OPTIMIZATION OF AVIATION MAINTENANCE PERSONNEL TRAINING AND CERTIFICATION

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TABLE OF CONTENTS

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1.1 EXECUTIVE SUMMARY

Since late 1989 there has been industry activity focused on revision and updating of the Federal Aviation Regulations (FAR) for maintenance personnel training and certification. These FARs are 14 CFR, PART 65, SUBPART D: CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS and PART 147: AVIATION MAINTENANCE TECHNICIAN SCHOOLS. The aviation maintenance industry generally agrees that these rules are dated and well overdue for update and revision. Though several thousand hours of work through the Aviation Rule Making Advisory Committee (ARAC), a coalition of representatives from industry, labor unions, and the FAA, has been expended to revise the rules, positive results have not been achieved. The Notice of Proposed Rule Making (NPRM) for PART 65(66), the ARAC proposal to update the rule, was issued in late 1998. Due to the high volume of negative comments and complexity of the proposed rule, the FAA withdrew this NPRM for PART 66. The development of a new NPRM awaits further development by the FAA.

In an effort to help move the needed rule revisions forward, the FAA's Flight Standards Division initiated this study. The task of this Optimization study was to once again go out into the aviation maintenance and education community, seek objective input, including a review of new regulations related to JAR (Joint Aviation Regulations) and CAR (Canadian Aviation Regulations), address the negative comments from the 1998 NPRM, and recommend appropriate changes to both PARTs 65(66) and 147 that may be effectively administered under the existing FAA organizational structure

After an initial planning and NPRM comment review meeting in Washington, DC, a total of twelve meetings were held across the country, where industry professionals were given the opportunity to review the work in progress and provide input. Seven of these meetings were three-day regional focus group meetings, which were optimization process working sessions, where recommendations were agreed upon and opportunity to gather candid input was provided. The regional meetings attracted over one hundred and fifty participants from aviation maintenance organizations, airlines, aviation maintenance technician schools, US military aviation, FAA Aviation Safety Inspectors (Airworthiness), and FAA administrative staff. In addition to the regional meetings, four formal presentations describing the project and possible recommendations were presented at industry meetings/seminars attended by over one thousand stakeholders. The optimization plan, the results of the meetings and the developing recommendations for change, were on the aggregate, met with positive responses from the participating stakeholders.

The proposal for an optimized PARTS 65(66)-147 and all of the recommendations that are contained in this report are based upon the progressive (meeting to meeting) input and near unanimous agreement of

all who participated and provided input. The FAA members of the group provided input that assures the recommended changes can achieve the greatest degree of administrative oversight, when balanced with the required safety upgrades.

One of the most controversial subjects and one that drew the most negative comments of the withdrawn PART 66 NPRM, was the section that specified "recurrent training" for technicians. This issue was addressed and thoroughly discussed during the course of this project. It was a firm conviction of many participants that some form of recurrent training should be incorporated as a PART 66 requirement. The Professional Aviation Maintenance Association (PAMA), other industry groups, including the aviation maintenance technician labor unions, are in strong support of recurrent training for AMTs, but believe that the training issue may also be achieved by incorporating requirements for recurrent training into an operating rule; e.g. PARTS 121 and 135. This project's recommendations place the definitions, requirements and administration of this element outside the PART 66 rule, and suggest the optimal method of achieving recurrent training for the majority of AMTs is to implement the requirement within the relevant operating rules (PARTS 119, 121, 135, 145, 91.409) on a rule-by-rule basis. Only the basic requirement for recent maintenance experience need be prescribed in PART 66, the specific training and frequency requirements may be specified in the applicable operating rules. It was recommended that PART 91 continue without change. The provisions of PART 91 contain a "must be qualified" requirement. Most critical work within PART 91 operations requires inspection and return to service by holders of Inspection Authorizations (IA) and IA's have to meet recurrent training and/or currency requirements within the current PART 65. This concept of applying recurrent training requirements addresses the issue, meets the intent of recurrent training supporters in the U.S. and is congruent with similar requirements found in a majority of FAA and international certification regulations.

This current study represents the most objective and candid industry review of maintenance staff rule changes that the FAA could adopt for training and certification of aviation maintenance personnel conducted to date. The key objective of enhancing professionalism of the AMT community, "raising the bar," has been met without increasing the complexity or significantly adding to the administrative elements of PART 65(66) or 147. The PART 66 revision proposals provide new elements and changes that meet the needs of current and future aviation maintenance operations. Given the extensive input received from the AMT School community, including significant elements from previous FAA research, the PART 147 updates and changes will meet the objectives of current and future technology needs without an increase in qualification costs, or the need to change the existing minimum training hour requirements. The issue of training AMTs to maintain high technology "complex aircraft" has been addressed with proposals for new high technology training requirements and the reduction or elimination of training curricula that focused on obsolete or redundant technologies. It is the belief of the majority of those participating in this study, that this is the most current and objective information for the FAA to use as a basis for future rulemaking.

1.2 INTRODUCTION

The objective of the FAR PARTS 65(66)/147 Rule Optimization Project is to review existing regulatory requirements governing the certification of aviation maintenance personnel and to make recommendations to the FAA for program improvement. Fundamental to this initiative was a need to dialogue with all sectors of the aviation industry engaged in aircraft maintenance and training. In that regard, the team held twelve meetings across the country (coast to coast, border to border). Approximately one thousand aviation industry people have viewed presentations on the objectives and possible outcomes of this project. Over one hundred and fifty stakeholders, representing a broad cross-section of the aviation maintenance industry, provided significant input and documented feedback.

Meeting participants included representatives from general aviation, air transport, major repair stations, military aircraft maintenance, ATEC member AMTS faculty and administrators, FAA Aviation Safety Inspectors from local FSDOs, FAA staff from AFS 600 and 700 in Oklahoma City and AFS 300 in Washington, DC.

In making recommendations for specific rule changes, the participants reviewed and considered information and statistical data from previous FAA studies relevant to AMT duties, responsibilities and job tasks. In addition to recommendations for rule changes, the groups also generated several recommendations for improvements in the administration and operation of the rules. The 1993 FAA Blue Ribbon Panel Report, on the shortage of Pilots and Aviation Maintenance Technicians, was used as a starting point for guiding discussions. In addition, the Northwestern University *Job Task Analysis of the Aviation Maintenance Technician* and the Kroes/White report *Aviation Maintenance Technician Training: Training Requirements for the 21st Century*, which proposed revisions to PART 147 based upon the FAA NPRM PART 66 AMT-T (Aviation Maintenance Technician – Transport) provisions, were used for both guidance and reference. In particular, recommendations were guided by factors such as the frequency that tasks are being performed by an AMT in today's environment, the criticality of those tasks to aviation safety, and the difficulty scale of learning those tasks. This report's optimization focuses on two regulatory areas: (1) FAR PART 65, which deals with A & P, IA, and Repairmen certification requirements and privileges; and (2) FAR PART 147 which defines FAA standards for the maintenance technician primary training programs. This document provides proposed changes and amendments submitted to the FAA for FAR PART 65(66) and FAR PART 147, Appendix A, B, C, and D (curricula).

1.3 OPTIMIZATION PROCESS

The project's major objective is to describe how to best optimize the training and certification of Aviation Maintenance personnel including, aircraft maintenance technicians, Inspection Authorization holders, and repair specialists, who must adhere to both present day and future technologies, while keeping pace with industry requirements. Significant elements of past and present training and certification activities were reviewed for applicability to this optimization process. This report provides appropriate background for the FAA to develop realistic, optimum, goal driven, less complex regulations, based upon a variety of inputs from major aviation maintenance industry elements. Recommendations as to requirements, standards, and implementation of suggested rule changes are also included.

Transport Canada (TC) recently revised the personnel certification requirements for their AMT equivalent counterpart, Aviation Maintenance Engineers (AMEs). This task was accomplished in a three and one half year period, involving the Canadian aviation maintenance industry leaders as advisors (through the CARAC – Canadian Aviation Regulation Advisory Committee feedback process). This very successful regulatory change initiative and the new AME rule was evaluated for possible applicability to the FAA's efforts. Canada has also created an aviation maintenance specialty standards system for certification of special skills areas. This is accomplished through a group entitled, Canadian Aviation Maintenance Council (CAMC). The CAMC organization, through a process recognized by TC, authorizes and approves qualification trade standards for various aviation maintenance specialties and certifies persons who meet them. Transport Canada recognizes many of the CAMC certifications as authority for specialists to perform the prescribed maintenance tasks. The way in which this group was established, its operating procedures and processes were reviewed for possible application in the United States aviation maintenance industry.

This project's data collection was centered on a building block process, with comprehensive minutes taken at each meeting, which were summarized and shared with participants at subsequent meetings. This allowed for participants to build on, suggest changes or modifications to previous input, and become informed on what their peers previously provided for the optimization process. While the participants were free to provide all types and levels of input, they were guided to ensure that their input and issues met the basic goals of minimum complexity, practical recommendations that would meet the needs of the entire aviation maintenance industry, and changes that could be administered within the current FAA operational capabilities.

The information gathered at the meetings proposes reasonable and objective revisions to AMT certification and training rules. There was little disagreement with the team's approach and the methods used to gather input. With few exceptions, there was general consensus from the participants that optimization of PARTS 65(66) and 147, as discussed in the meetings, is very necessary, while at the same time both practical and doable.

1.4 INDUSTRY PARTICIPATION

Meetings were held at the FAA and various AMT Schools across the United States. Representatives from all facets of aircraft maintenance organizations, from general aviation through large air carriers, along with AMT school officials from Alaska to New York, Minnesota to Florida, and FAA Aviation Safety Inspectors. Meetings held to gather input and data were facilitated at the following locations:

- FAA Headquarters, Washington, DC
- FAA Operations Center, Oklahoma City, OK
- San Jose State University, San Jose, CA
- Tulsa Technology Center (Tulsa VOTEC Schools), Tulsa, OK (2 meetings)
- Embry Riddle Aeronautical University, Daytona Beach, FL
- Minneapolis Community & Technical College, Minneapolis, MN

In addition, presentations and discussions concerning the FAR PART 65/147 Optimization process and status were provided at the following meetings/symposia:

- Air Transport Association of America – Maintenance Training Sub-Committee, Montreal-2000 and Miami-2001
- World Aviation Training Seminars (Halldale Publications), Frankfurt-2000 and Atlanta-2001
- Aviation Technician Education Council (ATEC) Board of Directors 2001 annual meeting, Phoenix, AZ
- Those attending meeings and presentations displayed a high level of interest, providing active and objective levels of participation. While a limited few were not in full agreement with what was being done, the overall acceptance of the meeting process and the way in which they were conducted was excellent.

2.0 FAR PART 65(66) OPTIMIZATION

The recommended changes and revisions to FAR PART 65 contained in this report, while not as dramatic and potentially controversial as those included in the withdrawn NPRM for PART 66, meet the basic intent of the original PART 66. This would be accomplished by raising the professional level of the maintainer's certification across the board, without introducing an additional AMT-T (Transport) rating.

Every attempt was made to limit complexity and ensure that the recommended changes may be administered within the current FAA capability and capacity. This chapter includes a listing of changes recommended, a side-by-side comparison of the current rule and the proposed rule, and a section-by-section analysis of the changes being suggested.

PART 65 recommended changes include:

- Part 65 – CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS, SUBPART D-MECHANICS re-titled and the maintenance personnel certification regulation becomes a stand alone regulation as: PART 66 - CERTIFICATION: AVIATION MAINTENANCE PERSONNEL
- The term "mechanic" replaced with Aviation Maintenance Technician
- `Removal of gender specific references
- Addition of an Aviation Maintenance Instructor Rating
- Additonal foreign AMTs language requirements
- Electronic means for change of name and replacement of lost or destroyed certificates
- Periodic registration of AMTs
- Title "written test" changed to knowledge test
- Electronic notification options for change of address
- Increased English competency standard requiring candidates to demonstrate the ability to read, write, speak and understand the English language
- Added requirement for mandatory FAA approved training as an additional requirement to qualify as an AMT under the "work experience" only qualification standard in the current rule
- Additional means of AMT qualification through an FAA regulated, employer sponsored, classroom and structured On-Job-Training programs that are acceptable to the administrator
- Additional means of AMT qualification through successful completion of the joint FAA/US Military (DoD Certification Program)
- Added recent maintenance training requirements is "recurrent training." This will become part of PART 66 but specified in the various operating rules (PARTS 119, 121, 135, 145, 91.409). Except for those holding IA's, maintainers operating under PART 91 (other than .409) will continue without change.
- Inspection Authorization (IA) renewal requirement extended from each year, to every second year
- Inspection Authorization (IA) duration, persons not in compliance with renewal provisions may renew by completing an IA refresher course acceptable to the administrator of not less than 8 hours within the 12 months preceding the request for renewal
- Inspection Authorization – Added, All holders of IAs, regardless of activity level or type of activity, must attend and successfully complete an IA refresher course at least every four years
- Addition of the Aviation Repair Specialist (ARS) I, II, and III certificates to replace current Repairman certificates
- Added ARS I certification based on holder meeting national or international standards for qualification and recurrency, for further information see Appendix I: Excerpt from: Federal Aviation Administration. (March 1996) *Training and Certification in the Aircraft Maintenance Industry – Specialist Resources for the 21st Century*

2.1 FAR PART 65/66 Side-by-Side Comparison.

Continued on Following Page

FAR PART 65 Comparison

Current Rule

PART 65--CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS

Special Federal Aviation Regulations

SFAR No. 58 [Note]
SFAR No. 63

Subpart A—General

Sec.
65.1 Applicability.
65.3 Certification of foreign airmen other than flight crewmembers.
65.11 Application and issue.
65.12 Offenses involving alcohol or drugs.
65.13 Temporary certificate.
65.15 Duration of certificates.
65.16 Change of name: Replacement of lost or destroyed certificate.

Proposed Rule

PART 66--CERTIFICATION: Aviation Maintenance Personnel

Special Federal Aviation Regulations

SFAR No. 58 [Note]
SFAR No. 63

Subpart A—General

Sec.
66.1 Applicability***. Add Aviation Repair Specialist***
66.3 Certification of foreign ***AMT***
66.11 Application and issue.
66.12 Offences involving alcohol or drugs.
66.13 Temporary certificate.
66.15 Duration of certificates.
66.16 Change of name: Replacement of lost or destroyed certificate *via electronic means.* ***Add- On-line and Telefax requests, pay with credit card***
66.17 Periodic registration

(a) Except as provided in paragraph (b) of this section, the holder of an aviation maintenance technician certificate shall, before the last day of the 12th calendar month after [date 12 months after the effective date of the final rule], and before the last day of each 60-claendar-month period thereafter, notify, in a form and manner prescribed by the Administrator, the Department of Transportation, Federal Aviation Administration, Airman Certification Branch, Post Office Box 25082, Oklahoma City, Oklahoma 73125 their current mailing address.

(b) The holder of an aviation maintenance technician certificate need not comply with the notification provisions of paragraph(a) of this section if the holder has, within the same 12-or 60- calendar-month period for which notification was required in paragraph (a) of this section –

(1) Been issued a certificate, rating, or inspection authorization or IA renewal under the provisions of this part;

FAR PART 65 Comparison

Current Rule

Proposed Rule

(2) Been issued an airman medical certificate under the provisions of part 67 of this chapter, or;

(3) Notified the Administrator, the Department of Transportation, Federal Aviation Administration, Airman Certification Branch, Post Office Box 25082, Oklahoma City, Oklahoma 73125, under the provisions of 66.13 or 66.15

(c) The holder of an aviation maintenance technician certificate, issued under this part, who has not complied with the requirements of this section may not exercise the privileges of the certificate until the notification required by this section has been made.

65.17 Tests: General procedure.
65.18 Written tests: Cheating or other unauthorized conduct.
65.19 Retesting after failure.
65.20 Applications, certificates, logbooks reports, and records: Falsification reproduction, or alteration.
65.21 Change of address.
65.23 Refusal to submit to a drug or alcohol test.

66.18 Tests: General procedure.
66.19 ***Knowledge*** tests: Cheating or other unauthorized conduct *on tests or evaluations related to FAA Certificate qualification*
66.20 Retesting after failure.
66.21 Applications, certificates, logbooks reports, and records: Falsification reproduction, or alteration.
66.23 Change of address***. Add electronic option.***
66.24 Refusal to submit to a drug or alcohol test.

Subpart D—Mechanics

Subpart D—***Aviation Maintenance Technicians***

Sec. 65.71 Eligibility requirements: General.

Sec. 66.71 Eligibility requirements: General.

(a) To be eligible for a mechanic certificate and associated ratings, a person must—

(a) To be eligible for an AMT certificate and associated ratings, a person must—

(1) Be at least 18 years of age;

(1) Be at least 18 years of age;

(2) Be able to read, write, speak, and understand the English language, or in the case of an applicant who does not meet this requirement and who is employed outside of the United States by a U.S. air carrier, have his certificate endorsed "Valid only outside the United States";

(2) ***Demonstrate the ability*** to read, write, speak, and understand the English language, ***by reading and explaining appropriate maintenance publications and by writing defect and repair statements.*** ~~**in the case of an applicant who does not meet this requirement and who is employed outside of the United States by a U.S. air carrier, have**~~ her/~~**his certificate endorsed "Valid only outside the United States"**~~**:** **[***A new ARS I (see 66.101) as a possible alternative.]*

(3) Have passed all of the prescribed tests within a period of 24 months;

(3) Have passed all of the prescribed tests within a period of 24 months;

FAR PART 65 Comparison

Current Rule

and
(4) Comply with the sections of this subpart that apply to the rating he seeks.
(b) A certificated mechanic who applies for an additional rating must meet the requirements of Sec. 65.77 and, within a period of 24 months, pass the tests prescribed by Secs. 65.75 and 65.79 for the additional rating sought.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-6, 31 FR 5950, Apr. 19, 1966]

Sec. 65.73 Ratings.

(a) The following ratings are issued under this subpart:
(1) Airframe.
(2) Powerplant.

(b) A mechanic certificate with an aircraft or aircraft engine rating, or both, that was issued before, and was valid on, June 15, 1952, is equal to a mechanic certificate with an airframe or powerplant rating, or both, as the case may be, and may be exchanged for such a corresponding certificate and rating or ratings.

Sec. 65.75 Knowledge requirements.

(a) Each applicant for a mechanic certificate or rating must, after meeting the applicable experience requirements of Sec. 65.77, pass a written test covering the construction and maintenance of aircraft appropriate to the rating he seeks, the regulations in this subpart, and the applicable provisions of Parts 43 and 91 of this chapter. The basic principles covering the installation and maintenance of propellers are included in the powerplant test.
(b) The applicant must pass each section of the test before applying for the oral and practical tests prescribed by Sec. 65.79. A report of the written test is sent to the applicant.

Proposed Rule

and
(4) Comply with the sections of this subpart that apply to the rating sought.
(b) A certificated ***AMT*** who applies for an additional rating must meet the requirements of Sec. 66.77 and, within a period of 24 months, pass the tests prescribed by Secs. 66.75 and 66.79 for the additional rating sought.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-6, 31 FR 5950, Apr. 19, 1966]

Sec. 66.73 Ratings.

(a) The following ratings are issued under this subpart:
(1) Airframe.
(2) Powerplant.
(3) ***Aviation Maintenance Instructor***
(b) AN AMT certificate with an aircraft or aircraft engine rating, or both, that was issued before, and was valid on, June 15, 1952, is equal to an ***AMT*** certificate with an airframe or powerplant rating, or both, as the case may be, and may be exchanged for such a corresponding certificate and rating(s).

