes or power plants, install or approve the installation, repair, or overhaul of propellers, instruments, or radio, and return such aircraft to service in accordance with pertinent parts of the Civil Air Regulations: Provided, That any repair or alteration which changes the basic design on which the original airworthiness certificate was granted shall be subject to such engineering tests and inspections as may be required by the Civil Air Regulations. He may make the annual inspection of aircraft required by Part 43 of the Civil Air Regulations, and return the aircraft to service in accordance with procedures established by the Administrator.

The aircraft inspector rating has been established in order to provide competent personnel in the field to expedite inspection and the return to service of aircraft which have been repaired, overhauled, or altered, or aircraft which must undergo an annual airworthiness inspection as required by regulations. Inasmuch as inspecti accomplished by mechanics with aircraf inspector rating may take the place of such inspections made by representativ of the Administrator, all such inspect ions must be accomplished in accordanc with procedures prescribed by the Administrator.

24.23 Other mechanic ratings. A mechanic with a propeller, instrument, or radio rating may perform or supervise a major repair, overhaul, or alteration of propellers, instruments, radio, or appliances thereof, for which he is rated. He may reinstall and return such equipment to service.

## 24.3 LIMITATIONS

24.30 Certificated mechanic. A certificated mechanic may perform duties and assume responsibilities in such capacity only if he is competent by reason of previous experience with the particular operation. All repairs and alterations shall be executed in a workmanlike manner in accordance with the provisions of Part 18 of the Civil Air Regulations. He shall not release an aircraft for service after major repair, overhaul, or alteration unless he holds an aircraft inspector rating.

This rule is designed to prevent a mechanic from attempting to accomplish any work on any aircraft, or component part of an aircraft, with which he is inexperienced.

Top overhauls and complete overhauls o power plants of less than 200 h.p. accomplished in accordance with the provisions of Manual 18 are considered minor repairs, and may be released for service by a certificated power-plant mechanic.

24.31 Propeller, instrument, and radio mechanics. A certificated mechanic with propeller, instrument, or radio ratings shall not alter an aircraft structure or install any equipment in an aircraft which will appreciably affect its weight and balance unless the alteration is authorized by the manufacturer, or approved by a mechanic with an aircraft inspector rating or a representative of the Administrator.

This rule prevents the mechanic with propeller, instrument, or radio rating from making changes in the structure or weight and balance of any aircraft, unless such change is approved by a person who has demonstrated his qualifications in such matters.

## 24.4 GENERAL RULES

24.400 Application. Application for a mechanic certificate shall be made on a form prescribed by the Administrator.

24.401 Examinations. Oral and practical examinations shall be given on airframes, power plants, propellers, and appliances familiar to the applicant by a person authorized by the Administrator. The passing grade in oral, practical, or written examinations shall be at least 70 percent.

A mechanic who is familiar with light planes or engines will not be expected to pass an examination on air carrier equipment, but will be required to demonstrate his ability to perform major repairs within the scope of his experience and the rating applied for.

24.402 Reexaminations. An applicant who fails in oral, practical, or written examination may be reexamined in any part failed after 30 days.

24.403 Duration. A mechanic certificate shall remain in effect until a termination date is fixed by the Board, unless it is suspended or revoked. However, the Administrator or his authorized representative may issue a temporary certificate for a period not to exceed 90 days subject to the terms and conditions specified thereon by the Administrator.

24.404 Reinstatement. Certificates which expired prior to the effective date of this part may be reinstated by the Administrator, if the applicant can furnish evidence that he has served in the capacity designated thereon for at least 6 months preceding application and can pass the oral and practical tests appropriate to the rating sought.

24.405 Existing certificates. A current mechanic certificate will be valid until June 1, 1948, and during this period such certificate must be exchanged for a revised certificate with appropriate ratings as provided for herein.

24.406 Possession. A certificated mechanic shall have his certificate in his possession while working as a mechanic.

24.407 Surrender. Any mechanic shall, upon request, deliver his certificate or rating to the Administrator, if it has been suspended or revoked.

24.408 Change of address. A certificated mechanic shall inform the Administrator of any change of residence within 30 days of such change.

24.409 Reports. The holder of a mechanic certificate shall submit a report annually, during the month of January, in such form as is prescribed by the Administrator, setting forth his aeronautical experience for the preceding 12 months.

24.9 DEFINITIONS

(a) Airframe. An aircraft less power plant, propellers, and appliances.

(b) Power plant. The complete power unit less propeller.