Sec. 66.75 Knowledge requirements.

(a) Each applicant for an AMT certificate or rating must, after meeting the applicable experience requirements of Sec. 66.77, pass a ***knowledge*** test covering the construction and maintenance of aircraft appropriate to the rating ***being sought***, the regulations in this subpart, and the applicable provisions of Parts 43 and 91 of this chapter. The basic principles covering the installation and maintenance of propellers are included in the powerplant test.
(b) The applicant must pass each section of the test before applying for the oral and practical tests prescribed by Sec. 66.79. A report of the ***knowledge*** test is sent to the applicant.

FAR PART 65 Comparison

Current Rule

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-1, 27 FR 10410, Oct. 25, 1962; Amdt. 65-6, 31 FR 5950, Apr. 19, 1966]

Sec. 65.77 Experience requirements.

Each applicant for a mechanic certificate or rating must present either an appropriate graduation certificate or certificate of completion from a certificated aviation maintenance technician school or documentary evidence, satisfactory to the Administrator, of—

(a) At least 18 months of practical experience with the procedures, practices, materials, tools, machine tools, and equipment generally used in constructing, maintaining, or altering airframes, or powerplants appropriate to the rating sought; or

(b) At least 30 months of practical experience concurrently performing the duties appropriate to both the airframe and powerplant ratings.

[Doc. No. 1179, 27 FR, 7973, Aug. 10, 1962, as amended by Amdt. 65-14, 35 FR, 5533, Apr. 3, 1970]

Sec. 65.79 Skill requirements.

Each applicant for a mechanic certificate or rating must pass an oral and a practical test on the rating he seeks. The tests cover the applicant's basic skill in performing practical projects on the subjects covered by the written test for that rating. An applicant for a powerplant rating must show his ability to make satisfactory minor repairs to, and minor alterations of, propellers.

Proposed Rule

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-1, 27 FR 10410, Oct. 25, 1962; Amdt. 65-6, 31 FR 5950, Apr. 19, 1966]

Sec. 66.77 Experience requirements.

Each applicant for an AMT certificate or rating must present either an appropriate graduation certificate or certificate of completion from a certificated aviation maintenance technician school or documentary evidence, satisfactory to the Administrator, of—

(a) At least 18 months of practical experience with the procedures, practices, materials, tools, machine tools, and equipment generally used in constructing, maintaining, or altering airframes, or powerplants***, and successful completion of an AMT orientation training program acceptable to the administrator*** appropriate to the rating sought; or

(b) A minimum of 30 months practical experience concurrently performing the duties appropriate to both the airframe and powerplant ratings; ***and successfully complete an AMT orientation training program acceptable to the administrator***. (**See outline defined in 07.19-21.00 meeting notes)

(c) Successfully complete a twenty-four month employer-sponsored structured classroom and On-Job-Training program that is acceptable to the administrator.

(d) Successfully complete the joint FAA/ US Military A&P Certification Program appropriate to the rating(s) sought.

[Doc. No. 1179, 27 FR, 7973, Aug. 10, 1962, as amended by Amdt. 65-14, 35 FR, 5533, Apr. 3, 1970]

Sec. 65.79 Skill requirements.

Each applicant for an AMT certificate or rating must pass an oral and a practical test on the rating ***being sought***. The tests cover the applicant's basic skill in performing practical projects on the subjects covered by the ***knowledge*** test for that rating. An applicant for a powerplant rating must show ability to make satisfactory minor repairs to, and minor alterations of, propellers.

FAR PART 65 Comparison

Current Rule

Sec. 65.80 Certificated aviation maintenance technician school students.

Whenever an aviation maintenance technician school certificated under Part 147 of this chapter shows to an FAA inspector that any of its students has made satisfactory progress at the school and is prepared to take the oral and practical tests prescribed by Sec. 65.79, that student may take those tests during the final subjects of his training in the approved curriculum, before he meets the applicable experience requirements of Sec. 65.77 and before he passes each section of the written test prescribed by Sec. 65.75.

[Amdt. 65-14, 35 FR, 5533, Apr. 3, 1970]

Sec. 65.81 General privileges and limitations.

(a) A certificated mechanic may perform or supervise the maintenance, preventive maintenance or alteration of an aircraft or appliance, or a part thereof, for which he is rated (but excluding major repairs to, and major alterations of, propellers, and any repair to, or alteration of, instruments), and may perform additional duties in accordance with Secs. 65.85, 65.87, and 65.95. However, he may not supervise the maintenance, preventive maintenance, or alteration of, or approve and return to service, any aircraft or appliance, or part thereof, for which he is rated unless he has satisfactorily performed the work concerned at an earlier date. If he has not so performed that work at an earlier date, he may show his ability to do

Proposed Rule

Sec. 66.80 Certificated aviation maintenance technician school students.

(a). Where an aviation maintenance technician school (**AMTS**) certificated under Part 147 of this chapter demonstrates to an FAA safety inspector that a student has made satisfactory progress at the school and is prepared to take the oral and practical tests prescribed by Sec. 66.79, that student may take those tests during the final subjects of ***the student's*** training in the approved curriculum, before meeting the applicable experience requirements of Sec. 66.77, and before passing each section of the ***knowledge*** test prescribed by Sec. 66.75.

(b) An AMTS may make application at the local FAA FSDO office for authorization to conduct its own Oral & Practical (O&P) testing during the normal course of classroom and/or shop instruction. The AMTS shall provide the FAA with a description of a method satisfactory to the Administrator that is to be used to assure compliance with the requirements for the conduct of oral and practical tests. The AMTS must have held its operating certificate and ratings for at least 24 months before making this application. The Oral & Practical tests given by the AMTS must be approved by the Administrator and must be at least equal in scope and depth to the O&P tests prescribed under this part.

[Amdt. 65-14, 35 FR, 5533, Apr. 3, 1970]

Sec. 66.81 General privileges and limitations.

(a) A certificated ***AMT*** may perform or supervise the maintenance, preventive maintenance or alteration of an aircraft or appliance, or a part there of, for which ***a person*** is rated (but excluding major repairs to, and major alterations of, propellers, and any repair to, or alteration of, instruments), **except for minor repairs to a liquid filled horizontal card compass**, and may perform additional duties in accordance with Secs. 66.85, 66.87, and 66.95. However, ***a person*** may not supervise the maintenance, preventive maintenance, or alteration of, or approve and return to service, any aircraft or appliance, or part thereof, for which rated unless ***this person*** has satisfactorily performed that work at an earlier date. If ***a person*** has

FAR PART 65 Comparison

Current Rule

it by performing it to the satisfaction of the Administrator or under the direct supervision of a certificated and appropriately rated mechanic, or a certificated repairman, who has had previous experience in the specific operation concerned.

(b) A certificated mechanic may not exercise the privileges of his certificate and rating unless he understands the current instructions of the manufacturer, and the maintenance manuals, for the specific operation concerned.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-2, 29 FR 5451, Apr. 23, 1964; Amdt. 65-26, 45 FR 46737, July 10, 1980]

Sec. 65.83 Recent experience requirements.

A certificated mechanic may not exercise the privileges of his certificate and rating unless, within the preceding 24 months—

(a) The Administrator has found that he is able to do that work; or

(b) He has, for at least 6 months—

(1) Served as a mechanic under his certificate and rating;

(2) Technically supervised other mechanics;

(3) Supervised, in an executive capacity, the maintenance or alteration of aircraft; or

(4) Been engaged in any combination of paragraph (b) (1), (2), or (3) of this section.

Proposed Rule

not so performed that work at an earlier date, one may show ability to do it by performing it to the satisfaction of the Administrator, or under the direct supervision of a certificated and appropriately rated ***AMT***, or a certificated ARS, who has had previous experience in that specific maintenance function.

(b) A certificated ***AMT*** may not exercise the privileges of ***the*** certificate and rating unless current instructions of the manufacturer, and the maintenance instructions or manuals, for that specific maintenance function, are understood.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-2, 29 FR 5451, Apr. 23, 1964; Amdt. 65-26, 45 FR 46737, July 10, 1980]

Sec. 66.83 Recent maintenance experience requirements.

A certificated ***AMT*** may not exercise the privileges of ***the*** certificate or rating, unless within the preceding twenty-four months—

(a) The Administrator has found that ***a person*** is able to perform that work; or

(b) ***A person*** has, for at least six months—

(1) Served as an AMT under ***the*** certificate and rating;

(2) Technically supervised an other ***AMT***;

(3) Supervised, in an executive capacity, the maintenance or alteration of aircraft; or

(4) Been engaged in any combination of paragraph (b) (1), (2), or (3) of this section. ***and***

(c) ***Within the preceding*** **twenty-four** ***months have, except those Performing maintenance under PART 91 (other than PART 91.409),***

(d) successfully completed an aviation maintenance technician training course, IA refresher course, or other course(s) of instruction, as specified under training requirements of PARTS 121, 135, and 145 as applicable, and is appropriate to the duties of an AMT and is acceptable to the Administrator. (also see 66 NPRM 66.66 for additional new elements of this section)

Sec. 66.84 Aviation maintenance instructor rating: Additional eligibility

FAR PART 65 Comparison

Current Rule

Proposed Rule

requirements.

(a) An applicant for an aviation maintenance instructor rating: rating must –

(1) Hold a current and valid aviation maintenance technician certificate that has been in effect for at least 12 months;

(2) Have been actively engaged, for at least the 12 month period before the date of application, in maintaining aircraft in accordance with the is chapter, and

(3) Within 24 months of the date of application, pass a knowledge test on the methods of instruction required under 66.85 or, at the time of application -

(i) Hold a current and valid FAA ground instructor or FAA flight instructor certificate

(ii) Present and appropriate graduation certificate, or other documentary evidence acceptable to the Administrator, the demonstrates the award of a degree in education, vocational education, technical education, from an accredited institution, or

(iii) Hold a current and valid teaching certificate, acceptable to the Administrator, that requires the holder to obtain proficiency in the subjects specified in 66.85.

(b) Before [date 12 months after the effective date of the final rule], an applicant who can present evidence to the Administrator, that they have served as an aviation maintenance instructor, or as the supervisor of aviation maintenance instructors at an aviation maintenance school certificated under part 147 of this chapter, need not comply with the requirements of this section.

Sec 66.85 Aviation maintenance instructor rating: practical test instructional knowledge and proficiency

An applicant for an aviation maintenance instructor rating must pass a required practical test in the following subject areas:

(a) The learning process.

(b) Elements of effective teaching.

(c) Student evaluation and testing.

FAR PART 65 Comparison

Current Rule

Proposed Rule

(d) Course development.
(e) Lesson planning.
(f) Classroom teaching techniques.

66.86 ***Aviation maintenance instructor rating: Privileges and limitations***

A certificated aviation maintenance technician with an aviation maintenance instructor rating –

(a) May serve as on aviation maintenance instructor under the provisions of 147.23 and 147.36 of this chapter and;
(b) May only exercise the privileges of that rating when holding a current and valid aviation maintenance technician certificate and rating(s) for the subject areas being taught.

66.87 Aviation maintenance instructor rating: Recent experience requirements

A certificated aviation maintenance technician with an aviation maintenance instructor rating may not exercise the privileges of that rating unless within the preceding 24 months the individual –

(a) Has provided 300 hours of maintenance instruction; or
(b) Has, for the period of 300 hours, supervised other aviation maintenance instructors; or
(c) Has successfully completed an aviation maintenance technician training course acceptable to the Administrator and appropriate to the duties of an aviation maintenance instructor; or
(d) The Administrator has determined that the aviation maintenance technician meets the standards prescribed in this part for the issuance of the aviation maintenance technician certificate wit the aviation maintenance instructor rating.

Sec. 65.85 Airframe rating; additional privileges.

Sec. 66.88 Airframe rating; additional privileges.

FAR PART 65 Comparison

Current Rule

A certificated mechanic with an airframe rating may approve and return to service an airframe, or any related part or appliance, after he has performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, he may perform the 100-hour inspection required by Part 91 of this chapter on an airframe, or any related part or appliance, and approve and return it to service.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-10, 32 FR 5770, Apr. 11, 1967]

Sec. 65.87 Powerplant rating; additional privileges.

A certificated mechanic with a powerplant rating may approve and return to service a powerplant or propeller or any related part or appliance, after he has performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, he may perform the 100-hour inspection required by Part 91 of this chapter on a powerplant or propeller, or any part thereof, and approve and return it to service.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-10, 32 FR 5770, Apr. 11, 1967]

Sec. 65.89 Display of certificate.

Each person who holds a mechanic certificate shall keep it within the immediate area where he normally exercises the privileges of the certificate and shall present it for inspection upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

[Amdt. 65-9, 31 FR 13524, Oct. 20, 1966, as amended by Doc. No. 8084, 32 FR 5769, Apr. 11, 1967]

Sec. 65.91 Inspection authorization.

Proposed Rule

A certificated ***AMT*** with an airframe rating may approve and return to service an airframe, or any related part or appliance, after ***a person*** has performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, ***a person*** may perform the hundred-hour inspection required by Part 91 of this chapter on an airframe, or any related part or appliance, and approve those items for return to service.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-10, 32 FR 5770, Apr. 11, 1967]

Sec. 66.89 Powerplant rating; additional privileges.

A certificated ***AMT*** with a powerplant rating may approve and return to Service, a powerplant or propeller, or any related part or appliance, after having performed, supervised, or inspected its maintenance or alteration (excluding major repairs and major alterations). In addition, ***a person*** may perform the 100-hour inspection required by Part 91 of this chapter on a powerplant or propeller, or any part thereof, and approve it for return to service.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 66-10, 32 FR 5770, Apr. 11, 1967]

Sec. 66.90 Display of certificate.

Each person who holds an AMT certificate shall keep it within the immediate area where ***they*** normally exercise the privileges of the certificate, and shall present it for inspection upon request of the Administrator, an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

[Amdt. 65-9, 31 FR 13524, Oct. 20, 1966, as amended by Doc. No. 8084, 32 FR 5769, Apr. 11, 1967]

Sec. 66.91 Inspection authorization (IA).

FAR PART 65 Comparison

Current Rule

(a) An application for an inspection authorization is made on a form and in a manner prescribed by the Administrator.

(b) An applicant who meets the requirements of this section is entitled to an inspection authorization.

(c)To be eligible for an inspection authorization, an applicant must—

(1) Hold a currently effective mechanic certificate with both an airframe rating and a powerplant rating, each of which is currently effective and has been in effect for a total of at least 3 years;

(2) Have been actively engaged, for at least the 2-year period before the date he applies, in maintaining aircraft certificated and maintained in accordance with this chapter;

(3) Have a fixed base of operations at which he may be located in person or by telephone during a normal working week but it need not be the place where he will exercise his inspection authority;

(4) Have available to him the equipment, facilities, and inspection data necessary to properly inspect airframes, powerplants, propellers, or any related part or appliance; and

(5) Pass a written test on his ability to inspect according to safety standards for returning aircraft to service after major repairs and major alterations and annual and progressive inspections performed under Part 43 of this chapter.

An applicant who fails the test prescribed in paragraph (c)(5) of this section may not apply for retesting until at least 90 days after the date he failed the test.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-5, 31 FR 3337, Mar. 3, 1966; Amdt. 65-22, 42 FR 46279, Sept. 15, 1977; Amdt. 65-30, 50
FR 15700, Apr. 19, 1985]

Sec. 65.92 Inspection authorization: Duration.

(a) Each inspection authorization expires on March 31 of each year.

Proposed Rule

(a) An application for an inspection authorization (IA) is made on a form and in a manner prescribed by the Administrator.

(b) An applicant who meets the requirements of this section is entitled to an IA.

(c) To be eligible for IA, an applicant must—

(1) Hold a currently effective ***AMT*** certificate with both an airframe rating and a powerplant rating, each of which is currently effective, and has been in effect for a total of at least three years;

(2) Have been actively engaged, for at least the two-year period before the date ***of application***, in maintaining aircraft certificated and maintained in accordance with this chapter;

(3) Have a fixed base of operations at which ***they*** may be located in person, or by telephone, during a normal working week, but it need not be the place where the inspection authority will be exercised;

(4) Have available the equipment, facilities, and inspection data necessary to properly inspect airframes, powerplants, propellers, or any related part or appliance; and

(5) Pass a ***knowledge*** test on ***the applicant's*** ability to inspect according to safety standards, for returning aircraft to service after major repairs and major alterations, and annual and progressive inspections performed under Part 43 of this chapter.

An applicant who fails the test prescribed in paragraph (c)(5) of this section may not apply for retesting until at least ninety days after the date ***the test*** was failed.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-5, 31 FR 3337, Mar. 3, 1966; Amdt. 65-22, 42 FR 46279, Sept. 15, 1977; Amdt. 65-30, 50
FR 15700, Apr. 19, 1985]

Sec. 66.92 Inspection authorization (IA): Duration.

(a) Each IA expires on March 31 ***every second year***.

FAR PART 65 Comparison

Current Rule

However, the holder may exercise the privileges of that authorization only while he holds a currently effective mechanic certificate with both a currently effective airframe rating and a currently effective powerplant rating.

(b) An inspection authorization ceases to be effective whenever any of the following occurs:

(1) The authorization is surrendered, suspended, or revoked.

(2) The holder no longer has a fixed base of operation.

(3) The holder no longer has the equipment, facilities, and inspection data required by Sec. 65.91(c) (3) and (4) for issuance of his authorization.

(4)The holder of an inspection authorization that is suspended or revoked shall, upon the Administrator's request, return it to the Administrator.

Doc. No. 12537, Amdt. 65-22, 42 FR 46279, Sept. 15, 1977]

Sec. 65.93 Inspection authorization: Renewal.

(a) To be eligible for renewal of an inspection authorization for a 1-year period an applicant must present evidence annually, during the month of March, at an FAA Flight Standards District Office, or an International Field Office that the applicant still meets the requirements of Sec. 65.91(c) (1) through (4) and must show that, during the current period that the applicant held the inspection authorization, the applicant—

(1) Has performed at least one annual inspection for each 90 days that the applicant held the current authority; or

(2) Has performed inspections of at least two major repairs or major alterations for each 90 days that the applicant held the current authority; or

(3) Has performed or supervised and approved at least one progressive

Proposed Rule

However, the holder may exercise the privileges of that authorization only while holding a currently effective ***AMT*** certificate with both a currently effective airframe rating and a currently effective powerplant rating.

(b) Persons not complying with the renewal provisions of 66.93 may renew IA privileges by successfully attending and completing an IA refresher training course acceptable to the Administrator of not less than 8 hours in the 12 months preceding the request for renewal, or have passed an oral test conducted by an FAA Aviation Safety Inspector (Airworthiness) to determine the applicant's knowledge and current experience.

(c) An IA ceases to be effective whenever any of the following occur:

(1) The authorization is surrendered, suspended, or revoked.

(2) The holder no longer has a fixed base of operation.

(3) The holder no longer has the equipment, facilities, and inspection data required by Sec. 66.91(c) (3) and (4) for issuance of ***the*** authorization.

(4) The holder of an IA that is suspended or revoked shall, upon the Administrator's request, return it to the Administrator.

[Doc. No. 12537, Amdt. 66-22, 42 FR 46279, Sept. 15, 1977]

Sec. 66.93 Inspection authorization: Renewal.

(a) To be eligible for renewal of an IA for a ***two***-year period an applicant must present evidence ***every two years***, during the month of March, at an FAA Flight Standards District Office, or an International Field Office that the applicant still meets the requirements of Sec. 66.91(c) (1) through (4) and must show that, during the current period that the applicant held the inspection authorization, the applicant—

(1) Has performed at least one annual inspection for each ninety days that the applicant held the current authority; or;

(2) Has performed inspections of at least two major repairs or major alterations for each ninety days that the applicant held the current authority; or

(3) Has performed or supervised and approved at least one progressive

FAR PART 65 Comparison

Current Rule

inspection in accordance with standards prescribed by the Administrator; or

(4) Has attended and successfully completed a refresher course, acceptable to the Administrator, of not less than 8 hours of instruction during the 12-month period preceding the application for renewal; or

(5) Has passed on oral test by an FAA inspector to determine that the applicant's knowledge of applicable regulations and standards is current.

(b) The holder of an inspection authorization that has been in effect for less than 90 days before the expiration date need not comply with paragraphs (a) (1) through (5) of this section.

Doc. No. 18241, Amdt. 65-26, 45 FR 46738, July 10, 1980as amended by Amdt.

Sec. 65.95 Inspection authorization: Privileges and limitations.

(a) The holder of an inspection authorization may—

(1) Inspect and approve for return to service any aircraft or related part or appliance (except any aircraft maintained in accordance with a continuous airworthiness program under Part 121 or 127 of this chapter) after a major repair or major alteration to it in accordance with Part 43 [New] of this chapter, if the work was done in accordance with technical data approved by the Administrator; and

(2) Perform an annual, or perform or supervise a progressive inspection according to Secs. 43.13 and 43.15 of this chapter.

Proposed Rule

inspection in accordance with standards prescribed by the Administrator; or

(4) Has attended and successfully completed a refresher course, acceptable to the Administrator, of not less than 8 hours of instruction during the twenty four-month period preceding the application for renewal; or,

(5) Has passed on oral test by an FAA safety inspector to determine that the applicant's knowledge of applicable regulations and standards is current.

(6) All holders of IAs, regardless of activity level or type of activity, must attend and successfully complete an IA refresher course as described in 66.93 (a) (4) every four years.

(b) The holder of an IA that has been in effect for less than ninety days before the expiration date, need not comply with paragraphs (1) through (5) of this section***. (Options such as: a permanent certificate, that becomes inactive, but that can become active when an IA returns to active status, a four year training requirement regardless of numbers of Annual Inspections completed, and regulation clean up… See AFS 600, IA Authorization Coordinator.)***

(c) Persons whose IA privileges have lapsed, may renew those privileges by making application to an FAA Flight Standards District Office (FSDO) or an International Field Office, and, by attending and successfully completing a refresher course as described in 66.93 (a) (4).

[Doc. No. 18241, Amdt. 65-26, 45 FR 46738, July 10, 1980as amended by Amdt.

Sec. 66.95 Inspection authorization (IA): Privileges and limitations.

(a) The holder of an IA may—

(1) Inspect and approve for return to service any aircraft or related part, or appliance (except any aircraft maintained in accordance with a continuous airworthiness program under Part 121 or 127 of this chapter), after a major repair or major alteration has been accomplished to the item in accordance with Part 43 [New] of this chapter, if the work was performed in accordance with technical data approved by the Administrator; and

(2) Perform an annual, or perform or supervise a progressive inspection according to Secs. 43.13 and 43.15 of this chapter.

FAR PART 65 Comparison

Current Rule

(b) When he exercises the privileges of an inspection authorization the holder shall keep it available for inspection by the aircraft owner, the mechanic submitting the aircraft, repair, or alteration for approval (if any), and shall present it upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

(c)If the holder of an inspection authorization changes his fixed base of operation, he may not exercise the privileges of the authorization until he has notified the FAA Flight Standards District Office or International Field Office for the area in which the new base is located, in writing, of the change.

[Doc. No1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-2, 29 FR 5451, Apr. 23, 1964; Amdt. 65-4, 30 FR 3638, Mar. 14, 1965; Amdt. 65-5, 31 FR 3337, Mar. 3, 1966; Amdt. 65-9, 31 FR 13524, Oct. 20, 1966; 32 FR 5769, Apr.
11, 1967; Amdt. 65-35, 54 FR 39292, Sept. 25, 1989]

Subpart E—Repairmen

Sec. 65.101 Eligibility requirements: General.

(a) To be eligible for a repairman certificate a person must—

(1) Be at least 18 years of age;

Proposed Rule

(b) When exercising the privileges of an IA the holder shall keep it available for inspection by the aircraft owner, the ***AMT*** submitting the aircraft, repair, or alteration for approval (if any), and shall present it upon request of the Administrator, or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

(c) If the holder of an IA changes fixed base of operation, ***this person*** may not exercise the privileges of the authorization until the FAA Flight Standards District Office, or International Field Office for the area in which the new base is located has been notified in writing, of the base change.

[Doc. No1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-2, 29 FR 5451, Apr. 23, 1964; Amdt. 65-4, 30 FR 3638, Mar. 14, 1966; Amdt. 65-5, 31 FR 3337, Mar. 3, 1966; Amdt. 65-9, 31 FR 13524, Oct. 20, 1966; 32 FR 5769, Apr.
11, 1967; Amdt. 65-35, 54 FR 39292, Sept. 25, 1989]

Subpart E—***Aviation Repair Specialist***

Sec. 66.101 Aviation Repair Specialist certificates issued on the basis of proficiency in a designated specialty area (ARS – I): Eligibility.

(a) To be eligible for an Aviation Repair Specialist certificate issued on the
basis of proficiency in a designated specialty area (ARS – I), a person must—

(1) Be at least eighteen years of age;

(2) Demonstrate the ability to read, write, speak, and understand the English language by reading and explaining appropriate maintenance publications appropriate to the specialty certification sought. If the applicant is unable to meet any of these requirements, the Administrator may place such limitations on that applicant's certificate as are necessary

FAR PART 65 Comparison

Current Rule	Proposed Rule
	for the safe maintenance, preventative maintenance, or alteration of aircraft or component and; **(3) Present either –** **(4) An appropriate graduation certificate, a certificate of completion, or other documentary evidence acceptable to the Administrator, that demonstrates satisfactory completion of an Aviation Repair Specialist training course for a rating in a specialty area designated by the Administrator; or** **(5) Before [date 12 months after the effective date of the final rule], evidence acceptable to the Administrator, of the ability to perform those tasks appropriate to the rating sought.** **(6) In the case of an applicant who does not meet the English proficiency requirements of 66.101 (a) (2) and whom the administrator has determined is required to maintain U.S. registered aircraft outside the U.S., the ARS – I certificate will have limitations specified on the certificate. The limitations will specify the air carrier at which the applicant is employed and any other limitations deemed necessary by the administrator.** *(Suggested by AFS 300 as an alternative to the English requirements of 66.77)*
	(a) To be eligible for an employment based Aviation Repair Specialist certificate (ARS – II) must – **(1) Be at least eighteen years of age;** **(2) Demonstrate the ability to read, write, speak, and understand the English language by reading and explaining appropriate maintenance publications. If the applicant is unable to meet any of these requirements for any reason, the Administrator may place such limitations on that applicant's certificate as are necessary for the safe maintenance, preventative maintenance, or alteration of aircraft**
(2) Be specially qualified to perform maintenance on aircraft or components thereof, appropriate to the job for which he is employed;	**(3) Be specially qualified to perform maintenance on aircraft, airframes, aircraft engines, propellers, appliances, components, or thereof, that is appropriate to the job in which that person is employed;**
(3) Be employed for a specific job requiring those special qualifications by a certificated repair station, or by a certificated commercial operator or	**(4) Be employed in a specific job that requires those special qualifications, by a certificated repair station, by a certificated commercial**

FAR PART 65 Comparison

Current Rule

certificated air carrier, that is required by its operating certificate or approved operations specifications to provide a continuous airworthiness maintenance program according to its maintenance manuals;

(4) Be recommended for certification by his employer, to the satisfaction of the Administrator, as able to satisfactorily maintain aircraft or components, appropriate to the job for which he is employed;

(5) Have either—

(i) At least 18 months of practical experience in the procedures, practices, inspection methods, materials, tools, machine tools, and equipment generally used in the maintenance duties of the specific job for which the person is to be employed and certificated; or

(ii) Completed formal training that is acceptable to the Administrator and is specifically designed to qualify the applicant for the job on which the applicant is to be employed; and

(6) Be able to read, write, speak, and understand the English language, or, in the case of an applicant who does not meet this requirement and who is employed outside the United States by a certificated repair station, a certificated U.S. commercial operator, or a certificated U.S. air carrier, described in paragraph (c) of this section, have his certificate endorsed "Valid only outside the United States."

(b) This section does not apply to the issuance of repairman certificates (experimental aircraft builder) under Sec. 65.104.

Proposed Rule

operator, or certificated air carrier that is required by its operating certificate, or approved operations specifications, to provide a continuous airworthiness maintenance program according to its certificate holders manual;

(5) Be recommended for certification by *one's* employer, to the satisfaction of the Administrator, as able to satisfactorily maintain aircraft or components, appropriate to the job for which the person is employed;

(6) Have either—

(a) A minimum of eighteen months practical experience in the procedures, practices, inspection methods, materials, tools, machine tools, and equipment generally used in the maintenance duties of the specific job for which the person is to be employed and certificated; or have

(b) Completed formal training that is acceptable to the Administrator and is specifically designed to qualify the applicant for the job in which the applicant is to be employed; and

(7) This section does not apply to the issuance of an ARS III certificate (experimental aircraft builder) under Sec. 66.105.

(a) An applicant for an Aviation Repair Specialist certificate issued to an experimental aircraft builder (ARS - III), must –

(1) Be at least 18 years of age;

(2) Be the primary builder of the aircraft to which the privileges of the certificate are applicable;

(3) Show to the satisfaction of the Administrator that the individual has the requisite skill to determine whether the aircraft is in a condition for safe operations; and

(4) Be a citizen of the United States or an individual citizen of a foreign

FAR PART 65 Comparison

Current Rule

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-11, 32 FR 13506, Sept. 27, 1967; Amdt. 65-24, 44 FR 46781, Aug. 9, 1979; Amdt. 65-27, 47 FR 13316, Mar. 29, 1982]

Sec. 65.103 Repairman certificate: Privileges and limitations.

(a) A certificated repairman may perform supervise the maintenance, preventive maintenance, or alteration of aircraft or aircraft components appropriate to the job for which the repairman was employed and certificated, but only in connection with duties for the certificate holder by whom the repairman was employed and recommended.

(b) A certificated repairman may not perform or supervise duties under the repairman certificate unless the repairman understands the current instructions of the certificate holder by whom the repairman is employed and the manufacturer's instructions for continued airworthiness relating to the specific operations concerned.

Proposed Rule

country who has lawfully been admitted for permanent residence in the United States.

[Doc. No. 1179, 27 FR 7973, Aug. 10, 1962, as amended by Amdt. 65-11, 32 FR 13506, Sept. 27, 1967; Amdt. 65-24, 44 FR 46781, Aug. 9, 1979; Amdt. 65-27, 47 FR 13316, Mar. 29, 1982]

Sec. 66.107 Transition to new certificates

(a) A valid repairman certificate (other that a repairman certificated issued to an experimental aircraft builder) is equal to an **Aviation Repair Specialist** certificate issued on the basis of employment (**ARS – II**).

(b) A valid repairman certificate (experimental aircraft builder) is equal to an **Aviation Repair Specialist** certificate issued to an experimental aircraft builder (**ARS – III**).

Sec. 66.109 Aviation Repair Specialist certificates issued on the basis of proficiency in a designated specialty area (ARS – I): Privileges and limitations.

(a) The holder of an **Aviation Repair Specialist** certificate issued on the basis of proficiency in a designated specialty area (**ARS – I**) may perform or supervise the maintenance, preventative maintenance, or alteration of aircraft, airframes, aircraft engines, propellers, appliances, components, and parts appropriate to the designated specialty area for which the **Aviation Repair Specialist** is certificated while employed for the specific job requiring those specific qualifications by a certified operator under PARTS 121, 135, or 145 of this chapter.

(b) The holder of an **Aviation Repair Specialist** certificate issued on the basis of proficiency in a designated specialty area (**ARS – I**) may not perform or supervise duties under the repair specialist certificate unless the individual understands the current instructions of the certificate holder by whom the repair specialist is employed and the instructions for continued airworthiness that relate to the specific operations concerned.

Sec. 66.111 Aviation Repair Specialist certificates issued on the basis of employment (ARS – II): Privileges and limitations.

(a) The holder of an **Aviation Repair Specialist** certificate issued on the

FAR PART 65 Comparison

Current Rule

Sec. 65.104 Repairman certificate—experimental aircraft builder—Eligibility, privileges and limitations.

(a) To be eligible for a repairman certificate (experimental aircraft builder), an individual must—

(1) Be at least 18 years of age;

(2) Be the primary builder of the aircraft to which the privileges of the certificate are applicable;

(3) Show to the satisfaction of the Administrator that the individual has the requisite skill to determine whether the aircraft is in a condition for safe operations; and

(4) Be a citizen of the United States or an individual citizen of a foreign country who has lawfully been admitted for permanent residence in the United States.

(b) The holder of a repairman certificate (experimental aircraft builder) may perform condition inspections on the aircraft constructed by the holder in accordance with the operating limitations of that aircraft.

(c) Section 65.103 does not apply to the holder of a repairman certificate (experimental aircraft builder) while performing under that certificate.

[Doc. No. 18241, Amdt. 65-26, 45 FR 46738, July 10, 1980]

Proposed Rule

basis of proficiency in a designated specialty area (**ARS – I**) may perform or supervise the maintenance, preventative maintenance, or alteration of aircraft, airframes, aircraft engines, propellers, appliances, components, and parts thereof appropriate to the job in which the **Aviation Repair Specialist** is employed and certificated, but only in connection with the duties for the certificate holder by whom the **Aviation Repair Specialist** was employed and recommended.

(b) The holder of an **Aviation Repair Specialist** certificate issued on the basis of employment (**ARS – II**) may not perform or supervise duties under the repair specialist certificate unless the individual understands the current instructions of the certificate holder by whom the repair specialist is employed and the instructions for continued airworthiness that relate to the specific operations concerned.

Sec. 66.113 Aviation Repair Specialist certificates issued to experimental aircraft builders (ARS – III): Privileges and limitations

(a) The holder of an **Aviation Repair Specialist** certificate issued to an experimental aircraft builder (**ARS – III**) may perform conditional inspections on the aircraft constructed by the holder, in accordance with the operating limitations of that aircraft.

Sec 66.115 Aviation Repair Specialist certificates issued on the basis of proficiency in a designated specialty area (ARS – I): Recent experience requirements.

The holder of an **Aviation Repair Specialist** certificate issued on the basis of proficiency in a designated specialty area (**ARS – I**) may not exercise the privileges of the certificate unless the holder meets the current qualification and proficiency requirements of the issuance of the certificate and rating in the designated specialty area.

[Doc. No. 18241, Amdt. 65-26, 45 FR 46738, July 10, 1980]

FAR PART 65 Comparison

Current Rule

[Amdt. 65-24, 44 FR 46781, Aug. 9, 1979]

Sec. 65.105 Display of certificate.

Each person who holds a repairman certificate shall keep it within the immediate area where he normally exercises the privileges of the certificate and shall present it for inspection upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

[Amdt. 65-9, 31 FR 13524, Oct. 20, 1966, as amended by Doc. No. 8084, 32 FR 5769, Apr. 11, 1967]

Proposed Rule

[Amdt. 65-24, 44 FR 46781, Aug. 9, 1979]

Sec. 66.***116*** Display of certificate.

Each person who holds an ARS certificate shall carry it on their person, or shall keep it within the immediate area where one normally exercises the privileges of the certificate and shall present it for inspection upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

[Amdt. 65-9, 31 FR 13524, Oct. 20, 1966, as amended by Doc. No. 8084, 32 FR 5769, Apr. 11, 1967]

ARS III: NEW – Addition of Owner/Pilot *(EAA Request) will be considered by AFS 300.*

ARS III: NEW Aviation Repair Specialist certificate issued to a "classic", aircraft restorer/pilot *(EAA Request) will be considered by AFS 300.*

ARS III: NEW Aviation Repair Specialist certificate issued to a light, sport-aircraft maintainer, on the basis of completing required training *(FAA currently has this proposed rule issued as an NPRM) will be evaluated by AFS 300.)*

2.2 FAR PART 65/66 Section-by-Section Change Analysis and Rationale Summary

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FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

Preface

The objective of the FAR 65 Rule Optimization Project was to review existing regulatory requirements governing the certification of aviation maintenance personnel and to make recommendations to the FAA for program improvements, including rule changes. Fundamental to this initiative was a need to dialogue with all sectors of the aviation industry engaged in aircraft maintenance. In that regard, the Optimization Project team held extensive meetings across the country, receiving significant feedback and documented input from interested stakeholders representing a broad cross-section of the aviation maintenance industry. In making recommendations, consideration was given to the relevance of knowledge and tasks as they apply to aviation maintenance within civil aviation. In particular, team recommendations were guided by factors such as the frequency that tasks are being performed by an AMT in today's environment, and the criticality of those tasks to aviation safety. In response to industry feedback, rule optimization has primarily focused in two regulatory areas: FAR Part 65, which deals with A & P, IA, and Repairmen Certificate requirements and privileges; and, FAR Part 147 which defines standards for the approval of Aviation Maintenance Technician Schools by the Administrator. This document summarizes proposed changes to CFR 14, PART 65 SUBPART D - CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS, which also re titles and re numbers this rule to become CFR 14, PART 66- CERTIFICATION: AVIATION MAINTENANCE PERSONNEL.

This side-by-side comparison of the FAR Part 65 rule highlights proposed changes, and based on those proposals, this document summarizes the change rationale for each of the sections. Where new material has been introduced, or where subject matter has been removed, supportive rationale or background information is provided for the suggested change.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

1. **Title:** **CFR 14, PART 65 SUBPART D - CERTIFICATION: AIRMEN OTHER THAN FLIGHT CREWMEMBERS**

Chapter re numbered, Chapter title changed

CFR 14, PART 66- CERTIFICATION: AVIATION MAINTENANCE PERSONNEL

Airman personnel certification regulations have been grouped in two categories, flight crewmembers and other than flight crewmembers. The category of "other than flight crew members" includes mechanics, control tower operators, and parachute riggers. From the beginning of the current activities to revise the mechanic portion of the rule, it has been the contention of all parties concerned, including the FAA, that maintenance personnel should have a separate, stand alone rule. In the current environment of complex and constantly evolving aviation technology, it is necessary to have a dedicated rule that focuses solely on the maintenance personnel that serve the aviation industry.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

2. **Designation:** **Mechanic: now identified as Aviation Maintenance Technician (AMT) and those changes are reflected throughout the document.**

The ARAC PART 65 group agreed early on in the process that the term "mechanic," though acceptable to many working in the industry, was possibly preventing the Department of Labor from defining that particular job category as highly skilled, and is not fully descriptive of the work performed. The certificated schools that produce A&P "mechanic" candidates have been classified as Aviation Maintenance Technician Schools (AMTS) for more than 25 years. Thus changing from mechanic to Aviation Maintenance Technician is both consistent and logical. The term Aviation Maintenance Technician, or AMT, also more fully describes the duties and responsibilities of personnel holding the applicable ratings. This change should also help motivate the Department of Labor to validate that Aviation Maintenance Technicians are, without question, highly skilled.