(c) Appliances. Radio, instruments, equipment, parts, or accessories, excepting propellers, which are used in the navigation, operation, or control of aircraft in flight.

NOTE: The definitions of routine maintenance, repairs, minor repairs, major repairs, alterations, minor alterations, and major alterations will be found in Part 18 of the Civil Air Regulations.

A holder of a valid mechanic certificate with aircraft or aircraft engine rating should contact the local office of the Civil Aeronautics Administration prior to June 1, 1948, where these ratings will be exchanged for airframe or power-plant ratings.

# PART 53
# MECHANIC SCHOOL CERTIFICATES

(Note: For clarity, the proposed revision of Part 53 is set forth below in the left column, and the right-hand column is reserved for explanatory remarks as to the objectives and intent of the regulations.)

| | REMARKS |
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| **53.0 CERTIFICATE** | |
| 53.00 Issuance. A mechanic school certificate will be issued by the Administrator to an applicant who is a citizen of the United States and who meets the requirements for one or more of the ratings prescribed herein. | Make application to the nearest office of the Civil Aeronautics Administration presenting the data prescribed in § 53.400. |
| **53.1 RATINGS** | |
| 53.10 Issuance. The certificate shall show one or more of the ratings appropriate to the course or courses of instruction for which the school is approved in accordance with the following categories: | A school is privileged to apply for one rating or any combination of ratings, such as radio and instrument, airframe and power-plant, or all five. |

| Courses | Minimum instruction hours |
|---|---|
| (a) Airframe | 1,360 |
| (b) Power-plant | 1,120 |
| (c) Propeller | 920 |
| (d) Instrument | 1,000 |
| (e) Radio | 1,000 |

| | |
|---|---|
| **53.2 REQUIREMENTS** | |
| 53.20 Facilities, equipment, and material. An applicant shall have the following facilities, equipment, and material: | Manual 53, issued by the Administrator, prescribes the curriculum, facilities, and equipment required for each rating. This manual may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. |

(a) Suitable classroom and shop space adequate to accommodate the largest number of students scheduled for attendance at any one time. Such classroom and shop space shall be adequately heated, lighted, and ventilated.

Adequate ventilation does not necessarily mean air conditioning; however, fresh air must be supplied to classrooms or shops by windows or other means which will meet the requirements of applicable local and state building codes.

(b) Material and equipment of a kind and quantity necessary to give each student sufficient theoretical and practical training in each approved course.

53.21 Mechanic instructors.

(a) Applicant shall provide regularly available instructors possessed of mechanic and ground instructor certificates with ratings appropriate to the subject in which instruction is given.

Regularly available instructors are persons on duty to give instruction at all times during classroom hours or shop practice.

(b) At least one instructor shall be provided for a class of 30 students, or less, simultaneously receiving instruction in the theory of each subject.

(c) At least one instructor shall be provided for a class of 15 students, or less, simultaneously receiving instruction in shop practice.

53.22 Curriculum. Applicant shall have a curriculum of not less than the minimum number of hours of instruction prescribed in § 53.10 for each approved course. The curriculum of each course shall be approved by the Administrator and shall provide for instruction in the applicable provisions of the Civil Air Regulations, theory and practice of construction, maintenance, overhaul, repair, and inspection in all subjects necessary to qualify the graduate to perform the duties of a mechanic with a rating or ratings appropriate to the course or courses taken. The school shall not require attendance for more than 8 hours in any one day, nor more than 6 days in any week.

The curriculum of each course should show the number of hours devoted to classroom instruction and shop projects, and the total shall not be less than the minimum hours shown in § 53.10 for a particular course.

NOTE: The scope of each of the courses will be outlined in Manual 53.

## 53.3 STUDENT INSTRUCTION

53.30 Examinations. Upon completion of each subject included in any approved course, each student shall be given an appropriate examination. Seventy per-cent shall be the minimum passing grade in any examination.

53.31 Records. Certificated mechanic schools shall keep a record of each student enrolled. This record shall include attendance, subjects covered, examinations, and grades, and shall be certified by an appropriate official of the school who is familiar with the accuracy of such record. Student records shall be retained by the school for not less than two years from the date of termination of the student's enrollment, and shall be submitted to the Administrator on request.

Since a student should be examined in each subject, such as shop mathematics, blueprint reading, welding, etc., a record of his examination grades should be maintained.