During this optimization process it was agreed by a significant majority of the team participants that, considering all titles suggested by the 1998 PART 65 NPRM commenters, the title Aviation Maintenance Technician (AMT) was considered to be the best option.

3. **General:** **Removal of gender specific references**

The rule had not been changed to keep up with current wording requirements. Degenderization of all Federal documents is a legal requirement implemented as a result Congressional action.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

Subpart A – General

4. **66.1** **Applicability: Added rating of Aviation Maintenance Instructor and the new Aviation Repair Specialist I, II, and III certificates that replace the existing Repairman certificates.**

During the ARAC PART 65 process, which first delineated recommended changes to part 65, the ARAC group's consensus was to require AMTS instructors to hold an aviation maintenance instructor rating to ensure that all instructors in AMTS schools had the necessary minimum qualifications to properly teach AMT students. It was also agreed by consensus that the Repairman rating be replaced with a three levels of Aviation Repair Specialist ratings (ARS). In this certification process, ARS I (in specified skill areas only) would be issued to individual airmen, ARS II remains the same as the existing repairman certification, and ARS III is issued to qualified amateur aircraft builders. In the future, the FAA may consider adding other specialized ARS certifications to this group.

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5. **66.3** **Certification of foreign Aviation Maintenance Technicians: Changes to language requirements in subpart D, 66.71 (a) (2).**

It was agreed that non English-speaking foreign nationals, certifying US registered aircraft outside the US, should meet the same language requirements as US citizens holding the certificate. This will eliminate potential for compromising safety associated with the lack of language proficiency. A special ARS certificate with appropriate limitations may be issued to non-English speaking, but otherwise qualified, maintenance personnel required to perform maintenance for US air carriers outside the US borders.

6. **66.16** **Change of name: Replacement of lost or destroyed certificates**

Add methods that include "electronic means", which includes: On line, via the Internet and Telefax. Also add payment via credit card. These changes are both for convenience of the airman and compliance with the paperwork reduction act. All parties agree that this change is necessary to improve the certification process.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

7. **66.17** **<u>Added:</u> Periodic registration**

This new requirement will create a new section for periodic registration of certificated AMTs. It was a consensus decision of the ARAC PART 65 group, including FAA participants, that periodic registration of AMTs was necessary. Without such registration, there is no way for the FAA to determine the total numbers of active AMT personnel and to distribute critical advisory and essential program information. Since the original decision to include periodic registration as a requirement was made, many efficient electronic methods have since been adopted by the FAA, which significantly reduces any additional industry and FAA costs to collect and manage this information.

8. **66.19** **Title written test, changed to knowledge test**

Consistent with changes made to PART 147 and other FAA testing documents.

9. **66.23** **Change of address**

Add electronic options, corresponds to changes in 66.16. All parties agree that this change is necessary.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

Subpart D – Aviation Maintenance Technicians

10. **66.71 (a) (2)** **Demonstrate the ability able to read, write, speak, and understand the English language, by reading and explaining appropriate maintenance publications and by writing defect and repair statements.**

The additional requirement to demonstrate English-language comprehension was introduced to address related problems voiced by many in the industry. The application of this requirement will confirm that applicants have sufficient English language knowledge and comprehension skills to make the necessary decisions associated with privileges of the certificate within an aviation maintenance environment.

Reference to non-English speaking technicians, working outside the US, has been removed.

The issue of non-English speaking technicians, working for air carriers outside the USA, is addressed in Aviation Repair Specialist I privileges, 66.101.

11. **66.73 (a) (3)** **Ratings: <u>Added</u> - aviation maintenance instructor**

Previously described in 66.1

12. **66.75 (a)** **Knowledge test**

Previously discussed in 66.19; reflects changes previously introduced by the FAA in testing documentation.

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

13. **66.77 (a) & (b)** **Experience requirements: Introduced the concept of mandatory introductory training for all AMT candidates applying for AMT certification based upon "work experience" only.**

This additional training requirement has been added to address those AMT applicants who are applying for certification based upon experience only and who have not completed training under other programs describe in this section. This change ensures that all AMT candidates will have a sound understanding of FAA rules, duties and responsibilities of rating(s) being sought, and a familiarization with standard industry practices applicable to a typical maintenance environment.

14. **66.77 (c)** **Experience requirements: <u>Added</u> - Successfully complete a twenty-four month employer-sponsored classroom and structured On-Job-Training that is acceptable to the administrator.**

The means of qualification has been added to provide maintenance organizations with additional means of training their personnel to qualify for AMT certification. It addresses and would formalize programs that are currently being utilized or planned by air carriers and certificated maintenance providers. Maintenance organizations that have the means to develop and operate such programs would be able to seek FAA approval. This will help address the need for additional AMT resources in specific geographic locations and to help resolve the shortage of qualified aviation maintenance personnel. The 24-month time period, based on a 160 hour work month, was agreed upon to provide incentive for development of formal programs that allow qualification under structured work experience in less than the traditional 30-month requirement.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

15. **66.77 (d)** **Experience requirements: <u>Added</u> - Successfully complete the joint FAA/ US Military A&P Certification Program appropriate to the rating(s) sought.**

This change was addressed to standardize and formally recognize the training and experience requirements in a specific program for military personnel to become qualified for AMT certification. The program was developed by a joint services, DoD, FAA team and gained acceptance by the Administrator in December of 2000. To ensure program stability and to insure compliance with FAA regulations, guidance materials, and other regulatory requirements, the program is guided by the *Joint Service Aviation Maintenance Technician Certification Council* (JSAMTCC). This chartered group meets periodically to monitor compliance with program objectives, address potential problems, and to make necessary changes relative to program improvement.

16. **66.80 (b)** **Certificated aviation maintenance technician school students: <u>Added</u> - An AMTS may make application at the local FAA FSDO office for authorization to conduct its own Oral & Practical (O&P) testing during the normal course of classroom and/or shop instruction…**

This change formalizes into regulations the current practice being employed by certain AMT schools under a Part 147 exemption. The O&P is conducted on a progressive basis during defined periods of assessment approved for the particular program and monitored for compliance by the FAA. This change is consistent with other regulatory program approvals, such as progressive O&P testing of pilots.

Item: Reference:

17. **66.83(c)** **Recent maintenance experience requirements: Added – (c) Within the preceding 24 months, except those performing maintenance under PART 91 (except for maintenance under part 91.409)successfully completed and aviation maintenance technician refresher course, inspection authorization refresher course, or other course(s) of instruction, as specified under training requirements of PARTS 119, 121, 135, 145 and acceptable to the Administrator and appropriate to the duties of an aviation maintenance technician.**

It was the consensus of the ARAC PART 65 group, as well as all participants in the optimization program, that the requirement for recurrent training of certain AMTs be given high priority. Given the importance of this issue to aviation disciplines in the global environment, recurrent training requirements for AMTs are essential and therefore must become mandatory. This has been addressed in a practical and balanced manner that ensures associated costs are appropriately distributed and is accomplished by amending existing operating rules.

18. **66.84 - 87** **Aviation maintenance instructor rating: Added: These new requirements include all information pertinent to the rating and encompasses: additional eligibility requirements; knowledge and practical tests of instructional knowledge and proficiency; privileges and limitations; and, recent experience requirements.**

The ARAC PART 65 working group consensus was to require an aviation maintenance instructor rating to ensure that all instructors in AMTS schools have the necessary minimum qualifications to properly teach AMT students. The new requirements reflect the elements deemed necessary to support the rating qualifications.

Item: Reference:

19. **66.92 (a)** **Inspection authorization (IA) Duration: Renewal requirement extended from each year to every second year.**

Both the ARAC PART 65 and the optimization project participants agreed that an annual IA renewal requirement is too frequent and that a two-year frequency is in line with other aviation industry renewals. The benefits of this change allow the industry and FAA to distribute workload associated with annual renewal over a broader time period.

20. **66.92 (b)** **Inspection authorization (IA) Duration: <u>Added</u> - (b) Persons not complying with the renewal provisions of 66.93 may renew IA privileges by successfully attending and completing an IA refresher training course acceptable to the Administrator of not less than 8 hours in the 12 months preceding the request for renewal, or have passed an oral test conducted by an FAA Airworthiness Inspector to determine the applicant's knowledge and current experience.**

This was a consensus agreement by all participants in the optimization program. This change allows the IA privilege to become inactive without surrender of the certificate. When the holder elects to reactivate the privilege, the entire reapplication process is not required. The change provides the IA with an additional means of qualification renewal necessary to exercise continued IA privileges. This also streamlines program administration for the FAA without compromising program integrity.

Item: Reference:

21. **66.93 (a) (6)** **Inspection authorization (IA) renewal: Added - (6) All holders of IAs, regardless of activity level or type of activity, must attend and successfully complete an IA refresher course as described in 66.93 (a) (4) every four years.**

Data collected by the FAA indicates that there is a higher degree of regulatory non-compliance associated with IAs who continually re-new privileges based solely on IA activity. It was suggested by FAA participants in the optimization study that IAs should attend training on a regular basis to ensure that they have an awareness of current regulatory requirements applicable to the IA privilege. All optimization participants agreed that a four-year interval would meet this objective.

22. **66.93 (c)** **Inspection authorization (IA) renewal: Added – (c) - Persons whose IA privileges have lapsed, may renew those privileges by making application to an FAA Flight Standards District Office (FSDO) or an International Field Office, and, by attending and successfully completing a refresher course as described in 66.93 (a) (4).**

This change was requested by the representatives from AFS 300 and AFS 700 to simplify the renewal of lapsed IA privileges. There was industry consensus to adopt this change.

FAR PART 65/66

SECTION BY SECTION ANALYSIS AND RATIONALE SUMMARY

Item: Reference:

Subpart E – Aviation Repair Specialists

66.101-116 Introduction of the Aviation Repair Specialist (ARS) concept, including new certification categories, is a complete revision of *Subpart E – Repairmen.*

The need for improvement in the certification of aviation maintenance specialty areas was identified early on in the ARAC 65 process. The participants in the optimization program study support this issue as well. In order to recognize special skill sets and have them certificated under standards acceptable to the FAA, the proposal for a new ARS certification system was developed. This new designation and certification process replaces the Repairman certification, adding a new "portable certificate" based on national standards, the ARS I. The ARS I may be issued to the individual who meets the qualification standards for a specific specialty but may only exercise the privileges of the certificate while working under an approved aircraft maintenance provider's certificate (PARTS 119, 121, 135, 145). The designation ARS II replaces the repairman certificate, issued upon recommendations of a specialist's employer through a certificated repair station and is not "portable." The designation ARS III is allocated to replace the repairman certificate for armature aircraft builders. The ARS III may also be expanded in the future to include other special maintenance certifications. The processes by which the ARS program may be implemented and administered is described in a previous (1996) FAA study entitled *Training and Certification in the Aircraft Maintenance Industry – Specialist Resources for the 21st Century*. Applicable excerpts from this document can be found this report's appendix.

2.3 Additional FAR PART 66 Recommendations

There were recommendations and suggested needs that were outside the scope of rulemaking. The study participants wished to ensure that the FAA had sufficient information to implement the optimization process with as much relevant data as possible to support the primary recommendations.

- Some concern was expressed that additional means of AMT qualification through a structured, employer sponsored, classroom and structured On-Job-Training that is acceptable to the administrator would create competition with current AMT Schools. It was generally agreed that this would not be an alternate means but an additional way for those who would most probably not be able to attend an AMT school to become certificated. It also meets the intent of recommendations from the 1993 Blue Ribbon Panel: *Provide opportunities to establish student internships and other work/educational cooperatives* and also, *motivate industry participation in aviation cooperatives and partnerships*.

- Much of the PART 66 change will require solid definition in advisory material. Although one of the areas that generated negative comments in the PART 66 NPRM was that too much of the rule definition was to be contained in advisory material, this should not be a negative factor in this case, considering the significantly reduced administrative complexity of this project's recommendations for rulemaking.

- The FAA Aviation Safety Inspector's (Airworthiness) Handbook (8300-10) will need clearly defined revisions to align with rule changes. This will ensure a smooth transition for the inspectors in the field.

- There should be separate NPRMs issued for PARTS 65(66) and 147. The NPRMs should indicate that the rules are interdependent and tied together, but should be handled separately. This will both focus and restrict comments and discussion to those directly concerned with the specifics of each rule.

- The NPRM Preambles must be clearly written and include information that provides the rationale for all PART 66/147 changes

- Administration of AMT re-registration may be best accomplished, at least for AMTs not working in the PART 91 environment, by linking "recurrent training" and re-registration together. This could allow re-registration to be recorded as part of the training cycle.

- There is a need for the FAA to accelerate electronic reporting in all areas. Including IA renewal, change of address, re-registration, etc.

- The recently revised rule, 14 CFR PART 145 – REPAIR STATIONS; with an effective date of April 6, 2003, has Training Requirements in Section 145.159. Meeting these training requirements is the responsibility of the certificated 145 Repair Stations, but the maintainers must be trained at a minimum level yet to be determined. In order to provide sufficient time to develop and implement a standard(s), the Repair Stations have been given 2 years from the effective date of the rule to meet the 145.159 requirements. It is necessary for the FAA to conduct further studies and evaluations to be assured that the training requirements can meet industry needs and are congruent with the recommendations in this report relative to ARS I and

II. To be in compliance with PART 145, these new training requirments must be in place by April 6, 2005.

3.0 FAR PART 147 OPTIMIZATION

The rule change that resulted in an update to FAR PART 147 was completed during 1992-93. The revisions provided for technological changes, and curriculum adjustments, along with limited increases in flexibility for AMT Schools. It was recognized at the time that more extensive revisions were necessary, but they would depend on the outcome of the FAR PART 65 (66) ARAC revisions and any proposed new AMT Certification Rule arising from the PART 65 ARAC activity. Many of the individuals who participated in developing the PART 147 1992-93 revisions were also participating stakeholders during this PART 65/66 and 147 optimization project; this experience provided linkage and continuity with the work accomplished earlier.

The recommended changes and revisions to FAR PART 147, while not as dramatic or as potentially all encompassing as those included in the PART 66 ARAC submission, meet the basic intent of the original PART 66 training concepts. This is accomplished by raising the professional level of the certification across the board, without introducing an additional AMT-T (Transport) rating. Every attempt was made to limit complexity and ensure that the recommended rule changes in this report may be administered within the current FAA capability and capacity. This chapter includes a listing of changes recommended, a side-by-side comparison of the current rule and the proposed rule and a section-by-section analysis of the changes being suggested. It will become obvious that there is a greater amount of change recommended for PART 147 than for PART 66. This was required to bring PART 147 in line with the current requirements of the maintenance industry and maintain the 1900 minimum training hours that must be offered in the current regulation.

Also in 1993, the FAA sponsored a Blue Ribbon Panel, which identified among other findings, a need to, raise the level of aviation mechanic training standards, in an effort to address a shortfall in qualified resources to meet future civil aviation maintenance industry requirements. Of note in the Blue Ribbon Panel Report, is recommendation number three, which reads in part: Support the FAA-developed Advanced Standards Initiative as a means of training AMTs to a higher level of expertise, beyond the AMT of today. This must be done in order to develop advanced AMTs with the skills necessary to maintain our increasingly sophisticated fleet. Since the publication of the *Blue Ribbon Panel Report*, a number of other FAA-sponsored projects and studies have been completed that provide detailed information related to AMT duties, responsibilities, training requirements, and job task analysis. These studies provide significant information and data that supported this FAR PART 147 optimization project. All of these studies and their data have been referenced by this optimization project's participants, and collectively form a basis for rule optimization. In addition, along with AMT Schools who deliver the AMT training programs, aviation industry stakeholders were also consulted throughout the review process, resulting in meaningful rule change recommendations that reflect current industry maintenance training requirements.

As such, the proposals contained in this report suggest new regulations that focus on training standards that reflect more current maintenance tasks, which are deemed to be of greater relevance and value to the aviation maintenance industry. To that end, the updated curriculum proposal places increased training emphasis on those tasks that are viewed as having a high criticality factor, are difficult to learn, or that are performed at a higher frequency. Less significance is attached to the training of low criticality tasks, or those tasks that are performed to a lesser frequency. Overall, there is sufficient flexibility and latitude

built into these new curriculum proposals to accommodate diverse program delivery, as well as the necessary flexibility needed to accommodate local, or regional industry preferences.

PART 147 recommended changes include:

- Maintain the 1900-hour minimum curricula requirement that must be offered in PART 147 schools. (Note: all AMT school participants supported this as the minimum standard)
- Added "Conformity Inspection" to appendicies B, C, and D
- Teaching levels have been revised to fit modified curricula and meet the 1900 hours minimum training requirement with limited changes to overall subject matter.
- Appendix B, General, to become Core Curricula
  - Subject hours increased from 400 to 600
  - Added new section, Principles of Aviation Maintenance
  - The basic Physics element changed to Principles of Aviation Physics with additional subject
  - matter
  - Materials and processes element changed to Hardware and Materials
  - Maintenance Forms and Records element changed to Maintenance Documentation with
  - added subject matter and merging of the Maintenance Publications element
  - Mechanic privileges and limitations subject area changed to Privileges and Responsibilities
  - with added subject matter and merging of topics from other applicable subject areas
  - Added Error Management and Safety as a subject area
  - Removed mathematics from the curricula; as with English skills, the necessary mathematics
  - and computational skills will become prerequisite knowledge
  - New section added – Processes and Systems; merged applicable topics that were previously
  - covered in both the Airframe and Powerplant sections
  - New section added – Core Inspection which includes theory, fundamentals, and application
  - of inspection and inspection processes
- Appendix C remains as Airframe Curricula
  - Subject hours remain at 750
  - Sheet metal and Non-metallic structures section changed to Structural Materials and Processes. The expanded section includes wood and fabric at teaching level 1
  - The Welding element focuses on inspections of welds with no physical welding requirements
  - Increased subject matter on Rotor and Rotor System
  - Added new section – Instrument, Electronic and Computer systems
  - Airframe Inspection becomes a capstone project area with increased content and increased focus on performing inspections
- Appendix D title changed to Powerplant Curriculum
  - Subject hours decreased to 550
  - Reciprocating Engines element changed to Horizontally Opposed Engines
  - Radial engine inspection and repair element was removed (may be taught under new flexible guidelines described in material that follows)
  - The Overhaul of Reciprocating Engine elements have been removed, increased emphasis on
  - major component maintenance remains as a requirement
  - The Overhaul of Turbine Engine elements have been removed, major component and maintenance remains as a requirement
  - The overhaul element has been removed from Magneto and Ignition Harness systems
  - Added new section – Engine Electronic Systems
  - The overhaul of carburetors element has been removed, the repair and adjust requirement
  - remains

- Content in the Propeller section has been increased
- Powerplant Inspection becomes a capstone project area with increased content and increased focus on performing inspections

3.1 FAR PART 147 Side-by-Side Comparison

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FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

Appendix A to Part 147 - Curriculum Requirements

This appendix defines terms used in Appendices B, C, and D of this part, and describes the levels of proficiency at which items under each subject in each curriculum must be taught, as outlined in Appendices B, C, and D.

(a) Definitions as used in Appendices B, C, and D:

(1) "Inspect" means to examine by sight and touch.
(2) "Check" means to verify proper operation.
(3) "Troubleshoot" means to analyze and identify malfunctions.
(4) "Service" means to perform functions that assure continued operation.
(5) "Repair" means to correct a defective condition. Repair of an airframe or powerplant system includes component replacement and adjustment, but not component repair.
(6) "Overhaul" means to disassemble, inspect, repair as necessary, and check.

(b) Teaching levels.

(1) Level 1 requires:
(i) Knowledge of general principles, but no practical application.
(ii) No development of manipulative skill.
(iii) Instruction by lecture, demonstration, and discussion.

(2) Level 2 requires:
(i) Knowledge of general principles, and limited practical application.
(ii) Development of sufficient manipulative skill to perform basic

Proposed Curriculum

Appendix A to Part 147 - Curriculum Requirements

This appendix defines terms used in Appendices B, C, and D of this part, and describes the levels of proficiency at which items under each subject in each curriculum must be taught, as outlined in Appendices B, C, and D.

(a) Definitions as used in Appendices B, C, and D:

(1) "Inspect" means to examine by sight and touch.
(2) "Check" means to verify proper operation.
(3) "Troubleshoot" means to analyze and identify malfunctions.
(4) "Service" means to perform functions that assure continued operation.
(5) "Repair" means to correct a defective condition. Repair of an airframe or powerplant system includes component replacement and adjustment, but not component repair.
(6) "Overhaul" means to disassemble, inspect, repair as necessary, and check.
(7) “Conformity Inspection” as defined by the FAA policy**.** **(new)**

(b) Teaching levels.

(1) Level 1 requires:
(i) Knowledge of general principles, but no practical application.
(ii) No development of manipulative skill.
(iii) Instruction by lecture, demonstration, and discussion.

(2) Level 2 requires:
(i) Knowledge of general principles, and limited practical application.
(ii) Development of sufficient manipulative skill to perform basic

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

operations.
(iii) Instruction by lecture, demonstration, discussion, and limited practical application.

(3) Level 3 requires:
(i) Knowledge of general principles, and performance of a high degree of practical application.
(ii) Development of sufficient manipulative skills to simulate return to service.
(iii) Instruction by lecture, demonstration, discussion, and a high degree of practical application.

(c) Teaching materials and equipment.

The curriculum may be presented utilizing currently accepted educational materials and equipment, including, but not limited to: calculators, computers, and audio-visual equipment.

[Amdt. 147-2, 35 FR 5534, Apr. 3, 1970, as amended by Amdt. 147-5, 57 FR 28960, June 29, 1992]

Appendix B to Part 147--General Curriculum Subjects

This appendix lists the subjects required in at least 400 hours in general curriculum subjects.
The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Teaching

Proposed Curriculum

operations.
(iii) Instruction by lecture, demonstration, discussion, and limited practical application.

(3) Level 3 requires:
(i) Knowledge of general principles, and performance of a high degree of practical application.
(ii) Development of sufficient manipulative skills to simulate return to service.
(iii) Instruction by lecture, demonstration, discussion, and a high degree of practical application.

(c) Teaching materials and equipment.

The curriculum may be presented utilizing currently accepted educational materials and equipment, including, but not limited to: calculators, computers, and audio-visual equipment.

[Add new Amendment references]

Appendix B to Part 147 – Core Curriculum

This appendix lists the subjects required in at least **600** hours of Core Curriculum subjects. **(hours increased)**
The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

Teaching Level (TL)

(no equivalent title)

(no equivalent title)

TL

j. basic physics

(2) 30. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.

Proposed Curriculum

Teaching Level (TL)

I. Introduction and Basic Principles:

a. principles of aviation maintenance (new)

TL

(1) 1. History of aviation maintenance and maintenance program development. **(new)**

(1) 2. Role of maintenance personnel. **(new)**

(1) 3. Definition of aviation terms as defined in App. A. **(new)**

(1) 4. Use of tools and equipment. **(new)**

b. principles of aviation physics

(2) 5. Use and understand the application of basic physics as it relates to non-complex aircraft: aircraft structures; sound; fluid; heat dynamics; theory of flight and basic aerodynamics.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
		(closest equivalent title - e. materials and processes)			**c. hardware and materials**
(3)	17.	Identify and select aircraft hardware and materials.	(3)	6.	Identify and select approved aircraft hardware and materials.
		a. basic electricity			**d. basic electricity**
(2)	1.	Calculate and measure capacitance and inductance.	(2)	7.	Calculate and measure capacitance and inductance.
(2)	2.	Calculate and measure electrical power.	(2)	8.	Calculate and measure electrical power.
(3)	3.	Measure voltage, current, resistance, and continuity	(3)	9.	Measure voltage, current, resistance and continuity.
(3)	4.	Determine the relationship of voltage, current, and resistance in electrical circuits.	(3)	10.	Determine the relationship of voltage, current and resistance in electrical circuits.
(3)	5.	Read and interpret aircraft electrical circuit diagrams, including solid-state devices and logic functions.	(3)	11.	Read and interpret aircraft electrical circuit diagrams, including solid-state devices and logic functions used in complex aircraft.
(3)	6.	Inspect and service batteries.	(2)	12.	Inspect and service aircraft batteries. **(level reduced)**
		b. aircraft drawings			**e. introduction to aircraft drawings**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(2)	7.	Use aircraft drawings, symbols, and system schematics.	(1)	13.	Understand the basic use of aircraft drawings, symbols, and system schematics as they apply to aviation maintenance. **(level reduced)**
(3)	8.	Draw sketches of repairs and alterations.	(2)	14.	Draw sketches of repairs, alterations and use blueprint information. **(level reduced)**
(3)	9.	Use blueprint information.			
(3)	10.	Use graphs and charts.	(2)	15.	Use graphs and charts.
		c. weight and balance			**f. weight and balance**
(2)	11.	Weigh aircraft.	(1)	16.	Weigh aircraft and MAC coverage. **(level reduced)**
(3)	12.	Perform complete weight-and-balance check and record data.	(3)	17.	Perform complete weight and balance check on a type certificated type aircraft and record data.
		i. maintenance forms and records			**g. maintenance documentation** **(merged topics, new subject title)**
(3)	28.	Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft	(3)	18.	Write descriptions of work performance, aircraft discrepancies and corrective action, utilizing typical aircraft maintenance records.
(3)	29.	Complete required maintenance forms, records, and inspection reports.	(3)	19.	Complete maintenance and inspection forms, records, and reports.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
		reports.			reports.
TL		**k. maintenance publications**	**TL**		
(3)	31.	Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	(3)	20.	Demonstrate the ability to read, access, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, prints, schematics, drawings, data sheets, FARs, MMEL, MEL, CDL, manuals, including an understanding of Airline Transport Association (ATA) technical chapter formatting, Airworthiness Directives (AD) and Advisory material. **(merged from maintenance publications)**
(3)	32.	Read technical data.	(3)	21.	Demonstrate the ability to read Technical Data. **(merged from maint publications)**
		l. mechanic privileges and limitations			**h. AMT privileges and responsibilities (new title)**
(3)	33.	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	(3)	22.	Demonstrate the ability to exercise privileges of an AMT within limitations prescribed by applicable FARs. (e.g.: FAR 21, 23, 25, 43, 66, 91, 119, 121, 135, and 145.) **(content increased)**
			(2)	23.	Demonstrate awareness of desired team and individual personal characteristics, human factor elements related to safety-mindedness, integrity, error management, ethics, communication, and professionalism, as applicable within an aviation maintenance environment. **(new)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum		Proposed Curriculum	
TL		**TL**	
		(1) 24.	Understand safety implications when using: fuels; lubricants; hydraulic fluids; cements; rosins; sealants; paints; thinners; oxygen; nitrogen; halon; fluids under pressure; compressed gases; batteries; electrolyte; aviation ordnance; pyrotechnics; MSDS, electricity; radio, radar and transponder transmitters; x and gamma rays; as well as noise, vapor and other environmental hazards. **(brought forward from App D – Item M)**
		(2) 25.	Understand the importance of hazardous material identification and safety implications related to handling transporting, and reporting. **(new)**
		(2) 26.	Demonstrate awareness of safety related industry practices and procedures: including use of protective blanking caps, stabilizing features, locking pins, protective covers; lockouts, system deactivation and isolation procedures.
(no equivalent topic)		**i. error management and safety**	**(new)**
		(1) 27.	Understand the effect of human safety factors in an aircraft maintenance environment: and how it applies to potential errors, inspection processes and procedures, and how those risks are managed and mitigated.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
		h. mathematics			**(subject removed from Core Curriculum)**
					Note: Mathematics has been removed from the core curriculum as it is deemed to be a pre-requisite to aviation program entrance. Where a school has identified a need to prepare students for aviation maintenance program entrance by offering this subject matter, it should form part of a complimentary module outside of the FAR Part 147 program approval.
		(no equivalent topic)			**II. Processes and Systems:**
		d. fluid lines and fittings			**a. fluid lines and fittings**
(3)	13.	Fabricate and install rigid and flexible fluid lines and fittings.	(2)	28.	Fabricate and install rigid and flexible fluid lines and fittings. **(level reduced)**
		f. ground operation and servicing			**b. ground operation and servicing**
(2)	20.	Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.	(1)	29.	Start, ground-run, move, service and secure an aircraft. **(level reduced)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
			(2)	30.	Identify typical ground operation safety errors.
(2)	21.	Identify and select fuels.	(2)	31.	Identify and select aviation fuels and lubricants.
		g. cleaning and corrosion control			**c. cleaning and corrosion control**
(3)	22.	Identify and select cleaning materials.	(2)	32.	Identify and select cleaning materials. **(level reduced)**
(3)	23.	Inspect, identify, remove, and treat aircraft corrosion, and perform aircraft cleaning.	(3)	33.	Inspect, identify, remove and treat corrosion; and perform aircraft cleaning.
		f. aircraft fuel systems			**d. fuel and fuel systems**
		g. engine fuel systems			**(merged topic area – airframe & powerplant)**
(1)	41.	Check and service fuel dump systems.	(1)	34.	Check and service fuel dump valves.
(1)	42.	Perform fuel management transfer, and defueling.	(1)	35.	Perform fuel management, transfer and de-fueling.
(1)	43.	Inspect, check, and repair pressure fueling systems.	(1)	36.	Inspect, check and repair pressure fueling systems.
(2)	44.	Repair aircraft fuel system components.	(2)	37.	Repair fuel system components

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL					
(3)	24.	Repair engine fuel system components.			**(level reduced)**
(2)	45.	Inspect and repair fluid quantity indicating systems.	(2)	38.	Inspect and repair fuel quantity indicating systems.
(2)	46.	Troubleshoot, service, and repair fluid pressure a temperature warning systems.	(1)	39.	Understand the operation of fuel pressure warning systems and the servicing of such systems. **(level reduced)**
(3)	47.	Inspect, check, service, troubleshoot, and repair aircraft fuel systems.	(3)	40.	Inspect, check, service, troubleshoot and repair fuel systems.
(3)	25.	Inspect, check, service, troubleshoot, and repair engine fuel systems.			
(2)	21.	Overhaul carburetor.			**(task discontinued)**
		j. fire protection systems			**e. fire protection systems**
		b. engine fire protection systems			**(merged topic area – airframe & powerplant)**
(1)	54.	Inspect, check, and service smoke and carbon monoxide detection systems.	(1)	41.	Inspect, check and service smoke and carbon monoxide detection systems.
(3)	55.	Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	(2)	42.	Inspect, check, troubleshoot and repair aircraft and engine fire detection and extinguishing systems. **(level reduced)**
(3)	11.	Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.			

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
		g. aircraft electrical systems **c. engine electrical systems**			**f. aircraft electrical and electronic systems** **(merged topic area – airframe & powerplant)**
(2)	48.	Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors	(3)	43.	Repair and inspect electrical system components; crimp, splice and solder wiring to manufacturers specifications; and, repair pins and sockets of aircraft connectors. **(level increased)**
(2)	12.	Repair engine electrical system components.			
(3)	49.	Install, check, and service airframe electrical wiring controls, switches, indicators, and protective devices.	(3)	44.	Install, check, inspect and service electrical wiring; harnesses; bundles; controls; switches; indicators; emergency, interior, and exterior lighting; and, electrical system protective devices
(3)	13.	Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.			
(3)	50.	a. Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems.	(3)	45.	Inspect, check, troubleshoot, service and repair: alternating and direct current electrical systems.
(1)	50.	b. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.	(1)	46.	Inspect, check and troubleshoot constant speed and integrated speed-drive generators.
		h. position and warning systems			**g. position and warning systems**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
			(1)	47.	Inspect, check, troubleshoot and service: door and access panel position and warning systems. **(new)**
(2)	51.	Inspect, check, and service speed and configuration warning systems, electrical brake controls, and anti-skid systems.	(2)	48.	Inspect, check, and service: speed and configuration warning systems; electrical brake controls; and anti-skid systems.
(3)	52.	Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.	(3)	49.	Inspect, check, troubleshoot and service: landing gear position indicating and warning systems.
			(3)	50.	Inspect, check, troubleshoot and service: auto brake; flap; slat; and other similar position and warning systems. **(new)**
		i. ice and rain control systems			**h. ice and rain control systems**
(2)	53.	Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	(2)	51.	Inspect, check, troubleshoot, service and repair ice/rain protection and control systems associated with: airframe, propeller, and rotor blade.
		(no equivalent topic heading)			**III. Core Inspection (new)**
		(no equivalent topic)			**a. theory, fundamentals, and application**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

TL		
		(nearest equivalent - e. materials and processes)
(1)	14.	Identify and select appropriate nondestructive testing methods. Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.
(2)	15.	Perform basic heat-treating processes Perform precision measurements.
(1)	16.	
(2)	19.	
(3)	18.	Inspect and check welds.

Proposed Curriculum

TL		
(1)	52.	Theory and fundamentals of inspection and maintenance philosophy, including maintenance program development and Maintenance Steering Group (MSG) logic. **(new)**
(1)	53.	Understand the differences between Approved and Un-Approved Parts. **(new)**
(2)	54.	Apply inspection techniques and practices; including precision measurement and methods of Non Destructive Inspection (NDI). **(new)**
(1)	55.	Understand inspection techniques and practices related to welding, hardware, electrical wiring, and plumbing. **(new)**
(1)	56.	Understand the application of aging aircraft and corrosion inspection programs, including the basic principles of design philosophy, such as; *fail-safe* and *damage tolerance.* **(new)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

Proposed Curriculum

(1) 57. Understand inspection requirements and re-certification implications after disturbing the integrity of a pitot-static system.

[Amdt. 147-2, 35 FR 5534, Apr. 3, 1970, as amended by Amdt. 147-5, 57 FR 28960, June 29, 1992]

[Include new Amendment references]

Appendix C to Part 147--Airframe Curriculum Subjects

This appendix lists the subjects required in at least 750 hours of each airframe curriculum, in addition to at least 400 hours in general curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

Appendix C to Part 147 - Airframe Curriculum

This appendix lists the subjects required in at least 750 hours of each airframe curriculum, in addition to at least **600** hours in Core curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

I. Airframe Structures

I. Airframe Structures

d. sheet metal and non-metallic structures

(2) 10. Select, install and remove special fasteners for metallic, bonded, and composite structures.

a. structural materials and processes

(3) 1. Select, install and remove special fasteners for metallic, bonded, and composite structures. **(level increased)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(2)	11.	Inspect bonded structures.			
(2)	12.	Inspect, test and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.	(3)	2.	Inspect, test and repair: fiberglass, honeycomb, composite, laminated, bonded, primary, and secondary structures. **(level increased)**
(2)	13.	Inspect, check, service, and repair windows, doors, and interior furnishings.	(2)	3.	Inspect, check, service and repair: windows, plastics and interior furnishings.
(3)	14.	Inspect and repair sheet-metal structures.	(3)	4.	Inspect and repair sheet-metal structures.
(3)	15.	Install conventional rivets.	(3)	5.	Install conventional rivets.
(3)	16.	Form, layout, and bend sheet metal.	(2)	6.	Form, layout and bend sheet metal. **(level decreased)**
		b. aircraft covering			
(1)	5.	Select and apply fabric and fiberglass covering materials.	(1)	7.	Identify, test, service, and repair fabric covering.
(1)	4.	Inspect, test, and repair fabric and fiberglass.			
		a. wood structures			**(essential subject matter retained - integrated above)**
(1)	1.	Service and repair wood structures.			

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

TL		
(1)	2.	Identify wood defects.
(1)	3.	Inspect wood structures.
		c. aircraft finishes
(1)	6.	Apply trim, letters, and touchup paint.
(2)	7.	Identify and select aircraft finishing materials.
(2)	8.	Apply finishing materials.
(2)	9.	Inspect finishes and identify defects.
		e. welding
(1)	17.	Weld magnesium and titanium.
(1)	18.	Solder stainless steel.
(1)	19.	Fabricate tubular structures.