53.32 Graduation certificate. A certificated mechanic school shall furnish to each student who has successfully completed the prescribed course of study a graduation certificate and a transcript which shall set forth the courses completed and the student's final grades. A student who has not graduated from the entire curriculum but who has successfully completed a portion of the course shall receive a certified transcript from the school indicating credit for the portion of the course completed.

This transcript may be used by an individual desiring to make a transfer from one school to another, or as evidence of a specific amount of training which will be considered as aeronautical experience within the meaning of § 24.12 of Part 24 of the Civil Air Regulations.

53.33 Credit for other similar experience. A student who is engaged in a mechanical occupation of a nature comparable to a portion of the course in which he is enrolled may receive appropriate credit for this experience. Such credit shall in no case exceed one-third of the entire course.

## 53.4 GENERAL

53.400 Application. Application for a mechanic school certificate shall be made on a form prescribed by the Administrator.

The applicant shall furnish two copies of the proposed curricula, together with a list in duplicate of the equipment, facilities, and material available at the school.

NOTE: Manual 53 lists the minimum facilities, equipment, and material for a mechanic school certificate

53.401 Display. A mechanic school certificate shall be on display in the school for which the certificate was issued.

53.402 Nontransferability. A mechanic school certificate is not transferable.

53.403 Duration. A mechanic school certificate shall remain in effect unless it is suspended or revoked, or a general termination date for such certificate is fixed by the Board.

53.404 Surrender. Upon the suspension or revocation of a mechanic school certificate, the holder thereof shall surrender such certificate to an authorized representative of the Administrator.

53.405 Inspection. An authorized representative of the Administrator shall be permitted to inspect the school's facilities, equipment, personnel, and records at any time.

53.406 Notification to the Administrator. The Administrator shall be notified:

(a) of any change in location of an approved mechanic school; or

(b) of the discontinuance of any course of instruction; or

(c) of any substantial change in the facilities and equipment.

53.407 Advertising. Any advertising which indicates that the school is approved by the Administrator shall clearly differentiate between those courses which have been approved and those which have not.

53.408 Curriculum changes. No change shall be made in any approved curriculum unless authorized by the Administrator.

If changes in an approved curriculum are proposed, forward two copies of the desired changes to the Administrator for approval prior to putting them into effect.

53.409 Maintenance of facilities, equipment, and material. The holder of a mechanic school certificate shall maintain facilities, equipment, and material in conformity with the standards required for the original issuance of the certificate.

53.410 Standard of instruction. The quality of instruction shall be such that at least 80 percent of the students who apply within 60 days after graduation will be able to qualify for mechanic ratings appropriate to the curriculum from which they were graduated.

QUESTIONNAIRE

Please check the following items and mail to the Safety Bureau, Civil Aeronautics Board, Washington, 25, D. C., before March 20 , 1947. Fill out this questionnaire or forward your comments by letter.

Name (individual or organization)_____

Address_____ City_____ State_____

Do you hold a mechanic certificate?_____ Type_____

Do you hold any other CAA certificate?_____ Type_____

I. § 24.0 Certificate: I approve_____ I disapprove_____
Additional comments:

II. § 24.1 Mechanic ratings: I approve_____ I disapprove_____
Additional comments:

III. § 24.2 Privileges: I approve_____ I disapprove_____
Additional comments:

IV. § 24.3 Limitations: I approve_____ I disapprove_____
Additional comments:

V. § 24.4 General Rules: I approve_____ I disapprove_____
Additional comments:

NOTE: If you disapprove of any of these sections, kindly indicate reason for your disapproval. If more space is needed for your comments, please add other pages.

QUESTIONNAIRE

Please check the following items and mail to the Safety Bureau, Civil Aeronautics Board, Washington 25, D. C., before March 20, 1947. Fill out this questionnaire or forward your comments by letter.

Name (individual or organization) _____

Address _____ City _____ State _____

Are you now, or have you ever been, a student in a mechanic school? _____

Do you hold any CAA certificate? _____ Type _____

I. § 53.1 Ratings: I approve _____ I disapprove _____
Additional comments:

II. § 53.2 Requirements: I approve _____ I disapprove _____
Additional comments:

III. § 53.22, Curriculum: I approve _____ I disapprove _____
Additional comments:

IV. § 53.3, Student instruction: I approve _____ I disapprove _____
Additional comments:

V. § 53.4, General: I approve _____ I disapprove _____
Additional comments:

NOTE: If you disapprove of any of these sections, kindly indicate reason for your disapproval. If more space is needed for your comments, please add other pages.