Proposed Curriculum

TL		
		b. aircraft finishes
(1)	8.	Apply trim and registration markings.
(2)	9.	Identify and select aircraft finishing materials.
(3)	10.	Apply preservation and finishing materials. **(level increased)**
(3)	11.	Inspect finishes and identify defects. **(level increased)**
		c. welding
(3)	12.	Perform inspection of welds, brazing, and silver solder on airframe structures and components. **(level increased – focus on inspection)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(2)	20.	Solder, braze, gas-weld, and arc-weld steel.			
(1)	21.	Weld aluminum and stainless steel.			
		f. assembly and rigging			**d. assembly and rigging**
(1)	22.	Rig rotary-wing aircraft.	(2)	13.	Rig and inspect rotary-wing aircraft primary flight control system. **(level increased)**
			(1)	14.	Track and balance rotor systems. **(new)**
			(1)	15.	Inspect rotor systems **(new)**
(2)	23.	Rig fixed-wing aircraft.	(2)	16.	Rig and inspect fixed-wing aircraft primary and secondary flight control system.
(2)	24.	Check alignment of structures.	(2)	17.	Check alignment of structures.
(3)	25.	Assemble aircraft components, including flight control surfaces.	(3)	18.	Assemble aircraft components, including flight control surfaces.
(3)	26.	Balance, rig, and inspect movable primary and secondary flight control surfaces.	(3)	19.	Balance, rig, inspect, and service moveable primary and secondary flight control surfaces.
(3)	27.	Jack aircraft.	(3)	20.	Jack aircraft.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
			(2)	21.	Inspect, check, and service aircraft doors. **(new)**
II. Airframe Systems and Components			**II. Airframe Systems and Components**		
		a. aircraft landing gear systems			**a. aircraft landing gear systems**
(3)	29.	Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.	(3)	22.	Inspect, check, service, and repair landing gear, retraction systems, shocks struts, brakes, wheels, tires, and steering systems.
		b. hydraulic and pneumatic power systems			**b. hydraulic and pneumatic powered systems**
(2)	30.	Repair hydraulic and pneumatic power systems components.	(2)	23.	Repair hydraulic and pneumatic powered system components.
(3)	31.	Identify and select hydraulic fluids.	(3)	24.	Inspect, check, service, troubleshoot, and repair: hydraulic and pneumatic powered systems; and identify and select hydraulic fluids.
(3)	32.	Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems			
		c. cabin atmosphere control systems			**d. cabin atmosphere control systems**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(1)	33.	Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines.	(2)	25.	Inspect, check, troubleshoot, service and repair: heating; cooling; air-conditioning; pressurization systems; and environmental control systems. **(level increased)**
(1)	34.	Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.			
(2)	35.	Inspect, check, troubleshoot, service and repair oxygen systems.	(3)	26.	Inspect, check, troubleshoot, service, and repair oxygen systems. **(level increased)**
		(nearest equivalent titles - d. aircraft instrument systems & e. communication and navigation systems)			**e. instrument, electronic and computer systems (new)**
(1)	36.	Inspect, check, service, troubleshoot and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment.	(1)	27.	Inspect, check, service, and troubleshoot: electronic flight instrument systems, glass cockpit and flat panel installations, and electronic systems interface. **(new)**
			(2)	28.	Inspect, check, service and troubleshoot: both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems; including the proper use of internal diagnostic equipment. **(new)**
(1)	38.	inspect, check, and troubleshoot autopilot, servos and approach coupling systems.	(2)	29.	Inspect, check and troubleshoot aircraft autopilot, servos and approach coupling systems. **(level increased)**
(1)	39.	Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address	(1)	30.	Inspect, check, troubleshoot aircraft electronic communication and navigation systems: including auto-flight, navigation,

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
		interphones and static discharge devices, aircraft VOR, ILS, LORAN, Radar beacon transponders, flight management computers, and GPWS.			communication, surveillance, and on- board computer systems.
(2)	40.	Inspect and repair antenna and electronic equipment installations.	(2)	31.	Inspect and repair antenna, and electronic equipment installations.
(2)	37.	Install instruments and perform a static pressure system leak test.	(3)	32.	Install instruments and perform a static pressure system leak check. **(level increased)**
		(no equivalent topic heading)			**III. Airframe Inspection (new)**
		g. airframe inspection			**a. airframe inspections**
(2)	28.	Perform airframe conformity and airworthiness inspections.	(2)	33.	Perform airframe conformity and airworthiness inspections.
			(2)	34.	Demonstrate an understanding of special inspection programs, including those associated with aging aircraft, hard landings, sudden stoppage, over-speed, and lightning strikes. **(new)**
			(3)	35.	Perform basic visual inspections of metallic and non-metallic structures; electrical wiring; static discharge devices; fuel; oil; hydraulic, and pneumatic system hardware; and, pressure lines. **(new)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

[Amdt. 147-2, 35 FR 5535, Apr. 3, 1970, as amended by Amdt. 147-5, 57 FR 28960, June 29, 1992]

Appendix D to Part 147--Powerplant Curriculum Subjects

This appendix lists the subjects required in at least 750 hours of each powerplant curriculum, in addition to at least 400 hours in genera curriculum subjects.

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

I. Powerplant Theory and Maintenance

TL

a. reciprocating engines

(1)	1.	Inspect and repair a radial engine.
(2)	2.	Overhaul reciprocating engine.
(3)	3.	Inspect, check, service, and repair reciprocating engines and engine installations.

Proposed Curriculum

[Include new Amendment references]

Appendix D to Part 147 - Powerplant Curriculum

This appendix lists the subjects required in at least **550** hours of each powerplant curriculum, in addition to at least **600** hours in Core Curriculum subjects. **(Decreased by 200 hours)**

The number in parentheses before each item listed under each subject heading indicates the level of proficiency at which that item must be taught.

I. Powerplant Theory and Maintenance

TL

a. horizontally opposed engines (new/revised task limited to horizontally opposed only)

		(task discontinued)
		(overhaul task removed)
(2)	1.	Disassemble, inspect, and reassemble a horizontally opposed engine.
(2)	2.	Inspect, check, service, and repair: horizontally opposed engine and engine installations. **(level decreased)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(3)	4.	Install, troubleshoot, and remove reciprocating engines.	(1)	3.	Remove, install and troubleshoot horizontally opposed engine.
		b. turbine engines			**b. turbine engines**
(2)	5.	Overhaul turbine engine.			**(overhaul task removed)**
			(2)	4.	Disassemble, inspect, and reassemble a turbine engine.
(3)	6.	Inspect, check, service, and repair turbine engines and turbine engine installations.	(3)	5.	Inspect, check, service, and repair: turbine engines, including performance of a hot and compressor section inspection.
(3)	7.	Install, troubleshoot, and remove turbine engines.	(3)	6.	Remove, install, and troubleshoot a turbine engine and a turbine engine installation.
II. Powerplant Systems and Components			**II. Powerplant Systems and Components**		
		a. engine instrument systems			**a. engine instrument systems**
(2)	9.	Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	(2)	7.	Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, rate of flow

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		and rpm. indicating systems.
(3)	10.	Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and rpm. indicating systems.			**(partial level decreased)**
		d. lubrication systems			**b. lubrication systems**
(2)	14.	Identify and select lubricants.	(2)	8.	Identify and select engine lubricants.
(2)	15.	Repair engine lubrication system components.	(3)	9.	Inspect, check, service, troubleshoot, and repair engine lubricating systems.
(3)	16.	Inspect, check, service, troubleshoot, and repair engine lubrication systems.			**(partial level increased)**
		e. ignition and starting systems			**c. ignition and starting systems**
(2)	17.	Overhaul magneto and ignition harness.	(1)	10.	Repair magnetos and ignition harnesses**.**
					(overhaul task discontinued - level decreased)
(2)	18.	Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	(2)	11.	Inspect, service, troubleshoot and repair: reciprocating and turbine engine ignition systems and components.
(3)	19.	a. Inspect, service, troubleshoot, and repair turbine engine	(3)	12.	Inspect, service, troubleshoot and repair: turbine engine electrical starting systems.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
		electrical starting systems.			electrical starting systems.
(1)	19.	b. Inspect, service, and troubleshoot turbine engine pneumatic starting systems.	(2)	13.	Inspect, service and troubleshoot: turbine engine pneumatic starting systems. **(increased level)**
		(mo equivalent)			**d. engine electronic systems (new)**
			(1)	14.	Inspect, test/interrogate, troubleshoot, repair, and adjust: electronic engine fuel control system. **(new)**
		f. fuel metering systems			**e. fuel and fuel metering systems (merged tasks)**
		g. engine fuel systems			
(2)	21.	Overhaul carburetor.	(2)	15.	Repair and adjust carburetor. **(overhaul task removed)**
(3)	23.	Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.	(1)	16.	Inspect, check, service, troubleshoot, and repair: reciprocating and turbine engine fuel metering systems. **(level reduced)**
(3)	24.	**Repair engine fuel system components.** Inspect, check, service, troubleshoot, and repair engine fuel	(3)	17.	Inspect, check, service, troubleshoot and repair: reciprocating and turbine engine fuel systems.
(3)	25.	systems.			

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
		h. induction and engine airflow systems			**f. induction and airflow systems (revised title)**
(2)	26.	Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.	(2)	18.	Inspect, check, service, troubleshoot and repair: engine ice and rain control systems.
(1)	27.	Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.	(2)	19.	Inspect, check, service, troubleshoot and repair: heat exchangers; superchargers; compressor inlet guide vanes; bleed valves; and turbine engine airflow and temperature control systems. **(level increased)**
(3)	28.	Inspect, check, service, and repair carburetor air intake and induction manifolds.	(2)	20.	Inspect, check, service and repair: carburetor air intake and induction manifolds. **(level decreased)**
		i. engine cooling systems			**g. cooling systems (revised title)**
(2)	29.	Repair engine cooling system components.	(1)	21.	Inspect, check, service and troubleshoot engine cooling systems. **(level decreased)**
(3)	30.	Inspect, check, troubleshoot, service, and repair engine cooling systems.			
		j. engine exhaust and reverser systems			**h. exhaust system and thrust reverser systems (revised title)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum			Proposed Curriculum		
TL			**TL**		
(2)	31.	Repair engine exhaust system components.	(3)	22.	Inspect, check, service, troubleshoot, and repair engine exhaust systems.
(3)	32.	a. Inspect, check, troubleshoot, service, and repair engine exhaust systems.			
(1)	32.	b. Troubleshoot and repair engine thrust reverser systems and related components.	(1)	23.	Troubleshoot and repair engine thrust reverser systems and related and related components.
		k. propellers			**i. propellers (content consolidated)**
(1)	33.	Inspect, check, service, and repair propeller synchronizing and ice control systems.	(1)	24.	Inspect, check, service and repair: propeller synchronizing and ice control systems.
(1)	35.	Balance propellers.	(1)	25.	Balance propellers
(2)	34.	Identify and select propeller lubricants.	(2)	26.	Identify and select propeller lubricants.
(1)	36.	Repair propeller control system components.	(3)	27.	Inspect, check, service and repair: fixed pitch, constant-speed, feathering propellers; and propeller governing systems.
(3)	37.	Inspect, check, service, and repair fixed-pitch, constant- speed, and feathering propellers, and propeller governing systems.			
(3)	38.	Install, troubleshoot, and remove propellers.	(3)	28.	Install, troubleshoot, inspect and remove propellers.
(3)	39.	Repair aluminum alloy propeller blades.	(3)	29.	Repair aluminum alloy propeller blades.

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

TL

m. auxiliary power units

(1) 41. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.

l. unducted fans

(1) 40. Inspect and troubleshoot unducted fan systems and components.

(no equivalent topic heading)

c. engine inspection

Proposed Curriculum

TL

j. auxiliary power units

(2) 30. Inspect, check, service and troubleshoot: turbine powered auxiliary power units. **(increased level)**

(1) 31. Inspect, check, service, and troubleshoot: ram air turbine (RAT) power units and air driven generators (ADG).

(new)

(topic removed)

III. Powerplant Inspection (new)

a. engine inspections

(3) 32. Perform basic visual inspections of engine structures, hardware and components, electrical wiring; fuel, oil, hydraulic, and pneumatic system hardware and associated fluid lines. **(new)**

FAR PART 147 Curriculum – Appendices Comparison

Current Curriculum

TL		
(3)	8.	Perform powerplant conformity and airworthiness inspections.

(Sec. 6©, Dept. of Transportation Act; 49 U.S.C. 1655©) [Amdt. 147-2, 35 FR 5535, Apr. 3, 1970, as amended by Amdt. 147-5, 57 FR 28961, June 29, 1992] 14 CFR 147 * Amdt. 147-7 * Dec. 18, 1995.

Proposed Curriculum

TL		
(3)	33.	Perform inspection of welds, brazing, and silver soldering of powerplants, mounts, and components.
(1)	34.	Perform special inspections contained in engine manufacturers maintenance manuals.
(2)	35.	Perform powerplant conformity and airworthiness inspections.

[New Amendment references will included]

3.2 FAR PART 147 Section-by-Section Change Analysis and Rationale Summary

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FAR PART 147 Appendices

Section By Section Analysis

Preface

The objective of the FAR 65 Rule Optimization Project was to review existing regulatory requirements governing the certification of aviation maintenance personnel and to make recommendations to the FAA for program improvement. Fundamental to this initiative was a need to dialogue with all sectors of the aviation industry engaged in aircraft maintenance. In that regard, the project team held extensive meetings across the country, receiving significant feedback and documented input from interested parties representing a broad cross-section of the aviation maintenance industry. In making recommendations, consideration was given to the relevance of knowledge and tasks as they apply to aviation maintenance within civil aviation. In particular, recommendations were guided by factors such as the frequency that tasks are being performed by an AMT in today's environment, and the criticality of those tasks to aviation safety. In response to industry feedback, rule optimization has primarily focused in two regulatory areas: FAR Part 65, which deals with A & P, IA, and Repairmen Certificate requirements and privileges; and, FAR Part 147 which defines standards for the approval of Aviation Maintenance Technician Training Schools, by the Administrator. This document summarizes proposed curriculum changes that address the latter of these two regulatory areas, PART 147.

The proposed curriculum reflects a departure from traditional programs that previously accentuated subject matter focused on *piston engines* and *overhaul*, to one that increases student awareness of *turbine engines,* and the importance of *inspection processes* to aviation safety. This new emphasis recognizes changes that have taken place within the maintenance industry brought about by advancing technology. Also, there was broad industry support for a program that prepares newly graduated students for easy entry into a typical aviation shop environment and for those students to be more familiar with complex aircraft, and support systems that compliment that technology. In response to those requirements, the proposed curriculum reflects workplace realities that need to be addressed at an early point in the learning process. Evident throughout the document is an increase in content and teaching levels to support enhanced inspection related knowledge and practices. More subject matter has also been included relative to complex aircraft, their systems, and the use of systems technology that governs maintenance control. In all instances, recommended changes result from consensus industry input and are supported by ARAC, aviation industry studies, or recent Job Task Analysis (JTA) data.

A side-by-side comparison of the entire FAR Part 147 Curriculum highlights proposed material changes, and based on those proposals, this document summarizes the change rationale for each of the sections that make up the curriculum. Where new material has been introduced, or where subject matter has been removed, supportive rationale or background information is provided for the change. In most instances, curriculum changes relate to the content, delivery of subject matter, or the depth of instruction (teaching levels).

FAR PART 147 Appendices

Section By Section Analysis

23. **Index:** **Curricula Titles**

Changes were made to Appendix B, C, & D titles, to more accurately reflect subject matter content as follows: General Curriculum Subjects now becomes Core Curriculum; Airframe Curriculum Subjects is now Airframe Curriculum; and Powerplant Curriculum Subjects, has been changed to Powerplant Curriculum. In addition, to underscore the importance of the inspection function within the privilege of the AMT certificate, a new module has been added to each of the major curricula. The three new Inspection modules are located at the end of each curriculum respectively, and provide the basis for capstone projects to evaluate student comprehension of the overall curriculum taken and the corresponding inspection process.

1. **General:** **Minimum Curriculum Hours**

Essentially, the total AMT curricula will remain at a minimum of 1900 hours. However, allocation of those hours has been re-distributed within the three appendices to accommodate the proposed changes and subject matter realignment. These changes are further defined at each change-point or area, within the curricula.

2. **General:** **Subject Matter and Content**

Through the review and evaluation process some curricula subjects have undergone adjustment by adding or removing content to reflect current aviation maintenance industry requirements. As well, subject matter within the core curriculum deemed to be prerequisite in nature has been removed. The subjects in question may form part of a school's prerequisite requirement for a given aviation program. *e.g: use of English, basic mathematics, and non-aviation physics.*

APPENDIX A - CURRICULUM REQUIREMENTS

3. **Appendix A (b)** **Teaching levels:**

Teaching level definitions of have not been altered, as there was unanimous agreement in meetings and seminars that existing definitions meet the objectives of the rule.

FAR PART 147 Appendices

Section By Section Analysis

4. **Appendix A (a) (7)** **Definitions as used in Appendices B, C, and D:**

New Definition - Conformity Inspection

A new definition, under item (7) "Conformity Inspection," has been introduced to ensure that the term is interpreted as defined by FAA policy, and not as it may apply in other functional areas within aviation. The definition as defined, provides for a singular understanding as it applies to this rule.

5. **Appendix B** **Core Curriculum**

Minimum time associated with the Core Curriculum has increased from 400 to 600 hours. This change is largely due to an increase in content resulting from a transfer of consolidated Airframe and Powerplant subject matter from Appendix C and D into Appendix B - Core Curriculum. This fundamental change was thoroughly discussed at rule Optimization program meetings and agreement to increase the number of hours was supported by industry consensus. In addition, the basis for Curriculum content is supported by recent industry JTA data.

6. **Appendix C** **Airframe Curriculum**

Minimum time associated with the Airframe Curriculum remains at 750 hours. Though there is significant increase in content, pertaining to complex aircraft and the introduction of additional technology, the transfer and of consolidation Airframe and Powerplant subject matter into Appendix B - Core Curriculum balanced the hours. This fundamental change was thoroughly discussed at rule Optimization meetings and agreement to increase the number of hours was supported by industry consensus. In addition, the basis for Curriculum content is supported by recent industry JTA data.

7. **Appendix D Powerplant Curriculum**

Minimum time associated with the Powerplant Curriculum decreases from 750 to 550 hours. This change is largely due to a decrease in content resulting from a transfer of consolidated Airframe and Powerplant subject matter from Appendix C and D into Appendix B - Core Curriculum. It also reflects the removal of radial engines, and changing from engine overhaul tasks focus to an increased component repair focus. Technology for complex powerplant electronic systems and increased emphasis on propellers, rotor systems, and inspection was added. This fundamental change was thoroughly discussed at rule Optimization meetings and agreement to reduce the number of hours was supported by industry consensus. In addition, the basis for Curriculum content is supported by recent industry JTA data.

APPENDIX B – CORE CURRICULUM (600 Hours)

I. Introduction and Basic Principles

8. **(a) Principles of Aviation Maintenance**

A new heading has been introduced within the Core Curriculum titled, *Principles of Aviation Maintenance*. The intent of this new topic area is to ensure that students have a sound understanding of aviation maintenance fundamentals. This includes an awareness of how aviation maintenance programs are developed, their basic foundations; and, applied maintenance theories and practices. Change is supported by industry and FAA feedback.

9. **(b) Principles of Aviation Physics**

Formerly Physics: This heading has been re-titled *Principles of Aviation Physics,* to more accurately reflect its revised contents. This subject matter has been introduced at an early point in the curriculum to provide the student with a sound foundation for the remainder of the curricula. Content is focused more strongly toward application of principles encountered by technicians performing maintenance and inspection.

FAR PART 147 Appendices

Section By Section Analysis

10. **(c) Hardware and Materials**

Content remains relatively unchanged. However, there is increased emphasis placed on the recognition of approved parts and materials. This change reflects both industry and regulatory concern regarding the use of unapproved parts in civil aviation.

11. **(d) Basic Electricity**

Subject matter in this area remains unchanged except for a reduction in teaching level related to the servicing of batteries. This minor change is supported by industry group feedback and recent JTA data.

12. **(e) Introduction to Aircraft Drawings**

Formerly Aircraft Drawings: This heading has been re-titled, *Introduction to Aircraft Drawings*, to more accurately reflect its revised contents. In some instances teaching levels have been reduced inline with revised industry requirements as identified in the current JTA (Job Task Analysis). However, practical application of this knowledge has been retained in this area, and further reinforced in other topic areas within the overall curricula. Content remains relatively unchanged and minor changes reflect industry feedback at Rule Optimization meetings.

13. **(f) Weight and Balance**

Minimum requirements have been amended to ensure that *weight and balance checks* are performed on FAR Part 23 aircraft. Content has been expanded, while teaching levels has been reduced for basic subject matter. These changes have been introduced as a result of industry consensus based on industry input, and validated by the most recent JTA.

14. **(g) Maintenance Documentation**

Formerly Maintenance Forms and Records; Maintenance Publications. These two subject areas have been blended into *Maintenance Documentation.* The integration of these subjects is a natural outflow from currently accepted industry practices, environment, regulatory requirements, and the extensive use of information technology as it applies to control of maintenance information and record keeping systems.

Support for these changes reflect a consensus industry request that AMT graduates be better prepared to deal with information technology and recording systems as these are now commonly used as a basis of document control the aviation maintenance industry. In that regard, content has been expanded to emphasize the interrelationship of maintenance documentation to maintenance processes, programs, configuration management, return to service, and other essential safety considerations.

This topic was moved into the Core Curriculum area as it affects all other elements of the AMT training program, and as such, avoids unnecessary duplication or repetition associated with the subject matter.

15. **(h) AMT Privileges and Responsibilities**

Formerly Mechanic Privileges and Limitations: This new topic has been changed to *AMT Privileges and Responsibilities*. Content has been significantly expanded to reflect both industry and FAA consensus that graduates clearly understand their certificate responsibilities, and to further enunciate professionalism within the aviation maintenance industry. Topics contained in this subject area are crucial to the development of aviation maintenance personnel and contribute to the desirable behavioral quality of a graduate AMT. Changes to this area are supported by strong industry, FAA, and NTSB input.

FAR PART 147 Appendices

Section By Section Analysis

16. **(i) Error Management and Safety**

This new topic has *Privileges and Responsibilities* overtones and has been introduced as a dedicated topic to further acquaint students with the importance of a sound human factors program, and to understand the role that error management and safety plays in a successful aircraft maintenance environment. In particular, the direct effect that errors have on inspection processes and procedures. This change is supported by the FAA, industry feedback, several NTSB reports, and is supported by recent JTA data.

17. ***Note: Deleted Topic – Mathematics:***

This subject has been removed from the core curriculum as it is deemed to be *pre-requisite* subject matter to aviation program entrance. Where a school has identified a need to prepare students for aviation maintenance program entrance by offering this subject matter, it should form part of a complimentary module outside of the FAR Part 147 program approval. This was considered as a necessary step to provide the time required to teach other subjects that are essential for certification that are not generally offered outside the AMT school curricula.

II. Processes and Systems

18. **(a) Fluid Lines and Fittings**

Teaching level reduced, reflecting recent JTA. data.

19. **(b) Ground Operations and Servicing**

This subject area has undergone minor adjustments to teaching levels and a lubricant subject has been added. This reflects overall industry consensus and recent JTA data.

FAR PART 147 Appendices

Section By Section Analysis

20. **(c) Cleaning and Corrosion Control**

Content in this subject area remains relatively unchanged. Some minor adjustments have been made to teaching levels relating to the identification of cleaning materials. Minor changes have been precipitated by industry input, citing a need to place increased emphasis on the most important of these tasks.

21. **(d) Fuel and Fuel Systems**

These merged topics have been drawn from both Airframe and Powerplant curricula. They have been moved and integrated into the Core Curriculum to eliminate unnecessary program duplication and to address common subject matter in a unified manner. Content that was deemed to be less fundamental in nature and particularly crucial to a specific *Certificate Rating* has been retained within its individual Curriculum. The net affect of these changes allows for the introduction of new material without increasing overall program length. Where elements of a topic relate singularly to either Airframe or Powerplant, content has not been moved, but has been retained in its respective curriculum.

Support for subject matter consolidation stems from an AMTS industry preference to improve training program delivery strategies, so that content can be adjusted without increasing overall program length.

22. **(e) Fire Protection Systems**

Fire Protection Systems content has been drawn from both Airframe and Powerplant curricula. Subject matter has been moved and integrated into the Core Curriculum to eliminate unnecessary program duplication and to address common subject matter in a unified manner. Content that was deemed to be less fundamental in nature and crucial to a particular *Certificate Rating* has been retained within its individual Curriculum. The net affect of these changes allows for the introduction of new material without increasing overall program length. Where elements of a topic relate singularly to either Airframe or Powerplant, content has not been moved, but has been retained in its respective curriculum.

Support for subject matter consolidation stems from an AMTS industry preference to improve program delivery strategies, so that content can be adjusted without increasing overall program length.

23. **(f) Aircraft Electrical and Electronic Systems**

Formerly *Aircraft Electrical* and *Engine Electrical Systems,* content has been drawn from both areas of Airframe and Powerplant curricula. Subject matter has been moved and integrated into the Core Curriculum to eliminate unnecessary program duplication and to address common subject matter in a unified manner. Content that was deemed to be beyond basic in nature and crucial to a particular *Certificate Rating* has been retained within its individual Curriculum. The net affect of these changes allows for the introduction of new material without increasing overall program length. Where elements of a topic relate singularly to either Airframe or Powerplant, content has not been moved, but has been retained in its respective curriculum.

Support for subject matter consolidation stems from an AMTS industry preference to improve program delivery strategies, so that content can be adjusted without increasing overall program length.

24. **(g) Position and Warning Systems**

Position and Warning Systems content has been drawn from both Airframe and Powerplant curricula. Subject matter has been moved and integrated into the Core Curriculum to eliminate unnecessary program duplication and to address common subject matter in a unified manner. Content that was deemed to be beyond basic in nature and crucial to a particular *Certificate Rating* has been retained within its individual Curriculum. The net affect of these changes allows for the introduction of new material without increasing overall program length. Where elements of a topic relate singularly to either Airframe or Powerplant, content has not been moved, but has been retained in its respective curriculum.

An additional subject has been added to address inspection and to include complex aircraft systems. The added material reflects industry input and is supported by JTA data.

Support for subject matter consolidation stems from an AMTS industry preference to improve program delivery strategies, so that content can be adjusted without increasing overall program length.

25. **(h) Ice and Rain Control Systems**

Ice and Rain Control Systems content has been drawn from each of the Airframe and Powerplant curricula. Subject matter has been moved and integrated into the Core Curriculum to eliminate unnecessary program duplication and to address common subject matter in a unified manner. Content that was deemed to be less fundamental in nature and crucial to a particular *Certificate Rating* has been retained within its individual Curriculum. The net affect of these changes allows for the introduction of new material without increasing overall program length. Where elements of a topic relate singularly to either Airframe or Powerplant, content has not been moved, but has been retained in its respective curriculum.

The content remains the same, however the teaching level has been increased to emphasize the importance of the inspection function.

Support for subject matter consolidation stems from an AMTS industry preference to improve program delivery strategies, so that content can be adjusted without increasing overall program length.

III. Core Inspection

26. **(a) Theory, Fundamentals, and Application**

This is a new capstone subject area that introduces the student to maintenance program concepts, theories and practices as they apply to aircraft maintenance and inspection programs for both modern and aging aircraft. As is the case with the other Inspection modules located in Appendix C and D, Capstone projects, based on this topic and preceding subject matter, will test the student's overall comprehension and application with respect to maintenance and inspection practices.

This addition incorporates subjects from the materials and process subject area in the original "general subjects" curriculum and is viewed as a necessary adjunct to the revised Core Curriculum based on industry consultation. The resultant effect of this Capstone Subject meets with recommendations contained in the latest JTA analysis, which calls for an increased understanding of inspection processes.

FAR PART 147 Appendices

Section By Section Analysis

APPENDIX C – AIRFRAME CURRICULUM (750 Hours)

I. Airframe Structures

27. **(a) Structural Materials and Processes**

Formerly Sheet Metal and Non-Metallic Structures: This topic area has now become *Structural Materials and Processes*, as these subject areas were viewed as interrelated. The effect of *human factors* and the importance of the *inspection function* have both been introduced into this area to underline their collective importance to aviation safety and maintenance reliability. Hazardous material identification, handling, and processing have been also been included. Wood structures and aircraft covering have been de-emphasized and are included in the non-metallic structure topic area.

As well, in addition to being addressed as a dedicated topic area, the effect of *error management methodology* will receive an expanded emphasis in other applicable topic areas. Because of the overall importance of the inspection function, significant content has been introduced at the basic level, to emphasize proper inspection techniques, practices, and application. Increased emphasis on inspection techniques are also reflected in the revised Airframe and Powerplant Curricula. Support for these changes result from industry consensus, FAA input, and recent JTA data.

28. **(b) Aircraft Finishes**

Aircraft Finishes subject matter remains relatively unchanged and is similar to previous content. However, teaching levels have been increased to emphasize the importance of inspection processes as they relate to finishes and application of finishing materials, particularly as a corrosion protection measure. These changes result from industry and FAA input, and are supported by data incorporated in the recent JTA.

29. **(c) Welding**

Welding has been altered significantly from its past structure as a greater emphasis has been placed upon the inspection element within the welding function and teaching levels have been increased to coincide with the new requirements. With the focus on inspection, non-inspection related tasks such as the performance of welding has been eliminated. This change is supported by data contained in the latest JTA, which confirms that welding is a highly specialized skill that is performed at a low frequency, but with a high criticality factor.

There was broad agreement that most repair stations engaged in this type of maintenance utilize specialized trade qualification standards for welding technicians beyond that expected at the basic training level. Therefore, other than soldering, the welding and fusing of materials has been dropped from the curriculum, with an increased focus on welding inspection. Changes were supported by industry feedback at Rule Optimization meetings and further supported by recent JTA data.

30. **(d) Assembly and Rigging**

Assembly and Rigging remains essentially the same except for the introduction of a new task related to the inspection and servicing of aircraft entry and access doors. Teaching levels associated with inspection tasks have also been increased.

Rotor Systems - Two new tasks have been added to the curriculum to familiarize students with several of the of maintenance and inspection functions that are critical to rotary-wing maintenance. Teaching levels are minimal, the task changes have been supported by participants at Rule Optimization meetings, representing rotary-wing interests, and is also supported by data incorporated in the most recent JTA.

II. Airframe Systems and Components

31. **(a) Aircraft Landing Gear Systems**

Aircraft Landing Gear Systems – There are no changes to this topic area.

32. **(b) Hydraulic and Pneumatic Powered Systems**

Hydraulic and Pneumatic Powered Systems content and teaching levels remain unchanged. However, there was industry consensus that some of the tasks be consolidated and hydraulic fluid selection criteria be taught.

33. **(d) Cabin Atmosphere Control Systems**

Cabin Atmosphere Control Systems teaching levels were increased to reflect an increased inspection emphasis and some tasks have been consolidated to streamline the curriculum. These changes are based on a consensus agreement with industry, the FAA, and are also supported by the most recent JTA data.

34. **(e) Instrument, Electronic, and Computer Systems**

Besides new material related to computer systems, most of the content for this new topic area has been drawn from the former, *Aircraft Instrument and Communication and Navigation Systems* subject areas . Under the new title: *Instrument, Electronic, and Computer Systems,* teaching levels have been increased for several tasks to support enhanced inspection emphasis. Higher teaching levels have been introduced as well to ensure that there is a sound understanding of complex systems and to underline the importance of static pressure system leak checks. The remaining tasks have been incorporated into the new Instrument, Electronic, and Computer Systems subject area. These changes are supported by recommendations from recent NTSB investigations, and significant long term input from both the aviation industry and the FAA. The changes are supported by the most recent JTA data.

35. ***Note:*** ***Previous Topic Title- Aircraft Fuel, Electrical:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

36. ***Note:*** ***Previous Topic Title- Position and Warning:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

37. ***Note:*** ***Previous Topic Title- Ice and Rain Control:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

38. ***Note:*** ***Previous Topic Title- Fire Protection Systems:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

III. Airframe Inspection

39. **(a) Airframe Inspection**

Airframe Inspection has been retained and in addition to basic inspections, has been further expanded to include special and visual inspection programs. As a Capstone Project, this module is also used to evaluate overall student understanding of airframe maintenance through application of inspection principles and processes applicable to the Airframe Curriculum.

This addition is viewed as a necessary adjunct to the revised Airframe Curriculum based on industry consultation. The incorporation of this Capstone Project in congruent to the recommendations contained in the latest JTA analysis, which calls for an increased understanding of inspection processes.

Appendix D - Powerplant Curriculum (550 Hours)

I. Powerplant Theory and Maintenance

40. **(a) Horizontally Opposed Engines**

Formerly Reciprocating Engines, this subject area has been re named *Horizontally Opposed Engines* to reflect a departure from the radial engine era as new study data found those tasks were occurring at a As well, low frequency. While still important to some sectors of aviation maintenance, radial engines are no longer a minimum AMT teaching requirement. In addition, the same data let to discontinuing the engine overhaul task in favor of the inspection and repair functions associated with engine maintenance. These changes reflect industry and FAA consensus and are supported by recent JTA data with respect to task frequency and criticality.

41. **(b)** **Turbine Engines**

Subject matter for *Turbine Engines* remains relatively unchanged. Other than some reformatting, the focus remains on inspection and this is supported by industry, the FAA and recent JTA data.

II. Powerplant Systems and Components

42. **(a)** **Engine Instrument Systems** subject matter has been re-located into the Core Curriculum for the reasons discussed above.

43. **(b)** **Lubrication Systems** remains relatively unchanged in terms of content with some tasks consolidated to eliminate delivery duplication.

44. **(c)** **Ignition and Starting Systems** remains relatively unchanged in term of content with some tasks consolidated to eliminate delivery duplication.

45. **(d)** **Engine Electronic Systems**

This is a new subject area that has been included in the curriculum to address electronic fuel controls, electronic engine management systems and their control systems. Changes were based upon industry and FAA input and recent JTA data.

46. **(e)** **Fuel and Fuel Metering Systems**

Previously titled as *Engine Fuel Systems* and *Fuel Metering Systems,* the new title has been expanded to reflect consolidation and now includes all subject matter relating to powerplant fuel systems. Most evident is a change in tasks related to carburetor maintenance. In this section, the overhaul task has been removed and the focus is shifted toward carburetor inspection, repair and adjustment tasks. Subject matter now relates to both reciprocating and turbine engines, and so some tasks have been consolidated while teaching levels have been adjusted in others. Changes are based upon industry and FAA input and are supported by recent JTA data.

47. ***Note:*** ***Previous Topic Title- Engine Fuel Systems:***

Content from this old topic has been merged into the new, Fuel and Fuel Metering Systems topic area above.

48. **(f) Induction and Airflow Systems**

Previously known as *Engine Induction and Airflow Systems* the topic has been re-titled and there is now a greater emphasis placed on inspection tasks, with increased teaching levels associated with the inspection of turbine engines. These changes reflect current maintenance industry practices. These are industry and FAA recommendations supported by recent JTA data.

49. **(g) Cooling Systems**

This subject remains relatively unchanged with content remaining as it was. However, teaching levels have been reduced, as task performance is at a fairly low frequency. These changes reflect industry and FAA input, and are supported by recent JTA data.

50. **(h) Engine Exhaust and Thrust Reverser Systems**

Other than a consolidation of subject matter, tasks and teaching levels remain unchanged.

51. **(i) Propellers**

Content and teaching levels remain basically unchanged, with minor subject consolidation.

52. ***Note:*** ***Deleted Topic - Unducted Fans:***

This topic has been removed from the curriculum, as the design is not used commercially. Recent JTA studies confirm that there is no useable application for this subject matter in civil aviation. Removal of this topic was strongly recommended by participants at Rule Optimization meetings.

53. **(j) Auxiliary Power Units**

General content remains relatively unchanged while some teaching levels have increased and a subject element on ram air turbines had been added to reflect the importance of new technologies and the inspection element. These changes were agreed to by industry and FAA participants and are supported by recent JTA data.

54. ***Note:*** ***Previous Topic Title- Engine Fire Protection Systems:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

55. ***Note:*** ***Previous Topic Title- Engine Electrical Systems:*** Content has been re-located into the Core Curriculum for the reasons discussed above.

III. Powerplant Inspection

56. **(a) Engine Inspections**

Subject content has been enhanced and the subject is presented as a Capstone Project to ensure that students demonstrate an applied awareness of the various inspection processes applicable to the Powerplant Curriculum. These changes include an added emphasis on visual, special, weld, and other types of inspection associated with engine maintenance.

This addition is viewed as a necessary adjunct to the revised Powerplant Curriculum based on industry and FAA consultation. The resultant effect of the Capstone Project meets with recommendations contained in the latest JTA analysis, which calls for an increased understanding of engine inspection processes.

3.3 Additional FAR PART 147 Recommendations

The project stakeholders provided significant input outside the regulatory area of PART 147 curricula optimization & update, and suggested policy changes that have potential to significantly improve overall Aviation Maintenance Technician School operations. The primary recommendation is for the FAA to administer the AMT Schools, from certification to surveillance, with a uniform standard throughout the country. There are considerable differences between individual FAA regions and FSDOs as to AMT Schools certification and compliance requirements within the PART 147 rule. Since there are differences in regional industry needs for AMT graduates from region to region of the US, (as example Alaskan aviation operations differ from the needs of agricultural aviation in the southern lower 48 states), there is a need for certain flexibility in implementation of the PART 147 curricula to meet local and regional AMT training needs. Other suggestions that follow, are based on a careful analysis by the participating groups to ensure that they are reasonable, in the best interests of aviation safety, conform to the duties and responsibilities of the FAA, and are in the best interest of the nation's AMT Schools and their students. This report stresses the need for regulatory flexibility as an essential factor for efficient management of the nation's AMT Schools.

- There is an acute need to have regulatory standardization during both FAA certification and on-going surveillance. The advisory stakeholders discussed this issue at length and there were strong concerns regarding disparities within the current process. Therefore, the participants suggest that in order to eliminate this discontinuity, Principal Maintenance Inspectors (PMIs) associated with PART 147 certification and surveillance activities must be given appropriate initial and recurrent training. It was also concluded that a centralized AMTS certification group should be established within the FAA, which would include industry participation, to approve new AMTS programs and significant changes to existing approvals. This concept was supported by all participants from both the AMT school community and aviation maintenance industry. It was acknowledged that having a centralized "certification board" could increase FAA costs, it was also recognized that fees may be a possible means of offsetting such costs.

  Under this proposal, an AMTS Certification Team would have members from AFS 300 and AFS 600, as well as aircraft maintenance industry professionals and AMT school officials. Though all the final certification decisions would remain with the FAA, the team will ensure uniformity of evaluation, based upon a thorough understanding of both aircraft maintenance and the training/education requirements that must be met. This team may also consider alternative means of compliance with the rule such as: major program revisions, distance learning, computer based training, credit for life experience and/or other industry experience and education, AMT self testing authorization, and contact hours based upon off campus study.

  A team similar to the AMTS Certification Team outlined above could also effectively assist PMIs in the conduct of school surveillance for compliance.

- In order to provide individual AMTS the flexibility to deliver the curricula in their program requirements, the teaching sequence within each subject would be considered a process and should reflect to the extent possible, institutional preferences. Sequence may vary as each institution sees fit, as long as the sequence is logical from an educational standpoint and meets the intent of the rule.

- For the same flexibility need as indicated above, contact hours in each teaching element may vary plus or minus 15%. This is not a variance to lower the total 1900- training hour minimum

standard, but merely to adjust specific curricula subject hours within a particular topic area. Any variances will be based on each institutions teaching sequence, application of electronic learning materials, improved training methods, individual student performance in subject, and the regional focus the school may be using.

- Industry stakeholder feedback suggests the need to have regional flexibility to accommodate local industry requirements. The proposed rule has been adjusted to allow for such flexibility without compromising rule requirements

- AMT self testing – Certain AMT Schools may conduct their own Oral & Practical testing during the normal course of classroom and/or shop instruction following FAA approval

- Expand the rationale for FAA AMTS Instructor qualifications and ratings. There is also need for individual AMTS instructor professional standards. Increasing the professionalism of the AMT community starts with the AMT Schools and the professionalism demonstrated by their instructors.

- Teaching philosophy has moved from emphasis on overhaul to one that focuses on increased inspection and repair subject matter.

- AMTS programs should be dynamic and schools encouraged to keep pace with technology. Schools should be free to update their own subject matter and materials within each FAA approved subject area, keeping pace with technology, without prior FAA/PMI approval. These changes should be noted in the school's program manual, but approved by the FAA on review basis.

- FAA Aviation Inspector (Airworthiness) Handbook (8300-10) will need objective revisions to align with rule changes.

- There should be separate NPRMs issued for PARTS 65(66) and 147. The NPRMs should indicate that the rules are interdependent and tied together, but should be handled separately. This will both focus and restrict comments and discussion to those directly concerned with the specifics of each rule.

- The NPRM Preambles must be clearly written and include information that provides the rationale for all PART 66/147 changes

- The use of a team approach to prepare new FAA advisory materials and ASI Handbook changes relative to PARTS 65/66 and 147. FAA internal team should have representation from both AFS 300 and AFS 600. This will ensure that both FAA Headquarters policy and Oklahoma City's responsible administrations maintain excellent communications. This will involve all concerned and provide input that will create the best possible means to be sure the changes are understood by the entire industry and effectively administered by the FAA.

- There is a need for objective guidance on the definition of electronic learning materials such as computer based training (CBT), simulation, and distance learning. The stakeholders wish to participate with the FAA in developing such guidance. There was no disagreement that improvements in training quality can be achieved by applying new innovations in electronic learning materials and teaching systems.

- Focus on Error Management, Safety, and professionalism should be apparent in the subject matter throughout the curricula.

- Several participants and stakeholders submitted suggestions as to how curricula hours may be allocated by subject in Appendix B, C, and D. The authors of this report compiled the input into a document that provides values based on the averages from individual submissions. This data is displayed in Appendix II: Suggested Hours by Subject, Proposed 147 Curricula.

4.0 CONCLUSIONS

This project is another example of the regulator and industry coming together for the public benefit of improving aviation safety and providing for up-to-date, meaningful and objective regulations. Learning from the difficulties of past efforts in the regulatory arena, significant progress was made in this project to not repeat that past.

During the period of time that update of AMT certification and training regulations have been in process, the FAA has sponsored several excellent studies and projects that have served to support this effort. As such the participants and stakeholders in this project were able to review and benefit from the information and data provided by those published reports, initiatives, and studies.

A number of the stakeholders and participants in this study have been involved in the AMT certification, training review and update process since its' beginning in 1989. The amount of time invested and level of dedication by the aviation industry has been significant. The suggestions and recommendations presented in this report represent the realistic views and opinions of both the aviation maintenance and aviation maintenance education communities. It is essential that the FAA move forward with the rulemaking that has been sought for an extended period. Though quick action is often difficult, especially given the current regulatory resources available, every consideration should be given to proceeding with the regulatory suggestions presented in this report.

5.0 RECOMMENDATIONS

The aviation maintenance industry is expecting the FAA to make positive change and revision to both FAR PARTS 65(66) and 147. This effort has been underway since 1989. Those participating in the process of improving these aircraft maintenance certification and training rules over the years have spent thousands of hours. These hours translate into a significant financial investment from both the maintenance and education/training communities. In addition, significant funds have been spent by the FAA on the various projects directly related to the revision of these rules. It is time for rulemaking action.

FAR PART 66 was previously released as an NPRM in 1998 and was withdrawn for "further review." This project and final report constitutes that further review. During the development of this project, it has become clear that the industry will overwhelmingly accept the updates, changes, and revisions outlined herein. The bar of professionalism must be raised; AMT training and certification rules must reflect the technology, operational criteria, production skill requirements, certification levels, and training curricula needs of America's aviation maintenance industry.

There is a perception that the United States has fallen behind the JAR community, Canada, and certain other countries in the modernization of AMT certification and training rules. It is reasonable for the FAA

to now demonstrate a commitment that the US can make this necessary and positive change, without dramatic overhaul of a system that continues to be one of, if not the best, in the world.

Maintenance rules have become an issue of credibility for the FAA. The findings of this project clearly indicate that the industry agrees with the recommendations of this optimization effort. The vast majority will support NPRMs for PART 66 and PART 147. It is clearly time for the FAA to move on the AMT certification and training effort, make the changes internally within the FAA, issue the NPRMs and complete the work that has been ongoing for the past twelve years.

6.0 ACKNOWLEDGEMENTS

Host organizations: Participants who attended the seven regional meetings were provided excellent facilities and logistics support by -- FAA Headquarters, Washington, DC, FAA Operations Center, Oklahoma City, OK, San Jose State University, San Jose, CA, Tulsa Technology Center, Tulsa, OK (2 meetings), Embry Riddle Aeronautical University, Daytona Beach, FL, and Minneapolis Community & Technical College, Minneapolis, MN. In addition, the hosting schools provided administration leadership, and department leadership participation, along with faulty who attended meetings. This level of support was of great help to the project team.

Aviation Technician Education Council's (ATEC) Board of Directors: Encouraged members to attend meetings and have supported the project with their interest and helpful comments. Several ATEC school representatives attended meetings.

FAA: Their participation was of great benefit. Providing help and suggestions based upon their experience and operational needs, it allowed the participants to focus their recommendations toward meeting aviation industry, educational, and the agency's needs.

FAA/DoD A&P Certification Team: Attendees from the Army, Navy/Marines, Coast Guard, and the Air Force provided input that will benefit their maintenance organizations and in turn the aviation maintenance industry when their maintainers return to civilian status.

Major Airlines, Certificated Repair Stations, and Fixed Base Operators: The participation of their representatives rounded out the range of participation and added a "customer's" prospective to the groups.

The World Aviation Training Seminars (Civil Aviation Training Magazine, Halldale Publishing) and the Air Transport Association of America, its Maintenance Training Sub Committee: Provided opportunity for presentations and discussions on this project, allowing the team to gain significant input and guidance.

All Participants: The hundreds of email and other forms of correspondence that were generated between participants and the various players should also be recognized. In particular, the on-going and continuous communication activity that followed regional meetings, contributed directly towards the effectiveness and success of the overall optimization review process. In that regard, these efforts significantly reduced project expenses, minimized project length, and provided participants with a better understanding of national issues and regional disparities.

The fact that all participants funded their attendance at the meetings should also be acknowledged and is appreciated. This level of support is of great benefit to the industry overall.

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8.0 APPENDIX

Appendix I

Excerpt from: Federal Aviation Administration. (March 1996) ***Training and Certification in the Aircraft Maintenance Industry – Specialist Resources for the 21st Century*****, chapter VI, pages 49-54**

ARS CLASSIFICATIONS

The ARAC-65 working group discussed several issues pertaining to specialist certification and concluded that a new certification process needs to be developed. Since the membership is composed of an industry cross-section, their views are representative of the industry's thinking on this subject.

In Chapter III, we described the proposed rule changes to PART 65 and the major elements of the generalist and specialist certificates (see Figure 5). The current repairman certificate, as previously noted, is based on PART 65 and issued by the FAA to individuals who are qualified to accomplish specific maintenance tasks for PART 121 and PART 135 operators and PART 145 certificated repair stations. The certificates are also issued to individuals constructing their own amateur-built aircraft.

The repairman certificate will have its title changed to Aviation Repair Specialist (ARS) and have three classification levels under the proposed PART 66. The new certification may grant specific maintenance and repair privileges to individuals in three classifications, as follows:

- ARS-I—May be issued by the FAA to an individual based upon his or her completion of an acceptable industry developed standards-based training curriculum which includes appropriate competency testing and/or validation. The individual who has earned the ARS-I certification may only exercise these privileges while employed by a PART 145 certificated repair station, PART 121 operator, or PART 135 operator. This provides portability for this level of certification. The ARS-I certification skill areas will be provided for in the new PART 66 and in subsequent FAA policy and advisory material. Additional skill areas may be defined through industry input to the FAA, the JTA study, or as part of the international regulatory harmonization effort.
- ARS-II—Duplicates the current repairman certificate and may be issued under regulations very similar to those currently found in PART 65, Subpart E, 65.101. Individuals receiving the ARS-II certificate will be qualified to perform maintenance on aircraft or components appropriate to the job for which they are employed. The ARS-II certification is through an AMO. The individual must be employed by an FAA certificated repair station, or an FAA certificated air carrier that has a continuing airworthiness program.
- ARS-III—Issued by the FAA to amateur aircraft builders as currently described in PART 65, Subpart E, 65.104. As in the past, ARS-III certificated holders would be the primary builders of amateur aircraft for their own non commercial use.

PROPOSED SPECIALTY CATEGORIES

The ARAC-65 working group proposed that ARS-I certification should be based on nationally and internationally recognized standards developed by the aviation maintenance industry. The working group proposed four skill areas for ARS-I certification. The four specialty categories are:

- Aircraft electronics (avionics)
- Composite structural repair
- Nondestructive inspection
- Metal structures repair.

Selection of the categories was validated in part by the JTA study completed last year. Data collected on 23 task elements that represent a cross-section of AMT job assignments served to verify four of the ARS-I categories selected. When compared with other tasks, those involving aircraft electronics, composite structural repair, and metal structures repair were rated as the most difficult to learn and required in-depth training, specific technical knowledge, and extensive experience and practice.

A significant amount of work has already been completed with respect to development of training, qualification, and certification standards in the categories selected. In some cases, existing standards of professional associations are applicable to ARS-I specialty categories. One or more of these standards may be approved for ARS certification—and, more than one standard may be approved in a specific category. Moreover, multiple organizations may provide standards for a category; for example, the ATA Specification 105 and the ASNT-TC-1A, MIL-STD-410 standard for NDI are possible candidates for this specialty category.

Aircraft Electronics

In its broadest definition, aircraft electronics (i.e., avionics) encompasses all aircraft electrical and electronic systems and their components. The term avionics now goes well-beyond a definition that once included only communication, navigation and auto-flight systems.

One of the major changes in today's aircraft is the extensive use of digital electronic data processors, computers, electronic controls, and fly-by-wire technology. From a systems standpoint, aircraft have become fully integrated. While additional emphasis is placed on electronics in the proposed AMT(T) rating, industry support is also strong for an ARS-I certification in aircraft electronics. Maintenance, repair and alteration of electronic systems requires a highly specialized set of knowledge and skills beyond AMT and AMT(T) requirements.

The Association for Avionics Education (AAE), with the support of the Aircraft Electronics Association (AEA), is in the process of developing a training and qualification ARS-I standard for aviation electronics technicians. Their working documents were presented to ARAC-65 on two occasions for review and comment. The initial input was to develop a separate avionics rating to be issued in the same context as AMT or AMT(T) certification. The ARAC-65 group agreed that while there should not be a separate avionics rating on the AMT certificate, the licensing of avionics personnel could be done as an ARS-1 specialty category. They encouraged AAE to continue their standards development process, addressing aircraft electronics as an ARS-I certification.

There are other industry standards for electronic technicians, such as those developed by the Electronics Technicians Association International (ETA) and described in Chapter V. Under FCC regulations, there is a certification process governing the radio and telephone operators licenses. The FCC certification is presently used by many operators and repair stations as qualification for specialists who perform avionics maintenance, repair, and modification. Neither the ETA nor FCC certification regulations, however, are specific to aviation; these standards do not address the technology as it applies to aircraft or to any of the FAA regulations as they apply to maintenance and repair. For these reasons, the ARAC-65 working group and the FAA conclude that the industry is better served with an ARS-I certification specifically designed for aircraft electronics.

Composite Structural Repair

Composites are nonmetallic structures that include materials, such as fiberglass, carbon fiber, or graphite filament. They are usually chemically compounded or laminated with resins and bonded to metal or other composite support structures with adhesives to make light weight, non corroding, high-strength aircraft structural components. Composite parts are typically formed and cured under heat and vacuum. Special equipment and working environments are required to construct or repair composite structures, and specific skills are necessary for appropriate handling and repair techniques. Improper handling of materials can lead to extensive damage and environmental hazards.

In general, the use of composite materials in aircraft construction, particularly transport aircraft, is increasing. Some light aircraft have all composite airframes. Composite structural repair is a complex and highly specialized segment of aviation maintenance. The knowledge and skills necessary to undertake major composite repair and alterations activity could require expertise beyond AMT and AMT(T) training requirements.

The Commercial Aircraft Composite Repair Committee (CACRC) is an international organization and is sponsored by both industry and Society of Automotive Engineering (SAE). They are in process of developing a standard for an ARS-I composite structures repair specialty category. ATA's Specification 105 for NDI is being used as a format model. Membership in the organization includes representatives from air carriers, airframe manufacturers, PART 145 repair stations, academia as well as from the European aviation maintenance community. CACRC has been developing their standards for more than three years. The group is also close to the release of drafts that will include additional standards for composite materials handling; preventive maintenance; inspection, repair, alteration, and fabrication; and application of protective coatings.

Metal Structures Repair

Aircraft structure maintenance, repair, and modification are areas of increasing focus and concern. Several factors have caused change in both work content and personnel specialization within this segment of the industry. The need to reduce operating costs has caused air carriers to conduct business differently:

- Increasing amounts of modification and repair work (up to and including D check level) are being accomplished by second- and third-party maintenance providers.
- The number of aircraft classified as aging is increasing. By definition and structural status, these aircraft require extensive structural inspections, repairs, and modifications in order to remain operational.

- The size of the leased aircraft fleet is at an all time high, with continued growth forecast for the future. Leased aircraft move from operator to operator and are maintained by various AMOs around the world.
- Many airframe sheet metal specialists are not certificated. A majority of sheet metal specialists work in PART 145 certified repair stations performing heavy maintenance and modification.
- A high percentage of work done by second- and third-party maintenance providers is competitively bid; workload for these operations is cyclical with variable staffing demands. A significant number of temporary contract aircraft maintenance personnel agencies whose workers are assigned by contract to operators worldwide have entered the business. Temporary workers are transient, moving from company to company and place to place, as needed. Many are noncertificated structures specialists with training, qualifications, and backgrounds supported only by resumes and references. This could present a problem with the non-uniformity of skills.

An independent Structures Repair Committee (SRC) was formed by several participants involved in the CACRC. SRC is presently developing a standard for aircraft metal structures repair specialists. Their objective is to create a document describing the appropriate training, qualifications, and certification of an ARS-I aircraft metal structures repair. Final draft of the document is scheduled in 1996.

The Canadian Aviation Maintenance Council (CAMC) has developed an aviation structures repair specialist standard. It prescribes qualification standards for personnel performing aircraft structural repair, including composites. The CAMC standard is comprehensive and includes the basic curriculum, qualification, and certification elements necessary to qualify for review as a potential ARS-I certification standard. (A more detailed discussion of CAMC is presented in Chapter VII.)

Nondestructive Inspection

NDI is a highly specialized skill area requiring the use of sophisticated tooling and diagnostic test equipment to detect defects and flaws. Technology ranges from magnetic particle and dye penetrant methods through x-ray, ultrasonic, eddy current and some currently emerging technologies. The technician is responsible for the setup and operation of these systems, in addition to the reading and interpretation of the results. Competency in NDI requires a high degree of both knowledge and skill, and proficiency requires a considerable amount of continuous hands-on practice and recurrent training.

The document for ATA's Specification 105, *Guidelines for Non Destructive Inspection,* includes training curricula for various NDI processes and associated inspection techniques. Qualification standards for NDI personnel are also included. The ATA Specification 105 document is highly respected; it was developed with input from all elements of the aviation manufacturing and maintenance industry.

ASNT standards have been in place for many years. They are kept current with state-of-the-art processes and emerging technology. These standards specify training, qualification, and industry certification in each of the NDI processes from dye penetrant to the most complex radiography. ASNT standards are recognized by several industries other than air transport and are considered as one of the best examples in standards development.

While there are two other standards also recognized in the NDI discipline, the aviation industry generally recognizes both the ATA Specification 105 and ASNT as the baseline. One or more of these could become standards accepted by the FAA for ARS-I certification.

Other Potential Skill Areas

While the ARAC-65 working group and the FAA may be considering the four ARS-I categories selected as representing primary areas of focus, other categories could be added in the future. The JTA final report may identify the need for additional ARS-I categories. Technological advances, industry experience, and the supply and demand of qualified technicians will be major determinants of future categories.

QUALIFICATION AND CERTIFICATION

Qualification is a set of requirements on which a certification is based. Qualifications serve to affirm that an individual has met a set of knowledge and skill standards to an acceptable level. Certification, usually granted by a governmental regulatory agency, is a license conferring a privilege that confirms an individual's qualifications to practice or perform work.

Certifications granted by the FAA to operators and individuals who perform maintenance have specific qualification requirements. In situations where persons performing maintenance are not individually certificated and work under an operator's certificate, they are required to be qualified through internal, manufacturer, or other training acceptable to the FAA.

One of the elements of the ARS-I system is individual certification where privileges are granted through with the AMO employer. Persons who are certified on an individual basis may share a broader responsibility than persons who work only under an operator's certificate. This also increases the individual's level of accountability.

The most important of these two elements for aviation maintenance is qualifications. If for some reason the ARS-I system is not included in the final PART 66 rule, the process of qualification standards being developed by industry will remain. The concept of generalists and specialists is central to the FAA's aviation rule making policies. Even if individual certification under ARS-I is not adopted, the FAA will continue to promote ARS qualifications based on industry developed and maintained standards.

Appendix II - Suggested Hours by Subject, Proposed 147 Curricula

Appendix B to Part 147 – Core Curriculum – 600 Hours

	Topic	Hours	Notes
			*Minimum Curriculum Offering =1900 Hrs.
	I. Introduction and Basic Principles:	**360**	+ - 15% *
1.	a. principles of aviation maintenance	32	
2.	b. principles of aviation physics	48	
3.	c. hardware and materials	24	
4.	d. basic electricity	112	
5.	e. aircraft drawings	20	
6.	f. weight and balance	20	
7.	g. maintenance documentation	48	
8.	h. privileges and responsibilities	24	
9.	i. human factors	32	
	II. Processes and Systems:	**192**	+ - 15% *

10.	a. fluid lines and fittings	16	
11.	b. ground operation and servicing	16	
12.	c. cleaning and corrosion control	40	
13.	d. fuel and fuel systems	32	
14.	e. fire protection systems	16	
15.	f. aircraft electronic systems:	48	
16.	g. position and warning systems	16	
17.	h. ice and rain control systems	8	
	III. Core Inspection	**48**	+ - 15% *
18.	a. theory, fundamentals and application	48	

Appendix C to Part 147 - Airframe Curriculum – 750 Hours

	I. Airframe Structures	**400**	+ - 15% *
19.	a. structural materials and processes	304	

20.	b. aircraft finishes	32	
21.	c. welding	8	
22.	d. assembly and rigging	56	
	II. Airframe Systems and Components	**240**	+ - 15% *
23.	a. aircraft landing gear systems	48	
24.	b. hydraulic and pneumatic powered systems	64	
25.	c. rotor systems	16	
26.	d. cabin atmosphere control systems	32	
27.	e. instrument, electronic and computer systems	100	
	III. Airframe Inspection	**110**	+ - 15% *
28.	a. airframe inspection	110	

Appendix D to Part 147 – Powerplant Curriculum – 550 Hours

	I. Powerplant Theory and Maintenance	**286**	+ - 15% *
29.	a. horizontally opposed engines	126	
30.	b. turbine engines	160	
	II. Powerplant Systems and Components	**200**	+ - 15% *
31.	a. engine instrument systems	16	
32.	b. lubrication systems	16	
33.	c. ignition and starting systems	48	
34.	d. engine electronic systems	16	
35.	e. fuel and fuel metering systems	32	
36.	f. induction and airflow systems	16	

37.	g. cooling systems	8	
38.	h. exhaust system and thrust reverser systems	8	
39.	i. propellers	24	
40.	j. auxiliary power units	16	
	III. Powerplant Inspection	**64**	+ - 15% *
41.	a. engine inspection	64	
	Total Curriculum Hour Allocation	**1900**	***Minimum Curriculum Offering =1900 Hrs.**